



U.S. ARMY CORPS OF ENGINEERS, ST. LOUIS DISTRICT

17TH STREET
OUTFALL CANAL
REEVALUATION REPORT

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Executive Summary

The 17th Street Canal is one of three outfall canals that provide discharge of surface water pumped from the City pump stations into Lake Pontchartrain. The 17th Street Canal is located west of Orleans Canal at the parish line between Jefferson and Orleans parishes. The canal extends about 2.4 miles north from Drainage Pump Station No. 6 to discharge at Lake Pontchartrain. Flood risk reduction is provided by a system of levees and I-walls on both sides of the canal. Analyses conducted for the Maximum Operating Water Level Report (MOWL) dated March 2011 confirmed that most concerns along the 17th Street Canal were related to seepage and the I-wall gap formation. All areas of concern documented in the MOWL Report were expeditiously remediated by June 2011.

St. Louis District (MVS) was designated to re-evaluate the 17th Street Canal using the guidance for Hurricane and Storm Damage Risk Reduction System (HSDRRS) and the new Engineer Technical Letter (ETL) 1110-2-575 *Evaluation of I-Walls*. The ETL 575 presented a new method of analysis for evaluating I-wall stability. Each reach was evaluated with this new method to determine the effects of the change. This re-evaluation report also analyzes all non-hurricane load cases that were not addressed in the MOWL Report. Additionally, this report presents results of FLAC analyses on select reaches to confirm the ETL 575 results and FLAC analyses on typical sections not meeting the 4-foot maximum stickup criteria.

The re-evaluation report analysis determined that all reaches met both guidance for HSDRRS and the new ETL 575 criteria except for Reach 16. The re-evaluation resulted in the recommendation that only Reach 16 be further evaluated to address seepage concerns. Additional field investigations and laboratory tests were performed to provide additional data for the Reach 16 seepage analyses. Further analyses of Reach 16 has been addressed in a separate report, Reach 16 DDR March 2013, MVS, and can be found in Appendix H. Reach 16 was recommended for remediation to address seepage concerns. Reach 16 remediation was included in the OFC-07 construction contract and encompassed approximately 1,615 linear feet of risk reduction measures. The method of remediation was the installation of a sheet pile cutoff wall offset five feet on the protected side of the existing I-wall, through the beach sand and embedded five feet into the underlying Bay Sound clay. After remediation work was complete (as of March 2015), all reaches met acceptable factors of safety for seepage and stability for the target water level of elevation +8.

Purpose of report

The purpose of this report is to analyze the I-walls along the 17th Street Canal and determine which I-wall reaches are deficient with respect to the Maximum Operating Water Level (MOWL) and Factor of Safety (FoS) requirements. These analyses have been completed in accordance with the criteria and methods of the HSDRRS and the new ETL 1110-2-575 guidance. The new ETL 575 provides updated technical criteria and guidance for evaluation of existing I-walls. The ETL 575 focused on three I-wall performance items:

1). FoS gap propagation, 2). Rotational stability failure mode, and 3). Criteria for deflections. While the analyses and methods used to evaluate the I-walls/Levees in the MOWL Report were conservative, non-hurricane loading cases were not fully considered due to the past performance of the projects with regards to the acceptable non-hurricane performance history. The non-hurricane loading cases were analyzed as part of this re-evaluation report and include flood side stability analyses with an average low water condition Q-case (undrained condition) and S-case (drained condition) analyses with normal water conditions for both flood side and protected side stability. These S-case (drained condition) analyses are considered for long-term conditions.

Background

The Corps of Engineers New Orleans District, Hurricane Protection Office (HPO) requested a study for the 17th Street Canal to determine a MOWL that could be sustained for the flood control levees/floodwalls along both sides of the canal. This study was prepared by Black & Veatch Special Projects Group (B&V) using Corps design and the Geotechnical Criteria Applications Team (GCAT) procedures to establish the gap propagation along the sheet pile as a possible mechanism of failure. The report determined that stability was the controlling condition on both banks of the canal and at that time seepage was not found to be a concern for any reach on the 17th Street Canal. Out of the 37 reaches, B&V Group encountered 18 reaches with deficiencies that prohibited the floodwall from meeting the required FoS for an MOWL elevation of +8.0 ft.

The Hurricane Protection Office (HPO) proposed remediating these 18 reaches of the 17th Street Canal to create a minimum MOWL. The HPO contracted with URS to analyze and design necessary mitigation methods for global stability, gap stability, sheet pile penetration, and stickup along the 17th Street Canal. URS recommended mitigating for global and gap stability by using deep soil mixing (DSM) as a ground improvement method, placing fill on the protected side to satisfy sheet pile stickup criteria (4 feet or less stickup) and placing rock on the flood side to increase embedment depth.

In February 2011, HPO submitted a design documentation report (DDR) that described the required remediation of the floodwalls on the 17th Street Canal. The remediation consisted of approximately 4,000 linear feet of ground improvement along the west bank (Jefferson Parish side) of the canal and approximately 7,100 linear feet of ground improvement along the east bank (Orleans Parish side) of the canal. Fill was added to raise the protected side crest to 4 feet below the MOWL for approximately 4,400 linear feet along the east bank where ground improvement was also constructed.

The previous URS remediation conformed to all HSDRRS guidelines at the time of the analyses. However, Engineer Technical Letter (ETL) 1110-2-575 for design and evaluation of cantilever I-Walls was issued in June 2011, after construction had been complete for the remediated reaches.

Review of Existing Reports

In addition to the B&V and URS reports, other major design reports published on this canal include:

- Remediation of Floodwalls on the 17th Street Canal OFC-05, Design Documentation Report (DDR), dated February 2011.
- Seepage Addendum Geotechnical Engineering Report Remediation to Raise the Maximum Operating Level for the 17th Street Canal OFC-05, dated December 2010.
- Seepage Addendum 2 Geotechnical Engineering Report Remediation to Raise the Maximum Operating Level for the 17th Street Canal OFC-05 (Reach 16), dated September 2011.

These reports covered detailed analyses for the soil improvement and seepage respectively. The St. Louis District (MVS) Geotechnical Team has reviewed, checked, and concurred with the strength lines, water contents, unit weights and computer geotechnical models presented in all previous reports. MVS also reviewed the geotechnical computer models obtained from the B&V and URS reports and adjusted them to account for the guidelines provided by the new ETL 575. The St. Louis Geotechnical Team analyzed each of the 37 individual reaches with a multitude of different geotechnical computer modeling programs in accordance with specific performance criteria and existing conditions.

Hydraulic Analysis of Water Surface Profiles

To provide the "Usual" water surface profile along each outfall canal, a hydraulic analysis was performed. The Permanent Canal Closure and Pumps (PCCP) project is providing the same nominal capacity at its pumping stations as the combination of nominal capacities delivered by the last upstream Sewerage &

Water Board New Orleans (S&WBNO) and Jefferson Parish Drainage Department pumping stations and any upgrades per the 2010 capital improvement plan. For example, at 17th Street outfall canal, the nominal discharge into the canal is a combination of the S&WBNO pumping stations DPS6, I-10, the Jefferson Parish Drainage Department Canal Street pumping station, plus 2,000 cfs planned for DPS6 for a total of 12,500 cfs. London Ave. outfall canal's nominal discharge is delivered from the S&WBNO DPS3 and DPS4, plus 1,000 cfs at DPS4 as outlined in the 2010 capital improvement plan for a total of 8,980 cfs. Finally, Orleans Ave. nominal discharge is delivered by DPS7 for a total of 2,700 cfs.

The PCCP project is planned to isolate the outfall canals from Lake Pontchartrain's surge during tropical storm events. This will be accomplished by providing a set of closure gates capable of passing the total outfall canal's discharge with Lake Pontchartrain's stage at 4', 4', and 3' for 17th Street, Orleans Ave., and London Ave. canals, respectively without violating the prescribed maximum operating water level (MOWL). The prescribed MOWL for 17th Street is +10' at 2,100' northward of DPS6, then +8' from there to the current location of the Interim Control Structure (ICS). The Orleans Ave. prescribed MOWL is +8' from DPS7 to the current location of the ICS. Finally, the London Ave. MOWL is +9' at 2,000' northward of DPS3, then +8' from there to the current location of the ICS. All elevations referenced are to NAVD88 datum 2004.65 Epoch.

The Hydrologic Engineering Center's River Analysis System (HEC-RAS) was used to perform the hydraulic analysis. The geometry for each of the canals, including all crossings, was provided by recent hydrographic and topographic surveys. Calibration and verification of the models was performed by using the S&WBNO and Jefferson Parish Drainage Departments pumping records for recent rainfall events, with associated lake stages. Each canal has a series of stage recording gages located from the respective ICS to the last upstream pumping station. The computed hydrographs were plotted against the gage records and compared for reasonableness. Once it was determined the models reproduced the historical events, the models were calibrated.

To create the "usual" water surface profiles, each canal's HEC-RAS model was run using its maximum nominal discharge and its appropriate lake stage. For example, the 17th Street canal model uses three upstream hydrographs, one for DPS6, one for I-10 and one for Canal Street and a constant downstream boundary at Lake Pontchartrain of +4°. The model assumes an uncertainty of 0.5 ft. The usual water surface profiles for all three outfall canals are shown below.

17th St. Outfall Canal S&WB & JP Input - 12,500 cfs

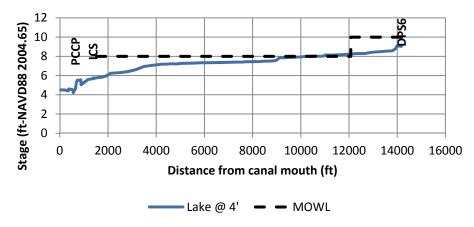


Figure 1: 17th St Canal profile

Orleans Ave. Outfall Canal S&WB Input - 2,700 cfs

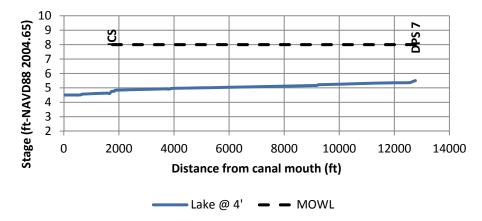
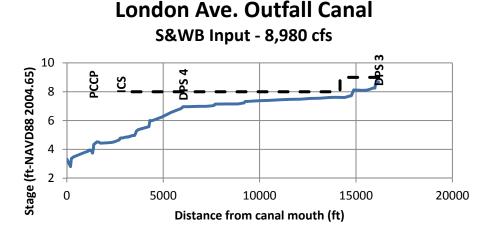


Figure 2: Orleans Ave. Canal profile



MOWL

Lake @ 3'

Figure 3: London Ave. Canal profile

Water Surface profile for Q-case analysis

For the Q-case analysis, an average low water level was needed for each of the three outfall canals. The NOAA New Canal Station 8761927 gage was used to compute the average low water. The average low water in the Lake along the south shore, excluding all tropical events, is -0.8' and is -0.7' including tropical events. This number is determined by averaging the monthly minimum observations for the period of record. The new PCCP's prescribed operation, as referenced in "Request for Proposal (RFP) for the Permanent Canal Closures and Pump Stations (PCCP) Revision S, June 2012; Section 01010, Article 3.1.11, pg. 13" allows the pump station operator to draw down the outfall canal to elevation -1.0'. Based on the prescribed operation, an elevation of -1.0' was provided as the elevation for the Q-case analysis.

Water Surface profile for S-case analysis

For the S-case analysis, a mean water level was needed for each of the three outfall canals. The mean water level for the Lake Pontchartrain south shore is based upon analysis of historical data. Due to the proximity of the USACE West End gage to the outfall canals, the mean water level for all canals is based off of this gage and assumed to be +0.39°.

Extreme Water Surface Profile

For the "extreme" water surface profile, the HEC-RAS model was used to simulate conditions at the PCCP similar to what happened in 2012 during Hurricane Isaac at 17th Street Canal ICS, where water levels

exceeded usual standards, and the peak stage rose to 6.0 ft. The model assumes an uncertainty of 0.5 ft, and the two upstream Orleans Parish pumping stations are producing their nominal capacity.

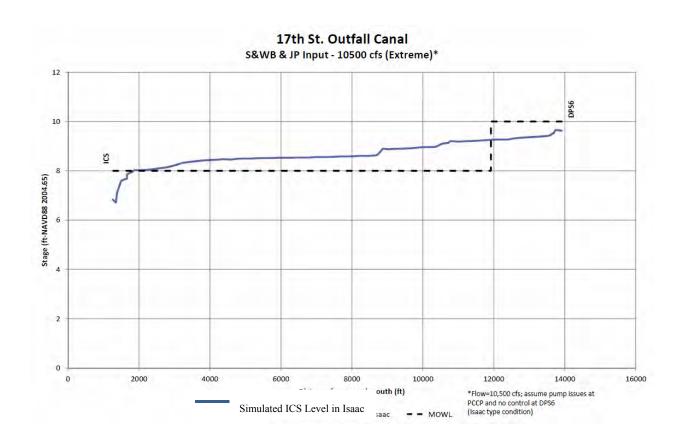


Figure 4: 17th Street Canal Extreme Water Surface Profile

Geotechnical Analyses

The geotechnical data used in this study was obtained from the B&V and URS reports. No additional laboratory investigations and surveys were conducted for the analysis performed in this report except those performed for Reach 16 and addressed in, Reach 16 DDR March 2013, CEMVS. Cross sections as developed in the B&V Report were utilized in this report and were based on surveys performed in June 2009 and June 2010, respectively. Levee cross sections were taken approximately every 100 to 200 feet along the baselines on each side of the canal. No protected side geotechnical analyses were conducted under this report on reaches that were remediated with deep soil mixing. These reaches had improved soil strengths to such a degree that by judgment, the ETL 575 failure modes would not be applicable. They include Reaches 2, 3A, 3B, 4, 5, 6, 7, 8, and 9 at the west bank, and 20, 21, 22, 23, 24, 25, 26, 27, 28, and 29 at the east bank.

The target factor of safety required under the ETL 575 is based upon frequency intervals of occurrence. However, the 17th Street Outfall Canal, as well as all the outfall canals, represents a more controlled environment considering the gated closure at the Lake Pontchartrain end during a storm event. After investigating the 1 percent and 0.2 percent annual change of water levels, it was evident that previous water level targets were well above these frequency intervals. Therefore, the required factor of safety of 1.5 for Spencer's Method was used in reaches where the maximum water surface elevation was within one foot of the target water level and for reaches where the difference was greater than one foot, a factor of safety of 1.4 for Spencer's Method was used. Therefore, on the west side of 17th Street Outfall Canal for Reaches 3 through 18, and on the east side for Reaches 21 through 33 the required factor of safety is 1.5. The target water level of El. +8 was used for most reaches while El. +8.1 NAVD88 was used for Reaches 15B, 31, 32 and El.+10 NAVD88 used for Reaches 16, 17, 18, 33, 34, and 35. In addition Reaches 1 and 19 have an existing rip-rap layer that was added to the flood side slope to aid in the protection against scour from the nearby pump stations turbulent waters. This layer was not previously modeled by URS and B&V. However, MVN chose to include this layer in the analyses to account for extra reinforcement on the flood side.

Global Stability Analyses Protected Side (based on ETL 1110-2-575)

In this failure mode the wall is assumed to displace along with the soil mass in which it is embedded when it slides or rotates under a slope stability type failure mechanism. This failure mode is most likely to be critical when I-walls are located on top of levees in very soft soils. Therefore, the existing I-wall levee parallel protection system for each reach was analyzed using Spencer's Method. Global Stability analyses were performed on those reaches that were not previously remediated with deep soil mixed columns. The GEO-SLOPE program SLOPE/W, Version 7.18 was used to perform the Spencer's Method of analysis. Reaches 3 through 18 on the west side and 21 through 33 on the east side are more likely to experience water levels at the target elevation therefore a FoS equal to 1.5 was used. For the remaining reaches that are less likely to experience water levels at the target elevation, a FoS equal to 1.4 was used.

For the analyses presented herein, most of the reaches were at El.+ 8.0 ft, with the exception of Reaches 15B, 31 and 32, which the water canal level was at El. +8.1 ft, and Reaches 16, 17, 18, 33, 34 and 35, which the water canal level was at El.+10 ft.

Process:

1. Spencer's method used pore-water pressures developed from SEEP/W analyses.

2. Tension crack options were used whenever a slide wedge was in tension.

The subsurface conditions at each reach of the 17th Street Canal were evaluated for both a block and a circular failure for Spencer's Method. The critical failure surface identified was further optimized by the internal methodology included in the SLOPE/W software. Table 1 shows the Factor of Safety results neglecting the sheet pile wall. All global stability analyses satisfied the criteria.

 $Table\ 1-Factor\ of\ Safety\ Global\ Stability\ Results\ (Initial\ results\ neglecting\ steel\ sheet\ pile)$

Reach	Block Failure 4	Entry/ Exit Failure 4
1	2.03 ³	2.03
10	1.77	1.77
11	1.68	1.75
12 13	2.55	2.54
13	2.23	2.46
14	1.90	1.91
15A	2.30	2.31
15B	1.81 2	1.79 ²
16	1.54 1	1.70 1
17	2.02 1,3	1.89 1
18	2.26 1	2.21 1
19	1.713	1.75
30	1.53	1.50
31	2.66 ²	2.65 ²
32	2.23 ²	2.21 2
33	1.75 1	1.71 1
34	2.28 1	2.11 1
35	2.62 1,3	2.58 1

Note:

- 1- Canal water EL= 10 ft.
- 2- Canal water EL=8.1 ft.

Gap Stability Analyses Protected Side (based on ETL 1110-2-575)

The gap analysis was based on the formation of a gap on the FS of the I-wall. Gap stability analyses were performed neglecting the sheet pile walls. Full gap analyses were performed on all reaches, assuming that a gap will extend to the bottom of the sheet pile. All full gap and global stability analyses neglecting the sheet pile wall satisfied criteria, therefore, no partial gap analyses were required. Reaches 3 through 18 on the west side and 21 through 33 on the east side are more likely to experience water levels at the target

³⁻ A proper through sheet pile failure surface did not develop while using the block method.

Critical failure is at extent of search.

⁴⁻ Factors of Safety are not the true system Global Stability Factors of Safety since failure surfaces ignore reinforcing effects of the sheet pile. These values are conservative and the intermediate step as part of ETL 1110-2-575.

elevation therefore a FoS equal to 1.5 was used. For the remaining reaches that are less likely to experience water levels at the target elevation, a FoS equal to 1.4 was used.

Process:

- 1. Spencer's method used pore-water pressures developed from SEEP/W analyses.
- 2. A flood side water-filled gap was included by removing the flood-side soil to the bottom of the gap and replacing it with a mechanical pressure to represent the hydrostatic water load against the wall.
- 3. The slip surface entrance conditions for the circular and block options were allocated to account for slip surfaces through the sheet pile (neglecting the sheet pile reinforcing effects).

Water level at the canal was increased to El. +10 for Reaches 17, 18, 33, 34 and 35. A gap analysis was not performed for Reaches 16, 30, 31 and 32 because the flood side crown of the earth levee was higher than the water elevation and therefore, no gap will form between the sheet pile and the soil.

The subsurface conditions at each reach of the 17th Street Canal were evaluated for both a block and a circular failure. The critical failure surface identified was further optimized by the internal methodology included in the SLOPE/W software. Table 2 shows the Factor of Safety results neglecting the sheet pile wall. All gap stability analyses satisfied critiera.

 $Table\ 2-Factor\ of\ Safety\ Gap\ Stability\ Results\ (Initial\ results\ neglecting\ steel\ sheet\ pile)$

Reach	Block Failure 4	Entry/ Exit Failure 4
1	1.86 ³	1.85
10	1.633	1.58
11	1.58	1.57
12	2.44	2.44
13	2.25	2.25
14	1.69	1.63
15A	2.23	2.25
15B	1.96 ²	2.25 1.95 ²
16	N/A ⁵	N/A^5
17	1.85 1	1.87 1
18	2.19 1	2.17 1
19	1.86	1.80
30	N/A ⁵	N/A ⁵
31	N/A ⁵	N/A ⁵
32	N/A ⁵	N/A ⁵
33	1.69 ¹	1.67 ¹
34	2.08 1	2.08 1
35	2.68 1	2.64 1
3.7		

Note:

- 1-Canal water EL= 10.0 ft.
- 2-Canal water EL=8.1 ft.
- 3-A proper through sheet pile failure surface did not develop while using the block method.
- 4-The results of the full gap analyses for the ETL 575 do not reflect the true global factor of safety since reinforcing effects of the sheet pile was neglected for this intermediate step.
- 5-Gap analysis was not performed because the flood side crest of the earth is higher than the water elevation.

Rotational Analyses using Corrected Passive Pressure (based on ETL 1110-2-575)

In total, 13 of the 18 analyzed reaches in this report were evaluated for this potential failure mechanism for reaches that were non-remediated. Reaches 16, 30, 31, and 32 did not have a rotational analysis performed because the flood side crest of the earth is higher than the flood elevation. Also, Reach 19 was not analyzed because the net pressures cross over the sheet pile multiple times making it difficult to correlate passive pressure between CWALSHT and Slope/W. Previous sheet pile CWALSHT analyses in the 2011 MOWL report showed a design sheet pile tip penetration much less than the actual sheet pile penetration. The penetration ratio is over 5, so the sheet pile will likely act as a pile because of its embedment depth. The amount of reduction of passive pressure due to the protected side slope and reduced shear strengths at the PS toe was evaluated utilizing the method outlined in the ETL 575. The procedure for this analysis involved applying various FS loads to the I-wall for the gap case, which was the controlling case between the global and gap analyses. The optimized failure surface was loaded with a series of triangularly increasing distributed loads to evaluate the response to the FoS using Spencer's Method. A graph of the applied loads versus the resulting FoS was plotted. A trend line was added to the graph which adequately matched the curve of this plot. In some cases, fourth and fifth order polynomial trend lines were required. These can be found in Appendix E.

Each reach was then evaluated without using a corrected passive pressure in CWALSHT. For six (6) out of thirteen (13) reaches analyzed, CWALSHT was unable to complete this analysis due to various error messages. These errors included apparent top of wall rotation towards the FS, extremely shallow tip penetrations, and zero soil pressures on the PS. In order to complete the analysis using CWALSHT, the cohesion of the top layer of the protected side ground surface was modified (reduced), or the corrected passive pressure was applied as a uniform distributed load in the program. Table 3 shows the modified (reduced) cohesions where appropriate and Table 4 shows the corresponding factors of safety and applied loads.

Table 3 – CWALSHT Modified (Reduced) Cohesion

Reach	Original Cohesion (psf)	Modified Cohesion (psf)	Cohesion Depth Modified (ft)
1		(psi)	
1	540	-	N/A
10	700	-	N/A
11	600	-	N/A
12	500	-	N/A
13	750	-	N/A
14	860	430	2.0
15A	800	500	1.5
15B	800	600	3.0
17	800	500	3.0
18	800	-	N/A
33	750	375	1.0
34	700	500	3.7
35	700	-	N/A

Table 4 – Factor of Safety Rotation Stability Results

Reach	FoS	Applied Horizontal Load (psf)
1	2.42	512
10	1.60	784
11	1.54	692
12	2.39	347
13	2.06	672
14	1.37 1,2	736.9
15A	2.58 1	508
15B	1.84 1	786
17	1.89 1	794
18	2.19	777
33	1.90 1	627
34	2.23 1	487
35	2.65	408

¹ Cohesion had to be reduced in order to make the CWALSHT program run.

² FoS below required criteria, however, the rotational FoS was further analyzed with FLAC and shown to be within required criteria.

These changes allowed the CWALSHT program to successfully run, however the baseline factors of safety without using the correction were not able to be computed. These analyses are slightly conservative because the upper part of the embankment material strengths was reduced.

Using Appendix B of the aforementioned ETL 575, each reach was iterated by varying the applied horizontal load and passive factor of safety in CWALSHT. The active FoS was held at 1.0 for all iterations according to USACE criteria. The applied horizontal load was applied as a distributed load from the elevation of the PS soil down to the elevation of the critical failure surface. The left-side passive pressures from CWALSHT were copied into a spreadsheet and summed along the length from the PS soil surface to the critical failure surface. Then, using the FoS input from CWALSHT, the total passive force from the Slope/W plot was calculated using the defined trend line equation. If the CWALSHT passive load was less than the Slope/W load, then a correction to the passive load was not necessary. However, for all 13 reaches analyzed, a correction was required. This correction was calculated as the difference between these two passive forces, and applied in CWALSHT as the new horizontal distributed load. In this way, the passive reduction was actually applied as a load increase on the driving side.

The primary deviation from the ETL 575 Appendix B procedure is the way in which the successive iterations were completed. Using the exact ETL 575 procedure, changing the distributed load as described above, the solution diverged away from the correct FoS. Therefore, an alternate methodology was used. Instead, to determine the magnitude of the distributed load for the successive iterations, a value was selected that was between the actual applied load from the current iteration and the load calculated from the difference of the passive loads. This may have increased the number of iterations, but allowed the solution to converge to the exact solution.

After the new distributed load was calculated, it was input into CWALSHT, and a new FoS corresponding to this load was found. Then, a new distributed load was computed, and this iterative process continued until the FoS from two successive iterations went unchanged. This was the final FoS. To verify this value, a plot was created of the applied CWALSHT passive force versus the passive force difference. Where these two curves met, the FoS at this point should correlate to the final factor of safety from the iterations. For all reaches, this plot confirmed the iterative factors of safety. Reaches 3 through 18 on the west side and 21 through 33 on the east side are more likely to experience water levels at the target elevation, therefore a FoS equal to 1.5 was used. For the remaining reaches that are less likely to experience water levels at the target elevation, a FoS equal to 1.4 was used. Of the 13 reaches analyzed, only Reach 14 has a factor of safety less than the required criteria. See next section for further analysis of Reach 14.

Numerical Modeling

Numerical analyses (Finite Element Analysis - FLAC) were conducted to estimate the gap initiation and gap propagation for the existing I-wall using the soil properties and stratigraphy included in the B&V Report for 5 reaches, Reaches 10, 11, 14, 15A, and 17. FLAC also estimated the wall displacements and factor of safety. The current I-wall structure was modeled as two beam elements: (1) the upper concrete portion of the I-wall and (2) the supporting sheet pile beneath the concrete. Interface elements were applied to the wall below the ground surface. These elements allow slip and separation between the soil and wall. The soil parameters used for all five reaches were obtained from the B&V report and soil moduli are shown in Appendix F.

Canal water loadings were modeled as mechanical pressures acting normal to the ground surface and normal to the wall face. When a gap was included between the soil and I-wall, a horizontal mechanical pressure was added to both the soil and the wall to the depth of the gap. The total horizontal stress in the element adjacent to the wall was compared to the hydrostatic pressure that would exist if a gap were present. If the hydrostatic water pressure exceeded the total horizontal stress, it was assumed that a gap would form. Each zone was checked as canal water levels were raised from the normal pool elevation of +0.4 ft to the maximum operating water level in 1 ft increments. Gaps were deepened in 1 ft increments as they developed. Once the gaps were fully developed they were utilized at this depth throughout the remainder of the analyses.

The FLAC factor of safety was checked for MOWL with the gap to the greatest depth. FLAC was used since it is a more rigorous and precise analysis. The SSI diagram shows that the mechanism of failure is more of a translational failure due to shear increment along the slip surface instead of a rotational failure. The slip surface starts on the FS and exits on the PS, similar to the one obtained using the Spencer's Method. In addition, water levels beyond MOWL have been analyzed in FLAC for four reaches to determine wall displacement and FoS for water elevation exceeding MOWL. The analyses for the additional water levels can be found in Appendix F. The extreme water levels used occurred during Hurricane Isaac in August 2012 and the water levels exceeded those of the usual working conditions at 17th Street Canal. See Figure 4 for the simulated extreme water levels.

All five reaches (10, 11, 14, 15A, &17) have a maximum PS ground displacement less than 1.5 inches for the 1% water loading. On Reach 17 the gap did not propagate all the way to the tip of the sheet pile, but for the other four reaches the gap propagated all the way to the tip of the sheet pile. Four out of the five reaches achieved the 1.5 factor of safety where the targeted water levels were less likely to be experienced

on the western side. The fifth (Reach 10) had a factor of safety of 1.49 which was deemed acceptable based on the ETL 575 analysis. Graphs of the Top of Protected Side Ground Displacement, Gap Propagation and Factor of Safety versus Canal Water Elevation and Top of Protected Side Ground Displacement versus Factor of Safety, can be found in Appendix F. Table 5 provides detail of the results of the stability analyses conducted for the selected reaches for the 17th Street Outfall Canal, New Orleans using FLAC.

Table 5 – Factor Of Safety FLAC Numerical Model Results

Reach	FoS	Corrected Maximum PS Ground Displacements (in)	Canal Water Elevation (ft NAVD88)	Gap Tip Depth (ft)	Gap Tip Elevation (ft NAVD88)
10	1.49	1.49	8.0	9.0	-6.5
11	1.51	1.07	8.0	9.0	-6.5
14	1.69	0.65	8.0	8.0	-3.8
15A	2.07	0.51	8.0	8.0	-4.5
17	1.95	0.59	10.0	0.0	9.9

Alternate Extreme Water Surface Profiles Considered

Hurricane Isaac came ashore in August 2012. During this time, water levels exceeded those of the usual working conditions at 17th Street Canal, and peak stages were above those used in the MOWL report. Water surface profiles have been provided by MVN H&H branch and four reaches were chosen to be run with a water surface profile +0.6 to +1.1 feet above the MOWL elevation in the canal; +1.1 is the highest differential from the water level previously analyzed. This made the water elevations +8.6, +8.9, +9.2, and +9.1 on Reaches 11, 14, 15B, and 30 respectively. These four reaches were chosen due to their low global, gap and ETL 575 factors of safety in the initial analyses. Global, gap, and CWALSHT analyses were performed for all four reaches at the extreme water level. For these extreme water level cases, the target factors of safety are 1.4 for global and 1.3 for CWALSHT analyses. Analyses can be found in Appendices A, B, and E respectively. Reaches 14 and 15B were rerun in FLAC at the extreme water level. The FLAC analyses can be found in Appendix F. Table 6 below shows factors of safety and displacements corresponding to the extreme water profile. Reach 30 factor of safety is within 0.02 of the target factor of safety for a 0.2% event and no remediation is required.

Table 6 – Extreme Water Surface Profile Results

Reach	Extreme Water	Change in Elevation	Global***	Gap***	Partial Gap	CWALSHT]	FLAC
	Elevation	Elevation	FoS	FoS	FoS	FoS	FoS	Disp (in.)
11	8.6	0.6	1.63	1.53		1.5	1	
14	8.9	0.9	1.81	1.57		1.51	1.64	0.8301
15B	9.2	1.2	1.86	1.91		1.9	1.46	1.267
30	9.1	1.1	1.35	1.35	1.38**	1.4*	1	

^{*}cohesion was significantly reduced in the top layer of soil for program to run.

Low Water Level (LWL) Undrained (Q-Case) Stability

MVS analyzed LWL undrained (Q-case) stability on all 37 reaches along the 17th Street Canal. These analyses were conducted using Spencer's Method and utilized the pore pressures developed from Seep/W analyses. New Orleans District's Hydraulics and Hydrology (H&H) branch determined the extreme low lake water elevation as -2.3 ft based on their analyses. With the gates open and if, for this extreme event, the lake gets to this low lake elevation, theoretically the canal could see these elevations also. Only a FS failure analysis was examined due to the fact that this type of failure would be more critical and prone to occur during undrained soil conditions. Under these conditions, the reinforcing effect of the sheet pile is neglected, and potential slip surfaces are allowed to pass through the sheet pile location for the initial conservative analysis. The average low water is -1.0 for 17th Street canal, which is the minimum operating water elevation with the gates closed. The extreme low water for 17th Street canal is -2.3, which would occur in a non-tropical event with the gates open (very unusual). The initial analyses were performed with the extreme low water condition of -2.3 to determine the factor of safety for the extreme event. Reaches that did not achieve stability at the required factor of safety of 1.3 were then checked with the water elevation at the average low water condition at EL -1.0. In addition, when tension cracks were observed they were assumed to be filled with water according to Corps criteria. However, this is a very conservative assumption. Thus Reaches 1, 19, and 30 were analyzed with the tension cracks half-filled to determine the FS stability FoS for a more realistic case.

Process:

- 1. Spencer's method model used pore- water pressures developed from SEEP/W parent analyses.
- 2. Tension crack options were used whenever a slide wedge was in tension.

^{**}Partial Gap factor of safety is within 0.02 of the target 0.2% annual exceedance factor of safety. No remediation is required.

^{***}Factors of Safety are not the true system Global Stability Factors of Safety. These values are conservative (sheet pile neglected) and the intermediate step as part of ETL 1110-2-575.

 $Table \ 7-Factor\ of\ Safety\ LWL-Q\ case\ Stability\ Results\ (results\ neglecting\ the\ existing\ sheet\ pile)$

Reach	Block Failure	Entry/ Exit Failure
1	0.98 ^{1,2,4} 1.45 ⁴ 1.73 ⁴ 1.68 ⁴ 1.32 ⁴ 1.36 1.80 ⁴ 1.53 ⁴ 1.56 1.54 1.56 1.74 1.50 1.48 ⁴ 1.63 1.40 ⁴ 1.74 ⁴ 1.60 ⁴	0.99 ^{1,4} 1.45 ⁴ 1.68 ⁴ 1.38 ⁴ 1.38 1.78 ⁴ 1.46 ⁴ 1.65 1.48 1.55 1.82
2	1.454	1.454
	1.734	1.684
3A 3B	1.684	1.684
4	1.414	1.38^{4}
4 5 6	1.324	1.344
6	1.36	1.38
7	1.80^{4}	1.78^{4}
7 8	1.534	1.464
9	1.66	1.65
10	1.54	1.48
11	1.56	1.55
12	1.74	1.82
13	1.50	1.51
14	1.48^{4}	1.47^4
15A	1.63	1.61
13 14 15A 15B	1.40^4	1.51 1.47 ⁴ 1.61 1.41 ⁴ 1.69 ⁴ 1.60 ⁴
16	1.744	1.69 ⁴
17	1.60^4	1.60^4
18	1.62^4	1.62^4
18 19 20 21 22 23 24	$ \begin{array}{r} 1.60^{4} \\ 1.62^{4} \\ 1.31^{1,2,4} \\ 2.09^{3} \\ 1.62^{4} \\ 1.70^{4} \end{array} $	$ \begin{array}{r} 1.62^4 \\ 1.30^{1,4} \\ 2.17^4 \\ 1.60^4 \\ 1.56^4 \\ 1.94^4 \\ 1.67^4 \end{array} $
20	2.09^{3}	2.17^4
21	1.62^4	1.60^4
22	1.79^4	1.56^4
23	1.62 1.79 ⁴ 2.17 ⁴ 1.61 ⁴ 1.84 ⁴	1.94 ⁴
24	1.614	1.67^4
25	1.844	1.79^4
26	2.53^4	2.44^{4}
26 27	2.53 ⁴ 2.17 ⁴	2.44 ⁴ 2.15 ⁴
28	2.09^4	2.09^4
29	1.344	1.31^{4}
30	1.19 ^{1,2,4}	1.31 ⁴ 1.27 ^{1,2,4}
31	1.38 ⁴ 1.70 ⁴ 1.36 ⁴ 1.39 ⁴ 1.92 ⁴	1.38^{4}
32	1.70^4	1.674
33	1.364	1.354
34	1.39 ⁴	1.36 ⁴ 1.93 ⁴
35	1.92^4	1.93 ⁴
1 A water level of	1 Oft was utilize	d within the mode

¹ A water level of -1.0ft was utilized within the mode. ² The tension crack was only assumed to be half full.

³ A proper through sheet pile failure surface did not develop while using the block method.

⁴ Factors of Safety are not the true system Global Stability Factors of Safety. These values are conservative with failure surfaces ignoring reinforcing effects of the sheet pile.

The subsurface conditions at each reach of the 17th Street Canal were evaluated for both a block and a circular failure. The critical failure surface identified was further optimized by the internal methodology included in the SLOPE/W software. Table 7 shows the factor of safety results.

For Reach 1 the calculated FoS for the LWL Q-case was 0.98 with a tension crack half-filled, a canal water elevation of -1.0 feet, and neglecting the reinforcing effects of the existing sheet pile wall. To achieve the needed stability, the reinforcement properties of the existing sheet pile were included in the model. Three rows of sheet pile, each of varying depths and each with a shear force of 81,201 lbs used to mimic the reinforcement effect were modeled and analyzed. The inclusion of these rows of sheet pile forced the critical failure surface below the sheet pile depths. The calculated results show that the rows of sheet pile stabilized this reach by achieving a FoS of 1.65. Therefore this reach meets Corps criteria when the reinforcing effects of the existing sheet piles are included, and no further action is necessary.

For Reach 30 the LWL Q-case was run with a tension crack half-filled, a canal water elevation of -1.0 feet, and the FoS calculated was 1.19. For this analysis the reinforcing effect of the sheet pile was neglected although the critical failure surface passed through the sheet pile, and therefore this is not a true factor of safety. To account for the effects of the sheet pile, a modified version of the ETL 1110-2-575 procedure was used. The procedure was modified to include the reinforcing properties of the sheet pile as the ETL 575 does not cover the low water condition. The condition analyzed was considered conservative. This analysis shows that once the sheet pile is taken into account, Reach 30 meets the required factor of safety of 1.3, and no further action is necessary.

Drained (S-Case) Stability

Drained (S-case) stability analyses were performed on Reaches 1 through 35 to account for the soil conditions experienced at steady state long term conditions. Both a flood side and protected side analysis was evaluated to determine the corresponding critical factor of safety. Geo-Studio's Slope/W was utilized as the stability analysis software for this evaluation. The subsurface conditions at each reach of the 17th Street Canal were evaluated for both a block and a circular failure. The critical failure surface identified was further optimized by the internal methodology included in the SLOPE/W software. Both block and entry/exit analyses were performed. The S-case analysis was modeled using the GCAT paper S-case Analysis Parameters for Outfall Canals based on laboratory test results and literature by Brandon et al. (2011). The GCAT parameters are assigned to all materials. A drained cohesive strength of 75 psf was assigned to any cohesive material above the phreatic surface to account for negative pore pressures and to

reduce the possibility of infinite slope failures occurring. Also, the friction angles differ based on soil type and are given in Table 8 below.

Table 8 – Recommended S-case Design Friction Angles

Soil Type	Design Cohesion c'	Design Friction Angle φ'
СН	0	26
СНО	0	24
CL	0	32
ML	0	34
PT	0	30
SC	0	33
SM	0	33
SP	0	34

An initial water elevation of +0.4 ft was incorporated into the model to determine the drained stability. A water elevation of +0.4 ft is utilized because this is the mean water level conditions of the canal. Flood side and protected side searches were performed with both block and entry/exit analyses (Slope/W optimization function was used), and factors of safety were above the required 1.3 for every reach except the flood side analysis for Reach 19, which fell just below 1.3 with a factor of safety of 1.28. The investigated failure surfaces neglected the reinforcing effects of the sheet pile and do not represent a true factor of safety. These values are conservative and worst case scenario. With the reinforcing effect of the sheet pile the 1.3 FoS would be met. Table 9 shows the factor of safety results (neglecting the reinforcing effect of the sheet pile) for each reach.

Process:

- 1. A Spencer's method model used pore- water pressures developed from SEEP/W parent analyses.
- 2. Tension crack options were used whenever a slide wedge was in tension due to added tension above phreatic surface.
- 3. The use of passive mode was incorporated when the entrance elevation of the active wedge was lower than the exit elevation of the passive wedge.
- 4. While using the block method some reaches developed a non-optimized "through the sheet pile" failure surface that did not stay within the block's specified grid. When this type of failure surface

occurred a note was added to the model. Because of this, a failure zone was then analyzed on the flood side of the sheet pile to obtain a correct failure surface. The calculated factors of safety are not the true system stability factors of safety if the failure plane passes through the sheet pile and if the sheet pile reinforcing effect is neglected. These values are conservative and the worst case scenario.

 $Table \ 9 - Factor \ of \ Safety \ S-case \ Stability \ Results \ (neglecting \ the \ reinforcing \ effect \ of \ the \ sheet \ pile, \ if \ applicable)$

REACH	FS Block (thru)	FS Block (front)	FS Entry/Exit (thru S/P)	FS Entry/Exit (front of S/P)	PS Block	PS Entry/Exit
1	2.23*	1.60	/	1.47	2.49	2.48
2	2.19	/	2.09	/	2.43	2.43
3A	2.31*	/	2.29	/	2.59	2.56
3B	2.66*	/	2.75	/	2.13	2.12
4	2.29*	/	/	2.14	2.55	2.55
5	2.33	/	2.29	/	2.38	2.35
6	2.20	/	2.21	/	2.47	2.18
7	2.39	/	2.43	/	2.59	2.61
8	2.40	/	2.27	/	2.55	2.53
9	2.77	/	2.76	/	2.62	2.62
10	2.25*	/	2.28	/	2.44	2.44
11	2.69	/	2.69	/	2.71	2.71
12	1.86	/	1.68	/	3.02	3.00
13	2.06	/	2.05	/	2.39	2.38
14	2.36*	/	2.35	/	2.29	2.24
15A	2.03	/	2.06	/	2.77	2.77
15B	/	1.60	1.81	/	2.21	2.11
16	1.56*	1.55	/	1.56	1.50	1.47
17	2.12*	1.92	1.80	/	1.85	1.85
18	1.99*	1.95	1.95	/	2.14	2.04
19	1.28	/	1.29	/	2.32	2.31
20	2.83	/	2.84	/	2.91	2.83
21	2.22	/	2.22	/	2.51	2.50
22	2.86*	/	2.86	/	2.31	2.28
23	3.00*	/	2.94	/	2.82	2.81
24	3.08	/	3.06	/	2.71	2.71
25	2.83*	/	2.73	/	2.39	2.35
26	2.39*	/	2.97	/	2.82	2.82
27	3.05	/	3.08	/	2.67	2.67
28	4.09*	/	3.84	/	2.70	2.70
29	2.29	/	2.30	/	2.32	2.32

30	1.47	/	1.37	/	1.51	1.50
31	1.35*	1.36	1.35	1.37	2.45	2.43
32	1.71*	1.40	1.72	/	2.27	2.29
33	/	1.47	/	1.47	2.11	2.09
34	/	1.76	/	1.74	2.81	2.81
35	2.22*	2.08	2.21	2.07	3.19	3.18

^{*} A proper failure surface did not develop while using the non-optimized block search method "/" symbol indicates that no analyses was done for that performance mode.

Summary of Critical Analyses

MVS analyzed thirty-seven (37) reaches with regard to USACE criteria for stability, including global, gap, and rotational stability analyses. In addition, seepage analysis was re-evaluated.

Global & Gap Stability Eighteen (18) reaches were analyzed for global stability and fourteen (14) of those same reaches were analyzed for full gap stability against the target water level using both block and circular failure searches including optimization and neglecting the reinforcing effect of the sheet pile. All analyses satisfied criteria and therefore, no partial gap analyses were required. Four (4) reaches were not analyzed for gap stability because the flood side crest was higher than the water elevation and therefore, no gap will form.

Rotational Stability Of the eighteen (18) reaches analyzed in this report, thirteen (13) reaches were analyzed for rotational stability and analyses were in accordance with ETL 575. Four (4) reaches were not analyzed for rotational stability because the flood side crest was higher than the water elevation and therefore, there is no water load on the wall to cause instability. One (1) reach was not analyzed because the net pressures cross over the sheet pile multiple times making it difficult to correlate passive pressure between CWALSHT and Slope/W. All reaches analyzed through equilibrium analysis except one (1) met criteria. The rotational stability of that one (1) reach was further analyzed using advanced finite element analysis (FLAC) which fully evaluates the sheet pile and embankment system factor of safety. In addition, FLAC is a complete soil-structure interaction (SSI) analysis and the benefit of using this tool is the ability to identify potential failure modes without the restriction of having to assume one mode over another (i.e., rotational versus global stability).. The FLAC analysis showed that this reach also met criteria.

Low Water Level (Q-case) Stability Thirty-seven (37) reaches were analyzed for global stability against the average low water level using both block and circular failure searches including optimization. All reaches analyzed except two (2) met criteria, without including the reinforcing effect of the sheet pile. Once

the reinforcing effect of the sheet pile was accounted for in the analysis, these two (2) reaches also met criteria.

<u>Drained (S-case) Stability</u> Thirty-seven (37) reaches were analyzed for global stability against the mean water level using both block and circular failure searches including optimization. All reaches analyzed except one (1) met criteria, without including the reinforcing effect of the sheet pile. Once the reinforcing effect of the sheet pile was accounted for in the analysis, this one (1) reach also met criteria.

<u>Stability with Extreme Water Surface Profiles</u> For an extreme condition where in the event water levels exceed MOWL in the canal, four (4) reaches were selected for further analysis to determine the effect of higher water on wall stability. The four (4) reaches selected were based on their relatively low factors of safety with respect to MOWL; but these reaches still met criteria. The factor of safety and the displacement criteria were met for the respective extreme loading event of each of the four (4) reaches.

<u>Seepage</u> All reaches, except Reach 16, met the HSDRRS seepage criteria. Reach 16 was further field investigated and analyzed as shown in the DDR report in Appendix H. Remediation was recommended.

Table 10 shows the critical stability factors of safety for each analysis type by reach. For seepage results of Reach 16, please see Appendix H of this report. This table does not include results of the analyses for Extreme Water Surface Profiles. For those results, please see Table 6.

Table 10 – Factor of Safety Summary

	Reach	Remediated	Non – Remediated	Global Stability Analysis ^{4,9}	Full Gap Stability Analysis ^{4,9}	Rotational Analysis CWALSHT	Numerical Model FLAC	LWL-Q Stability Analysis ⁴ (Flood side)	S-case Stability Analysis ⁴ (Flood side)	S-case Stability Analysis ⁴ (Protected Side)
	1		X	2.03	1.85	2.42	N/A	$0.98^{5,8}$	1.60	2.48
	2	X		N/A	N/A	N/A	N/A	1.45	2.09	2.43
	3A	X		N/A	N/A	N/A	N/A	1.68	2.29	2.56
	3B	X		N/A	N/A	N/A	N/A	1.68	2.66	2.12
West	4	X		N/A	N/A	N/A	N/A	1.38	2.14	2.55
	5	X		N/A	N/A	N/A	N/A	1.32	2.29	2.35
	6	X		N/A	N/A	N/A	N/A	1.36	2.20	2.18
	7	X		N/A	N/A	N/A	N/A	1.78	2.39	2.59
	8	X		N/A	N/A	N/A	N/A	1.46	2.27	2.53
	9	X		N/A	N/A	N/A	N/A	1.65	2.76	2.62
	10		X	1.77	1.58	1.60	1.49	1.48	2.25	2.44
	11		X	1.68	1.57	1.54	1.51	1.55	2.69	2.71
	12		X	2.54	2.44	2.39	N/A	1.74	1.68	3.00
	13		X	2.23	2.25	2.06	N/A	1.50	2.05	2.38
	14		X	1.90	1.63	1.37 2, 5	1.69	1.47	2.35	2.24

	15A		X	2.30	2.23	2.58 ²	2.07	1.61	2.03	2.77
	15B		X	1.79 ⁷	1.957	1.84 ²	N/A	1.40	1.60	2.11
	16		X	1.54 6	N/A ^{1,6}	N/A ²	N/A	1.69	1.55	1.47
	17		X	1.89 ⁶	1.85 6	1.89 ²	1.95	1.60	1.80	1.85
	18		X	2.21 6	2.17 6	2.19	N/A	1.62	1.95	2.04
	19		X	1.71	1.80	N/A ³	N/A	1.308	1.28	2.31
	20	X		N/A	N/A	N/A	N/A	2.09	2.83	2.83
	21	X		N/A	N/A	N/A	N/A	1.60	2.22	2.50
	22	X		N/A	N/A	N/A	N/A	1.56	2.86	2.28
	23	X		N/A	N/A	N/A	N/A	1.94	2.94	2.81
	24	X		N/A	N/A	N/A	N/A	1.61	3.06	2.71
	25	X		N/A	N/A	N/A	N/A	1.79	2.73	2.35
st	26	X		N/A	N/A	N/A	N/A	2.44	2.39	2.82
East	27	X		N/A	N/A	N/A	N/A	2.15	3.05	2.67
	28	X		N/A	N/A	N/A	N/A	2.09	3.84	2.70
	29	X		N/A	N/A	N/A	N/A	1.31	2.29	2.32
	30		X	1.50	N/A^1	N/A ¹	N/A	1.19 5,8	1.37	1.50
	31		X	2.65	N/A ¹	N/A ¹	N/A	1.38	1.35	2.43
	32		X	2.21	N/A ¹	N/A ¹	N/A	1.67	1.40	2.27
	33		X	1.75 ⁶	1.67 ⁶	1.90	N/A	1.35	1.47	2.09
	34		X	2.11 6	2.08 6	2.23^{2}	N/A	1.36	1.74	2.81
	35		X	2.58 6	2.64 6	2.65	N/A	1.92	2.08	3.18

¹ A gap analysis/CWALSHT was not performed because the flood side crest of the earth is higher than the water elevation.

Conclusions and Recommendations

MVS analyzed 37 reaches with regard to USACE criteria for slope stability, including global, gap, and rotational stability analyses. All reaches met global stability criteria and I-wall gap and rotational stability criteria. All reaches met seepage criteria except for Reach 16. Additional field investigations and analysis have been completed for Reach 16. Based on this analysis contained in Appendix H, Reach 16 was recommended to be remediated to address potential seepage concerns. The remediation of Reach 16 encompassed approximately 1,615 linear feet of risk reduction measures in the form of new sheet pile driven behind the existing sheet pile as part of construction contract OFC-07. No further remediation is required for the 17th Street Canal.

² Cohesion had to be reduced for the program to run. Real factor of safety is higher.

³ Net pressures crossover the sheet pile multiple times making it difficult to correlate passive pressure between CWALSHT and Slope/W. Sheet pile might act as pile because of its depth length.

⁴ Spencer's method used.

⁵ Factor of Safety below criteria, however, for Reaches 1 and 30 the failure surface ignores the reinforcing effect of the sheet pile, which is very conservative. For Reach 14, the rotational FoS was further analyzed with FLAC and shown to be above criteria.

⁶ Canal water EL = 10ft.

⁷ Canal water EL = 8.1ft.

⁸ Canal water EL = -1.0ft

⁹ Factors of Safety are not the true system Global Stability Factors of Safety. These values are conservative and the intermediate step as part of ETL 1110-2-575.

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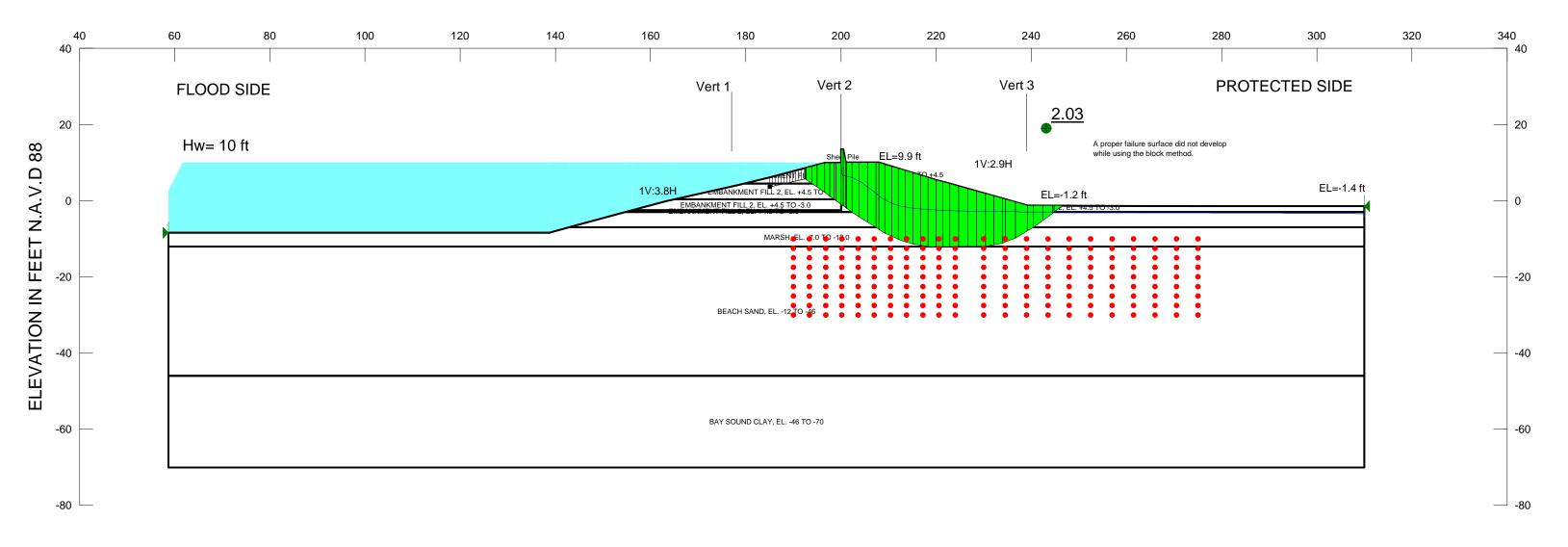
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Appendix A – Global Stability Analyses									



Name: EMBANKMENT FILL, EL. +9.6 TO +4.5 Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -3.0 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -12 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Clay

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion Spatial Fn: Embankment Fill 2 Phi: 0 °

Name: MARSH, EL. -7.0 TO -12.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 2 Phi: 0°

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global Block File Name: 17thReach1.gsz Last Edited By: Goltz, Amanda MVS

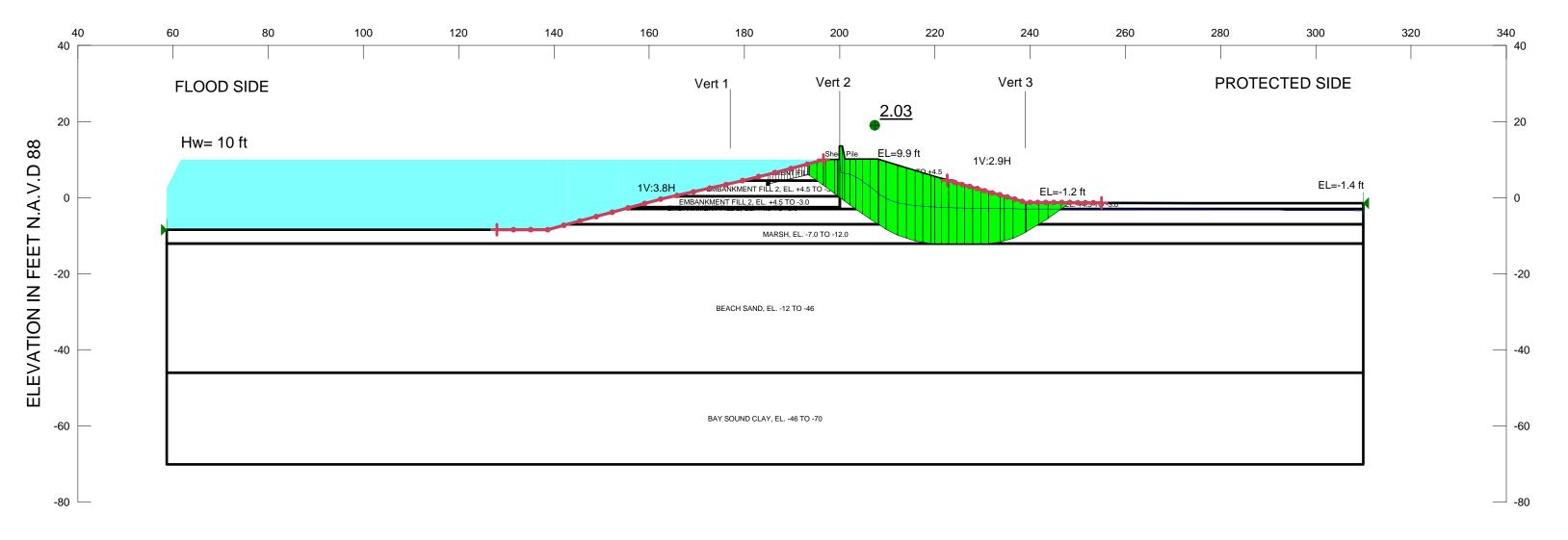




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17th STREET OUTFALL CANAL, REACH 1, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global Block STA. 658+00 - 663+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.6 TO +4.5 Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -3.0 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -12 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Clay

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion Spatial Fn: Embankment Fill 2 Phi: 0 °

Name: MARSH, EL. -7.0 TO -12.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 2 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

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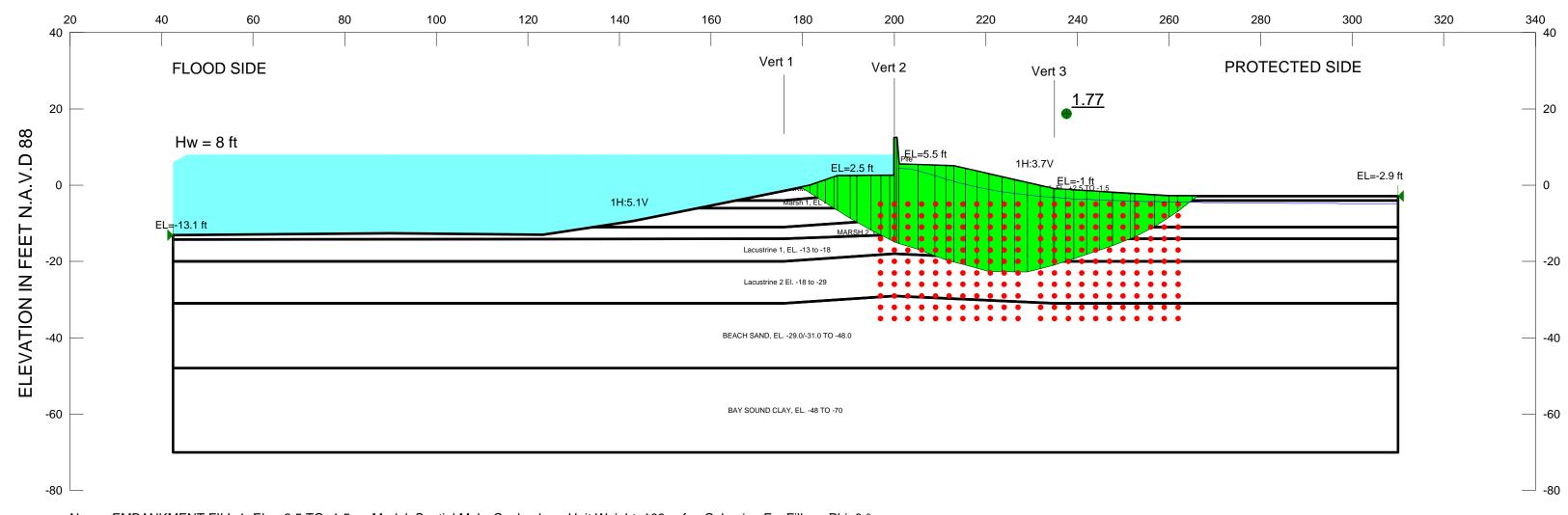




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17th STREET OUTFALL CANAL, REACH 1, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global Entry & Exit STA. 658+00 - 663+00 WEST ORLEANS PARISH, LOUISIANA



Cohesion Spatial Fn: Lacustrine 2 Cohesion Phi: 0 °

Phi: 0°

Name: EMBANKMENT FILL 1, EL. +2.5 TO -1.5 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Fn: Fill Phi: 0 °
Name: MARSH 2, EL. -9 TO -13 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: Marsh 2 Phi: 0 °
Name: BEACH SAND, EL. -29.0/-31.0 TO -48.0 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °
Name: BAY SOUND CLAY, EL. -48 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Clay Phi: 0 °
Name: Marsh 1, EL -1.5 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion Fn: Marsh 1 Phi: 0 °
Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf
Name: Lacustrine 1, EL. -13 to -18 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1 Cohesion

Name: Lacustrine 2 El. -18 to -29 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

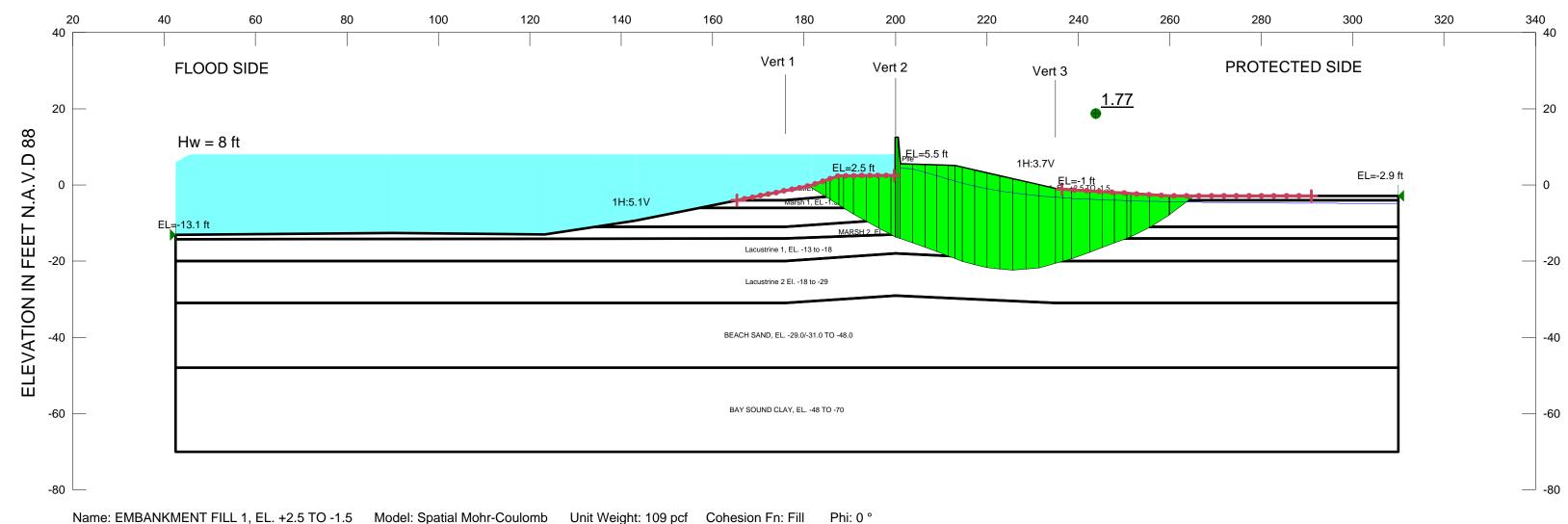
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17th STREET OUTFALL CANAL, REACH 10, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global Block STA. 593+00 - 596+05 WEST ORLEANS PARISH, LOUISIANA



Name: MARSH 2, EL. -9 TO -13 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: Marsh 2 Phi: 0 °
Name: BEACH SAND, EL. -29.0/-31.0 TO -48.0 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °
Name: BAY SOUND CLAY, EL. -48 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Clay Phi: 0 °
Name: Marsh 1, EL -1.5 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion Fn: Marsh 1 Phi: 0 °
Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf
Name: Lacustrine 1, EL. -13 to -18 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1 Cohesion Phi: 0 °
Name: Lacustrine 2 El. -18 to -29 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion Spatial Fn: Lacustrine 2 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global Entry & Exit File Name: 17thReach10.gsz Last Edited By: Goltz, Amanda MVS

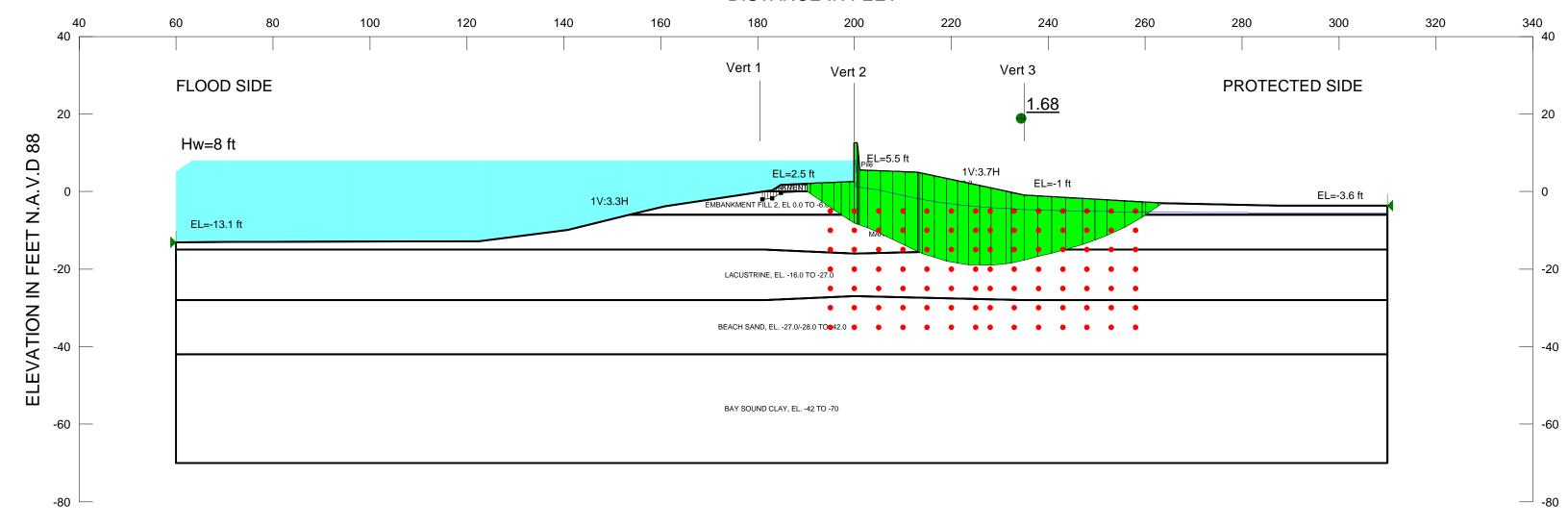




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17th STREET OUTFALL CANAL, REACH 10, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global Entry & Exit STA. 593+00 - 596+05 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.5 TO 0.0 Model: Undrained (Phi=0) Unit Weight: 118 pcf Cohesion: 800 psf

Name: MARSH 1, EL. -6.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -27.0/-28.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi: 0 °

Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Spatial Fn: Fill 2 Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: LACUSTRINE, EL. -16.0 TO -27.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global (Block) File Name: 17thReach11.gsz Last Edited By: Goltz, Amanda MVS



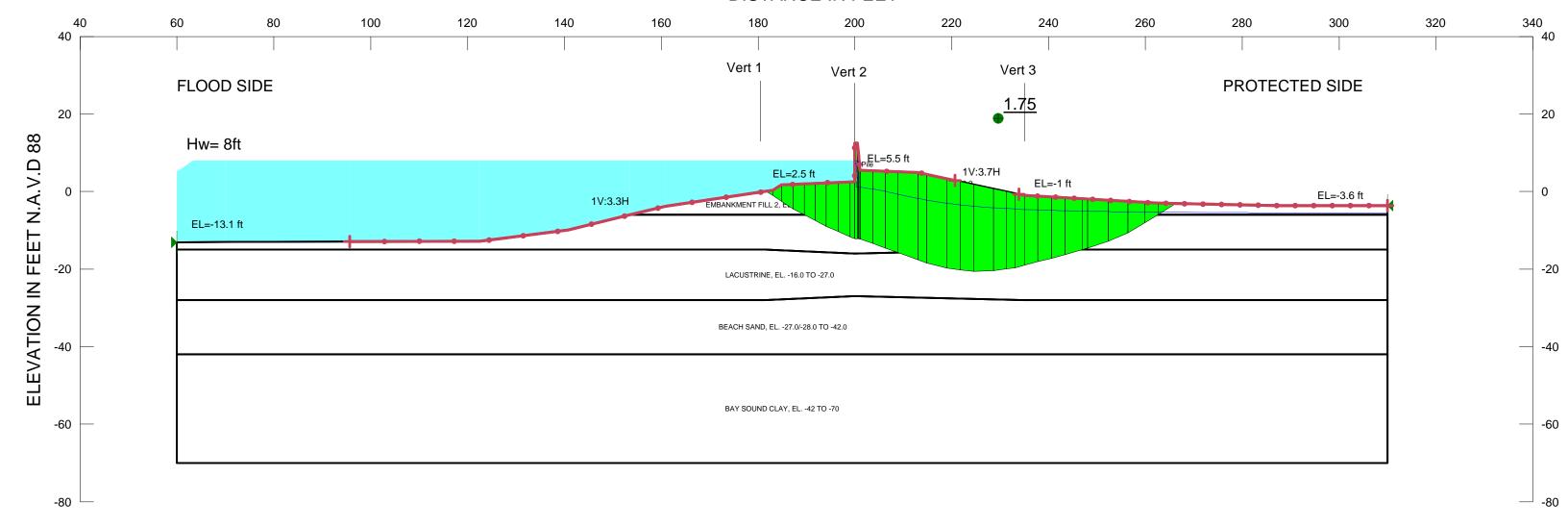
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17th STREET OUTFALL CANAL, REACH 11, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Block) STA. 596+05 to 609+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.5 TO 0.0 Model: Undrained (Phi=0) Unit Weight: 118 pcf Cohesion: 800 psf

Name: MARSH 1, EL. -6.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -27.0/-28.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi: 0 °

Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Spatial Fn: Fill 2 Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: LACUSTRINE, EL. -16.0 TO -27.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability Global (Entry/Exit) File Name: 17thReach11.gsz Last Edited By: Goltz, Amanda MVS

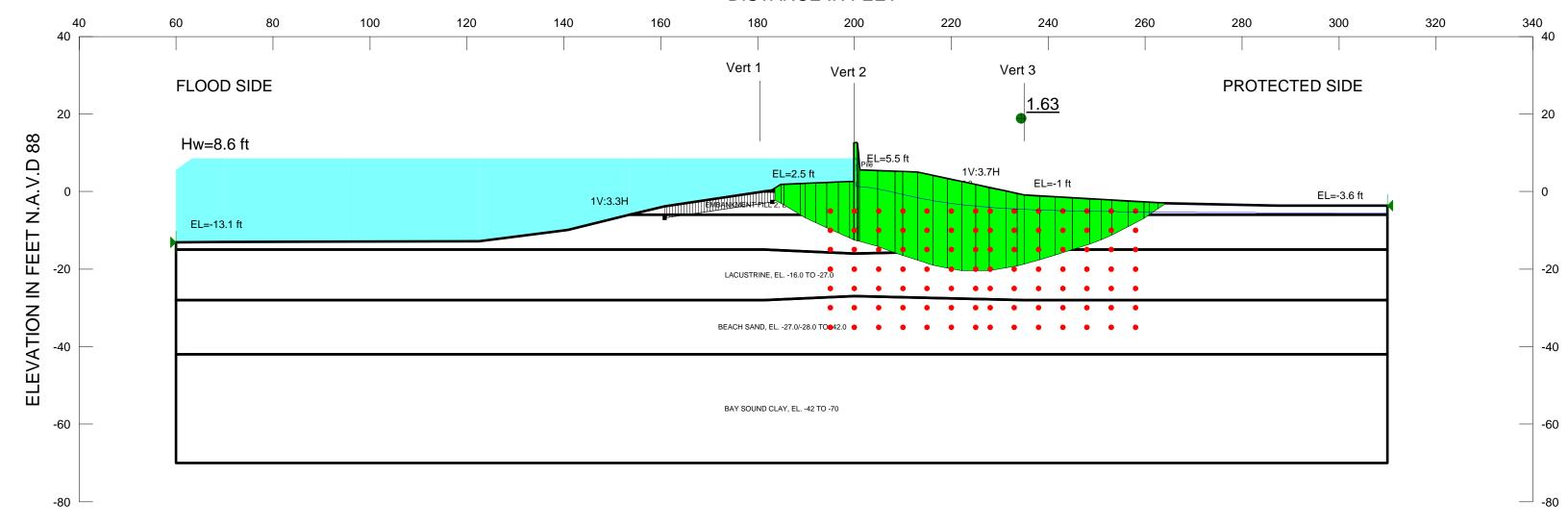






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17th STREET OUTFALL CANAL, REACH 11, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Entry/Exit) STA. 596+05 to 609+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.5 TO 0.0 Model: Undrained (Phi=0) Unit Weight: 118 pcf Cohesion: 800 psf

Name: MARSH 1, EL. -6.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -27.0/-28.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi: 0 °

Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Spatial Fn: Fill 2 Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: LACUSTRINE, EL. -16.0 TO -27.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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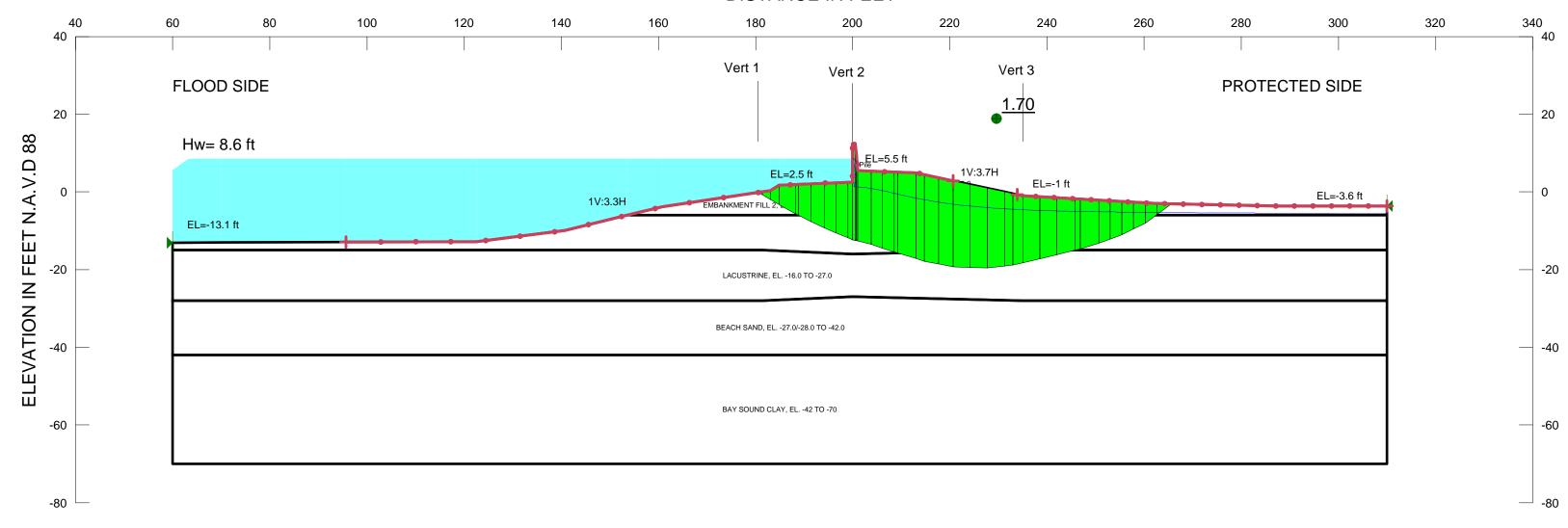
Name: Slope Stability Global (Block) File Name: 17thReach11.gsz Last Edited By: Goetz, Ryan MVS





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17th STREET OUTFALL CANAL, REACH 11, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Block) STA. 596+05 to 609+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.5 TO 0.0 Model: Undrained (Phi=0) Unit Weight: 118 pcf Cohesion: 800 psf

Name: MARSH 1, EL. -6.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -27.0/-28.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi: 0 °

Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Spatial Fn: Fill 2 Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: LACUSTRINE, EL. -16.0 TO -27.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

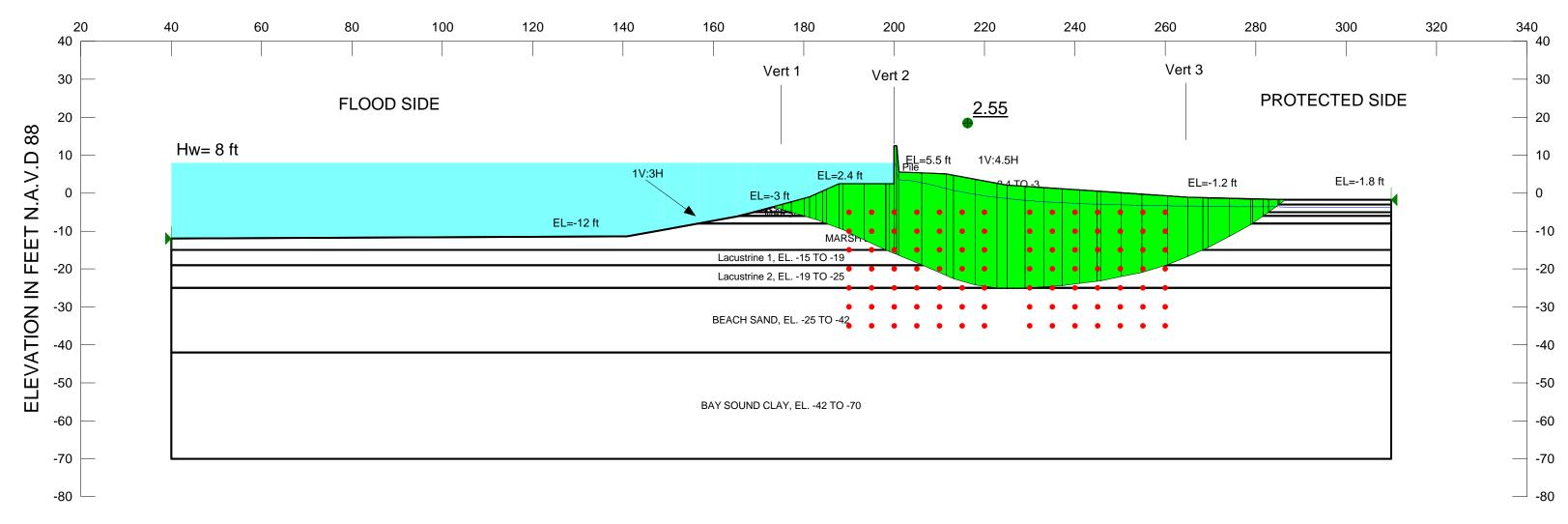
Name: Slope Stability Global (Entry/Exit) File Name: 17thReach11.gsz Last Edited By: Goetz, Ryan MVS





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17th STREET OUTFALL CANAL, REACH 11, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Entry/Exit) STA. 596+05 to 609+00 WEST ORLEANS PARISH, LOUISIANA



Phi: 0°

Name: MARSH 1b, EL. -5 TO -8 Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion Spatial Fn: Marsh 1b Phi: 0 ° Name: BEACH SAND, EL. -25 TO -42 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi: 0 ° Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: MARSH 2, EL. -8 TO -15 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Marsh 2 Phi: 0 ° Name: Lacustrine 1, EL. -15 TO -19 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Lacustrine 1 Phi: 0 °

Name: EMBANKMENT FILL, EL. +2.4 TO -3 Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 500 psf

Name: Lacustrine 2, EL. -19 TO -25 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine 2 Phi: 0 ° Name: MARSH 1a, EL. -0.4 TO -5 Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh 1a unit wt Cohesion Spatial Fn: Marsh 1a Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

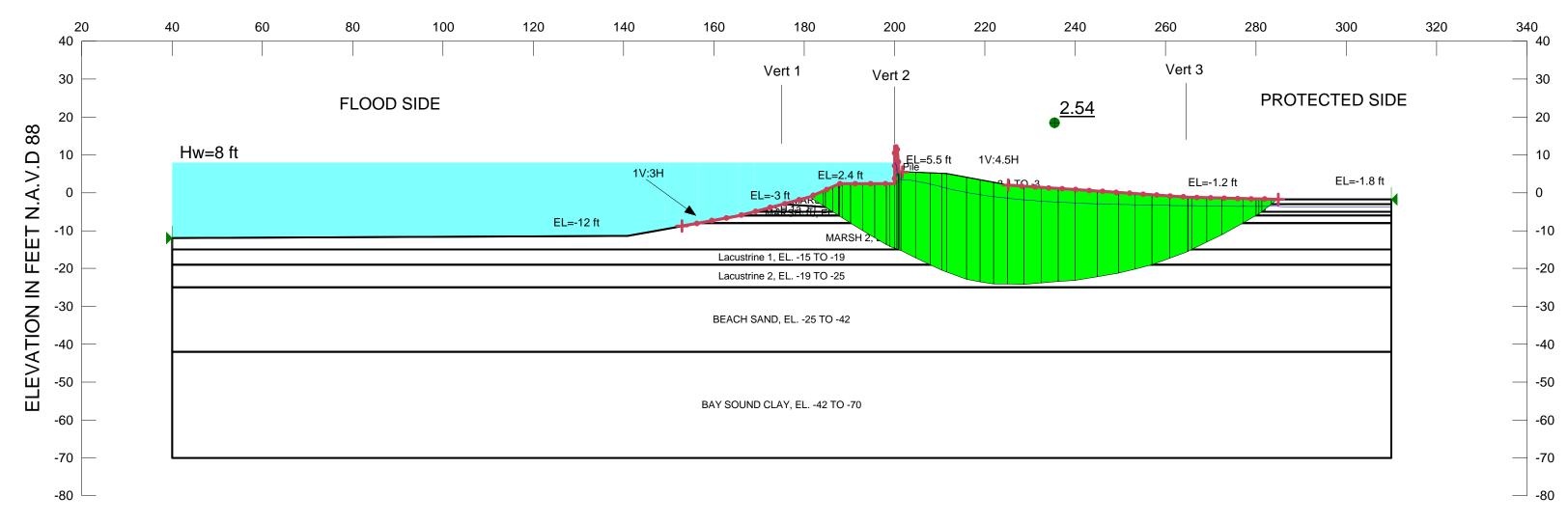
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Name: Slope Stability Global (Block) File Name: 17thReach12.gsz Last Edited By: Redell, Chris MVS





17th STREET OUTFALL CANAL, REACH 12, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Block) STA. 609+00 to 614+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.4 TO -3 Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 500 psf Phi: 0° Name: MARSH 1b, EL. -5 TO -8 Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion Spatial Fn: Marsh 1b Phi: 0°

Name: BEACH SAND, EL. -25 TO -42 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: MARSH 2, EL. -8 TO -15 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Marsh 2 Phi: 0 °

Name: Lacustrine 1, EL. -15 TO -19 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Lacustrine 1 Phi: 0° Name: Lacustrine 2, EL. -19 TO -25 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine 2 Phi: 0 °

Name: MARSH 1a, EL. -0.4 TO -5 Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh 1a unit wt Cohesion Spatial Fn: Marsh 1a Phi: 0°

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global (Entry/ Exit) File Name: 17thReach12.gsz Last Edited By: Redell, Chris MVS

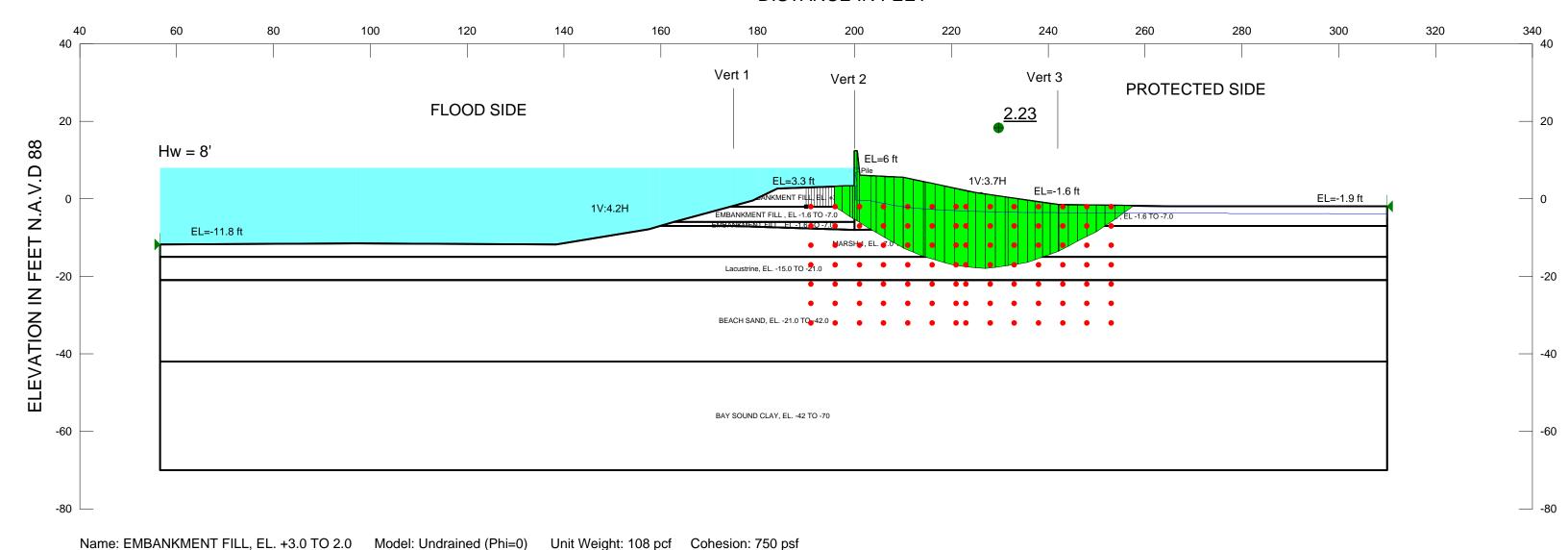




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17th STREET OUTFALL CANAL, REACH 12, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Entry/ Exit) STA. 609+00 to 614+00 WEST ORLEANS PARISH, LOUISIANA



Name: BEACH SAND, EL. -21.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf Name: EMBANKMENT FILL, EL -1.6 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: FILL 2 Phi: 0 ° Name: MARSH 1, EL. -7.0 TO -15.0 Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion Fn: MARSH 1 Phi: 0 °

Name: Lacustrine, EL. -15.0 TO -21.0 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine Phi: 0 ° Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: Clay Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

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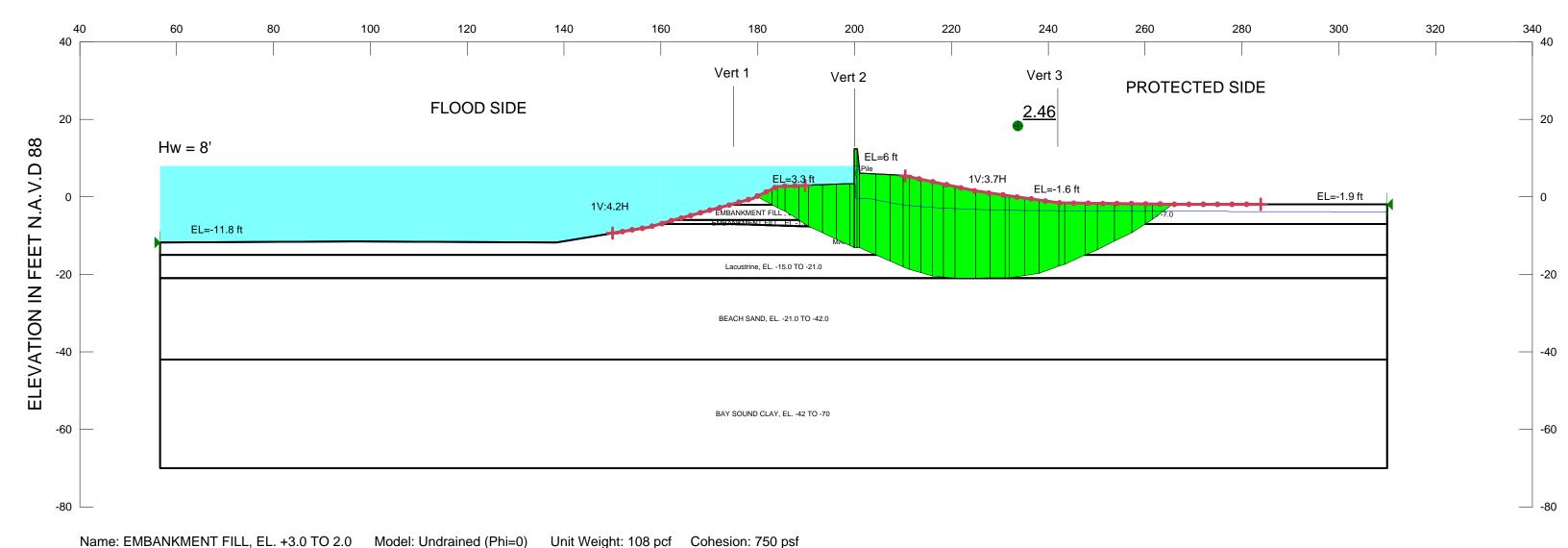




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17th STREET OUTFALL CANAL, REACH 13, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Block) STA. 614+00 to 617+00 WEST ORLEANS PARISH, LOUISIANA



Name: BEACH SAND, EL. -21.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf Name: EMBANKMENT FILL, EL -1.6 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: FILL 2 Phi: 0 °

Name: MARSH 1, EL. -7.0 TO -15.0 Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion Fn: MARSH 1 Phi: 0 °
Name: Lacustrine, EL. -15.0 TO -21.0 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine Phi: 0 °
Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: Clay Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

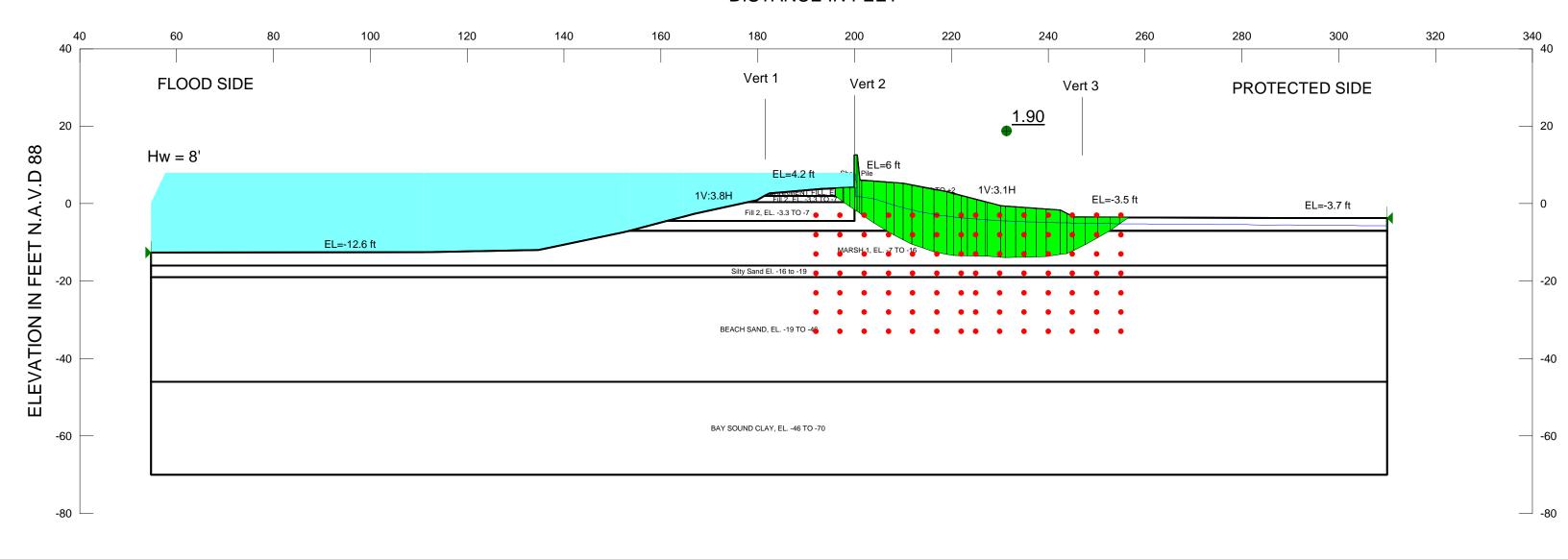
Name: Slope Stability Global (Entry & Exit) File Name: 17thReach13.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 13, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Entry & Exit) STA. 614+00 to 617+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +4.2 TO +2 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 860 psf Phi: 0 °

Name: BEACH SAND, EL. -19 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Fill 2, EL. -3.3 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Fill Phi: 0 °

Name: MARSH 1, EL. -7 TO -16 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Spatial Fn: Marsh 1 Cohesion Phi: 0 °

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0°

Name: Silty Sand El. -16 to -19 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

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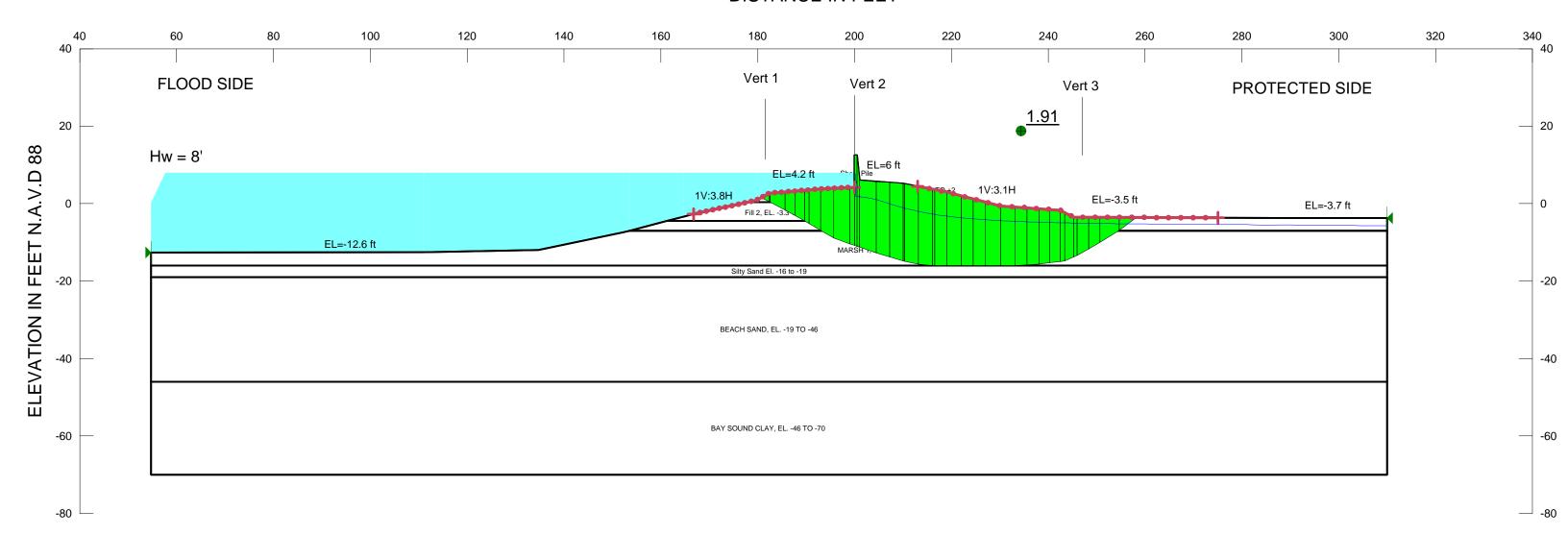




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17th STREET OUTFALL CANAL, REACH 14, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Block) STA. 617+00 to 625+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +4.2 TO +2 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 860 psf Phi: 0 °

Name: BEACH SAND, EL. -19 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Fill 2, EL. -3.3 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Fill Phi: 0 °

Name: MARSH 1, EL. -7 TO -16 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Spatial Fn: Marsh 1 Cohesion Phi: 0 °

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0°

Name: Silty Sand El. -16 to -19 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global (Entry & Exit)

File Name: 17thReach14.gsz Last Edited By: Redell, Chris MVS

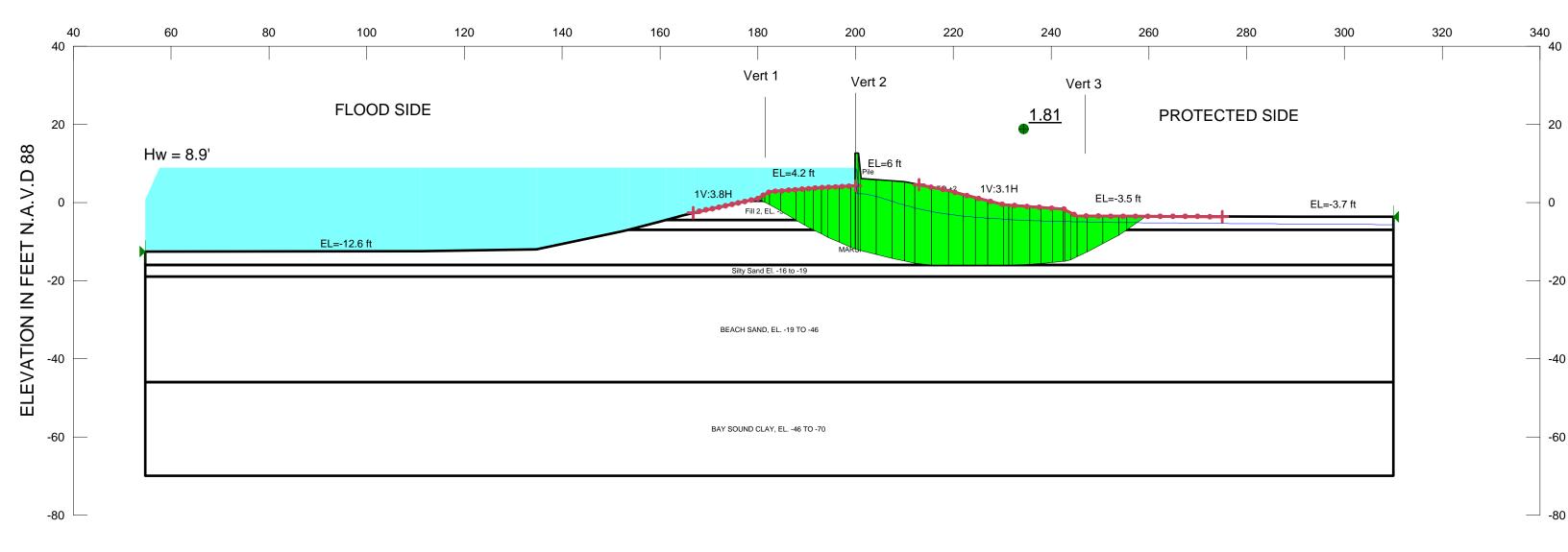




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17th STREET OUTFALL CANAL, REACH 14, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Entry & Exit) STA. 617+00 to 625+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +4.2 TO +2 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 860 psf Phi: 0 °

Name: BEACH SAND, EL. -19 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Fill 2, EL. -3.3 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Fill Phi: 0 °

Name: MARSH 1, EL. -7 TO -16 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Spatial Fn: Marsh 1 Cohesion

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

Name: Silty Sand El. -16 to -19 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global (Entry & Exit) File Name: 17thReach14.gsz Last Edited By: Goltz, Amanda MVS

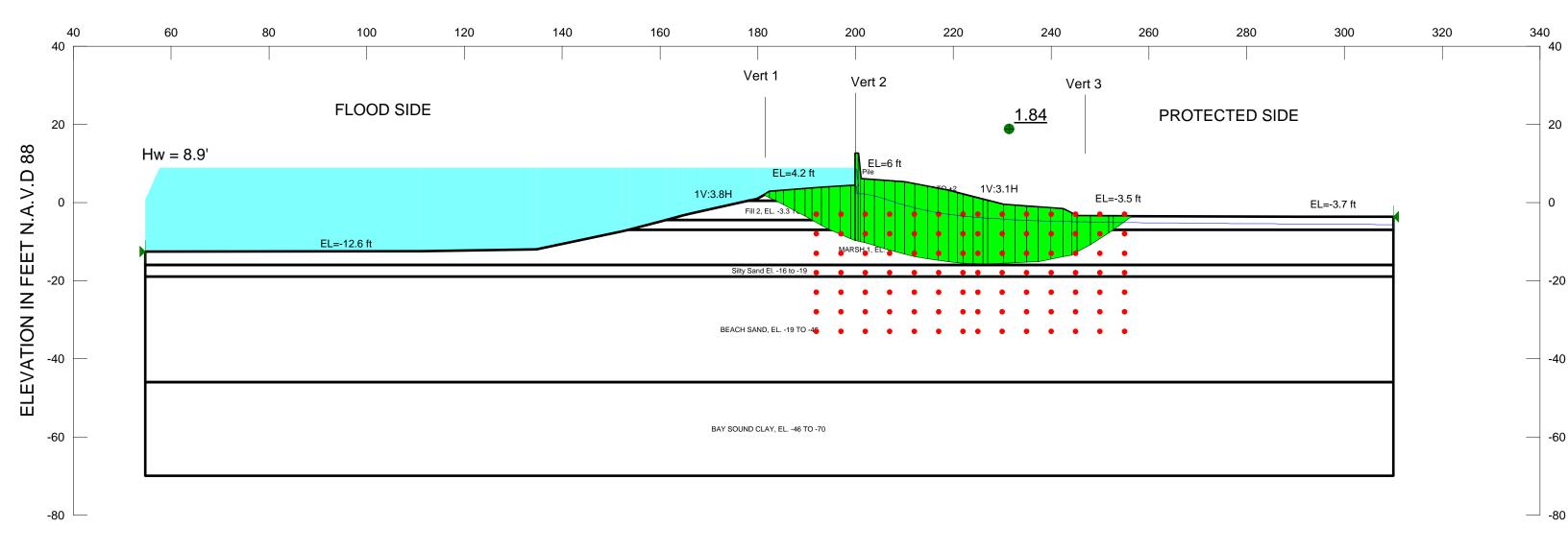




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17th STREET OUTFALL CANAL, REACH 14, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Entry & Exit) STA. 617+00 to 625+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +4.2 TO +2 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 860 psf Phi: 0 °

Name: BEACH SAND, EL. -19 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Fill 2, EL. -3.3 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Fill Phi: 0 °

Name: MARSH 1, EL. -7 TO -16 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Spatial Fn: Marsh 1 Cohesion

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

Name: Silty Sand El. -16 to -19 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global (Block) File Name: 17thReach14.gsz Last Edited By: Goltz, Amanda MVS

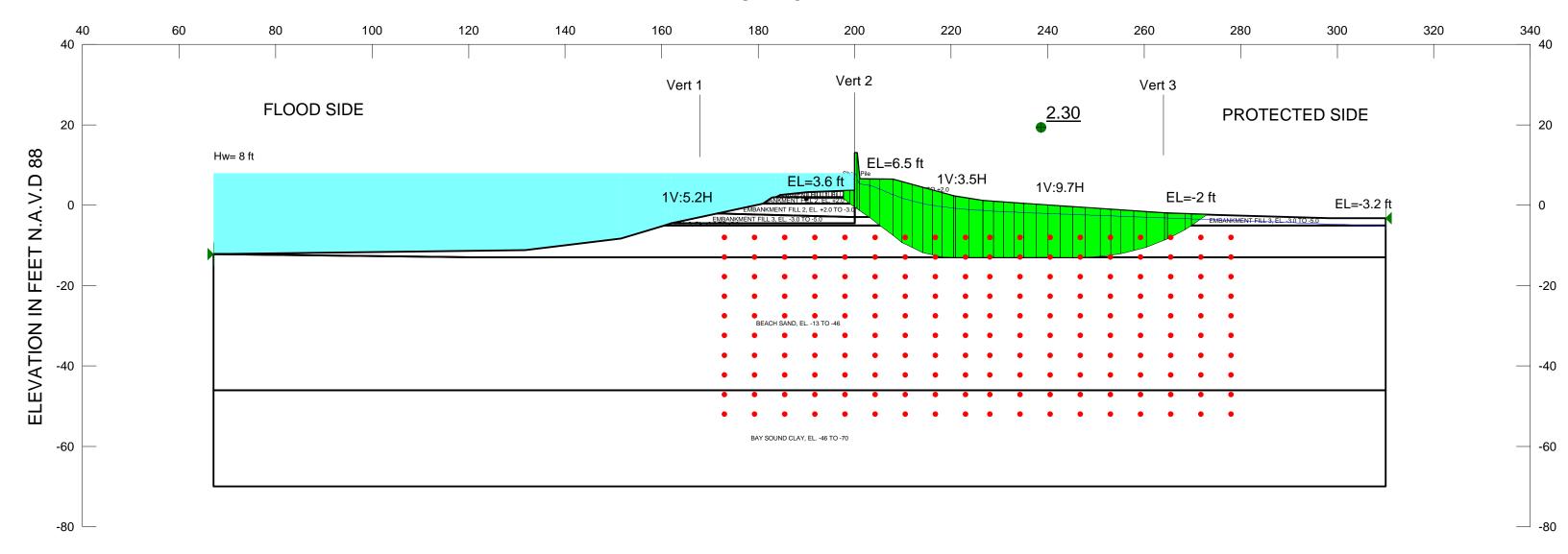




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17th STREET OUTFALL CANAL, REACH 14, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Block) STA. 617+00 to 625+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 1, EL. +5.9 TO +2.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0 °

Name: BEACH SAND, EL. -13 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: EMBANKMENT FILL 2, EL. +2.0 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi: 0 ° Name: EMBANKMENT FILL 3, EL. -3.0 TO -5.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global (Block) File Name: 17thReach15A.gsz Last Edited By: Redell, Chris MVS



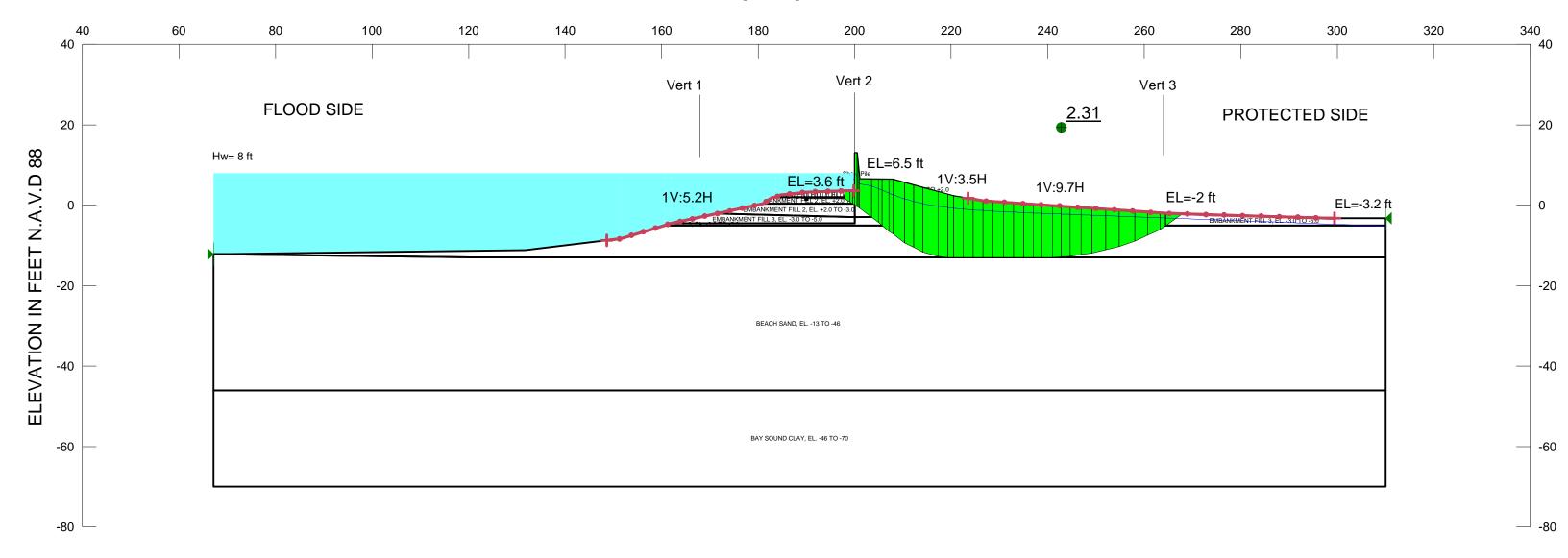
Phi: 0°



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17th STREET OUTFALL CANAL, REACH 15A, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Block) STA. 626+56 to 635+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 1, EL. +5.9 TO +2.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0 °

Name: BEACH SAND, EL. -13 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: EMBANKMENT FILL 2, EL. +2.0 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi: 0 ° Name: EMBANKMENT FILL 3, EL. -3.0 TO -5.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global (Entry & Exit) File Name: 17thReach15A.gsz Last Edited By: Redell, Chris MVS

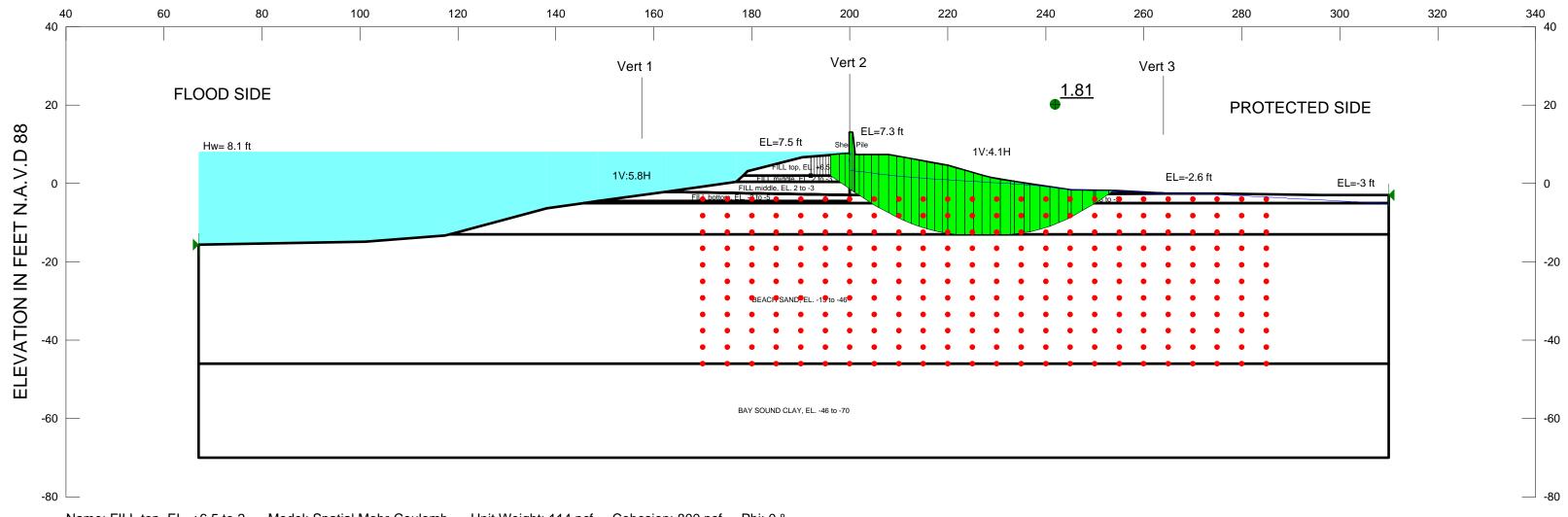




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17th STREET OUTFALL CANAL, REACH 15A, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Entry & Exit) STA. 626+56 to 635+00 WEST ORLEANS PARISH, LOUISIANA



Name: FILL top, EL. +6.5 to 2 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -5 to -13 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: BEACH SAND, EL. -13 to -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi: 0°

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: FILL middle, EL. 2 to -3 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi: 0 ° Name: FILL bottom, EL. -3 to -5 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global Block File Name: 17thReach15B.gsz Last Edited By: Redell, Chris MVS

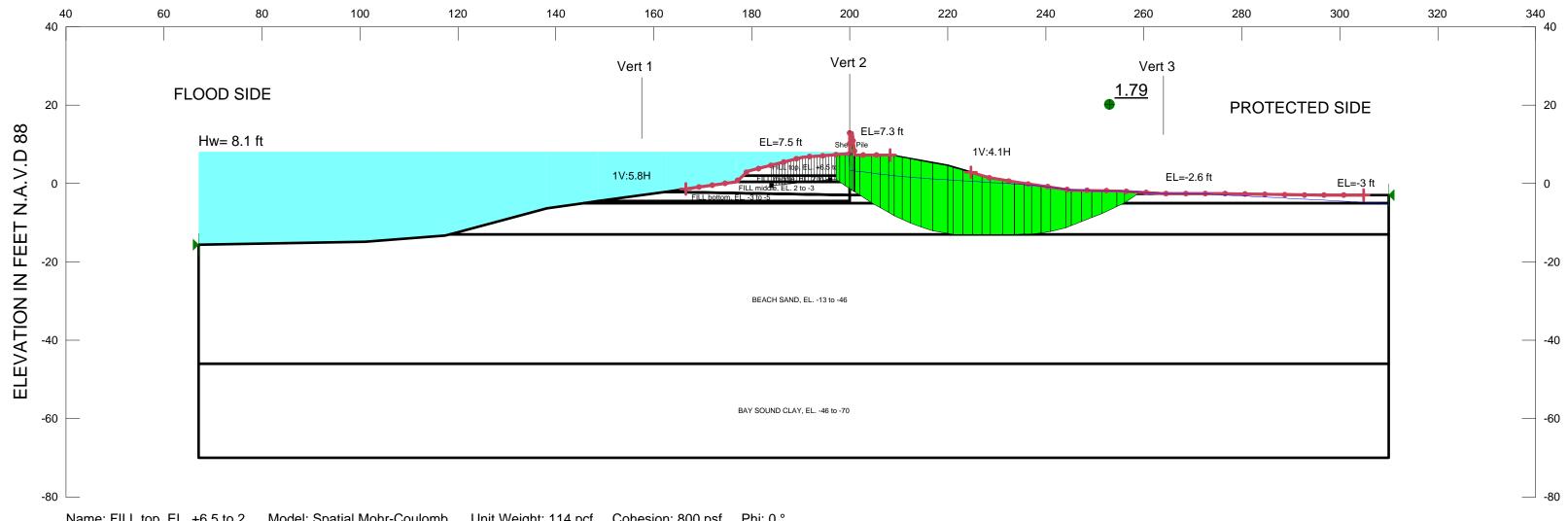




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17th STREET OUTFALL CANAL, REACH 15B, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global Block STA. 635+00 to 639+06 WEST ORLEANS PARISH, LOUISIANA



Name: FILL top, EL. +6.5 to 2 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -5 to -13 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: BEACH SAND, EL. -13 to -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi: 0°

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: FILL middle, EL. 2 to -3 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi: 0 ° Name: FILL bottom, EL. -3 to -5 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability Global Entry & Exit File Name: 17thReach15B.gsz Last Edited By: Redell, Chris MVS

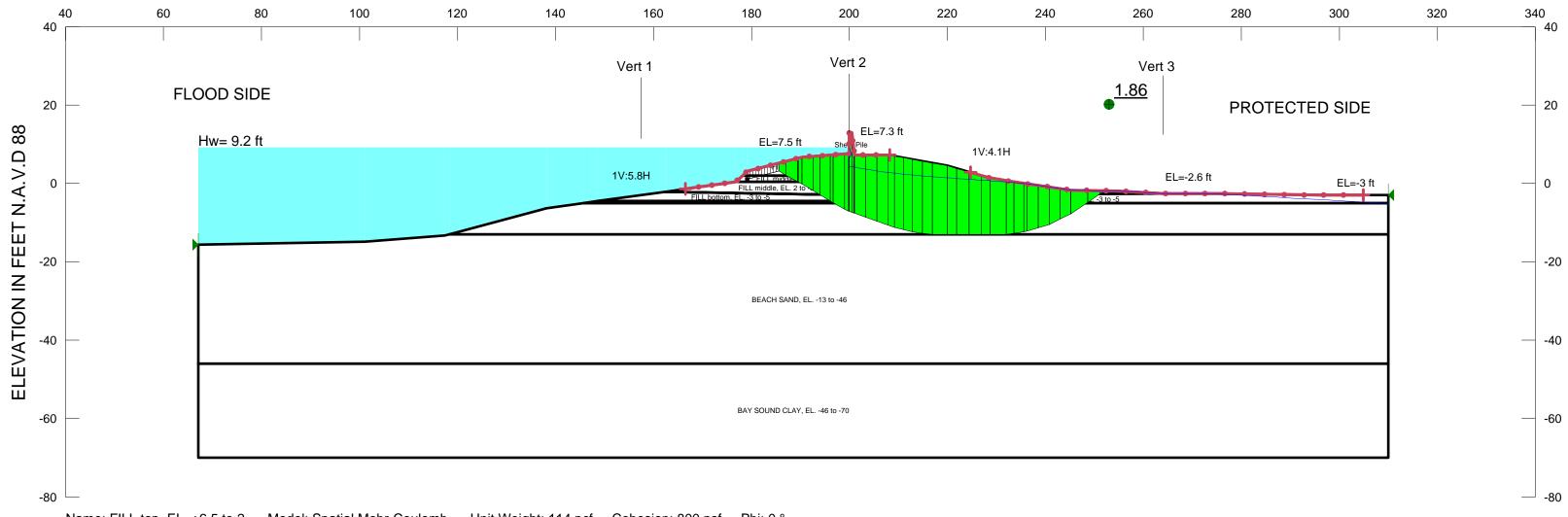




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17th STREET OUTFALL CANAL, REACH 15B, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global Entry & Exit STA. 635+00 to 639+06 WEST ORLEANS PARISH, LOUISIANA



Name: FILL top, EL. +6.5 to 2 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -5 to -13 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: BEACH SAND, EL. -13 to -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi: 0°

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: FILL middle, EL. 2 to -3 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi: 0 ° Name: FILL bottom, EL. -3 to -5 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 °

GENERAL NOTES

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Name: Slope Stability Global Entry & Exit File Name: 17thReach15B.gsz Last Edited By: Goetz, Ryan MVS

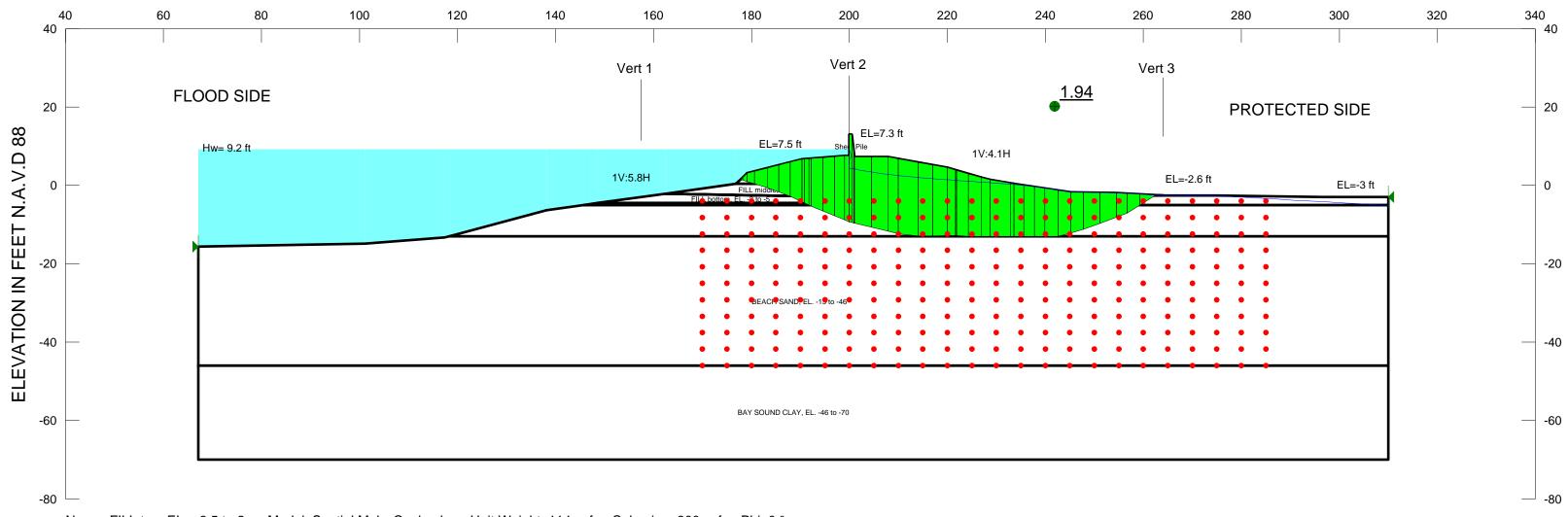




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17th STREET OUTFALL CANAL, REACH 15B, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global Entry & Exit STA. 635+00 to 639+06 WEST ORLEANS PARISH, LOUISIANA



Name: FILL top, EL. +6.5 to 2 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -5 to -13 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: BEACH SAND, EL. -13 to -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi: 0°

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: FILL middle, EL. 2 to -3 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi: 0 ° Name: FILL bottom, EL. -3 to -5 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability Global Block File Name: 17thReach15B.gsz Last Edited By: Goetz, Ryan MVS

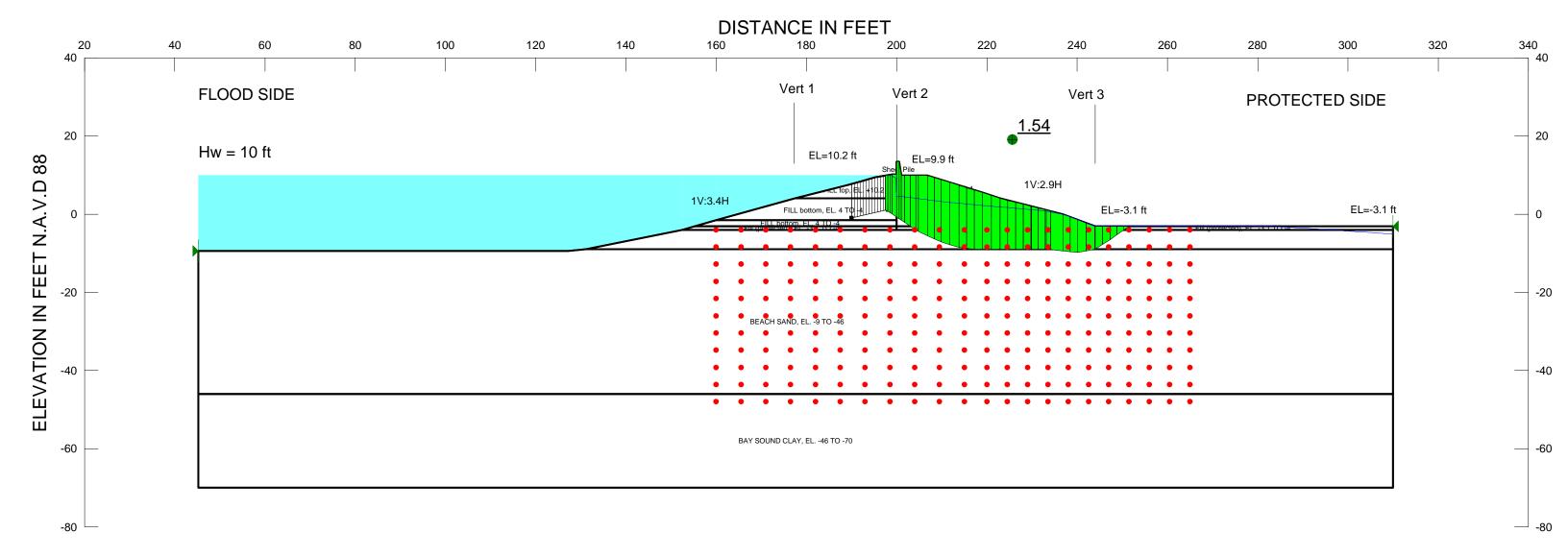




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17th STREET OUTFALL CANAL, REACH 15B, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global Block STA. 635+00 to 639+06 WEST ORLEANS PARISH, LOUISIANA



Name: FILL top, EL. +10.2 TO 4 Model: Spatial Mohr-Coulomb Unit Weight: 119 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -4 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion Fn: MARSH 1 Phi: 0 ° Name: BEACH SAND, EL. -9 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0°

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Fill (protected), EL. -3.1 TO -4 Model: Spatial Mohr-Coulomb Weight Fn: Fill 2 Cohesion Fn: Fill Phi: 0 ° Name: FILL bottom, EL. 4 TO -4 Model: Spatial Mohr-Coulomb Unit Weight: 119 pcf Cohesion: 700 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global (Block) File Name: 17thReach16.gsz Last Edited By: Redell, Chris MVS

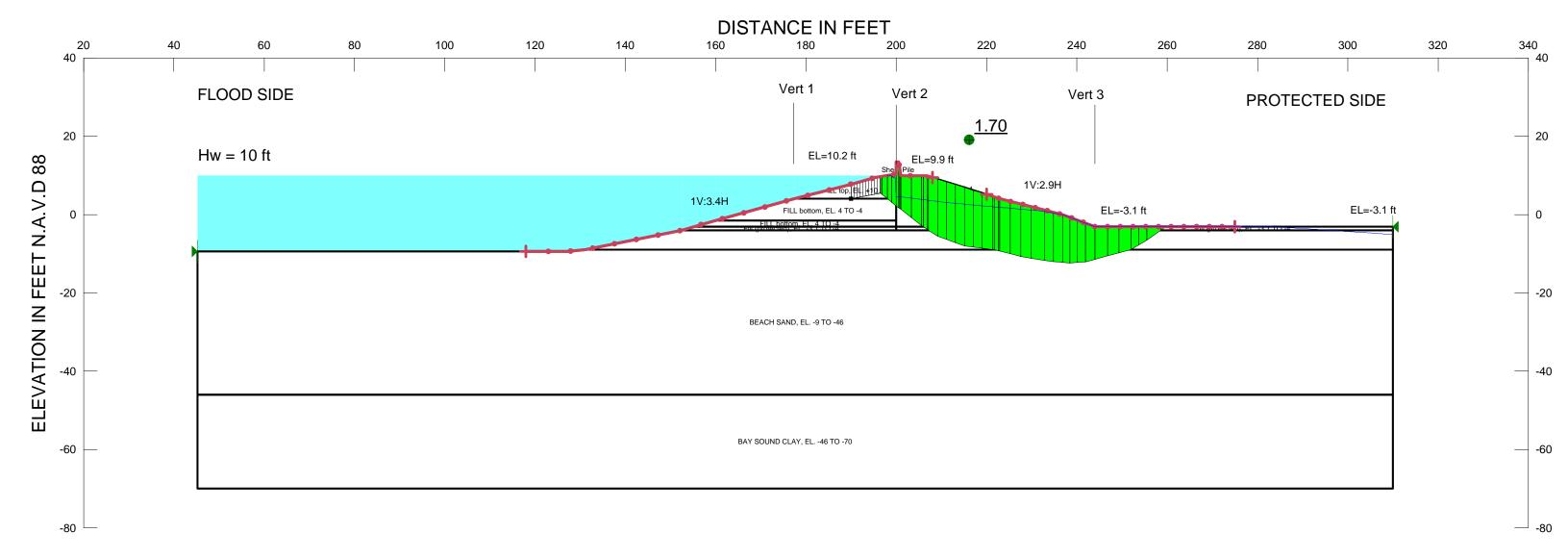




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17th STREET OUTFALL CANAL, REACH 16, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Block) STA. 641+85 - 658+00 WEST ORLEANS PARISH, LOUISIANA



Name: FILL top, EL. +10.2 TO 4 Model: Spatial Mohr-Coulomb Unit Weight: 119 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -4 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion Fn: MARSH 1 Phi: 0 °

Name: BEACH SAND, EL. -9 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0°

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Fill (protected), EL. -3.1 TO -4 Model: Spatial Mohr-Coulomb Weight Fn: Fill 2 Cohesion Fn: Fill Name: FILL bottom, EL. 4 TO -4 Model: Spatial Mohr-Coulomb Unit Weight: 119 pcf Cohesion: 700 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global (Entry & Exit) File Name: 17thReach16.gsz Last Edited By: Redell, Chris MVS

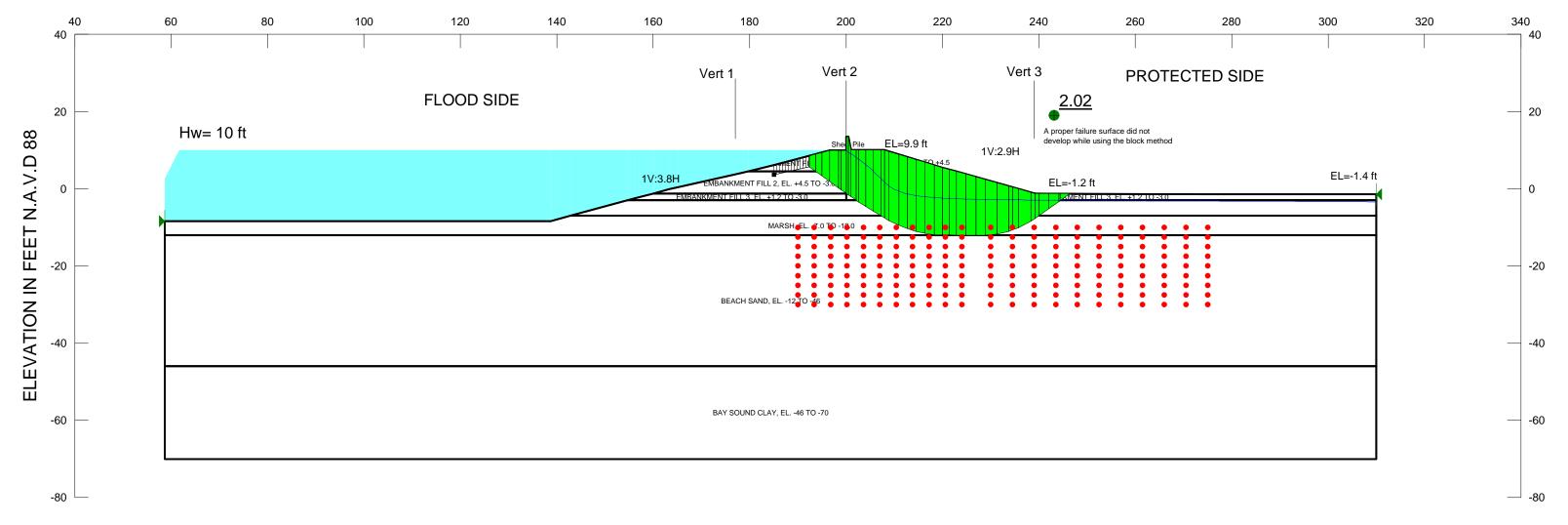




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17th STREET OUTFALL CANAL, REACH 16, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Entry & Exit) STA. 641+85 - 658+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.6 TO +4.5 Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -3.0 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -12 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Clay Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 650 psf Phi: 0 ° Name: EMBANKMENT FILL 3, EL. +1.2 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion Fn: Fill Phi: 0 ° Name: MARSH, EL. -7.0 TO -12.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 2 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global Block File Name: 17thReach17.gsz Last Edited By: Redell, Chris MVS

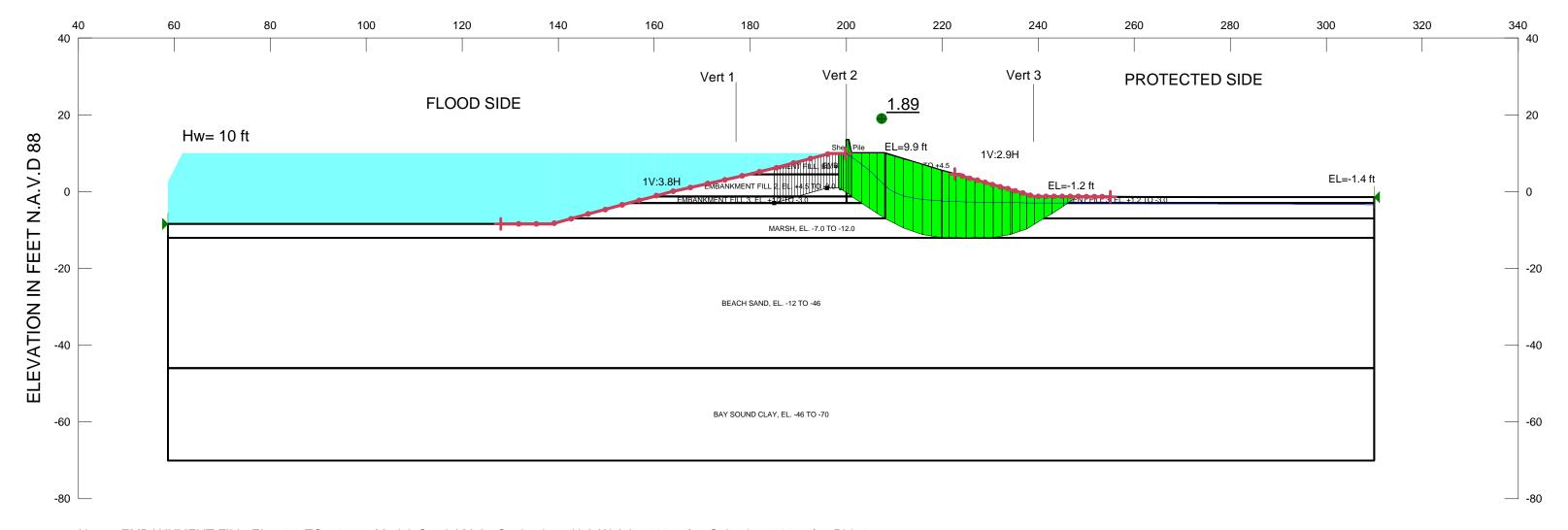




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17th STREET OUTFALL CANAL, REACH 17, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global Block STA. 658+00 - 663+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.6 TO +4.5 Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -3.0 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -12 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Clay Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 650 psf Phi: 0 ° Name: EMBANKMENT FILL 3, EL. +1.2 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion Fn: Fill Phi: 0 ° Name: MARSH, EL. -7.0 TO -12.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 2 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global Entry & Exit File Name: 17thReach17.gsz Last Edited By: Redell, Chris MVS

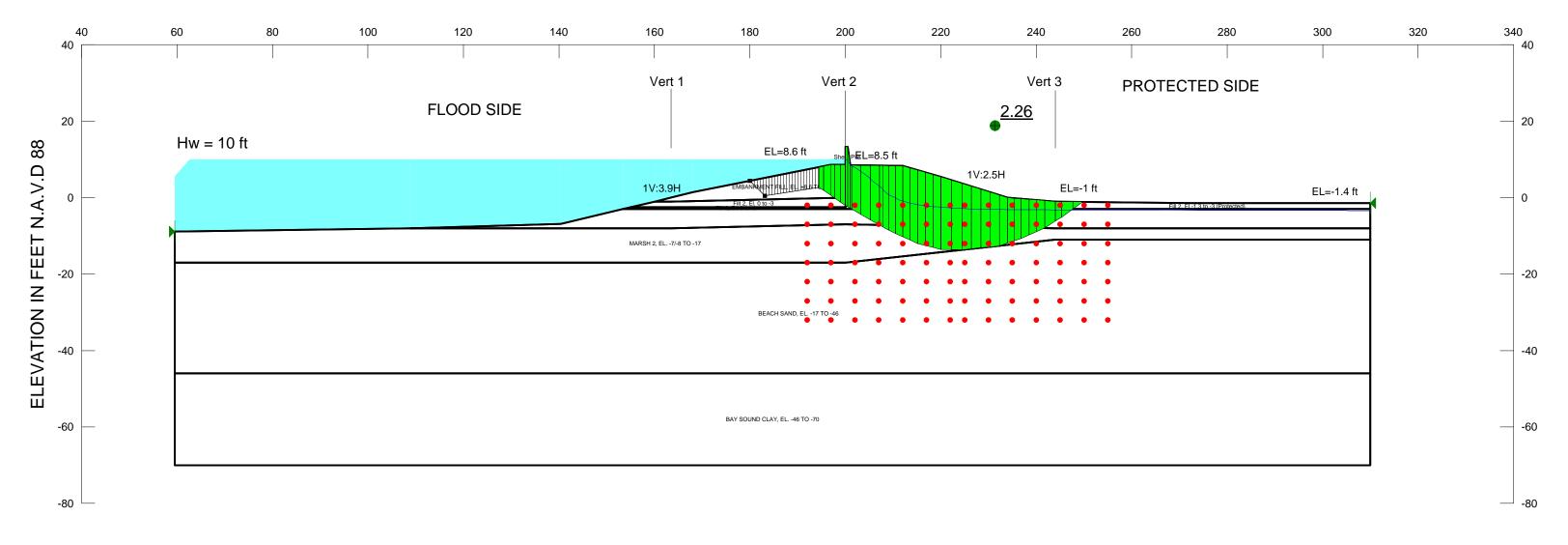




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17th STREET OUTFALL CANAL, REACH 17, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global Entry & Exit STA. 658+00 - 663+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.6 TO 0 Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH 1, EL. -3 TO -7/-8 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -17 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0°

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: MARSH 2, EL. -7/-8 TO -17 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: MARSH 2 Phi: 0 °

Name: Fill 2, El. 0 to -3 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion Fn: Fill Phi: 0 °

Name: Fill 2, El -1.3 to -3 (Protected) Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 800 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global Block File Name: 17thReach18.gsz Last Edited By: Redell, Chris MVS

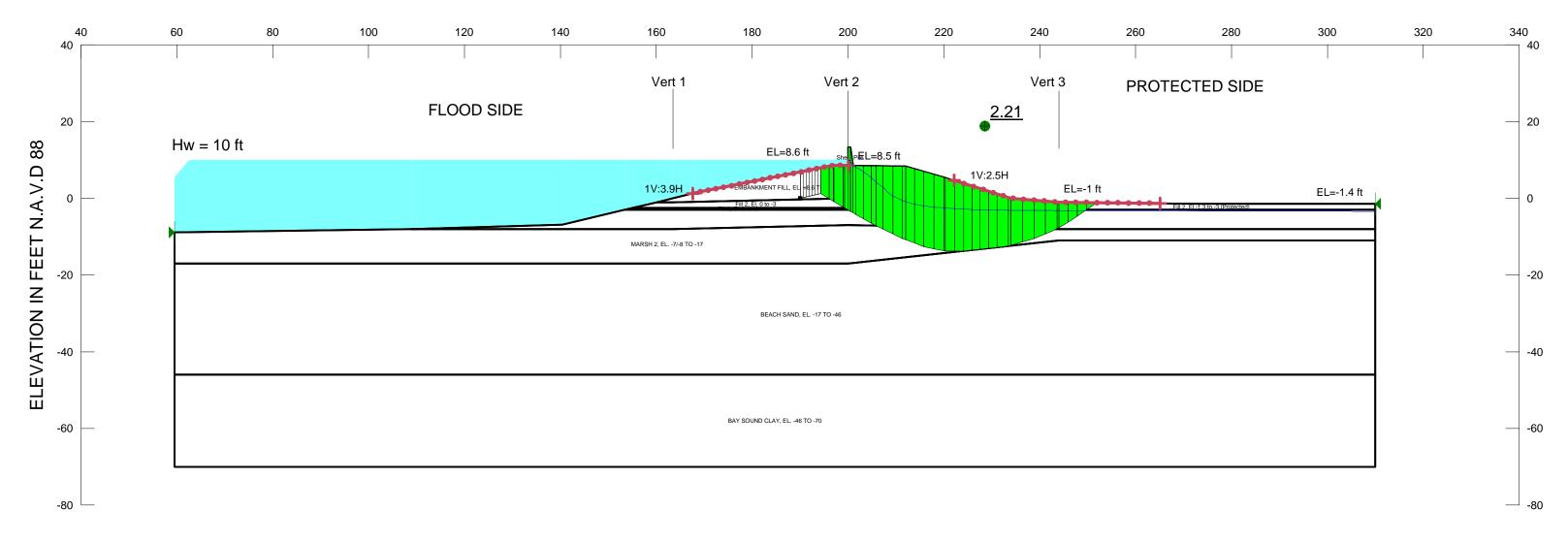




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17th STREET OUTFALL CANAL, REACH 18, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global Block STA. 663+00 to 669+36 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.6 TO 0 Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH 1, EL. -3 TO -7/-8 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -17 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0°

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: MARSH 2, EL. -7/-8 TO -17 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: MARSH 2 Phi: 0 °

Name: Fill 2, El. 0 to -3 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion Fn: Fill Phi: 0 °

Name: Fill 2, El -1.3 to -3 (Protected) Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 800 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global Entry & Exit File Name: 17thReach18.gsz Last Edited By: Redell, Chris MVS

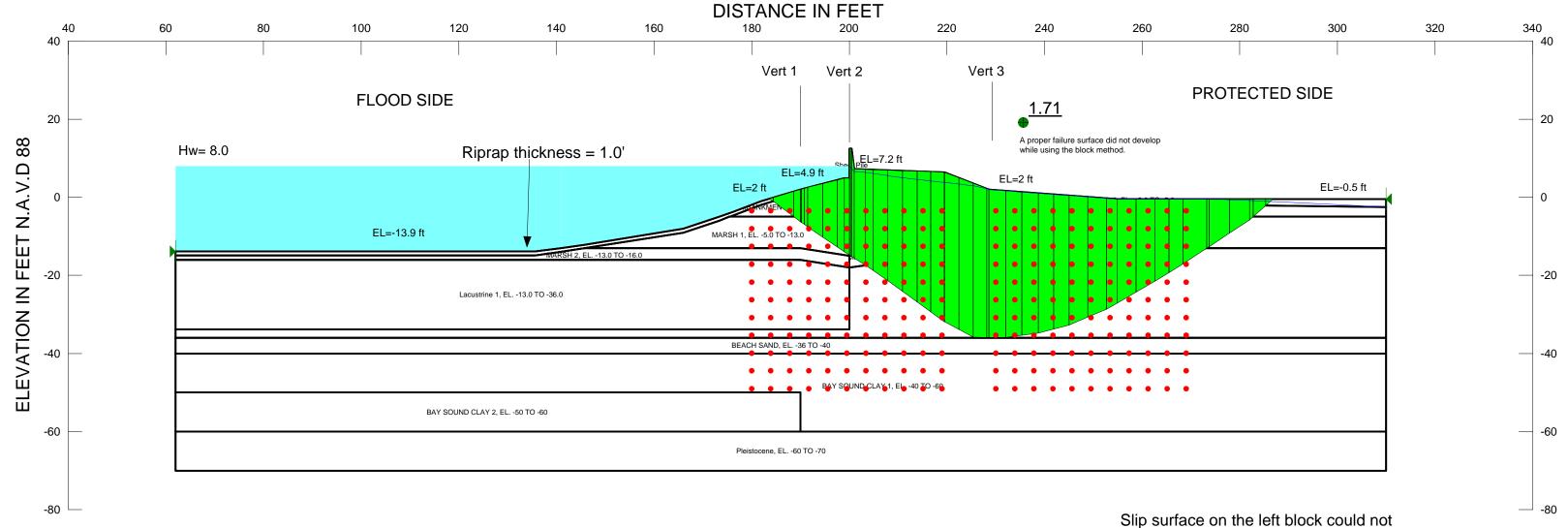




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17th STREET OUTFALL CANAL, REACH 18, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global Entry & Exit STA. 663+00 to 669+36 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL. +2.0 TO -5.0 Model: Spatial Mohr-Coulomb Weight Fn: Fill (2) Cohesion: 500 psf Phi: 0 ° Name: MARSH 1, EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi: 0 ° Name: BEACH SAND, EL. -36 TO -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY 1, EL. -40 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Bay Sound 1 Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Lacustrine 1, EL. -13.0 TO -36.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1 Phi: 0 °

Name: Pleistocene, EL. -60 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 124 pcf Cohesion: 1000 psf Phi: 0 °

Name: EMBANKMENT FILL, EL. +7.2 TO 0.0 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion Spatial Fn: Embankment Fill Phi: 0 °

Name: MARSH 2, EL. -13.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion Fn: MARSH 2 Phi: 0 ° Name: BAY SOUND CLAY 2, EL. -50 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Bay Sound 2 Phi: 0 °

Name: Rip Rap Model: Spatial Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 0 psf Phi: 40 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global Block File Name: 17thReach19.gsz Last Edited By: Redell, Chris MVS

be located inside the block grid, therefore the 0.7H criteria was used to find the critical failure.

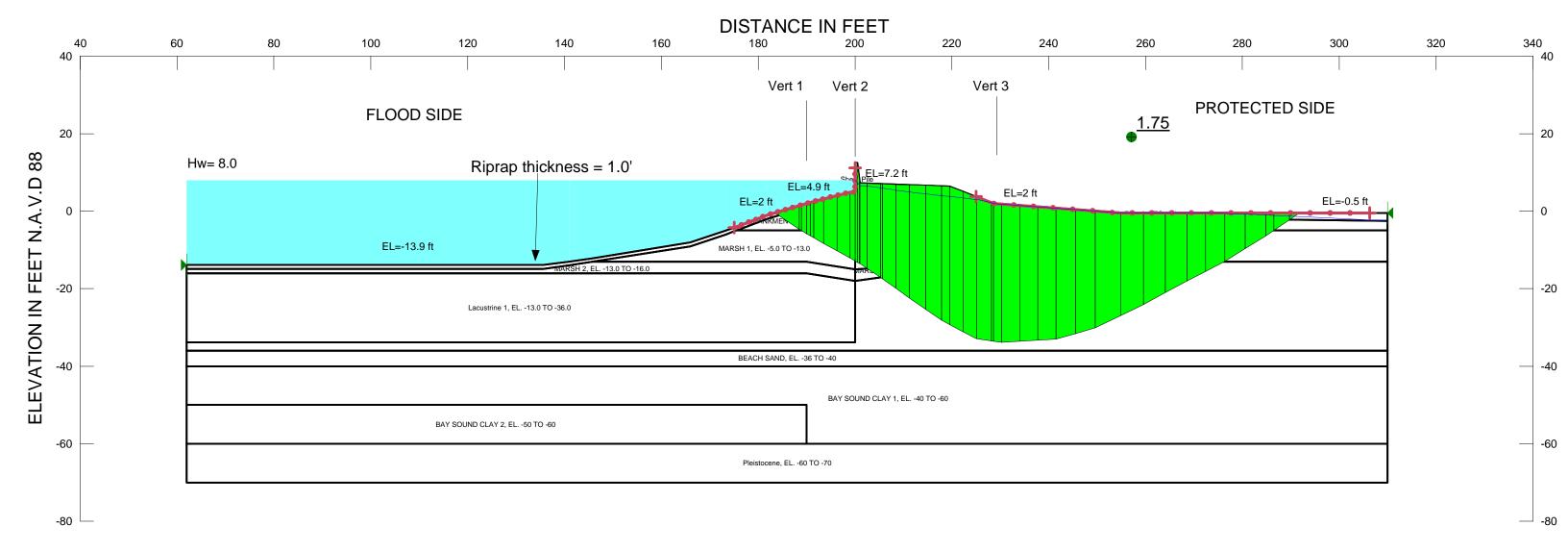




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17th STREET OUTFALL CANAL, REACH 19, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global Block STA. Closure to 552+17 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL. +2.0 TO -5.0 Model: Spatial Mohr-Coulomb Weight Fn: Fill (2) Cohesion: 500 psf Phi: 0 ° Name: MARSH 1, EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -36 TO -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY 1, EL. -40 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Bay Sound 1 Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Lacustrine 1, EL. -13.0 TO -36.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1 Phi: 0 °

Name: Pleistocene, EL. -60 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 124 pcf Cohesion: 1000 psf Phi: 0 °

Name: EMBANKMENT FILL, EL. +7.2 TO 0.0 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion Spatial Fn: Embankment Fill Phi: 0 °

Name: MARSH 2, EL. -13.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion Fn: MARSH 2 Phi: 0 °

Name: BAY SOUND CLAY 2, EL. -50 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Bay Sound 2 Phi: 0 °

Name: Rip Rap Model: Spatial Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 0 psf Phi: 40 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

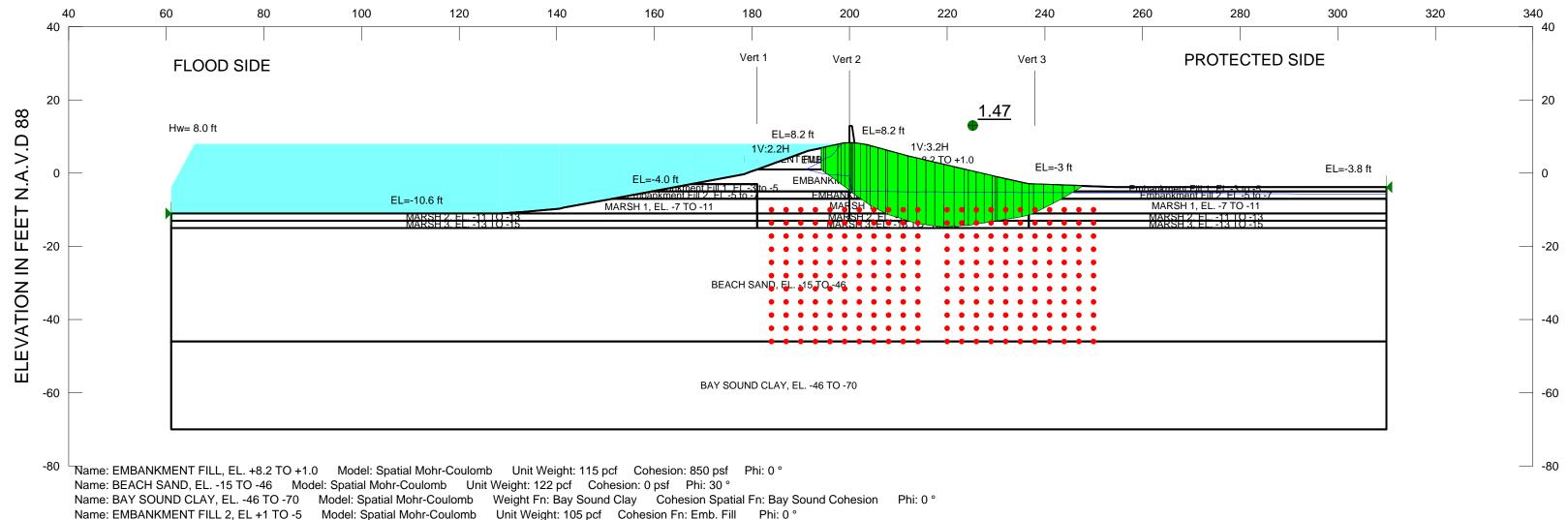
Name: Slope Stability Global Entry/Exit File Name: 17thReach19.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 19, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global Entry/Exit STA. Closure to 552+17 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -7 TO -11 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 270 psf Phi: 0 ° Name: MARSH 2, EL. -11 TO -13 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 180 psf Phi: 0 ° Name: Embankment Fill 1, El. -3 to -5 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 800 psf Phi: 0 ° Name: Embankment Fill 2, El. -5 to -7 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 500 psf Phi: 0 ° Name: MARSH 3, EL. -13 TO -15 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 285 psf Phi: 0 ° Name: MARSH 1, EL. -7 TO -11 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: MARSH 2, EL. -11 TO -13 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Phi: 0 ° Name: MARSH 3, EL. -13 TO -15 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi: 0 ° Name: EMBANKMENT FILL 3, EL -5 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Emb. Fill 2 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global (Block) File Name: 17thReach30.gsz Last Edited By: Goltz, Amanda MVS

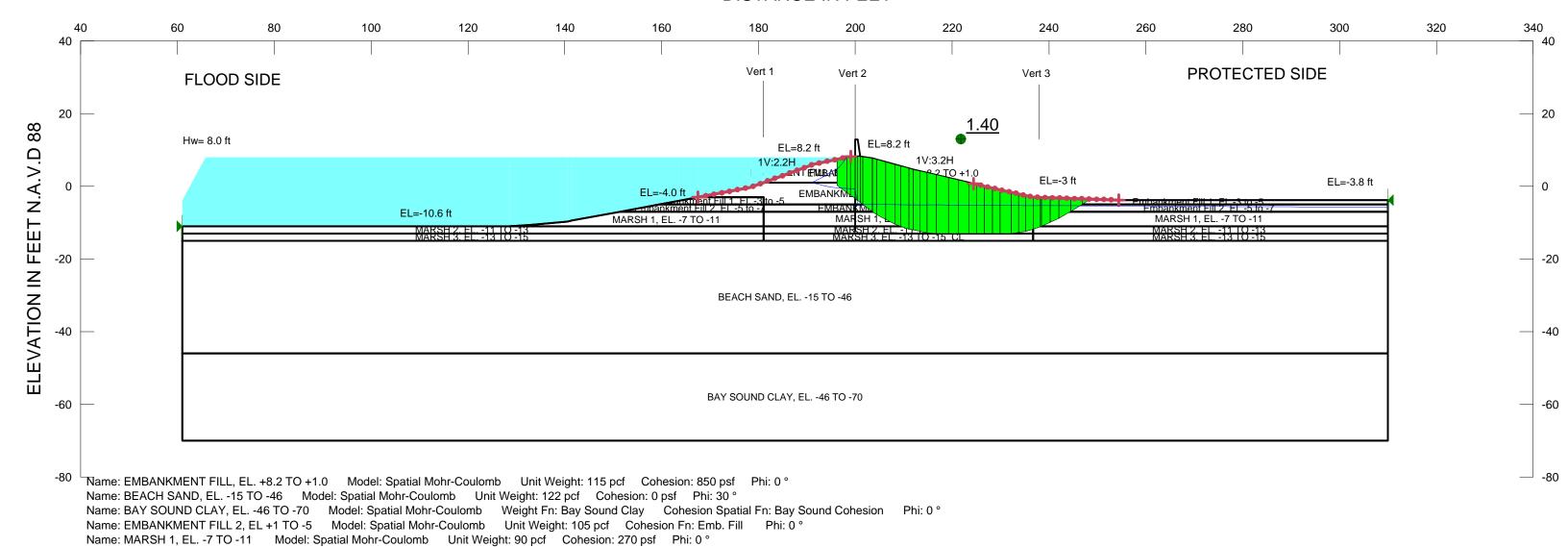




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17th STREET OUTFALL CANAL, REACH 30. PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Block) STA. 626+73 to 634+09 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 2, EL. -11 TO -13 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 180 psf Phi: 0 ° Name: Embankment Fill 1, El. -3 to -5 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 800 psf Phi: 0 ° Name: Embankment Fill 2, El. -5 to -7 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 500 psf Phi: 0 ° Name: MARSH 3, EL. -13 TO -15 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 285 psf Phi: 0 ° Name: MARSH 1, EL. -7 TO -11 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: MARSH 2, EL. -11 TO -13 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Phi: 0 ° Name: MARSH 3, EL. -13 TO -15 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi: 0 ° Name: EMBANKMENT FILL 3, EL -5 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Emb. Fill 2 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global (Entry/Exit) File Name: 17thReach30.gsz Last Edited By: Goltz, Amanda MVS



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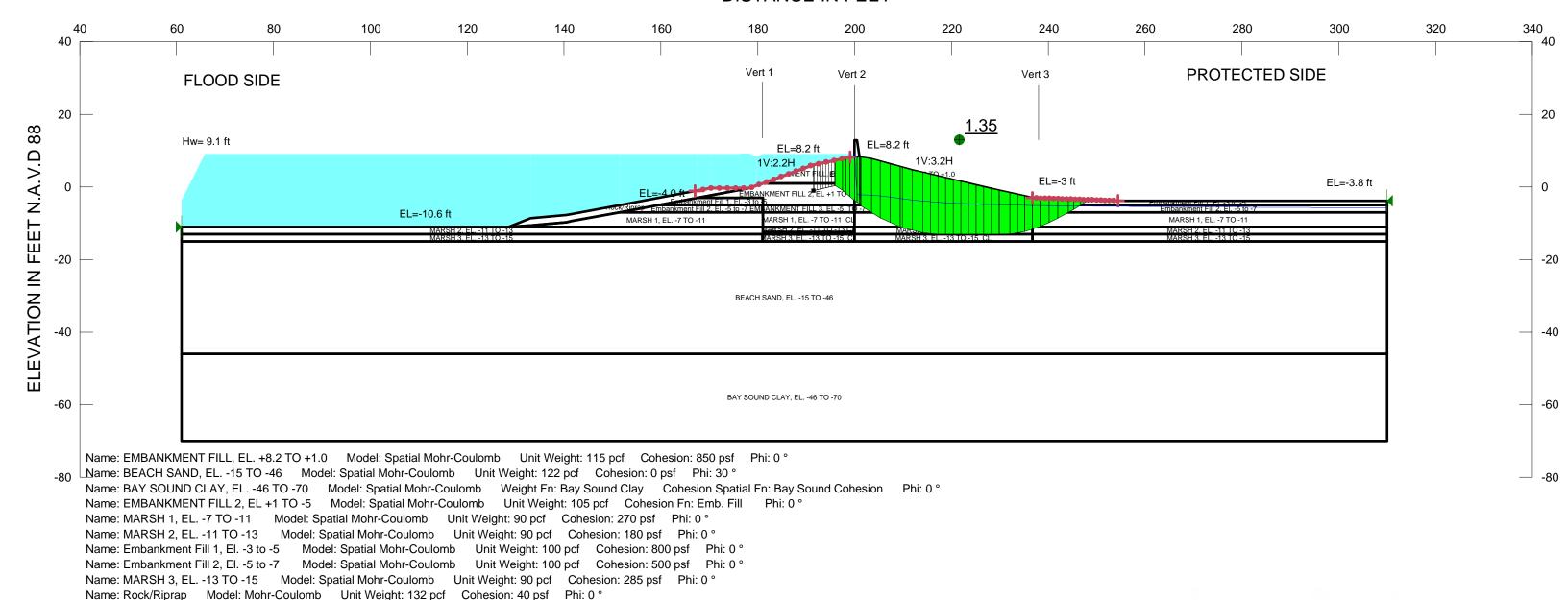


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17th STREET OUTFALL CANAL, REACH 30, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Entry/Exit) STA. 626+73 to 634+09 EAST ORLEANS PARISH, LOUISIANA



Unit Weight: 90 pcf Cohesion Fn: MARSH 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: MARSH 1, EL. -7 TO -11 CL Model: Spatial Mohr-Coulomb

Name: MARSH 2, EL. -11 TO -13 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Phi: 0 ° Name: MARSH 3, EL. -13 TO -15 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi: 0 °

Name: EMBANKMENT FILL 3, EL -5 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Emb. Fill 2 Phi: 0 °

Name: Slope Stability Global (Entry/Exit) File Name: 17thReach30 Modified.gsz Last Edited By: Goltz, Amanda MVS

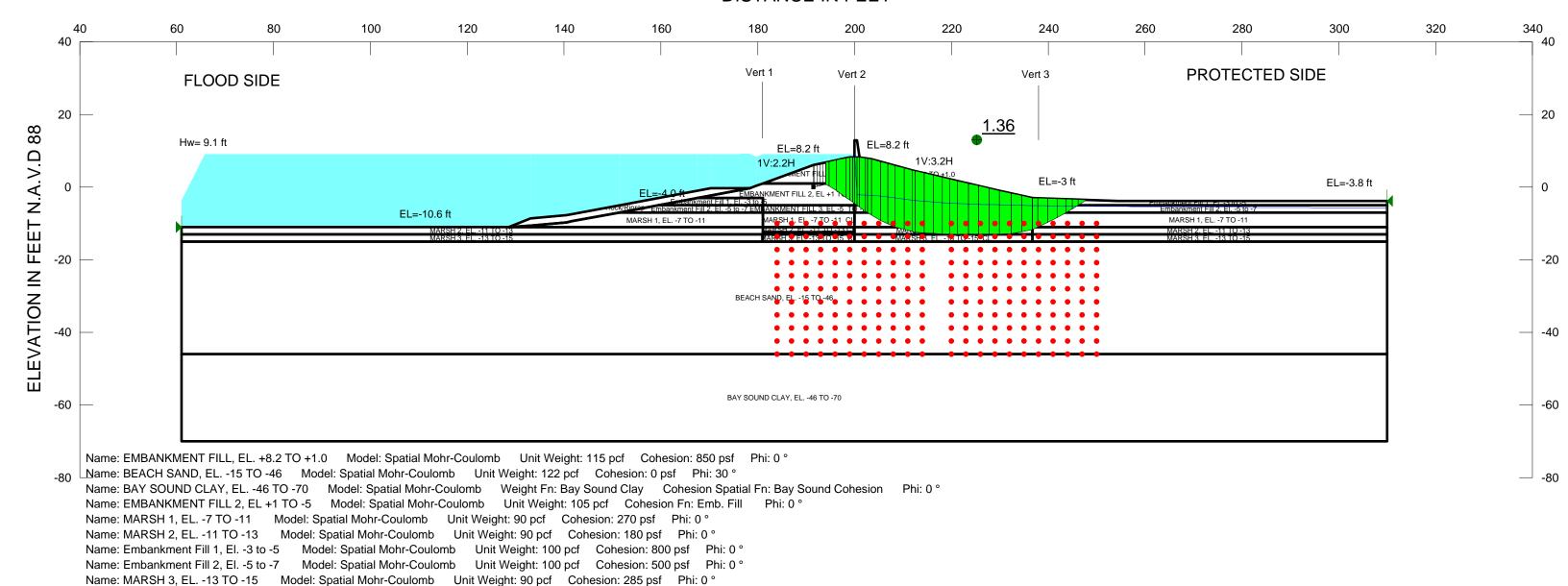




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17th STREET OUTFALL CANAL, REACH 30, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Entry/Exit) STA. 626+73 to 634+09 EAST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Rock/Riprap Model: Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 40 psf Phi: 0 °

Name: MARSH 3, EL. -13 TO -15 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi: 0 °

Name: EMBANKMENT FILL 3, EL -5 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Emb. Fill 2 Phi: 0 °

Unit Weight: 90 pcf Cohesion Fn: MARSH 1

Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Phi: 0 °

Name: MARSH 1, EL. -7 TO -11 CL Model: Spatial Mohr-Coulomb

Name: MARSH 2, EL. -11 TO -13 CL Model: Spatial Mohr-Coulomb

Name: Slope Stability Global (Block) File Name: 17thReach30 Modified.gsz Last Edited By: Goltz, Amanda MVS

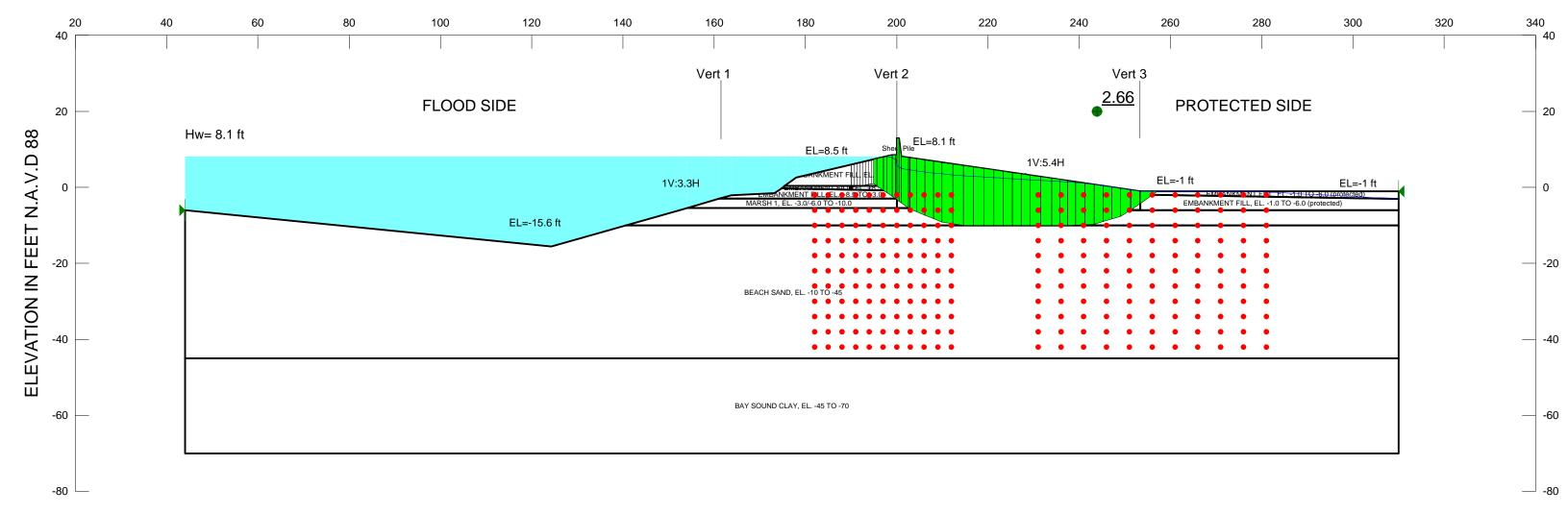


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17th STREET OUTFALL CANAL, REACH 30, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Block) STA. 626+73 to 634+09 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.5 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: Emb. 8.1 TO -3 Name: MARSH 1, EL. -3.0/-6.0 TO -10.0 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: Marsh -3.0/-6.0 to -10.0 Phi: 0 °

Name: BEACH SAND, EL. -10 TO -45 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: -45.0 to -70.0 Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: EMBANKMENT FILL, EL. -1.0 TO -6.0 (protected) Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 650 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

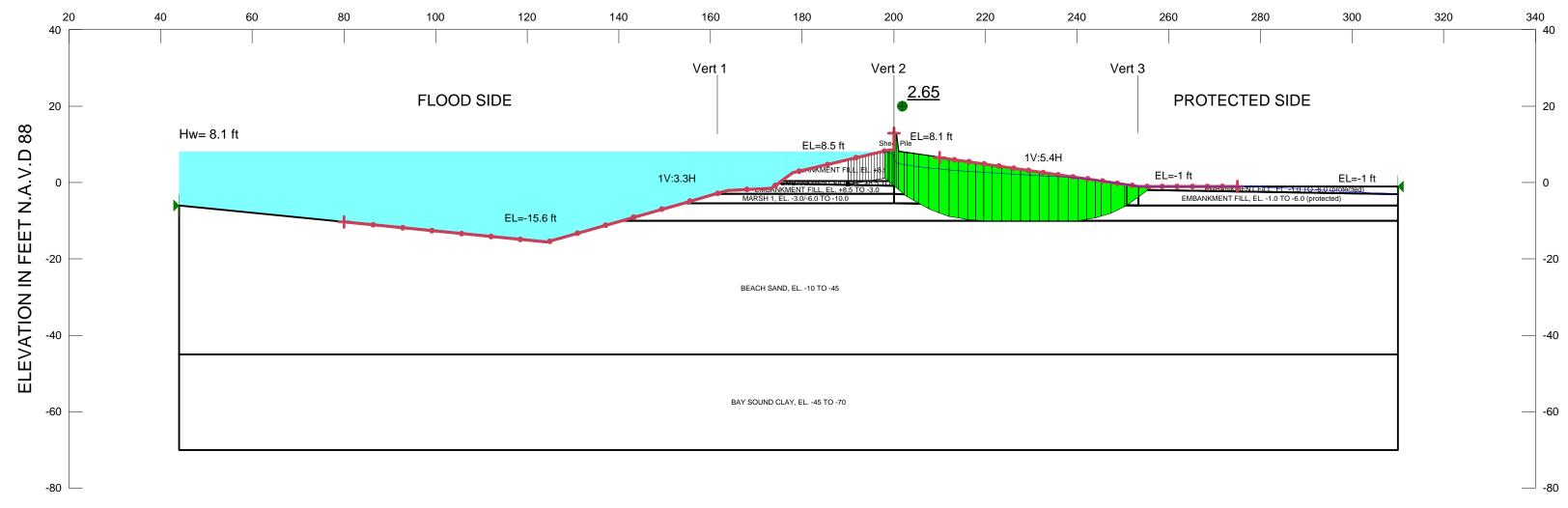
Name: Slope Stability Global (Block) File Name: 17thReach31.gsz Last Edited By: Goltz, Amanda MVS



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17th STREET OUTFALL CANAL, REACH 31, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Block) STA. 634+09 to 637+00 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.5 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: Emb. 8.1 TO -3 Name: MARSH 1, EL. -3.0/-6.0 TO -10.0 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: Marsh -3.0/-6.0 to -10.0 Phi: 0 °

Name: BEACH SAND, EL. -10 TO -45 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: -45.0 to -70.0 Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: EMBANKMENT FILL, EL. -1.0 TO -6.0 (protected) Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 650 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global (Entry/Exit) File Name: 17thReach31.gsz Last Edited By: Goltz, Amanda MVS

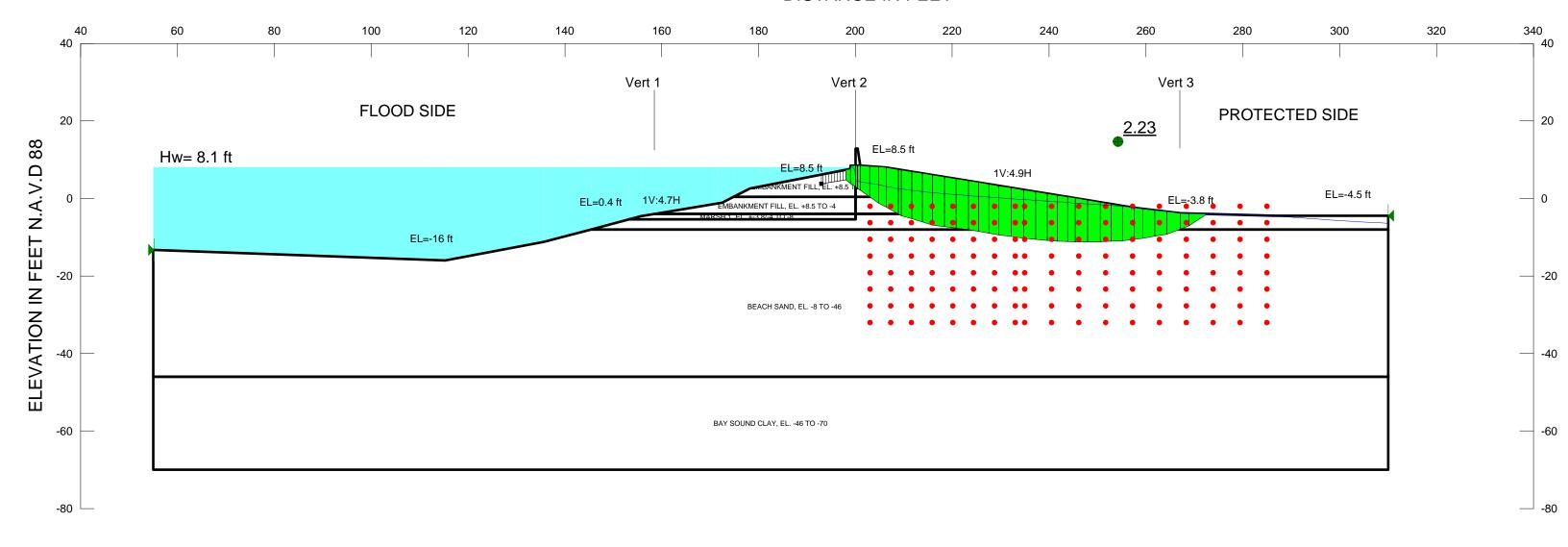




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17th STREET OUTFALL CANAL, REACH 31, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Entry/Exit) STA. 634+09 to 637+00 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.5 TO -4 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 400 psf Phi: 0 ° Name: MARSH 1, EL. +-3.8/-4 TO -8 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -8 TO -46 Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global (Block) File Name: 17thReach32.gsz Last Edited By: Redell, Chris MVS

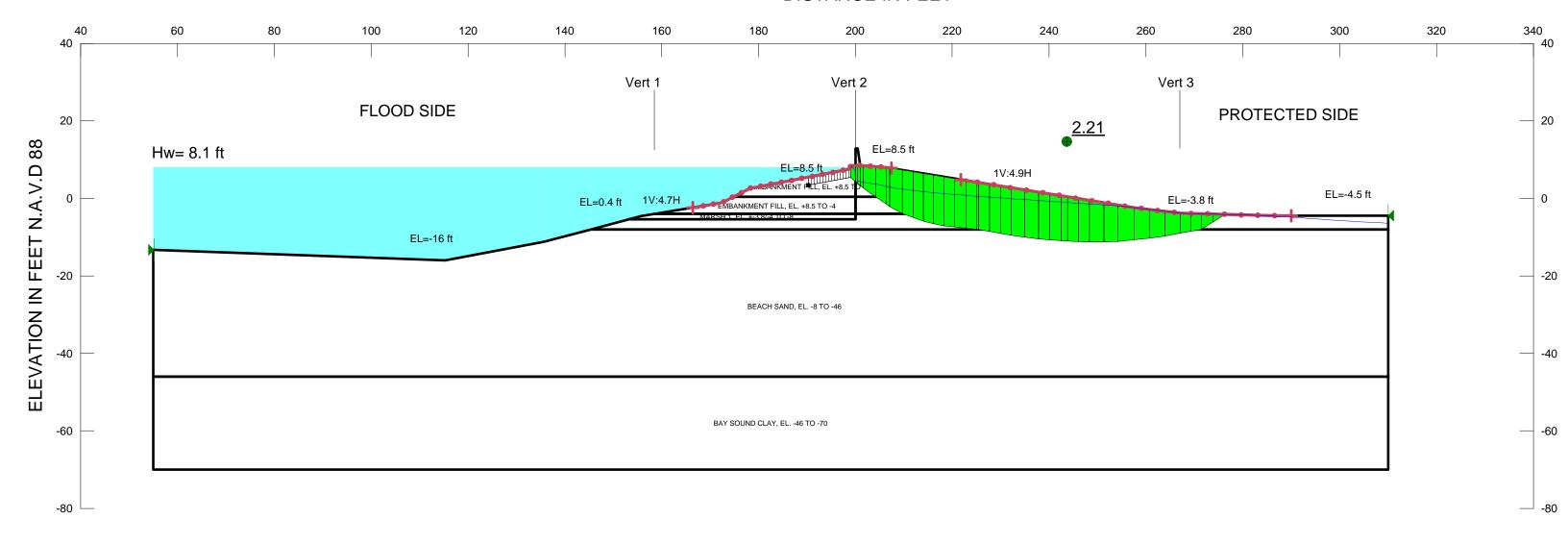




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17th STREET OUTFALL CANAL, REACH 32, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Block) STA. 637+00 to 638+44 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.5 TO -4 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 400 psf Phi: 0 ° Name: MARSH 1, EL. +-3.8/-4 TO -8 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -8 TO -46 Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global (Entry & Exit) File Name: 17thReach32.gsz Last Edited By: Redell, Chris MVS

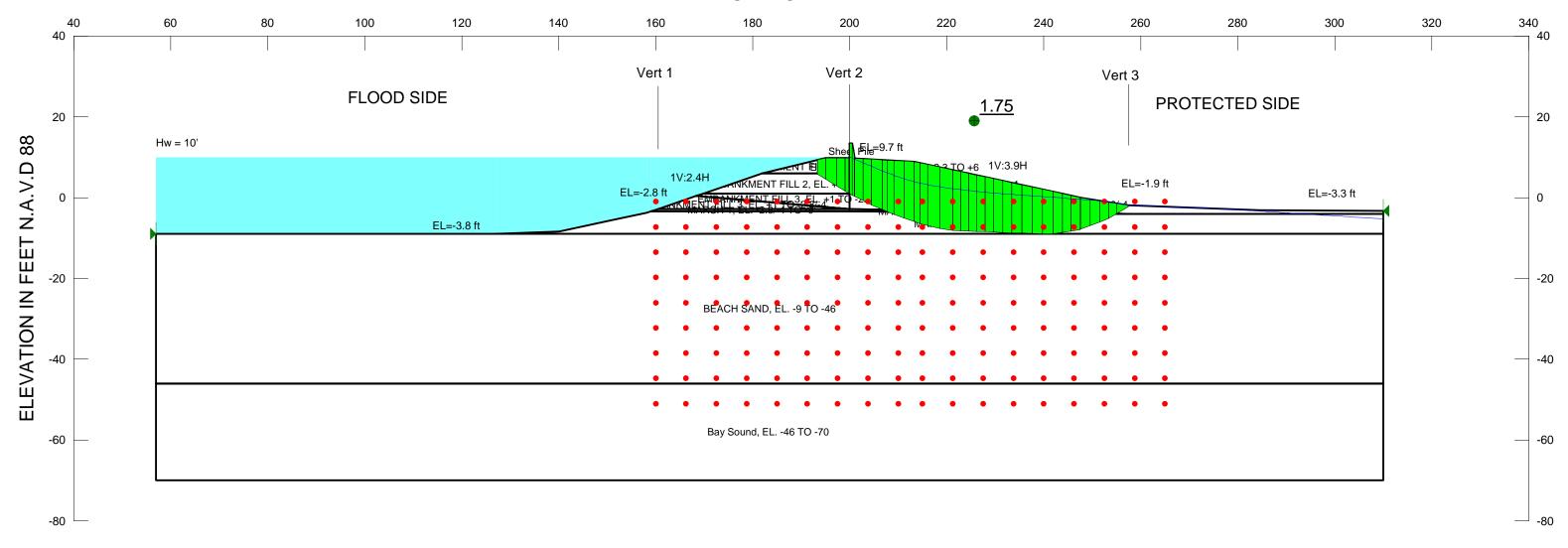




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17th STREET OUTFALL CANAL, REACH 32, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Entry & Exit) STA. 637+00 to 638+44 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.3 TO +6 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 750 psf Phi: 0 °

Name: MARSH 1, EL. -2.8/-4 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH -2.8 TO -9 Cohesion Fn: MARSH -2.8 to -9 Phi: 0 °

Name: BEACH SAND, EL. -9 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Bay Sound, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

Name: EMBANKMENT FILL 2, EL. +6 TO +1 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 325 psf Phi: 0 °

Name: EMBANKMENT FILL 3, EL. +1 TO -2.8/-4 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 300 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global (Block) File Name: 17thReach33.gsz Last Edited By: Goltz, Amanda MVS Slip surface on the left block could not be located inside the block grid, therefore the 0.7H criteria was used to find the critical failure.

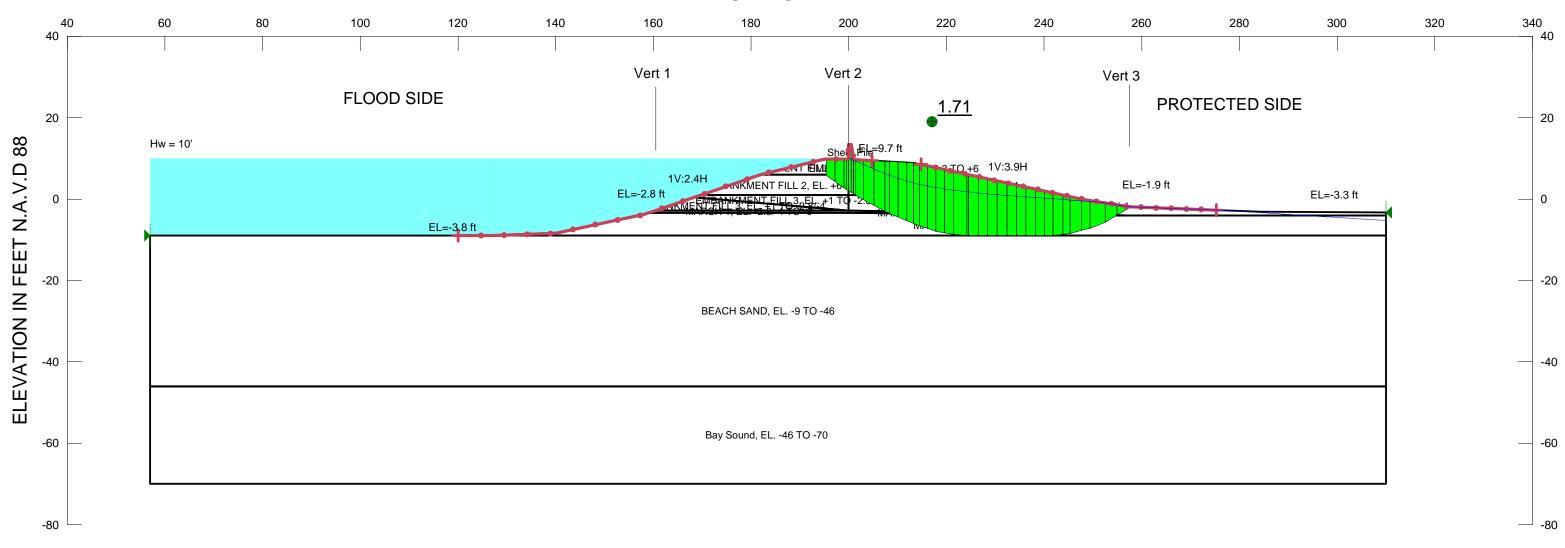




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17th STREET OUTFALL CANAL, REACH 33, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Block) STA. 643+40 to 658+00 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.3 TO +6 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 750 psf Phi: 0 °

Name: MARSH 1, EL. -2.8/-4 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH -2.8 TO -9 Cohesion Fn: MARSH -2.8 to -9 Phi: 0°

Name: BEACH SAND, EL. -9 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Bay Sound, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

Name: EMBANKMENT FILL 2, EL. +6 TO +1 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 325 psf Phi: 0 °

Name: EMBANKMENT FILL 3, EL. +1 TO -2.8/-4 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 300 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global (Entry & Exit) File Name: 17thReach33.gsz Last Edited By: Goltz, Amanda MVS

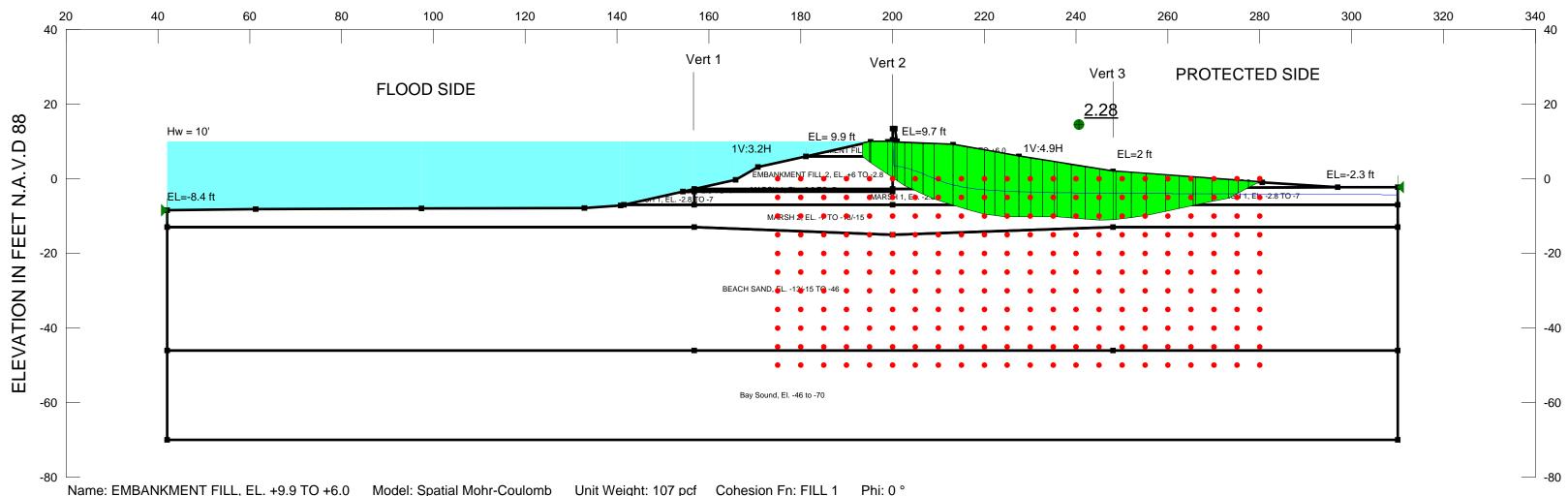




US Army Corps of Engineers® Saint Louis District

US Army Corps of Engineers® **New Orleans District**

17th STREET OUTFALL CANAL, REACH 33, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global (Entry & Exit) STA, 643+40 to 658+00 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.9 TO +6.0 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: FILL 1 Name: MARSH 1, EL. -2.8 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: BEACH SAND, EL. -13/-15 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: MARSH 2, EL. -7 TO -13/-15 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Fn: MARSH 2 Phi: 0 ° Name: EMBANKMENT FILL 2, EL. +6 TO -2.8 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: FILL 2 Phi: 0 ° Name: Bay Sound, El. -46 to -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0° Name: EMBANKMENT FILL EL. +2.0 TO -2.3 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 650 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global Block File Name: 17thReach34.gsz Last Edited By: Goltz, Amanda MVS



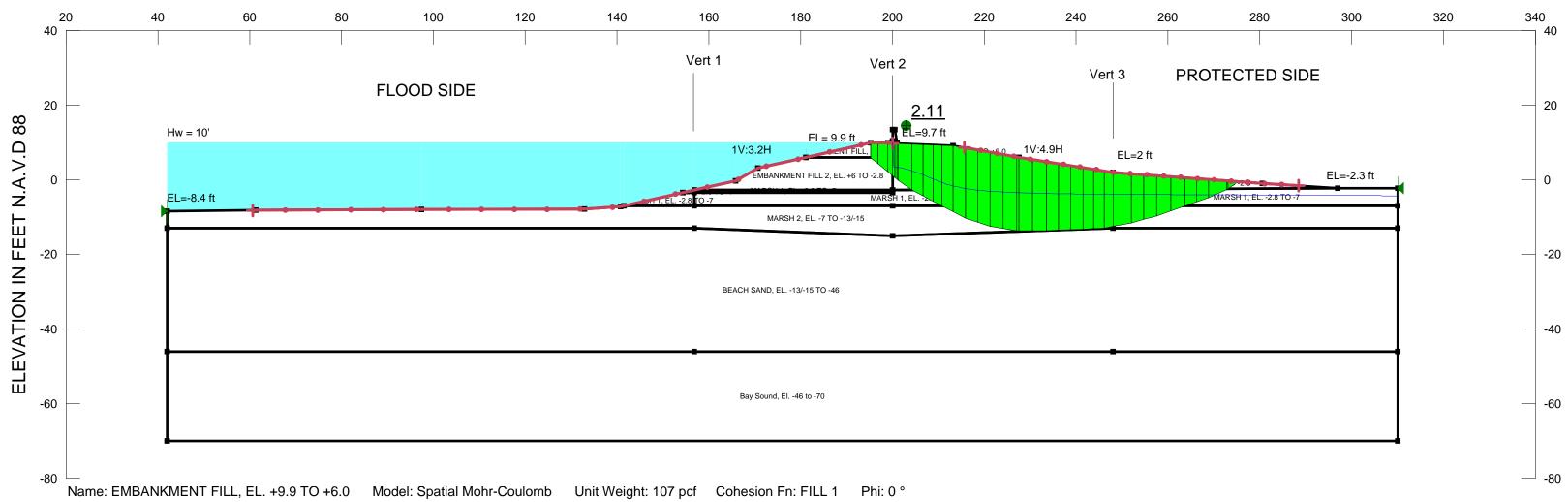


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17th STREET OUTFALL CANAL, REACH 34, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global Block STA. 658+00-662+87 EAST ORLEANS PARISH, LOUISIANA

DISTANCE IN FEET



Name: EMBANKMENT FILL, EL. +9.9 TO +6.0 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: FILL 1 Phi: 0 °
Name: MARSH 1, EL. -2.8 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: MARSH 1 Phi: 0 °
Name: BEACH SAND, EL. -13/-15 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °
Name: MARSH 2, EL. -7 TO -13/-15 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Fn: MARSH 2 Phi: 0 °
Name: EMBANKMENT FILL 2, EL. +6 TO -2.8 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: FILL 2 Phi: 0 °
Name: Bay Sound, El. -46 to -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °
Name: EMBANKMENT FILL EL. +2.0 TO -2.3 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 650 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global Entry & Exit

File Name: 17thReach34.gsz Last Edited By: Goltz, Amanda MVS



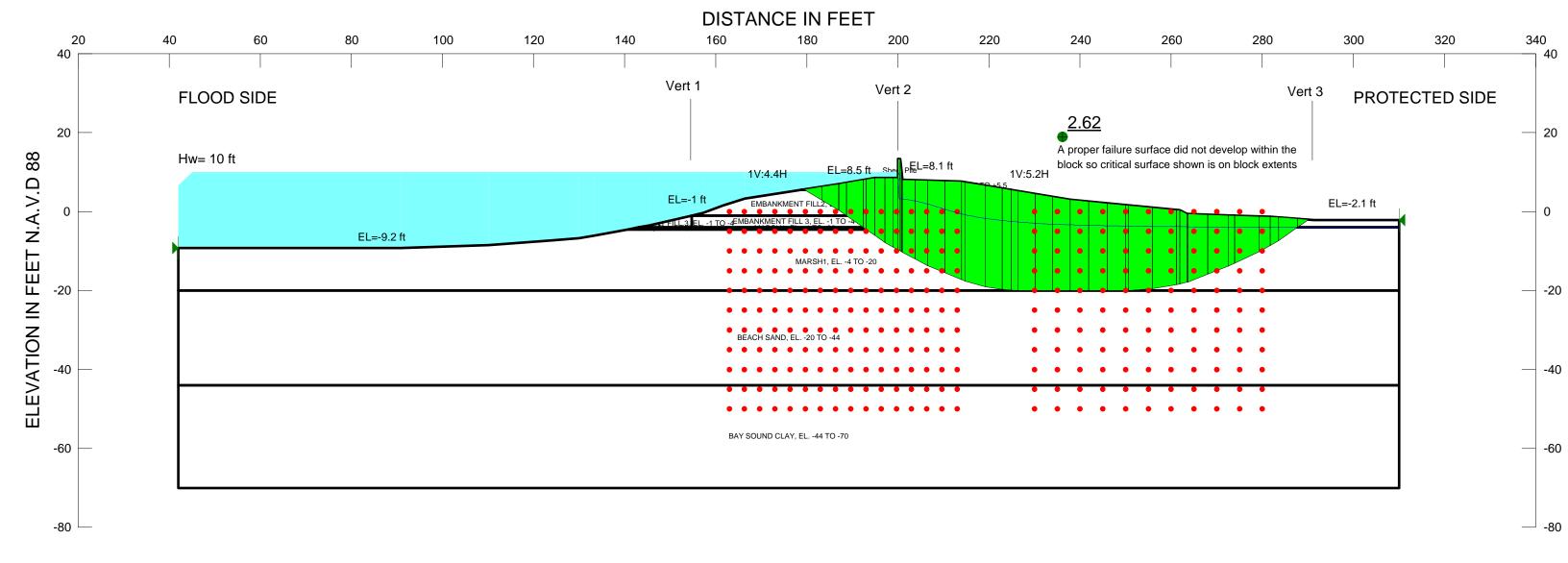


US Army Corps of Engineers® Saint Louis District

US Army Corps of Engineers® New Orleans District

17th STREET OUTFALL CANAL, REACH 34, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global Entry & Exit STA. 658+00- 662+87 EAST ORLEANS PARISH, LOUISIANA

MARCH 2013
LAKE PONTCHARTRAIN, LA. AND VICINITY
HURRICANE PROTECTION PROJECT



Name: EMBANKMENT FILL, EL. +8.5 TO +5.5 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 700 psf Phi: 0 °

Name: EMBANKMENT FILL 3, EL. -1 TO -4 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Embankment Fill 3 Phi: 0 °

Name: BEACH SAND, EL. -20 TO -44 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -44 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: MARSH1, EL. -4 TO -20 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 ° Name: EMBANKMENT FILL2, EL. +5.5 TO -1 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Fn: FILL 2 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global Block File Name: 17thReach35.gsz Last Edited By: Goltz, Amanda MVS Slip surface on the left block could not be located inside the block grid, therefore the 0.7H MOP criteria was used.



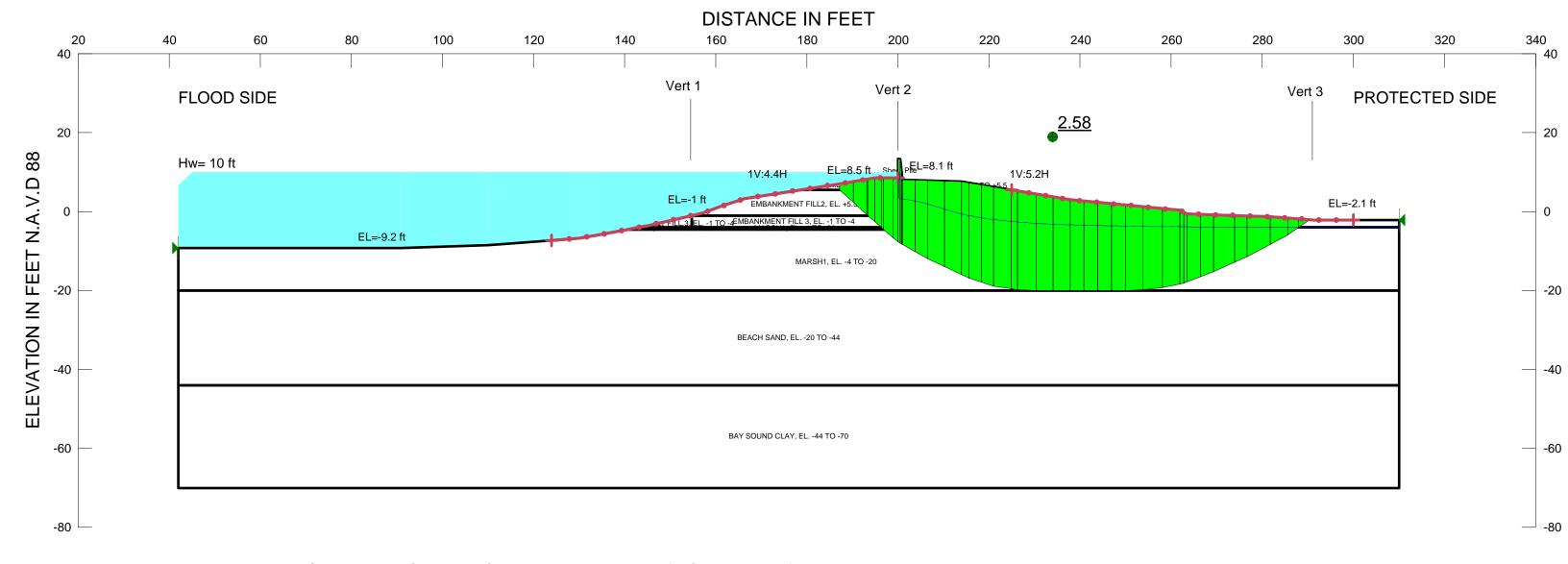


US Army Corps of Engineers® Saint Louis District

US Army Corps of Engineers® New Orleans District

17th STREET OUTFALL CANAL, REACH 35, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global Block STA. 662+87 to 670+63 EAST ORLEANS PARISH, LOUISIANA

MARCH 2013 LAKE PONTCHARTRAIN, LA. AND VICINITY HURRICANE PROTECTION PROJECT



Name: EMBANKMENT FILL, EL. +8.5 TO +5.5 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 700 psf Phi: 0 °

Name: EMBANKMENT FILL 3, EL. -1 TO -4 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Embankment Fill 3 Phi: 0 °

Name: BEACH SAND, EL. -20 TO -44 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -44 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: MARSH1, EL. -4 TO -20 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 ° Name: EMBANKMENT FILL2, EL. +5.5 TO -1 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Fn: FILL 2 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Global Entry/Exit File Name: 17thReach35.gsz Last Edited By: Goltz, Amanda MVS





US Army Corps of Engineers® US Army Corps of Engineers® Saint Louis District New Orleans District

17th STREET OUTFALL CANAL, REACH 35, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Global Entry/Exit STA. 662+87 to 670+63 EAST ORLEANS PARISH, LOUISIANA

MARCH 2013 LAKE PONTCHARTRAIN, LA. AND VICINITY HURRICANE PROTECTION PROJECT

R1 Slope Stability Global Block Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

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File Information
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Created By: USACE St. Louis District Revision Number: 554 Last Edited By: Goltz, Amanda MVS Date: 11/26/2012 Time: 1:36:33 PM File Name: 17thReach1.gsz Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 11/26/2012 Last Solved Time: 1:44:48 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

```
Slope Stability Global Block
     Kind: SLOPE/W
     Parent: Seepage Analysis (Gap)
     Method: Spencer
          PWP Conditions Source: Parent Analysis
          Direction of movement: Left to Right
          Use Passive Mode: No
          Slip Surface Option: Block
          Critical slip surfaces saved: 1
          Optimize Critical Slip Surface Location: Yes
          Tension Crack
               Tension Crack Option: Tension Crack Line
               Percentage Wet: 1
               Tension Crack Fluid Unit Weight: 62.4 pcf
```

FOS Distribution FOS Calculation Option: Constant Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 5000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 **Ending Optimization Points: 16** Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL, EL. +9.6 TO +4.5 Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 800 psf Phi-B·∩° MARSH, EL. -3.0 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 1 Phi-B: 0 ° BEACH SAND, EL. -12 TO -46 Model: Shear/Normal Fn.

Unit Weight: 122 pcf Strength Function: Sand BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Clay Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0)

Unit Weight: 0.1 pcf

EMBANKMENT FILL 2, EL. +4.5 TO -3.0

Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion Spatial Fn: Embankment Fill 2 Phi-B: 0 °

MARSH, EL. -7.0 TO -12.0

Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 2

Slip Surface Limits

Phi-B: 0 °

Left Coordinate: (58.7, -8.4) ft Right Coordinate: (310, -1.4) ft

Slip Surface Block

Left Grid Upper Left: (190, -10) ft Lower Left: (190, -30) ft Lower Right: (224, -30) ft X Increments: 10 Y Increments: 8 Starting Angle: 125 Ending Angle: 155 Angle Increments: 6 Right Grid Upper Left: (230, -10) ft Lower Left: (230, -30) ft Lower Right: (275, -30) ft X Increments: 10 Y Increments: 8 Starting Angle: 15 ° Angle Increments: 6

Tension Crack Line

	X (ft)	Y (ft)

	185.05	3.64802
	196.6	6.84447
	199.05	6.79992

Shear/Normal Strength Functions

Sand Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 0

Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0)

Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf

Sigma3: 300000 psf Num. Points: 20

Spatial Functions

Bay Sound Clay

Model: Linear Internolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (116.5, -46, 555) Data Point: (116.5, -70, 790)
Data Point: (177, -46, 555) Data Point: (177, -70, 790) Data Point: (200, -46, 835) Data Point: (200, -70, 1070) Data Point: (239.2, -46, 555) Data Point: (239.2, -70, 790) Data Point: (310, -46, 555) Data Point: (310, -70, 790)

Embankment Fill 2

Model: Linear Interpolation Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf) Data Point: (200, 4.5, 650) Data Point: (239.2, -1.2, 800)

Data Point: (200, -3, 650) Data Point: (239.2, -3, 800) Data Point: (310, -1.2, 800) Data Point: (310, -3, 800) Data Point: (154.7, -3, 800) Data Point: (160, -1.2, 800)

Marsh 1

Model: Linear Interpolation

Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (177, -3, 425)
Data Point: (200, -3, 450) Data Point: (239.2, -3, 425)
Data Point: (177, -7, 425)
Data Point: (200, -7, 450)
Data Point: (239.2, -7, 425) Data Point: (310, -3, 425) Data Point: (310, -7, 425) Data Point: (143, -7, 425) Data Point: (154.7, -3, 425)

Marsh 2

Model: Linear Interpolation Data Point: (200, -7, 450)

Data Point: (200, -7, 450)
Data Point: (239.2, -7, 320)
Data Point: (177, -12, 320)
Data Point: (200, -12, 450)
Data Point: (239.2, -12, 320)
Data Point: (310, -7, 320) Data Point: (310, -12, 320)
Data Point: (116.5, -8.4, 320)
Data Point: (116.5, -12, 320)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	12,47,13,14,15,25	2.725
Region 2	EMBANKMENT FILL, EL. +9.6 TO +4.5	4,5,38,12,43,45	63.226664
Region 3	BEACH SAND, EL12 TO -46	22,21,30,27,18,19,34,36	8544.2

5

Point 20 310 -70 58.7 58.7 Point 23 Point 24 310 Point 26 239.2 Point 28 200 -3 Point 30 Point 31 -2.5 Point 32 239.2 Point 34 239.2 -46 -70 Point 36 -46 Point 37 177 -70 199 Point 38 Point 40 142.8494 Point 41 154.70482 -3 Point 42 156.18675 200 4.5 Point 43 Point 44 4.5 179.66667 Point 45 4.5 Point 47 200 10 165.10004 Point 48 0.40634 Point 49 200 0.4 Point 50 234.61639 0.40305

Critical Slip Surfaces

	Slip	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)	l
	Surface	.55		1		(11)	

Region 4	EMBANKMENT FILL, EL. +9.6 TO +4.5	44,7,6,15,25,12,43	84.332835
Region 5	MARSH, EL7.0 TO -12.0	21,1,2,40,33,32,17,18,27,30	1141.5954
Region 6	BAY SOUND CLAY, EL46 TO -70	22,23,37,35,20,19,34,36	6031.2
Region 7	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	41,42,31,16,28,29	22.277108
Region 8	MARSH, EL3.0 TO -7.0	40,41,29,28,26,24,46,17,32,33	644.89156
Region 9	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	42,3,48,49,16,31	114.63223
Region 10	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	48,39,45,43,49	112.79536
Region 11	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	43,49,50,44	117.80335
Region 12	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	49,16,28,26,24,11,10,9,8,50	245.83789

Points

	X (ft)	Y (ft)
Point 1	58.7	-8.4
Point 2	138.7	-8.4
Point 3	163.3	-0.1
Point 4	185	6.1
oint 5	196.6	9.9
oint 6	208	10
oint 7	220	5.5
Point 8	239.2	-1.2
oint 9	250.6	-1.3
oint 10	274.1	-1.4
oint 11	310	-1.4
oint 12	200	9.9
oint 13	200	13.5
oint 14	200.5	13.5
oint 15	201	10
oint 16	200	-2.5
oint 17	310	-7
oint 18	310	-12
oint 19	310	-46

6

4	Optimized	2.03	(219.947,	25.00913	(192.45,	(246.565, -
1	Optimized	2.03	7.173)	25.00913	8.54058)	1.2646)
2	4093	2.22	(219.947,	24.598	(191.686,	(246.97, -
2	4095	2.22	7.173)	24.396	8.2902)	1.26816)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	192.58115	5.6059555	159.71962	50.753821	0	800
2	Optimize d	193.3326	5.00795	174.60273	207.40076	0	800
3	Optimize d	194.4877	4.062345	206.74303	374.86286	0	670.82
4	Optimize d	195.81115	2.907394	262.38042	491.79328	0	665.41
5	Optimize d	197.1458	1.693804	352.42016	636.3571	0	660.24
6	Optimize d	198.1266	0.79888565	440.11295	730.4341	0	656.61
7	Optimize d	198.7808	0.19938019	502.18325	795.07163	0	654.25
8	Optimize d	199.5	-0.45969481	593.80852	866.12896	0	651.72
9	Optimize d	200.25	-1.1469859	656.65964	933.89758	0	650.96
10	Optimize d	200.75	-1.6051795	596.61747	981.71604	0	652.87
11	Optimize d	201.0818	-1.909223	549.34777	1024.2803	0	654.14
12	Optimize d	201.7552	-2.492085	436.70637	1106.9316	0	656.72
13	Optimize d	203.11775	-3.661925	221.37458	1305.3178	0	448.01
14	Optimize d	204.7502	-4.9928875	255.07234	1466.2591	0	446.97
15	Optimize	206.4732	-6.3309625	298.89463	1603.7768	0	445.87

	d						
16	Optimize d	207.66735	-7.2583375	337.63354	1705.9154	0	424.57
17	Optimize d	208.61055	-7.9908425	369.22006	1756.8449	0	421.44
18	Optimize d	209.92955	-8.8810425	409.89119	1855.0087	0	417.07
19	Optimize d	211.34645	-9.7131075	450.80119	1883.3085	0	412.37
20	Optimize d	212.8249	-10.43673	487.52058	1958.4279	0	407.47
21	Optimize d	214.36495	-11.051905	520.3721	1958.7294	0	402.36
22	Optimize d	215.93555	-11.51895	545.95893	2007.256	0	397.15
23	Optimize d	217.53665	-11.837865	563.74676	1972.8932	0	391.84
24	Optimize d	219.1686	-11.995885	572.40473	1984.9145	0	386.43
25	Optimize d	220.7164	-11.993215	571.6212	1919.2693	0	381.3
26	Optimize d	222.14925	-11.990745	570.90234	1860.8537	0	376.55
27	Optimize d	223.8046	-11.98789	570.05924	1794.3686	0	371.06
28	Optimize d	225.68245	-11.98465	569.10071	1719.763	0	364.83
29	Optimize d	227.56035	-11.98141	568.14218	1645.2107	0	358.6
30	Optimize d	229.43825	-11.97817	567.2369	1570.6583	0	352.37
31	Optimize d	231.24875	-11.776985	554.04698	1540.349	0	346.37
32	Optimize d	232.9919	-11.37785	528.58699	1425.8825	0	340.59
33	Optimize d	234.23995	-11	504.60458	1399.1118	0	336.45
34	Optimize	235.6507	-10.33185	462.48886	1265.575	0	331.77

	Slip Surfac	X (ft)	Y (ft)	PWP (psf)	Base Normal	Friction al Strength	Cohesiv e Strengt
	e				Stress (psf)	(psf)	h (psf)
1	4093	192.3889	4.9922435	169.82046	231.21054	0	800
2	4093	193.9689	3.8858925	201.58051	441.27756	0	672.73
3	4093	195.72295	2.6576775	265.63889	604.57809	0	665.66
4	4093	197.8	1.2033208	407.1527	777.37529	0	657.82
5	4093	199.5	0.0129678	574.38103	906.30952	0	651.74
6	4093	200.25	-0.51218785	622.83406	957.06447	0	650.96
7	4093	200.75	-0.86229185	569.78577	993.89355	0	652.87
8	4093	201.70075	-1.528008	440.41302	1074.9351	0	656.51
9	4093	203.10225	-2.509336	207.82117	1178.4482	0	661.87
10	4093	204.85225	-3.734699	191.07922	1362.9389	0	446.91
11	4093	206.95075	-5.204097	234.98556	1513.4961	0	445.57
12	4093	208.7578	-6.469398	286.98723	1611.9216	0	444.41

d

36 Optimize

37 Optimize

40 Optimize

237.9425

239.8357

241.46365

243.44815

244.599

245.6612

210.5867

212.7289

214.83335

218.96665

216.9

-8.885167

-7.444642

-6.0468575

-4.2187125

-3.15232

-2.1323015

371.4289

280.79595

192.86946

77.903845

10.844807

-53.279297

345.6869

421.04337

459.40154

456.29509

453.64348

451.80359

1675.3787

1742.3724

1868.7094

1778.5642

1077.8336

858.7057

787.63679

574.67984

460.54848

540.45618

0

0

0

0

0

0

324.17

320

425

425

800

414.89

407.79

400.81

393.95

387.1

381.3

0

0

0

0

35

39

13 4093

14 4093

16 4093

4093

4093

19	4093	222.14925	-10	450.44963	1646.2468	0	376.55
20	4093	223.8352	-10	449.01769	1578.8103	0	370.95
21	4093	225.77425	-10	447.56853	1502.175	0	364.52
22	4093	227.7133	-10	446.23283	1425.5398	0	358.09
23	4093	229.65235	-10	445.04669	1348.9561	0	351.66
24	4093	231.5914	-10	443.94821	1272.3208	0	345.23
25	4093	233.53045	-10	442.91162	1195.6855	0	338.8
26	4093	234.5582	-9.9592515	439.87444	1331.7991	0	335.39
27	4093	235.6584	-9.188877	391.46238	1196.206	0	331.75
28	4093	237.7424	-7.7296255	299.61948	939.30059	0	324.83
29	4093	238.9922	-6.8545125	244.47063	824.20626	0	425.13
30	4093	240.08285	-6.090854	196.30749	727.11803	0	425
31	4093	241.84855	-4.8545125	118.32543	583.76355	0	425
32	4093	243.6142	-3.618171	40.370755	440.37196	0	425
33	4093	245.7337	-2.1340805	-53.199857	403.69362	0	800

10

-9.25

-10

-10

-10

R1 Slope Stability Global Entry & Exit

File Information

Created By: USACE St. Louis District Revision Number: 554 Last Edited By: Goltz, Amanda MVS Date: 11/26/2012

Time: 1:36:33 PM File Name: 17thReach1.gsz

Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\

Last Solved Date: 11/26/2012 Last Solved Time: 1:45:56 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global Entry & Exit

Kind: SLOPE/W

Parent: Seepage Analysis (Gap) Method: Spencer

PWP Conditions Source: Parent Analysis

Direction of movement: Left to Right

Use Passive Mode: No

Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1

Optimize Critical Slip Surface Location: Yes

Tension Crack

Tension Crack Option: Tension Crack Line

Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf

FOS Distribution FOS Calculation Option: Constant Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +9.6 TO +4.5

Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 800 psf Phi: 0° Phi-B: 0°

MARSH, EL. -3.0 TO -7.0

Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0

Phi-B: 0°

BEACH SAND, EL. -12 TO -46

Model: Shear/Normal En Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 °

BAY SOUND CLAY, EL. -46 TO -70

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf

Cohesion Spatial Fn: Bay Sound Clay

Sheet Pile

Model: Undrained (Phi=0)

Unit Weight: 0.1 pcf

Cohesion: 0.01 psf

EMBANKMENT FILL 2, EL. +4.5 TO -3.0

Model: Spatial Mohr-Coulomb

Unit Weight: 113 pcf

Cohesion Spatial Fn: Embankment Fill 2 Phi-B: 0 °

MARSH, EL. -7.0 TO -12.0

Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf

Cohesion Spatial Fn: Marsh 2

Phi-B: 0°

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (128, -8.4) ft

Left-Zone Right Coordinate: (196.6, 9.9) ft

Left-Zone Increment: 20

Right Projection: Range

Right-Zone Left Coordinate: (222.6, 4.59271) ft

Right-Zone Right Coordinate: (255.00715, -1.31875) ft

Right-Zone Increment: 20

Radius Increments: 20

Slip Surface Limits

Left Coordinate: (58.7, -8.4) ft Right Coordinate: (310, -1.4) ft

Tension Crack Line

Г	X (ft)	Y (ft)		
Г	185	3.6		
Г	196	6.8		
	199	6.8		

Shear/Normal Strength Functions

Model: Spline Data Point Function

Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0)
Data Point: (0, 0) Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Spatial Functions

Bay Sound Clay

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)

Data Point: (116.5, -46, 555) Data Point: (116.5, -70, 790) Data Point: (177, -46, 555) Data Point: (177, -70, 790)

Data Point: (200, -46, 835) Data Point: (200, -70, 1070) Data Point: (239.2, -46, 555) Data Point: (239.2, -70, 790)

Data Point: (310, -46, 555) Data Point: (310, -70, 790)

Embankment Fill 2 Model: Linear Interpolation

Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf) Data Point: (200, 4.5, 650) Data Point: (239.2, -1.2, 800) Data Point: (200, -3, 650) Data Point: (239.2, -3, 800)

Data Point: (310, -1.2, 800) Data Point: (310, -3, 800) Data Point: (154.7, -3, 800) Data Point: (160, -1,2, 800)

Marsh 1

Model: Linear Interpolation

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (177, -3, 425)
Data Point: (200, -3, 450)
Data Point: (239.2, -3, 425)
Data Point: (239.2, -7, 425)
Data Point: (200, -7, 450)
Data Point: (239.2, -7, 425)
Data Point: (310, -3, 425)
Data Point: (310, -3, 425)
Data Point: (310, -7, 425)
Data Point: (143, -7, 425)
Data Point: (154.7, -3, 425)

Marsh 2

Arsh 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (177, -7, 320)
Data Point: (200, -7, 450)
Data Point: (239.2, -7, 320)
Data Point: (177, -12, 320)
Data Point: (200, -12, 450)
Data Point: (239.2, -12, 320)
Data Point: (310, -7, 320)
Data Point: (310, -7, 320)
Data Point: (310, -12, 320)
Data Point: (116.5, -8.4, 320)
Data Point: (116.5, -12, 320)

Regions

	Material	Points	Area (ft²)	
Region 1	Sheet Pile	12,47,13,14,15,25	2.725	
Region 2	EMBANKMENT FILL, EL. +9.6 TO +4.5	4,5,38,12,43,45	63.226664	
Region 3	BEACH SAND, EL12 TO -46	22,21,30,27,18,19,34,36	8544.2	
Region 4	EMBANKMENT FILL, EL. +9.6 TO +4.5	44,7,6,15,25,12,43	84.332835	
Region 5	MARSH, EL7.0 TO -12.0	21,1,2,40,33,32,17,18,27,30	1141.5954	
Region 6	BAY SOUND CLAY, EL46 TO -70	22,23,37,35,20,19,34,36	6031.2	
Region 7	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	41,42,31,16,28,29	22.277108	
Region 8	MARSH, EL3.0 TO -7.0	40,41,29,28,26,24,46,17,32,33	644.89156	
Region 9	EMBANKMENT FILL 2, EL. +4.5 TO -	42,3,48,49,16,31	114.63223	

5

Point 26	239.2	-3
Point 27	239.2	-12
Point 28	200	-3
Point 29	177	-3
Point 30	177	-12
Point 31	177	-2.5
Point 32	239.2	-7
Point 33	177	-7
Point 34	239.2	-46
Point 35	239.2	-70
Point 36	177	-46
Point 37	177	-70
Point 38	199	9.9
Point 39	177	3.7
Point 40	142.8494	-7
Point 41	154.70482	-3
Point 42	156.18675	-2.5
Point 43	200	4.5
Point 44	222.86567	4.5
Point 45	179.66667	4.5
Point 46	310	-3.4
Point 47	200	10
Point 48	165.10004	0.40634
Point 49	200	0.4
Point 50	234.61639	0.40305

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.03	(224.997, 22.869)	25.55442	(193.4, 8.85165)	(248.431, - 1.28098)
2	8750	2.12	(224.997, 22.869)	34.77	(194.408, 9.18207)	(249.999, - 1.29473)

Slices of Slip Surface: Optimized

JIICC	sinces of slip surface. Optimized									
Г		Slip	X (ft)	Y (ft)	PWP (psf)	Base	Friction	Cohesiv		

	3.0		
Region 10	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	48,39,45,43,49	112.79536
Region 11	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	43,49,50,44	117.80335
Region 12	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	49,16,28,26,24,11,10,9,8,50	245.83789

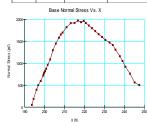
Points

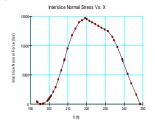
	X (ft)	Y (ft)
Point 1	58.7	-8.4
Point 2	138.7	-8.4
Point 3	163.3	-0.1
Point 4	185	6.1
Point 5	196.6	9.9
Point 6	208	10
oint 7	220	5.5
oint 8	239.2	-1.2
oint 9	250.6	-1.3
oint 10	274.1	-1.4
Point 11	310	-1.4
oint 12	200	9.9
Point 13	200	13.5
Point 14	200.5	13.5
oint 15	201	10
oint 16	200	-2.5
Point 17	310	-7
Point 18	310	-12
Point 19	310	-46
Point 20	310	-70
Point 21	58.7	-12
oint 22	58.7	-46
oint 23	58.7	-70
oint 24	310	-3
oint 25	201	9.9

	Surface				Normal Stress (psf)	al Strengt h (psf)	e Streng h (psf)
1	Optimize d	193.56105	5.924706	156.63592	54.060584	0	800
2	Optimize d	194.46645	5.15292	181.59146	187.98037	0	800
3	Optimize d	195.9053	3.8904975	239.94646	399.9829	0	665.3
4	Optimize d	196.82595	3.0827425	289.36851	499.59606	0	661.6
5	Optimize d	198.02595	1.959834	391.79917	596.59651	0	657.1
6	Optimize d	199.26335	0.785199	526.73312	723.33884	0	652.5
7	Optimize d	199.59995	0.4676397	564.35254	767.04996	0	651
8	Optimize d	199.8366	0.24936089	594.13936	790.60372	0	650.5
9	Optimize d	200.25	-0.13191056	602.6129	825.47778	0	650.
10	Optimize d	200.75	-0.5930565	560.16874	873.71445	0	652.
11	Optimize d	201.5895	-1.3673298	456.55928	965.64022	0	656.0
12	Optimize d	202.78725	-2.455515	249.32288	1089.8765	0	660.
13	Optimize d	204.10645	-3.636485	200.77253	1295.0819	0	447.
14	Optimize d	205.61305	-4.918438	237.64439	1451.1949	0	446.4
15	Optimize d	207.20435	-6.2093745	286.06148	1583.8893	0	445.
16	Optimize d	208.08945	-6.9274215	317.35505	1653.9615	0	444.
17	Optimize d	208.9579	-7.631945	348.13124	1698.8844	0	420.
18	Optimize	210.9697	-9.030955	414.44136	1819.6507	0	413.

	d						
19	Optimize d	213.11995	-10.180215	472.64237	1915.4012	0	406.49
20	Optimize d	214.95485	-10.944605	513.58751	1919.1239	0	400.4
21	Optimize d	216.6813	-11.494685	544.06923	1970.7698	0	394.68
22	Optimize d	218.29925	-11.83046	562.93876	1937.4849	0	389.31
23	Optimize d	219.5541	-11.99823	572.39129	1967.3252	0	385.15
24	Optimize d	220.7164	-11.997925	571.90814	1918.7834	0	381.3
25	Optimize d	222.14925	-11.99755	571.31491	1860.5771	0	376.55
26	Optimize d	223.7097	-11.997135	570.66486	1798.1085	0	371.37
27	Optimize d	225.3977	-11.99669	569.96581	1731.343	0	365.77
28	Optimize d	227.0857	-11.996245	569.26675	1664.6366	0	360.18
29	Optimize d	228.7737	-11.9958	568.5677	1597.8711	0	354.58
30	Optimize d	230.4617	-11.995355	567.86864	1531.1648	0	348.98
31	Optimize d	232.5178	-11.8032	555.16329	1471.1461	0	342.16
32	Optimize d	234.17315	-11.454565	532.84189	1417.7425	0	336.67
33	Optimize d	235.521	-10.97806	502.67359	1309.5642	0	332.2
34	Optimize d	237.6742	-9.933975	436.80405	1160.3885	0	325.06
35	Optimize d	239.0614	-9.1018435	384.35632	1055.1935	0	320.46
36	Optimize d	240.4815	-7.9969985	314.87824	922.09281	0	320
37	Optimize	242.76165	-6.22306	203.22919	763.70991	0	425

27	8750	235.7623	-10.17078	452.41679	1193.9157	0	331.4
28	8750	238.0541	-9.332787	399.22605	1025.0967	0	323.8
29	8750	240.0991	-8.434404	342.3111	893.56911	0	320
30	8750	241.89725	-7.5003265	283.2629	802.92889	0	320
31	8750	243.7019	-6.4216895	215.1827	732.56954	0	425
32	8750	245.51315	-5.1810145	136.97171	614.44754	0	425
33	8750	247.3244	-3.759325	47.486141	478.03449	0	425
34	8750	249.1144	-2.147363	-53.858561	508.38607	0	800





	d						
38	Optimize d	245.13185	-4.22306	77.382496	563.04397	0	425
39	Optimize	247.4673	-2.1404875	-53.575563	504.82134	0	800

Slices of Slip Surface: 8750

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	8750	194.9417	5.4184975	180.26678	-141.35774	0	800
2	8750	196.0375	3.6523245	249.47718	242.19339	0	664.78
3	8750	197.53085	1.6024642	378.44644	537.51365	0	658.84
4	8750	198.73085	0.08990795	498.62413	745.00311	0	654.42
5	8750	199.5	-0.7599898	606.13455	861.48827	0	651.72
6	8750	200.25	-1.552844	678.35141	963.23736	0	650.96
7	8750	200.75	-2.0494355	612.84795	1029.3925	0	652.87
8	8750	201.3821	-2.6463495	509.64944	1120.038	0	655.29
9	8750	202.6698	-3.759325	242.86724	1341.0689	0	448.3
10	8750	204.481	-5.1810145	268.33728	1518.3824	0	447.14
11	8750	206.29225	-6.4216895	305.77321	1674.5377	0	445.99
12	8750	207.59895	-7.231818	336.77349	1782.1947	0	424.8
13	8750	209	-7.9821585	366.38009	1836.8053	0	420.15
14	8750	211	-8.9407045	409.3711	1876.883	0	413.52
15	8750	213	-9.748539	448.58409	1899.0199	0	406.89
16	8750	215	-10.41669	483.0823	1904.6985	0	400.26
17	8750	217	-10.95347	512.12931	1894.9515	0	393.62
18	8750	219	-11.36509	534.90447	1870.6635	0	386.99
19	8750	220.7164	-11.629165	549.7419	1841.5	0	381.3
20	8750	222.14925	-11.77695	557.96648	1811.3374	0	376.55
21	8750	223.8449	-11.86832	562.78802	1767.1074	0	370.92
22	8750	225.80335	-11.878075	562.53765	1705.9388	0	364.43
23	8750	227.7618	-11.77721	555.51059	1632.0732	0	357.93
24	8750	229.72025	-11.564755	541.58482	1545.434	0	351.44
25	8750	231.6787	-11.23861	520.57496	1445.8745	0	344.94
26	8750	233.63715	-10.79546	492.18913	1332.937	0	338.45

R10 Slope Stability Global Block Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

```
File Information
```

Created By: USACE St. Louis District Revision Number: 609 Last Edited By: Goltz, Amanda MVS Date: 11/26/2012 Time: 9:13:19 AM File Name: 17thReach10.gsz Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 11/26/2012 Last Solved Time: 9:16:06 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

```
Slope Stability Global Block
     Kind: SLOPE/W
     Parent: Seepage Analysis (Gap)
     Method: Spencer
          PWP Conditions Source: Parent Analysis
          Direction of movement: Left to Right
          Use Passive Mode: No
          Slip Surface Option: Block
          Critical slip surfaces saved: 1
          Optimize Critical Slip Surface Location: Yes
          Tension Crack
               Tension Crack Option: (none)
    FOS Distribution
          FOS Calculation Option: Constant
```

Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 3000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL 1, EL. +2.5 TO -1.5 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Fn: Fill Phi-B: 0 ° MARSH 2, EL. -9 TO -13 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: Marsh 2 Phi-B: 0 ° BEACH SAND, EL. -29.0/-31.0 TO -48.0 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Phi-B: 0 ° BAY SOUND CLAY, EL. -48 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Phi: 0 Marsh 1, EL -1.5 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1

```
Cohesion Fn: Marsh 1
     Phi-B: 0°
Sheet Pile
     Model: Undrained (Phi=0)
     Unit Weight: 0.1 pcf
     Cohesion: 0.01 psf
Lacustrine 1, EL. -13 to -18
     Model: Spatial Mohr-Coulomb
      Weight Fn: Lacustrine 1
      Cohesion Spatial Fn: Lacustrine 1 Cohesion
     Phi-B: 0°
Lacustrine 2 El. -18 to -29
     Model: Spatial Mohr-Coulomb
      Weight Fn: Lacustrine 2
     Cohesion Spatial Fn: Lacustrine 2 Cohesion
     Phi-B: 0 °
Slip Surface Limits
     Left Coordinate: (42.5, -13.1) ft
Right Coordinate: (310, -2.9) ft
Slip Surface Block
     Left Grid
           Upper Left: (197, -5) ft
          Lower Left: (197, -35) ft
Lower Right: (227, -35) ft
           X Increments: 10
           Y Increments: 10
           Starting Angle: 135°
           Ending Angle: 180
           Angle Increments: 5
     Right Grid
           Upper Left: (232, -5) ft
           Lower Left: (232, -35) ft
```

Lower Right: (262, -35) ft

X Increments: 10

Y Increments: 10

Starting Angle: 0 ° Ending Angle: 45 °

Angle Increments: 5

Cohesion Functions

```
Marsh 2
     Model: Spline Data Point Function
     Function: Cohesion vs. X
Curve Fit to Data: 100 %
           Segment Curvature: 0 %
     Y-Intercept: 180
     Data Points: X (ft), Cohesion (psf)
           Data Point: (175.8, 180)
           Data Point: (200, 350)
           Data Point: (235, 180)
     Model: Spline Data Point Function
     Function: Cohesion vs. X
           Curve Fit to Data: 100 %
           Segment Curvature: 0 %
     Y-Intercept: 800
     Data Points: X (ft), Cohesion (psf)
           Data Point: (175.8, 800)
           Data Point: (200, 830)
           Data Point: (235, 800)
     Model: Spline Data Point Function
     Function: Cohesion vs. X
Curve Fit to Data: 100 %
           Segment Curvature: 0 %
     Y-Intercept: 500
     Data Points: X (ft), Cohesion (psf)
           Data Point: (175.8, 500)
           Data Point: (200, 700)
           Data Point: (235, 500)
     Model: Spline Data Point Function
     Function: Cohesion vs. X
           Curve Fit to Data: 100 %
           Segment Curvature: 0 %
     Y-Intercept: 180
     Data Points: X (ft), Cohesion (psf)
           Data Point: (175.8, 180)
           Data Point: (200, 375)
```

Data Point: (235, 180) Data Point: (235, 89)

Unit Weight Functions

MARSH 1

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 98 Data Points: X (ft), Unit Weight (pcf)

Data Point: (175.8, 98)
Data Point: (200, 109) Data Point: (235, 98)

Lacustrine 1

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102

Data Points: X (ft), Unit Weight (pcf) Data Point: (175.8, 102) Data Point: (200, 106) Data Point: (235, 102)

Lacustrine 2

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 99 Data Points: X (ft), Unit Weight (pcf)

Data Point: (175.8, 99) Data Point: (200, 102) Data Point: (235, 99)

MARSH 2

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 89
Data Points: X (ft), Unit Weight (pcf) Data Point: (175.8, 89) Data Point: (200, 82)

Spatial Functions

Lacustrine 2 Cohesion Model: Linear Interpolation

Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (175.8, -31, 400) Data Point: (200, -18, 300) Data Point: (200, -29, 500) Data Point: (235, -31, 400) Data Point: (175.8, -20, 258) Data Point: (235, -20, 258) Data Point: (42.5, -20, 258) Data Point: (42.5, -31, 400) Data Point: (310, -20, 258) Data Point: (310, -31, 400)

Lacustrine 1 Cohesion

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (200, -13, 300)

Data Point: (200, -18, 300) Data Point: (235, -20, 258) Data Point: (235, -14, 180) Data Point: (175.8, -20, 258) Data Point: (175.8, -14, 180)
Data Point: (42.5, -14.22618, 180) Data Point: (42.5, -20, 258) Data Point: (310, -14, 180) Data Point: (310, -20, 258)

Regions

Material	Points	Area (ft²)
BEACH SAND, EL29.0/-31.0 TO -48.0	13,14,46,44,15,16,42,30,37	4606.7
Sheet Pile	4,32,22,21,18	8.175
MARSH 2, EL9 TO -13	19,34,10,11,35,20,40,43,1,29,23,53,39	688.3599
Lacustrine 1, EL13 to -18	11,12,36,31,41,17,43,40,20,35	1560.3251
Lacustrine 2 El18 to -29	31,36,12,13,37,30,42,16,17,41	2942.5
	BEACH SAND, EL29.0/-31.0 TO -48.0 Sheet Pile MARSH 2, EL9 TO -13 Lacustrine 1, EL13 to -18	BEACH SAND, EL -29.0/-31.0 TO -48.0 Sheet Pile 4,32,22,21,18 MARSH 2, EL -9 TO -13 19,34,10,11,35,20,40,43,1,29,23,53,39 Lacustrine 1, EL -13 to -18 11,12,36,31,41,17,43,40,20,35

6

5

Region 6	BAY SOUND CLAY, EL48 TO - 70	15,28,45,47,26,14,46,44	5885
Region 7	Marsh 1, EL -1.5 TO -9	53,2,50,49,48,25,33,9,10,34,19,39	1022.162
Region 8	Marsh 1, EL -1.5 TO -9	48,49,50,51,38,25	107.61989
Region 9	EMBANKMENT FILL 1, EL. +2.5 TO -1.5	51,38,25,4,27,3,24,52	112.16306
Region 10	EMBANKMENT FILL 1, EL. +2.5	25,4,32,22,5,6,7,8,9,33	312

Points

	X (ft)	Y (ft)
Point 1	42.5	-13.1
Point 2	143.1	-9.4
Point 3	187.6	2.4
Point 4	200	2.5
Point 5	213	5
Point 6	235	-1
Point 7	260	-2.9
Point 8	310	-2.9
Point 9	310	-4
Point 10	310	-11
Point 11	310	-14
Point 12	310	-20
Point 13	310	-31
Point 14	310	-48
Point 15	42.5	-48
Point 16	42.5	-31
Point 17	42.5	-20
Point 18	200	12.4
Point 19	200	-9
Point 20	200	-13
Point 21	200.5	12.4
Point 22	201	5.5
Point 23	123.3	-13
Point 24	181.6	-0.1

Point 37

Point 38

Point 49

Point 50 Point 52 -12.6

-18

-4

-14

-20

-31

Point 39 175.8 Point 40 175.8 Point 41 -20 Point 42 175.8 -31 Point 43 42.5 -14.22618 Point 44 Point 45 175.8 -70 Point 46 235 -48 Point 47 -70 235 Point 48

175.8

175.8043

134.3

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.77	(223.642, - 1.15)	36.31614	(179.715, - 0.555415)	(266.202, - 2.9)

-1.5

-11

2	29044	1.84	(223.642, - 1.15)	39.415	(175.804, - 1.50007)	(271.449, - 2.9)
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	Slip Surface	e: Optimize X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	180.65735	- 1.277162 8	494.80516	384.40157	0	540.14
2	Optimize d	182.40665	- 2.616535 5	432.47851	541.11489	0	554.6
3	Optimize d	184.09525	-3.909425	446.50437	823.66064	0	246.84
4	Optimize d	185.9114	-5.292345	520.23494	990.59661	0	261.48
5	Optimize d	187.2228	- 6.285711 5	574.14173	1111.1091	0	272.04
6	Optimize d	188.98725	- 7.622271 5	645.67658	1256.0153	0	286.26
7	Optimize d	191.10555	9.173891 5	729.66546	1427.9007	0	303.33
8	Optimize d	193.36665	- 10.72280 7	811.12842	1568.5267	0	303.4
9	Optimize d	196.0097	-12.44492	889.42413	1724.2824	0	321.97
10	Optimize d	198.06135	-13.68726	931.8331	1848.2192	0	291.13
11	Optimize d	199.49855	-14.55751	960.00329	1937.6796	0	298.01
12	Optimize d	199.99855	- 14.85995 5	969.47086	2026.4963	0	299.99

13	Optimize d	200.25	- 14.95679 5	971.4366	1700.6533	0	299.36
14	Optimize d	200.75	- 15.14934 5	975.43067	1720.1011	0	298.14
15	Optimize d	203.0873	-16.04944	996.29505	2123.0927	0	293.42
16	Optimize d	207.0445	- 17.68132 5	1034.9411	2255.086	0	289.37
17	Optimize d	210.09495	-19.03218	1074.117	2373.5833	0	295.47
18	Optimize d	212.13775	- 19.83600 5	1099.0095	2473.4055	0	304.12
19	Optimize d	214.28135	-20.53466	1120.7771	2497.8834	0	310.41
20	Optimize d	216.84405	- 21.36990 5	1150.0867	2501.3338	0	317.45
21	Optimize d	219.40675	-22.20515	1182.6612	2504.5244	0	323.95
22	Optimize d	222.0945	-22.64749	1196.5218	2559.6439	0	323.76
23	Optimize d	224.90735	-22.69693	1190.3014	2476.9303	0	317.35
24	Optimize d	227.72025	-22.74637	1184.9341	2394.1811	0	311.03
25	Optimize d	230.5269	-22.33564	1154.2093	2359.3963	0	298.56
26	Optimize d	233.32725	- 21.46474 5	1096.8211	2179.4912	0	280.54
27	Optimize d	234.8637	-20.97669	1064.4648	2099.5294	0	270.89
28	Optimize d	236.19685	-20.46204	1031.0954	2031.4415	0	263.96
29	Optimize	238.29625	-19.65158	978.06853	1928.2292	0	253.47

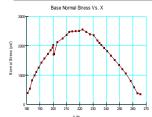
	d						
30	Optimize d	240.61295	-18.72699	917.44591	1814.427	0	241.45
31	Optimize d	243.44125	- 17.57465 5	841.90618	1666.6219	0	226.47
32	Optimize d	246.26955	-16.42232	766.16999	1518.8168	0	211.49
33	Optimize d	249.60255	- 14.92307 5	668.22879	1342.5627	0	192
34	Optimize d	252.0002	-13.76968	593.31269	1201.0992	0	180
35	Optimize d	254.63395	- 12.21596 5	493.24899	1057.5581	0	180
36	Optimize d	258.39445	-9.638938	328.17555	800.99871	0	180
37	Optimize d	260.9027	-7.680468	203.28974	587.53858	0	180
38	Optimize d	263.4105	-5.487815	63.659766	382.27844	0	180
39	Optimize	265.60895	-3.45	-65.836109	351.16917	0	500

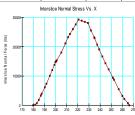
Slices of Slip Surface: 29044

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	29044	175.80415	- 1.500143 5	592.79432	449.56884	0	500.03
2	29044	177.84345	-2.539228	511.29098	578.77711	0	516.89
3	29044	180.7413	- 4.015756 5	462.32548	836.50249	0	219.82
4	29044	183.1178	-5.226637	517.99875	985.30713	0	238.97
5	29044	186.1178	-6.755213	594.89029	1191.7343	0	263.14

6	29044	189.723	-8.592154	695.42634	1412.4667	0	292.19
7	29044	193.5085	10.52095 1	803.93305	1598.3797	0	304.4
8	29044	196.83345	- 12.21508 5	884.96951	1733.9764	0	327.76
9	29044	198.74795	- 13.19058 5	912.95567	1825.2397	0	293.9
10	29044	199.5	-13.57378	925.31047	1864.877	0	297.7
11	29044	200.25	-13.95592	936.19841	1570.3456	0	299.25
12	29044	200.75	- 14.21068 5	942.02559	1596.3095	0	297.82
13	29044	202.3702	-15.03621	962.12747	1993.6727	0	293.93
14	29044	205.11055	- 16.43249 5	996.82011	2123.7945	0	289.75
15	29044	207.8509	-17.82878	1035.4795	2252.3557	0	288.5
16	29044	211.11055	- 19.48964 5	1088.8489	2397.684	0	300.78
17	29044	214.25	-21.08928	1148.2934	2502.4093	0	319.38
18	29044	216.75	- 22.36309 5	1201.0766	2548.3496	0	333.23
19	29044	219.75	-23	1223	2673.1429	0	335.17
20	29044	223.25	-23	1211.7143	2563.7714	0	325.99
21	29044	226.75	-23	1201.6857	2454.4286	0	317.03
22	29044	230.25	-23	1192.7429	2345.0857	0	308.27
23	29044	233.5	-22.23571	1141.0526	2303.9348	0	290.29
24	29044	236.4439	-20.73571	1046.5618	2084.5771	0	267.5
25	29044	239.35975	-19.25	951.68512	1900.7976	0	248.25
26	29044	242.3037	-17.75	855.07595	1712.9364	0	228.75
27	29044	245.24765	-16.25	757.89172	1525.0751	0	209.25
28	29044	248.19155	-14.75	660.46536	1337.2138	0	189.75
29	29044	251.13545	-13.25	562.91794	1162.367	0	180

30	29044	254.07935	-11.75	465.43105	1000.5345	0	180
31	29044	257.77565	9.866643 5	343.18987	786.90323	0	180
32	29044	261.54825	-7.944406	218.82301	574.93986	0	180
33	29044	264.6448	- 6.366643 5	116.98203	416.47963	0	180
34	29044	267.74135	-4.788881	15.470518	257.99926	0	180
35	29044	270.36905	-3.45	-70.385042	216.64841	0	500





R10 Slope Stability Global Entry & Exit

File Information

Created By: USACE St. Louis District Revision Number: 609 Last Edited By: Goltz, Amanda MVS Date: 11/26/2012

Time: 9:13:19 AM File Name: 17thReach10.gsz

Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case LWL and HIgh water analyses\High water cases\

Last Solved Date: 11/26/2012

Last Solved Time: 9:16:48 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global Entry & Exit

Kind: SLOPE/W Parent: Seepage Analysis (Gap)

Method: Spencer

PWP Conditions Source: Parent Analysis

Direction of movement: Left to Right Use Passive Mode: No

Slip Surface Option: Entry and Exit

Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes

Tension Crack

Tension Crack Option: (none)

FOS Distribution

FOS Calculation Option: Constant

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 3000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

Phi-B: 0°

Phi-B: 0 °

EMBANKMENT FILL 1, EL. +2.5 TO -1.5

Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Fn: Fill Phi: 0

MARSH 2, EL. -9 TO -13

Model: Snatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: Marsh 2 Phi: 0

BEACH SAND, EL. -29.0/-31.0 TO -48.0

Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi-B: 0 °

BAY SOUND CLAY, EL. -48 TO -70

Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Clay Phi-B: 0 °

Marsh 1, EL -1.5 TO -9

Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion Fn: Marsh 1

Phi: 0° Phi-B: 0

Sheet Pile

Model: Undrained (Phi=0)

Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Lacustrine 1, EL. -13 to -18

Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1

Cohesion Spatial Fn: Lacustrine 1 Cohesion

Lacustrine 2 El. -18 to -29

Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2

Cohesion Spatial Fn: Lacustrine 2 Cohesion

Phi-B: 0°

Slip Surface Entry and Exit

Left Projection: Range

Left-Zone Left Coordinate: (165.3, -4.0374) ft Left-Zone Right Coordinate: (199.7, 2.5) ft

Left-Zone Increment: 20 Right Projection: Range

Right-Zone Left Coordinate: (236.4, -1.1064) ft Right-Zone Right Coordinate: (291, -2.9) ft

Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (42.5, -13.1) ft Right Coordinate: (310, -2.9) ft

Cohesion Functions

Marsh 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 %

Segment Curvature: 0 %

Y-Intercept: 180

Data Points: X (ft), Cohesion (psf) Data Point: (175.8, 180) Data Point: (200, 350) Data Point: (235, 180)

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 800

Data Points: X (ft), Cohesion (psf) Data Point: (175.8, 800) Data Point: (200, 830) Data Point: (235, 800)

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 %

Segment Curvature: 0 %

Y-Intercept: 500 Data Points: X (ft), Cohesion (psf)

Data Point: (175.8, 500) Data Point: (200, 700) Data Point: (235, 500)

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 180 Data Points: X (ft), Cohesion (psf) Data Point: (175.8, 180) Data Point: (200, 375) Data Point: (235, 180)

Unit Weight Functions

MARSH 1

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 %

Segment Curvature: 0 % Y-Intercept: 98

Data Points: X (ft), Unit Weight (pcf) Data Point: (175.8, 98) Data Point: (200, 109) Data Point: (235, 98)

Lacustrine 1

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (175.8, 102) Data Point: (200, 106) Data Point: (235, 102)

Lacustrine 2

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 99 Data Points: X (ft), Unit Weight (pcf)

Data Point: (175.8, 99)
Data Point: (200, 102) Data Point: (235, 99)

MARSH 2

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 89
Data Points: X (ft), Unit Weight (pcf)

Data Point: (175.8, 89) Data Point: (200, 82) Data Point: (235, 89)

Spatial Functions

Lacustrine 2 Cohesion

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)

Data Point: (175.8, -31, 400) Data Point: (200, -18, 300) Data Point: (200, -29, 500) Data Point: (235, -31, 400) Data Point: (175.8, -20, 258) Data Point: (235, -20, 258) Data Point: (42.5, -20, 258) Data Point: (42.5, -31, 400) Data Point: (310, -20, 258) Data Point: (310, -31, 400)

Lacustrine 1 Cohesion

Model: Linear Interpolation Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (200, -13, 300)

Data Point: (200, -18, 300)
Data Point: (235, -20, 258)
Data Point: (235, -14, 180)
Data Point: (175.8, -20, 258) Data Point: (175.8, -14, 180) Data Point: (42.5, -14.22618, 180) Data Point: (42.5, -20, 258)
Data Point: (310, -14, 180) Data Point: (310, -20, 258)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL29.0/-31.0 TO -48.0	13,14,46,44,15,16,42,30,37	4606.7
Region 2	Sheet Pile	4,32,22,21,18	8.175
Region 3	MARSH 2, EL9 TO -13	19,34,10,11,35,20,40,43,1,29,23,53,39	688.3599
Region 4	Lacustrine 1, EL13 to -18	11,12,36,31,41,17,43,40,20,35	1560.3251
Region 5	Lacustrine 2 El18 to -29	31,36,12,13,37,30,42,16,17,41	2942.5
Region 6	BAY SOUND CLAY, EL48 TO - 70	15,28,45,47,26,14,46,44	5885
Region 7	Marsh 1, EL -1.5 TO -9	53,2,50,49,48,25,33,9,10,34,19,39	1022.162
Region 8	Marsh 1, EL -1.5 TO -9	48,49,50,51,38,25	107.61989
Region 9	EMBANKMENT FILL 1, EL. +2.5 TO -1.5	51,38,25,4,27,3,24,52	112.16300
Region 10	EMBANKMENT FILL 1, EL. +2.5 TO -1.5	25,4,32,22,5,6,7,8,9,33	312

Points

	X (ft)	Y (ft)
Point 1	42.5	-13.1
Point 2	143.1	-9.4
Point 3	187.6	2.4
Point 4	200	2.5
Point 5	213	5
Point 6	235	-1
Point 7	260	-2.9
Point 8	310	-2.9
Point 9	310	-4
Point 10	310	-11
Point 11	310	-14
Point 12	310	-20
Point 13	310	-31
Point 14	310	-48
Point 15	42.5	-48
Point 16	42.5	-31
Point 17	42.5	-20
Point 18	200	12.4
Point 19	200	-9
Point 20	200	-13
Point 21	200.5	12.4
Point 22	201	5.5
Point 23	123.3	-13
Point 24	181.6	-0.1
Point 25	200	-1.5
Point 26	310	-70
Point 27	199	2.5
Point 28	42.5	-70
Point 29	90	-12.6
Point 30	200	-29
Point 31	200	-18
Point 32	201	2.5
Point 33	235	-4

Point 34	235	-11
Point 35	235	-14
Point 36	235	-20
Point 37	235	-31
Point 38	175.8	-4
Point 39	175.8	-11
Point 40	175.8	-14
Point 41	175.8	-20
Point 42	175.8	-31
Point 43	42.5	-14.22618
Point 44	175.8	-48
Point 45	175.8	-70
Point 46	235	-48
Point 47	235	-70
Point 48	200	-6
Point 49	175.8	-6
Point 50	157.17527	-6
Point 51	165.45484	-4
Point 52	175.8043	-1.5
Point 53	134.3	-11

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.77	(224.771, 37.45)	35.49983	(181.096, - 0.221816)	(265.309, - 2.9)
2	4210	1.81	(224.771, 37.45)	57.974	(180.771, - 0.300207)	(266.399, - 2.9)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	181.34785	- 0.419133	502.95963	293.57401	0	545.85

			7				
			/				
2	Optimize d	183.17155	- 1.846286 7	433.18342	466.25659	0	560.92
3	Optimize d	185.21795	-3.447696	421.16899	793.12821	0	255.89
4	Optimize d	186.6464	-4.524998	480.88716	930.24902	0	267.4
5	Optimize d	188.11975	-5.615363	542.55737	1060.3385	0	279.27
6	Optimize d	189.71675	-6.797245	610.50954	1176.3986	0	292.14
7	Optimize d	192.22405	- 8.559470 5	710.90885	1368.2583	0	312.34
8	Optimize d	195.0313	- 10.45374 6	814.3196	1547.773	0	315.1
9	Optimize d	197.70425	-12.1966	884.19312	1696.4573	0	333.87
10	Optimize d	199.49725	- 13.32237 5	916.45229	1806.1655	0	297.6
11	Optimize d	199.99725	-13.63573	926.61039	1891.4308	0	299.99
12	Optimize d	200.25	- 13.74095 5	928.63103	1566.9575	0	299.22
13	Optimize d	200.75	- 13.94912 5	932.72996	1588.1538	0	297.74
14	Optimize d	202.38045	-14.62794	947.06589	1971.8753	0	293.47
15	Optimize d	205.14135	-15.7774	969.5697	2077.0714	0	288.23
16	Optimize d	207.7763	- 16.92895 5	996.64249	2170.5753	0	285.64
17	Optimize	210.28535	-18.0826	1029.0154	2275.0448	0	285.47

19	d	213.8209	-19.70822	1082.8127	2394.7831	0	298.2
20	Optimize d	215.9779	-20.48541	1109.4965	2450.1711	0	305.63
21	Optimize d	218.65005	- 21.28488 5	1137.6767	2446.8726	0	311.73
22	Optimize d	221.41735	-21.85625	1156.5225	2470.8693	0	313.67
23	Optimize d	224.2798	- 22.19950 5	1164.986	2416.5847	0	311.71
24	Optimize d	227.14115	- 22.22371 5	1157.3222	2394.7019	0	305.1
25	Optimize d	230.00145	-21.92888	1132.3868	2274.8937	0	294.25
26	Optimize d	233.2158	-21.16962	1080.0283	2160.2953	0	276.9
27	Optimize d	235.8133	-20.27889	1021.3167	2004.0767	0	261.6
28	Optimize d	237.58125	- 19.67263 5	981.112	1925.3636	0	253.74
29	Optimize d	240.5268	-18.51842	905.20437	1793.8025	0	238.74
30	Optimize d	243.86115	-17.07631	810.93327	1619.2948	0	219.99
31	Optimize d	246.54805	- 15.84578 5	730.49979	1463.5036	0	204
32	Optimize d	249.2349	-14.61526	650.16782	1307.6785	0	188
33	Optimize d	251.02565	-13.79512	596.61586	1207.3159	0	180

212.26995 18.99509 1058.0759 5

2355.0964

0

290.08

10

12

9

Optimize d

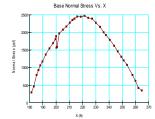
18

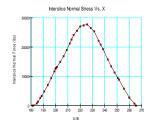
34	Optimize d	253.52355	- 12.36974 5	504.49408	1078.0714	0	180
35	Optimize d	257.6996	-9.53595	322.8113	792.84389	0	180
36	Optimize d	259.91255	-7.842548	214.64867	623.02669	0	180
37	Optimize d	262.05405	-5.881223	89.741852	421.13615	0	180
38	Optimize d	264.7086	-3.45	-64.826657	348.17158	0	500

Slices	of	Slip	Surface:	4210
		$\overline{}$		

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	4210	181.1856	- 0.7727583	497.49372	227.40706	0	544.51
2	4210	182.52265	- 2.2277525	438.09339	412.56978	0	555.56
3	4210	184.91725	- 4.6050975	481.95308	875.63727	0	253.47
4	4210	186.9946	-6.52013	585.07543	1113.445	0	270.2
5	4210	189.3443	-8.38837	683.9536	1332.2308	0	289.14
6	4210	192.4332	10.640645	802.36742	1568.7237	0	296.84
7	4210	195.1224	-12.3454	882.83681	1722.7635	0	315.74
8	4210	197.7335	- 13.813965	936.96835	1882.8412	0	289.79
9	4210	199.5	-14.72412	965.86532	1988.2498	0	298.07
10	4210	200.25	- 15.082995	975.8824	1695.4887	0	299.37
11	4210	200.75	- 15.313505	981.27462	1721.6219	0	298.19
12	4210	202.46795	- 16.039395	999.54258	2118.5499	0	294.76
13	4210	205.4038	- 17.171955	1025.3137	2236.7621	0	290.86

14 4210 208.3 15 4210 211.4 16 4210 214.4	3965 18.126435	1045.112	2335.0395	0	
		1	2555.0555	U	288.75
16 4210 214.4	038 -18.93882	1061.0568	2416.1505	0	291.04
	469 -19.57914	1072.6611	2442.1105	0	294.73
17 4210 217.3	407 - 20.028115	1078.8729	2412.5558	0	295.34
18 4210 220.2	3445 -20.32876	1080.0338	2367.6339	0	293.46
19 4210 223.1	282 20.483385	1075.3921	2307.4712	0	289.32
20 4210 226.0	22 -20.49317	1064.3796	2232.1293	0	283.12
21 4210 228.9	158 - 20.358185	1046.4255	2141.5203	0	275.06
22 4210 231.8	096 - 20.077405	1020.971	2035.4934	0	265.31
23 4210 234.1	2825 - 19.757775	995.52726	1939.8857	0	256.6
24 4210 236.3	7425 - 19.334365	964.32201	1866.1192	0	249.35
25 4210 239.1	2275 I8.702305	919.64809	1788.2183	0	241.13
26 4210 241.8	7125 -17.92669	866.62692	1694.666	0	231.05
27 4210 244.6	1975 -17.00137	804.77691	1584.4975	0	219.02
28 4210 247.3	6825 -15.91853	733.23338	1456.6501	0	204.94
29 4210 250.1	167 -14.66832	651.67586	1309.6339	0	188.69
30 4210 252.7	704 13.293995	562.66697	1160.7808	0	180
31 4210 255.3	294 - 11.793995	466.08909	1012.3002	0	180
32 4210 258.3	0445 -9.796558	338.08294	805.1323	0	180
33 4210 261.3	2605 - 7.5150615	192.46214	572.56191	0	180
34 4210 263.9	7815 - 5.2185035	46.22177	351.05001	0	180
35 4210 265.8	518 -3.45	-66.080232	368.28922	0	500





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File Information
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Created By: USACE St. Louis District Revision Number: 572 Last Edited By: Goltz, Amanda MVS Date: 2/21/2013 Time: 12:01:29 PM File Name: 17thReach11.gsz Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/21/2013 Last Solved Time: 12:03:04 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global (Block) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Slip Surface Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: Tension Crack Line Percentage Wet: 1 Tension Crack Fluid Unit Weight: 62.4 pcf

FOS Distribution FOS Calculation Option: Constant Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 **Ending Optimization Points: 16** Complete Passes per Insertion: Driving Side Maximum Convex Angle: 30 ° Resisting Side Maximum Convex Angle: 10 ° Materials EMBANKMENT FILL, EL. +2.5 TO 0.0 Model: Undrained (Phi=0) Unit Weight: 118 pcf Cohesion: 800 psf

MARSH 1, EL. -6.0 TO -16.0

Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1

Phi-B: 0 °

BEACH SAND, EL. -27.0/-28.0 TO -42.0

Model: Shear/Normal Fn Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 °

BAY SOUND CLAY, EL. -42 TO -70

Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi-B: 0 °

EMBANKMENT FILL 2, EL 0.0 TO -6.0

Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Spatial Fn: Fill 2

Phi: 0° Phi-B: 0

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

LACUSTRINE, EL. -16.0 TO -27.0

Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (60, -13.1) ft Right Coordinate: (310, -3.6) ft

Slip Surface Block

Left Grid Upper Left: (195, -5) ft Lower Left: (195, -35) ft Lower Right: (225, -35) ft X Increments: 6 Y Increments: 6 Starting Angle: 135 Ending Angle: 175 Angle Increments: 5 Right Grid Upper Left: (228, -5) ft Lower Left: (228, -35) ft Lower Right: (258, -35) ft X Increments: 6 Y Increments: 6 Starting Angle: 15 °

Ending Angle: 45 ° Angle Increments: 5

Tension Crack Line

Г	X (ft)	Y (ft)
Г	181	-2

	183	-1.7
ſ	184.8	-0.3
	192	0.1

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Unit Weight Functions

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 102) Data Point: (200, 104) Data Point: (235, 102) Model: Spline Data Point Function

Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102
Data Points: X (ft), Unit Weight (pcf)

Data Point: (181.4, 102)
Data Point: (200, 103)
Data Point: (235, 102)

FILL 2

Model: Spline Data Point Function
Function: Unit Weight vs. X

Function: Unit Weight vs. X

Curve Fit to Data: 100 %

Segment Curvature: 0 %

Y-Intercept: 106

Data Points: X (ft), Unit Weight (pcf)

Data Point: (181.4, 106)
Data Point: (200, 108)
Data Point: (235, 106)

Marsh 1

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 105 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 105) Data Point: (200, 99) Data Point: (235, 105)

Spatial Functions

Lacustrine

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Points: (181.4, -15, 200)
Data Point: (181.4, -28, 400)
Data Point: (200, -16, 275)
Data Point: (200, -27, 425)
Data Point: (255, -15, 200)
Data Point: (255, -15, 200)
Data Point: (60, -15, 200)
Data Point: (60, -15, 200)
Data Point: (310, -15, 200)
Data Point: (310, -15, 200)
Data Point: (310, -28, 400)

Fill 2

Model: Linear Interpolation Limit Range By: Data Values

Region 7	EMBANKMENT FILL 2, EL 0.0 TO -6.0	20,19,26,9,10,25,11,12,27	439.7656
Region 8	EMBANKMENT FILL 2, EL 0.0 TO -6.0	43,19,20,32,44,4	204.04076
Region 9	Sheet Pile	18,21,48,22,46,6,7,47	8.325

Points

	X (ft)	Y (ft)
Point 1	60	-13.1
Point 2	95.6	-12.9
Point 3	122.5	-12.8
Point 4	160.8	-3.8
Point 5	183	0.3
Point 6	200	2.5
Point 7	200	5.5
Point 8	213	4.9
Point 9	235	-1
Point 10	262.6	-3
Point 11	310	-3.6
Point 12	310	-6
Point 13	310	-15
Point 14	310	-28
Point 15	310	-42
Point 16	60	-42
Point 17	60	-28
Point 18	200	12.5
Point 19	200	0
Point 20	200	-6
Point 21	200.5	12.5
Point 22	201	5.5
Point 23	140.8	-9.9
Point 24	60	-15
Point 25	287.5	-3.6
Point 26	231.27119	0

Data Points: X (ft), Y (ft), Cohesion (psf)

Data Point: (181.4, 0, 400)
Data Point: (181.4, -6, 400)
Data Point: (181.4, -6, 400)
Data Point: (235, -1, 400)
Data Point: (235, -6, 400)
Data Point: (200, -6, 425)
Data Point: (168.9, -2.2, 400)
Data Point: (168.9, -6, 400)
Data Point: (168.9, -6, 400)
Data Point: (310, -3.6, 400)
Data Point: (310, -3.6, 400)
Data Point: (310, -6, 400)

Marsh 1

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -6, 200)
Data Point: (181.4, -15, 200)
Data Point: (235, -15, 200)
Data Point: (200, -6, 275)
Data Point: (200, -16, 275)
Data Point: (200, -16, 275)
Data Point: (153.4, -15, 200)
Data Point: (153.4, -15, 200)
Data Point: (60, -13.1, 200)
Data Point: (60, -15, 200)
Data Point: (310, -36, 200)

Data Point: (310, -15, 200)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. +2.5 TO 0.0	46,22,8,26,19,6	109.66442
Region 2	EMBANKMENT FILL, EL. +2.5 TO 0.0	6,42,31,5,43,19	34.363658
Region 3	BEACH SAND, EL27.0/- 28.0 TO -42.0	17,16,40,41,15,14,29,30,34	3526.8
Region 4	MARSH 1, EL6.0 TO -16.0	1,45,2,3,23,44,32,20,27,12,13,28,35,33,24	1721.2756
Region 5	LACUSTRINE, EL16.0 TO - 27.0	17,24,33,35,28,13,14,29,30,34	3196.4
Region 6	BAY SOUND CLAY, EL42 TO -70	36,37,38,39,15,41,40,16	7000

6

Point 27	235	-6
Point 28	235	-15
Point 29	235	-28
Point 30	200	-27
Point 31	184.8	1.7
Point 32	181.4	-6
Point 33	181.4	-15
Point 34	181.4	-28
Point 35	200	-16
Point 36	60	-70
Point 37	181.4	-70
Point 38	235	-70
Point 39	310	-70
Point 40	181.4	-42
Point 41	235	-42
Point 42	199	2.5
Point 43	181.37561	0
Point 44	153.58689	-6
Point 45	70	-13
Point 46	201	2.5
Point 47	200	10
Point 48	200.7	10

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.68	(225.492, 0.259)	31.27251	(190.229, 2.00585)	(263.522, - 3.0222)
2	6645	1.78	(225.492, 0.259)	34.223	(184.659, 1.59004)	(266.194, - 3.08661)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
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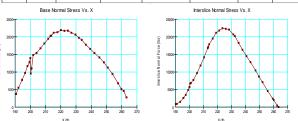
1	Optimize d	190.5754	- 0.2511358 9	395.81814	373.95193	0	412.33
2	Optimize d	192.12695	1.5663525	416.99567	550.70319	0	414.42
3	Optimize d	194.5369	- 3.6913175	475.72614	772.45974	0	417.66
4	Optimize d	196.5201	-5.3769	525.52229	973.35475	0	420.32
5	Optimize d	198.14915	- 6.6812965	673.38029	1170.5716	0	267.54
6	Optimize d	199.47795	- 7.7452765	745.33903	1272.8965	0	272.89
7	Optimize d	199.97795	- 8.1373315	747.47385	1400.1108	0	274.91
8	Optimize d	200.25	-8.252886	727.5186	957.42117	0	274.46
9	Optimize d	200.6	-8.401542	705.31819	1092.8612	0	273.71
10	Optimize d	200.85	- 8.5077245	691.81848	1102.8781	0	273.18
11	Optimize d	201.8931	-8.950752	656.91294	1484.9592	0	270.94
12	Optimize d	204.0629	- 10.089555	642.38856	1541.2815	0	266.29
13	Optimize d	206.61635	- 11.608525	650.39906	1675.6762	0	260.82
14	Optimize d	209.1698	- 13.127495	686.41267	1811.3499	0	255.35
15	Optimize d	211.72325	-14.64647	735.58639	1948.3026	0	249.88
16	Optimize d	213.17855	- 15.512165	769.22929	2022.5002	0	246.76
17	Optimize d	213.6909	- 15.816955	781.3209	2036.9076	0	248.66
18	Optimize d	215.26645	-16.49503	806.22229	2114.2159	0	255.76
19	Optimize	217.7499	-17.45401	843.82321	2134.7255	0	265.59

	d						
20	Optimize d	220.11895	-18.1645	872.32669	2188.2248	0	272.19
21	Optimize d	222.37365	-18.6265	889.70631	2166.8478	0	275.45
22	Optimize d	224.66175	- 18.899485	897.57657	2176.5941	0	275.95
23	Optimize d	226.9833	- 18.983455	895.63945	2114.391	0	273.62
24	Optimize d	229.70765	- 18.811465	878.53506	2064.4893	0	266.81
25	Optimize d	231.8186	- 18.522575	856.55465	1970.3997	0	259.14
26	Optimize d	233.683	-18.04107	823.8326	1915.4924	0	248.86
27	Optimize d	236.41965	-17.1962	767.42024	1776.1989	0	233.79
28	Optimize d	239.25895	- 16.319635	709.09981	1659.6254	0	220.3
29	Optimize d	242.09825	-15.44307	651.01494	1543.0181	0	206.82
30	Optimize d	245.30125	- 14.339305	578.61666	1413.3398	0	200
31	Optimize d	248.33865	-13.09062	497.67395	1274.0829	0	200
32	Optimize d	250.8468	-11.92422	422.65772	1127.8826	0	200
33	Optimize d	253.9316	-10.27121	316.87328	946.63475	0	200
34	Optimize d	257.5808	-7.90668	166.47841	680.9564	0	200
35	Optimize d	259.75065	-6.30598	64.993224	512.50457	0	200
36	Optimize d	261.351	- 4.9123335	-23.016586	460.90532	0	400
37	Optimize d	263.06075	- 3.4234355	-117.00477	282.03248	0	400

Slices of Slip Surface: 6645

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	6645	184.7293	- 0.4491391 5	425.34131	97.030678	0	404.47
2	6645	186.0429	-1.1772812	410.5993	589.37009	0	406.24
3	6645	188.52875	-2.555201	401.76808	738.5158	0	409.58
4	6645	191.0146	-3.9331205	415.91211	888.43556	0	412.92
5	6645	193.5004	-5.31104	448.70376	1039.0238	0	416.26
6	6645	195.8075	-6.5898775	533.19581	1218.2754	0	258.09
7	6645	197.93585	-7.7696325	666.09409	1337.0373	0	266.68
8	6645	199.5	-8.6366645	708.54696	1423.0063	0	272.98
9	6645	200.25	-9.052396	688.64061	1017.9524	0	274.46
10	6645	200.6	-9.246404	675.20645	1150.2562	0	273.71
11	6645	200.85	-9.3849815	673.66129	1163.4192	0	273.18
12	6645	202.39465	-10.241194	683.69293	1580.6401	0	269.87
13	6645	205.18395	-11.787325	683.44208	1716.6638	0	263.89
14	6645	207.97325	-13.333455	712.32124	1854.0985	0	257.91
15	6645	210.76255	-14.879585	757.47432	1992.9442	0	251.94
16	6645	212.5786	-15.886245	793.86048	2083.5465	0	251.57
17	6645	214.16665	-16.76653	828.23992	2132.148	0	261.53
18	6645	216.5	-18.059915	884.16561	2187.8863	0	276.43
19	6645	218.83335	-19.353305	944.40192	2243.3247	0	291.65
20	6645	221.4089	-20	971.07776	2399.2147	0	297.26
21	6645	224.2267	-20	962.38268	2313.0118	0	293.03
22	6645	227.0445	-20	954.93006	2226.7388	0	288.81
23	6645	229.8623	-20	948.57791	2140.3955	0	284.6
24	6645	232.1356	-20	944.05979	2073.3915	0	281.2
25	6645	234	-19.490475	910.29701	2114.1807	0	270.6
26	6645	236.3022	-18.31746	835.66803	1945.5129	0	251.04
27	6645	238.90655	-16.990475	750.58221	1778.3177	0	230.62
28	6645	241.5109	-15.66349	665.35953	1611.1225	0	210.21
29	6645	244.28505	-14.25	574.41903	1434.5191	0	200

30	6645	247.22895	-12.75	477.93092	1248.5041	0	200
31	6645	250.17285	-11.25	381.50334	1062.4588	0	200
32	6645	253.11675	-9.75	285.22104	876.44377	0	200
33	6645	256.06065	-8.25	189.12033	690.42873	0	200
34	6645	259.00455	-6.75	93.213326	504.4137	0	200
35	6645	261.53825	-5.4590235	10.90925	409.92243	0	400
36	6645	264.3972	-4.0023295	-81.790603	237.29066	0	400



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File Information

Created By: USACE St. Louis District Revision Number: 571 Last Edited By: Goltz, Amanda MVS Date: 2/21/2013 Time: 11:42:50 AM File Name: 17thReach11.gsz

Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_Hlgh_water_ analyses\High water cases\ Last Solved Date: 2/21/2013

Last Solved Time: 11:48:24 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

FOS Distribution

Slope Stability Global (Entry/Exit)

Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none)

FOS Calculation Option: Constant

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 30 $^{\circ}$ Resisting Side Maximum Convex Angle: 10 °

Materials

EMBANKMENT FILL, EL. +2.5 TO 0.0 Model: Undrained (Phi=0) Unit Weight: 118 pcf Cohesion: 800 psf

MARSH 1, EL. -6.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1

Phi-B: 0°

BEACH SAND, EL. -27.0/-28.0 TO -42.0 Model: Shear/Normal Fn Unit Weight: 122 pcf

Strength Function: Sand

BAY SOUND CLAY, EL. -42 TO -70

Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi-B: 0°

EMBANKMENT FILL 2, EL 0.0 TO -6.0

Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Spatial Fn: Fill 2 Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

LACUSTRINE, EL. -16.0 TO -27.0

Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (95.7, -12.89963) ft Left-Zone Right Coordinate: (220.7, 2.835) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (233.9, -0.705) ft Right-Zone Right Coordinate: (309.98889, -3.6) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (60, -13.1) ft Right Coordinate: (310, -3.6) ft

Shear/Normal Strength Functions

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-10000, 0) Data Point: (0, 0) Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100

Disturbance Factor: 0

SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Unit Weight Functions

Clay

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 102) Data Point: (200, 104) Data Point: (235, 102)

Lacustrine

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 102) Data Point: (200, 103) Data Point: (235, 102)

FILL 2

Model: Spline Data Point Function Function: Unit Weight vs. > Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 106 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 106) Data Point: (200, 108) Data Point: (235, 106)

Marsh 1

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 105 Data Points: X (ft), Unit Weight (pcf)

Data Point: (181.4, 105) Data Point: (200, 99) Data Point: (235, 105)

Spatial Functions

Lacustrine

Model: Linear Interpolation Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -15, 200) Data Point: (181.4, -28, 400)
Data Point: (181.4, -28, 400)
Data Point: (200, -16, 275)
Data Point: (200, -27, 425)
Data Point: (235, -15, 200) Data Point: (235, -28, 400) Data Point: (60, -15, 200) Data Point: (60, -28, 400) Data Point: (310, -15, 200) Data Point: (310, -28, 400)

Fill 2

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, 0, 400) Data Point: (181.4, -6, 400)
Data Point: (235, -1, 400)
Data Point: (235, -6, 400)
Data Point: (200, 0, 425) Data Point: (200, -6, 425)
Data Point: (168.9, -2.2, 400)
Data Point: (168.9, -6, 400) Data Point: (310, -3.6, 400) Data Point: (310, -6, 400)

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf) Data Point: (181.4, -6, 200) Data Point: (181.4, -15, 200) Data Point: (235, -6, 200) Data Point: (235, -15, 200) Data Point: (200, -6, 275) Data Point: (200, -16, 275)

Point 8 213 4.9 262.6 Point 11 Point 12 -6 Point 14 -28 Point 15 -42 -42 Point 16 60 -28 Point 18 200 Point 19 200 0 Point 20 200 Point 22 201 140.8 Point 24 60 Point 25 287.5 -3.6 0 Point 26 Point 28 235 Point 29 235 -28 -27 Point 30 200 184.8 Point 31 Point 32 181.4 -6 181.4 Point 33 -15 Point 35 200 -16 60 -70 181.4 -70 -70 Point 38 235 -70 Point 39 Point 40 -42 -42 Point 41 Point 42 199 2.5 Point 43 181.37561 0

Data Point: (153.4, -6, 200) Data Point: (153.4, -15, 200) Data Point: (60, -13.1, 200) Data Point: (60, -15, 200) Data Point: (310, -3.6, 200) Data Point: (310, -15, 200)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. +2.5 TO 0.0	46,22,8,26,19,6	109.66442
Region 2	EMBANKMENT FILL, EL. +2.5 TO 0.0	6,42,31,5,43,19	34.363658
Region 3	BEACH SAND, EL27.0/- 28.0 TO -42.0	17,16,40,41,15,14,29,30,34	3526.8
Region 4	MARSH 1, EL6.0 TO -16.0	1,45,2,3,23,44,32,20,27,12,13,28,35,33,24	1721.2756
Region 5	LACUSTRINE, EL16.0 TO - 27.0	17,24,33,35,28,13,14,29,30,34	3196.4
Region 6	BAY SOUND CLAY, EL42 TO -70	36,37,38,39,15,41,40,16	7000
Region 7	EMBANKMENT FILL 2, EL 0.0 TO -6.0	20,19,26,9,10,25,11,12,27	439.7656
Region 8	EMBANKMENT FILL 2, EL 0.0 TO -6.0	43,19,20,32,44,4	204.04076
Region 9	Sheet Pile	18,21,48,22,46,6,7,47	8.325

Points

	X (ft)	Y (ft)
Point 1	60	-13.1
Point 2	95.6	-12.9
Point 3	122.5	-12.8
Point 4	160.8	-3.8
Point 5	183	0.3
Point 6	200	2.5
Point 7	200	5.5

6

Point 44	153.58689	-6
Point 45	70	-13
Point 46	201	2.5
Point 47	200	10
Point 48	200.7	10

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.75	(225.882, 44.914)	35.38398	(181.656, 0.0518561)	(266.236, - 3.08761)
2	5490	1.81	(225.882, 44.914)	63.946	(180.521, - 0.157786)	(268.08, - 3.13206)

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
:	Optimize d	182.3282	- 0.4931494 7	474.22009	365.72058	0	401.25
:	Optimize d	183.9	- 1.7682855	431.56634	524.1527	0	403.36
:	Optimize d	186.01365	-3.483013	404.07556	756.32196	0	406.2
4	Optimize d	188.40725	-5.233805	395.38559	986.52704	0	409.42
	Optimize d	190.70995	- 6.7290975	447.28692	1201.0939	0	237.54
	Optimize d	192.9555	- 8.1872925	551.97507	1348.0606	0	246.59
	Optimize d	195.3087	-9.598585	659.68106	1510.1017	0	256.08
	Optimize d	197.76955	-10.96297	728.09427	1645.3999	0	266.01
9	Optimize d	199.4829	-11.9129	754.07354	1737.9895	0	272.91

10	Optimize d	199.9829	- 12.180925	761.34628	1902.9855	0	274.93
11	Optimize d	200.25	-12.18535	759.05601	1450.0813	0	274.46
12	Optimize d	200.6	- 12.191145	756.09641	1562.386	0	273.71
13	Optimize d	200.85	- 12.195285	753.96337	1562.6193	0	273.18
14	Optimize d	201.05115	- 12.198615	752.24222	1915.8997	0	272.75
15	Optimize d	202.3978	-12.79062	759.34335	1851.7641	0	269.86
16	Optimize d	204.9888	-13.97294	778.93614	1955.1353	0	264.31
17	Optimize d	207.5798	-15.15526	803.47979	2059.5249	0	258.76
18	Optimize d	210.93765	- 16.687525	848.27782	2194.9354	0	265.81
19	Optimize d	213.8965	-18.03772	897.79205	2290.9579	0	280.29
20	Optimize d	216.8983	-19.09428	938.59359	2349.4918	0	290.85
21	Optimize d	220.39935	- 19.953715	971.7231	2377.759	0	298.09
22	Optimize d	223.19085	- 20.377645	986.9522	2336.2154	0	300.19
23	Optimize d	226.58775	- 20.509375	985.76809	2305.0771	0	297.14
24	Optimize d	229.93005	- 20.191675	959.80493	2209.9559	0	287.4
25	Optimize d	232.19985	- 19.789785	931.41177	2099.9179	0	277.89
26	Optimize d	234.06425	-19.31887	899.88717	2039.9541	0	267.87
27	Optimize d	236.3983	- 18.554385	849.79742	1920.3696	0	254.68
28	Optimize d	239.19495	-17.6384	789.65101	1800.0088	0	240.59

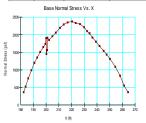
29	Optimize d	241.9916	-16.72242	729.53858	1679.648	0	226.5
30	Optimize d	245.2022	- 15.632215	658.37751	1541.9017	0	209.73
31	Optimize d	247.5391	- 14.816995	605.32949	1435.8183	0	200
32	Optimize d	250.17515	- 13.734715	535.45969	1314.1933	0	200
33	Optimize d	254.34155	-11.74396	408.0417	1086.1916	0	200
34	Optimize d	258.1405	-9.343335	255.51675	832.90571	0	200
35	Optimize d	261.24225	- 6.9767245	105.72461	552.21428	0	200
36	Optimize d	264.4179	- 4.5034345	-50.568659	363.05537	0	400

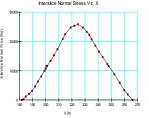
Slices of Slip Surface: 5490

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	5490	180.94845	- 0.579704 8	494.15194	326.03418	0	400
2	5490	182.1878	- 1.761940 5	453.55734	467.21979	0	401.06
3	5490	183.9	-3.305837	414.66035	667.92982	0	403.36
4	5490	185.99655	- 5.044708 5	390.40291	921.74928	0	406.18
5	5490	188.66895	- 7.056784 5	450.33493	1216.3643	0	229.31
6	5490	191.62065	9.050583 5	580.17133	1433.425	0	241.21
7	5490	194.5724	-	693.13008	1625.9183	0	253.11

			10.81674				
			9				
8	5490	197.52415	-12.37644	767.22778	1796.2099	0	265.02
9	5490	199.5	-13.33345	800.06814	1900.3565	0	272.98
10	5490	200.25	-13.6693	809.85361	1488.497	0	274.46
11	5490	200.6	- 13.82172 5	812.84571	1619.5832	0	273.71
12	5490	200.85	- 13.92858 5	814.9545	1631.1666	0	273.18
13	5490	202.2262	- 14.48077 5	826.25843	2031.1539	0	270.23
14	5490	204.67855	-15.40022	842.42929	2122.9418	0	264.97
15	5490	207.67855	- 16.35828 5	859.335	2219.7393	0	266.68
16	5490	211.2262	-17.30313	877.29455	2316.1399	0	274.1
17	5490	214.5226	-17.99592	891.66174	2348.4648	0	278.68
18	5490	217.5678	-18.47059	901.18572	2319.5488	0	280.71
19	5490	220.613	- 18.79625 5	905.91165	2274.9408	0	280.71
20	5490	223.6582	- 18.97519 5	905.0742	2214.7374	0	278.63
21	5490	226.7034	- 19.00864 5	897.83149	2138.8636	0	274.43
22	5490	229.7486	-18.89684	883.51089	2047.1794	0	268.04
23	5490	233.1356	-18.59165	858.02168	1931.3348	0	258.15
24	5490	236.323	- 18.15971 5	826.06603	1837.405	0	248.61
25	5490	238.969	- 17.66405 5	791.57361	1775.5472	0	240.99

26	5490	241.615	-17.05149	750.20156	1700.8476	0	231.56
27	5490	244.26095	16.31850 5	701.69482	1612.6855	0	220.28
28	5490	246.9069	-15.46071	645.72106	1510.3349	0	207.09
29	5490	249.6669	- 14.42400 5	578.69126	1387.7545	0	200
30	5490	252.54095	- 13.18868 5	499.32197	1243.2608	0	200
31	5490	255.415	-11.78082	409.37369	1079.7516	0	200
32	5490	258.289	- 10.18713 4	307.89782	895.56097	0	200
33	5490	261.163	-8.390887	193.94469	688.61203	0	200
34	5490	263.5859	- 6.719892 5	88.147678	501.58286	0	200
35	5490	266.32615	-4.56603	-47.829775	370.08219	0	400





Slope Stability Global (Entry/Exit) Report generated using GeoStudio 2007, version 7.22. Copyright © 1991-2013 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 575 Last Edited By: Goetz, Ryan MVS Date: 7/25/2014 Time: 2:52:30 PM File Name: 17thReach11.gsz Directory: C:\Users\B3ECGANG\Desktop\
Last Solved Date: 7/25/2014 Last Solved Time: 2:55:58 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Slope Stability Global (Entry/Exit) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer Settings PWP Conditions Source: Parent Analysis Slip Surface Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack
Tension Crack Option: (none) FOS Distribution
FOS Calculation Option: Constant Advanced

Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf LACUSTRINE, EL. -16.0 TO -27.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Phi-B: 0 °

Slip Surface Entry and Exit Left Projection: Range

Left-Zone Left Coordinate: (95.7, -12.89963) ft Left-Zone Right Coordinate: (220.7, 2.835) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (233.9, -0.705) ft Right-Zone Right Coordinate: (309.98889, -3.6) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (60, -13.1) ft Right Coordinate: (310, -3.6) ft

Shear/Normal Strength Functions

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-10000, 0) Data Point: (0, 0) Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0

Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 30 ° Resisting Side Maximum Convex Angle: 10 ° Materials EMBANKMENT FILL, EL. +2.5 TO 0.0 Unit Weight: 118 pcf Cohesion: 800 psf MARSH 1, EL. -6.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi: ∩ ° BEACH SAND, EL. -27.0/-28.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf

Number of Slices: 30

EMBANKMENT FILL 2, EL 0.0 TO -6.0

Model: Spatial Mohr-Coulomb

Phi-B: 0 °

Phi-B: 0 °

Weight En: FILL 2 Cohesion Spatial Fn: Fill 2

Num. Points: 20

SigmaC: 600000 psf

Sigma3: 300000 psf

Unit Weight Functions Clay Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 102) Data Point: (200, 104) Data Point: (235, 102) Lacustrine Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 102) Data Point: (200, 103) Data Point: (235, 102) FILL 2 Model: Spline Data Point Function Function: Unit Weight vs. > Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 106 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 106)
Data Point: (200, 108) Data Point: (235, 106)

Marsh 1 Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 105 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 105) Data Point: (200, 99) Data Point: (235, 105)

Spatial Functions

Lacustrine

Model: Linear Interpolation Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -15, 200)
Data Point: (181.4, -28, 400)
Data Point: (200, -16, 275)
Data Point: (200, -27, 425)
Data Point: (255, -15, 200)
Data Point: (255, -15, 200) Data Point: (235, -13, 200)
Data Point: (235, -28, 400)
Data Point: (60, -15, 200)
Data Point: (60, -28, 400)
Data Point: (310, -15, 200) Data Point: (310, -28, 400)

Fill 2

| 2 | Model: Linear Interpolation | Limit Range By: Data Values | Data Points: X (ft), Y (ft), Cohesion (psf) | Data Point: (181.4, 0, 400) | Data Point: (181.4, 6, 400) | Data Point: (235, -1, 400) | Data Point: (235, -6, 400) | Data Point: (200, -6, 425) | Data Point: (200, -6, 425) | Data Point: (168.9, -2.2, 400) | Data Point: (168.9, -6, 400) | Data Point: (310, -3.6, 400) | Data Point: (310, -3.6, 400)

rrsh 1
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), V (ft), Cohesion (psf)
Data Point: (181.4, -6, 200)
Data Point: (181.4, -15, 200)
Data Point: (235, -6, 200)
Data Point: (235, -6, 200)
Data Point: (200, -6, 275)
Data Point: (200, -16, 275)

Point 8	213	4.9
Point 9	235	-1
Point 10	262.6	-3
Point 11	310	-3.6
Point 12	310	-6
Point 13	310	-15
Point 14	310	-28
Point 15	310	-42
Point 16	60	-42
Point 17	60	-28
Point 18	200	12.5
Point 19	200	0
Point 20	200	-6
Point 21	200.5	12.5
Point 22	201	5.5
Point 23	140.8	-9.9
Point 24	60	-15
Point 25	287.5	-3.6
Point 26	231.27119	0
Point 27	235	-6
Point 28	235	-15
Point 29	235	-28
Point 30	200	-27
Point 31	184.8	1.7
Point 32	181.4	-6
Point 33	181.4	-15
Point 34	181.4	-28
Point 35	200	-16
Point 36	60	-70
Point 37	181.4	-70
Point 38	235	-70
Point 39	310	-70
Point 40	181.4	-42
Point 41	235	-42
Point 42	199	2.5
Point 43	181.37561	0

Data Point: (153.4, -6, 200) Data Point: (153.4, -15, 200) Data Point: (60, -13.1, 200) Data Point: (60, -15, 200) Data Point: (310, -3.6, 200) Data Point: (310, -15, 200)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. +2.5 TO 0.0	46,22,8,26,19,6	109.66442
Region 2	EMBANKMENT FILL, EL. +2.5 TO 0.0	6,42,31,5,43,19	34.363658
Region 3	BEACH SAND, EL27.0/- 28.0 TO -42.0	17,16,40,41,15,14,29,30,34	3526.8
Region 4	MARSH 1, EL6.0 TO -16.0	1,45,2,3,23,44,32,20,27,12,13,28,35,33,24	1721.2756
Region 5	LACUSTRINE, EL16.0 TO - 27.0	17,24,33,35,28,13,14,29,30,34	3196.4
Region 6	BAY SOUND CLAY, EL42 TO -70	36,37,38,39,15,41,40,16	7000
Region 7	EMBANKMENT FILL 2, EL 0.0 TO -6.0	20,19,26,9,10,25,11,12,27	439.7656
Region 8	EMBANKMENT FILL 2, EL 0.0 TO -6.0	43,19,20,32,44,4	204.04076
Region 9	Sheet Pile	18,21,48,22,46,6,7,47	8.325

Points

	X (ft)	Y (ft)
Point 1	60	-13.1
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Point 3	122.5	-12.8
Point 4	160.8	-3.8
Point 5	183	0.3
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Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.70	(225.882, 44.914)	35.18598	(180.53, - 0.156095)	(265.675, - 3.07409)
2	5490	1.73	(225.882, 44.914)	63.946	(180.521, - 0.157786)	(268.08, - 3.13206)

Slices of Slip Surface: Ontimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	Optimize d	180.953	- 0.458049 3	532.58579	403.63657	0	400
2	Optimize d	182.1878	- 1.340329 6	493.33412	504.0983	0	401.06
3	Optimize d	183.9	-2.56372	449.88693	656.02389	0	403.36
4	Optimize d	186.55085	-4.457787	415.85186	912.14621	0	406.92
5	Optimize d	188.5428	-5.854395	410.5263	1093.5356	0	409.6
6	Optimize d	190.1122	-6.802225	463.33828	1246.3413	0	235.13
7	Optimize d	192.76885	-8.406675	577.85179	1408.5419	0	245.84
8	Optimize d	195.3229	-9.861195	687.05369	1570.9074	0	256.14
9	Optimize	197.7743	-	750.75713	1700.0429	0	266.03

	d		11.16578 5				
10	Optimize d	199.4727	- 12.06963 5	774.14891	1788.2788	0	272.87
11	Optimize d	199.9727	-12.32961	780.9143	1873.4665	0	274.89
12	Optimize d	200.25	-12.41509	780.6151	1361.5802	0	274.46
13	Optimize d	200.6	- 12.52297 5	780.27085	1520.4531	0	273.71
14	Optimize d	200.85	-12.60004	780.01614	1527.8594	0	273.18
15	Optimize d	202.39765	- 13.07710 5	783.90777	1914.4375	0	269.86
16	Optimize d	204.97495	- 13.98987 5	791.11341	1964.011	0	264.34
17	Optimize d	207.3342	-14.95376	806.02379	2047.9408	0	259.28
18	Optimize d	208.9017	-15.58514	819.48964	2109.7369	0	255.92
19	Optimize d	211.1448	- 16.44930 5	841.40235	2184.9652	0	262.06
20	Optimize d	213.8585	- 17.49477 5	874.77595	2254.0046	0	272.53
21	Optimize d	216.20055	-18.18967	897.66431	2295.7294	0	278.8
22	Optimize d	219.16765	- 18.91796 5	922.70398	2279.6909	0	284.75
23	Optimize d	222.41545	- 19.35816 5	934.43364	2289.6923	0	286.23
24	Optimize	225.944	-19.51028	931.8571	2197.7297	0	283.12

	Surfac e				Normal Stress (psf)	I Strength (psf)	e Strength (psf)
1	5490	180.94845	- 0.579704 8	529.77744	351.38342	0	400
2	5490	182.1878	- 1.761940 5	484.11808	492.47734	0	401.06
3	5490	183.9	-3.305837	439.28086	690.30448	0	403.36
4	5490	185.99655	- 5.044708 5	409.14748	947.48224	0	406.18
5	5490	188.66895	- 7.056784 5	466.17337	1244.3226	0	229.31
6	5490	191.62065	9.050583 5	596.27369	1461.6256	0	241.21
7	5490	194.5724	- 10.81674 9	709.34554	1654.5686	0	253.11
8	5490	197.52415	-12.37644	782.40899	1825.4489	0	265.02
9	5490	199.5	-13.33345	814.06894	1930.3257	0	272.98
10	5490	200.25	-13.6693	823.37591	1444.064	0	274.46
11	5490	200.6	- 13.82172 5	826.07242	1614.2099	0	273.71
12	5490	200.85	- 13.92858 5	827.95991	1625.8295	0	273.18
13	5490	202.2262	- 14.48077 5	838.22935	2025.3958	0	270.23
14	5490	204.67855	-15.40022	852.62354	2117.787	0	264.97
15	5490	207.67855	- 16.35828 5	867.63031	2215.416	0	266.68
16	5490	211.2262	-17.30313	883.79709	2312.8201	0	274.1

	d						
25	Optimize d	229.48975	-19.32029	911.45703	2127.7694	0	274.86
26	Optimize d	232.1083	-18.92922	882.31003	2007.9406	0	264.9
27	Optimize d	233.9727	- 18.50805 5	853.37377	1950.6889	0	255.57
28	Optimize d	236.746	-17.70858	799.82367	1822.3113	0	241.67
29	Optimize d	240.23795	- 16.70191 5	732.51818	1687.0399	0	226.18
30	Optimize d	243.89095	-15.59929	659.48733	1546.1659	0	209.22
31	Optimize d	246.3169	-14.83694	609.41462	1445.1212	0	200
32	Optimize d	248.749	- 13.94878 5	551.58725	1344.4252	0	200
33	Optimize d	251.83845	- 12.66550 5	468.74796	1201.133	0	200
34	Optimize d	254.19095	-11.54913	397.16462	1061.5379	0	200
35	Optimize d	256.59695	- 10.25217 3	314.32358	925.10849	0	200
36	Optimize d	259.05645	- 8.774637 5	220.31405	744.01126	0	200
37	Optimize d	261.4431	-6.970613	106.06626	579.49994	0	200
38	Optimize d	264.13745	- 4.489724 5	-50.444744	410.61567	0	400

Slice	Slices of Slip Surface: 5490								
		Slip	X (ft)	Y (ft)	PWP (psf)	Base	Frictiona	Cohesiv	

47	5400	24.4.5226	47.00500	000.00464	2246 2027		270.00
17	5490	214.5226	-17.99592	896.86461	2346.2027	0	278.68
18	5490	217.5678	-18.47059	905.51616	2318.2789	0	280.71
19	5490	220.613	- 18.79625 5	909.54432	2274.6463	0	280.71
20	5490	223.6582	- 18.97519 5	908.15916	2215.3937	0	278.63
21	5490	226.7034	- 19.00864 5	900.52403	2140.4069	0	274.43
22	5490	229.7486	-18.89684	885.87094	2049.5722	0	268.04
23	5490	233.1356	-18.59165	860.09999	1934.5855	0	258.15
24	5490	236.323	- 18.15971 5	827.93032	1841.3946	0	248.61
25	5490	238.969	- 17.66405 5	793.27529	1780.1343	0	240.99
26	5490	241.615	-17.05149	751.77669	1705.9393	0	231.56
27	5490	244.26095	- 16.31850 5	703.14273	1618.1875	0	220.28
28	5490	246.9069	-15.46071	647.07732	1516.1882	0	207.09
29	5490	249.6669	- 14.42400 5	579.91853	1393.9877	0	200
30	5490	252.54095	- 13.18868 5	500.46046	1249.902	0	200
31	5490	255.415	-11.78082	410.42289	1086.664	0	200
32	5490	258.289	- 10.18713 4	308.85757	902.60909	0	200
33	5490	261.163	-8.390887	194.81804	695.63365	0	200
34	5490	263.5859	- 6.719892 5	88.950473	508.46395	0	200

35 5490 266.32615 -4.56603 -47.094951 382.1086 0 400

Slope Stability Global (Block)

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File Information

Created By: USACE St. Louis District Revision Number: 587 Last Edited By: Goetz, Ryan MVS Date: 7/30/2014 Time: 11:51:15 AM File Name: 17thReach11.gsz Directory: C:\Users\B3ECGANG\Desktop\
Last Solved Date: 7/30/2014 Last Solved Time: 11:52:22 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

```
Slope Stability Global (Block)
     Kind: SLOPE/W
Parent: Seepage Analysis (Gap)
     Method: Spencer
     Settings
           PWP Conditions Source: Parent Analysis
     Slip Surface
           Direction of movement: Left to Right
           Use Passive Mode: No
           Slip Surface Option: Block
           Critical slip surfaces saved: 1
           Optimize Critical Slip Surface Location: Yes
           Tension Crack
Tension Crack Option: Tension Crack Line
                Percentage Wet: 1
                Tension Crack Fluid Unit Weight: 62.4 pcf
     FOS Distribution
```

```
Sheet Pile
    Model: Undrained (Phi=0)
    Unit Weight: 0.1 pcf
    Cohesion: 0.01 psf
LACUSTRINE, EL. -16.0 TO -27.0
    Model: Spatial Mohr-Coulomb
```

Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine

Phi-B: 0 °

Phi-B: 0°

Slip Surface Limits

Left Coordinate: (60, -13.1) ft Right Coordinate: (310, -3.6) ft

Slip Surface Block

Left Grid Upper Left: (195, -5) ft Lower Left: (195, -35) ft Lower Right: (225, -35) ft X Increments: 6 Y Increments: 6 Starting Angle: 135 Ending Angle: 175 Angle Increments: 5 Right Grid Upper Left: (228, -5) ft Lower Left: (228, -35) ft Lower Right: (258, -35) ft X Increments: 6 Y Increments: 6 Starting Angle: 15 ° Ending Angle: 45 Angle Increments: 5

Tension Crack Line

	X (ft)	Y (ft)
	160.8	-6.8
Г	183	-2.7

```
FOS Calculation Option: Constant
    Restrict Block Crossing: Yes
     Advanced
          Number of Slices: 30
          Optimization Tolerance: 0.01
          Minimum Slip Surface Depth: 0.1 ft
          Optimization Maximum Iterations: 2000
          Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
          Ending Optimization Points: 16
          Complete Passes per Insertion: 1
          Driving Side Maximum Convex Angle: 30 °
          Resisting Side Maximum Convex Angle: 10 °
Materials
EMBANKMENT FILL, EL. +2.5 TO 0.0
    Model: Undrained (Phi=0)
Unit Weight: 118 pcf
     Cohesion: 800 psf
MARSH 1, EL. -6.0 TO -16.0
    Model: Spatial Mohr-Coulomb
     Weight Fn: Marsh 1
     Cohesion Spatial Fn: Marsh 1
     Phi-B: 0°
BEACH SAND, EL. -27.0/-28.0 TO -42.0
    Model: Shear/Normal Fn
     Unit Weight: 122 pcf
     Strength Function: Sand
BAY SOUND CLAY, EL. -42 TO -70
    Model: Spatial Mohr-Coulomb
Weight Fn: Clay
     Cohesion: 700 psf
     Phi: 0
     Phi-B: 0°
EMBANKMENT FILL 2, EL 0.0 TO -6.0
     Model: Spatial Mohr-Coulomb
     Weight Fn: FILL 2
     Cohesion Spatial Fn: Fill 2
```

184.8	-1.3
200	-0.5

Shear/Normal Strength Functions

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (0, 0) Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Unit Weight Functions

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 102) Data Point: (200, 104) Data Point: (235, 102) Lacustrine Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 102)

Data Point: (200, 103) Data Point: (235, 102)

FILL 2

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 106 Data Points: X (ft), Unit Weight (pcf)

Data Point: (181.4, 106)
Data Point: (200, 108)
Data Point: (235, 106)

Marsh 1

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 105 Data Points: X (ft), Unit Weight (pcf) Data Point: (200, 99) Data Point: (235, 105)

Spatial Functions

Lacustrine

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -15, 200)
Data Point: (181.4, -28, 400)
Data Point: (200, -16, 275)
Data Point: (200, -27, 425)
Data Point: (235, -15, 200)
Data Point: (235, -28, 400)
Data Point: (60, -15, 200)
Data Point: (60, -28, 400)
Data Point: (310, -15, 200)
Data Point: (310, -28, 400)

Fill 2

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)

7	0.0 TO -6.0		
Region 8	EMBANKMENT FILL 2, EL 0.0 TO -6.0	43,19,20,32,44,4	204.04076
Region 9	Sheet Pile	18,21,48,22,46,6,7,47	8.325

Points

	X (ft)	Y (ft)
Point 1	60	-13.1
Point 2	95.6	-12.9
Point 3	122.5	-12.8
Point 4	160.8	-3.8
Point 5	183	0.3
Point 6	200	2.5
Point 7	200	5.5
Point 8	213	4.9
Point 9	235	-1
Point 10	262.6	-3
Point 11	310	-3.6
Point 12	310	-6
Point 13	310	-15
Point 14	310	-28
Point 15	310	-42
Point 16	60	-42
Point 17	60	-28
Point 18	200	12.5
Point 19	200	0
Point 20	200	-6
Point 21	200.5	12.5
Point 22	201	5.5
Point 23	140.8	-9.9
Point 24	60	-15
Point 25	287.5	-3.6
Point 26	231.27119	0
Point 27	235	-6

Data Point: (181.4, 0, 400)
Data Point: (181.4, -6, 400)
Data Point: (235, -1, 400)
Data Point: (235, -6, 400)
Data Point: (200, 0, 425)
Data Point: (200, -6, 425)
Data Point: (168.9, -2.2, 400)
Data Point: (168.9, -6, 400)
Data Point: (310, -3.6, 400)
Data Point: (310, -3.6, 400)

Marsh 1

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), V (ft), Cohesion (psf)
Data Points: X (ft), V (ft), Cohesion (psf)
Data Point: (181.4, -15, 200)
Data Point: (235, -15, 200)
Data Point: (200, -6, 275)
Data Point: (200, -6, 275)
Data Point: (200, -16, 275)
Data Point: (153.4, -15, 200)
Data Point: (153.4, -15, 200)
Data Point: (60, -13.1, 200)
Data Point: (60, -15, 200)
Data Point: (310, -3.6, 200)
Data Point: (310, -3.6, 200)
Data Point: (310, -15, 200)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. +2.5 TO 0.0	46,22,8,26,19,6	109.66442
Region 2	EMBANKMENT FILL, EL. +2.5 TO 0.0	6,42,31,5,43,19	34.363658
Region 3	BEACH SAND, EL27.0/- 28.0 TO -42.0	17,16,40,41,15,14,29,30,34	3526.8
Region 4	MARSH 1, EL6.0 TO -16.0	1,45,2,3,23,44,32,20,27,12,13,28,35,33,24	1721.2756
Region 5	LACUSTRINE, EL16.0 TO - 27.0	17,24,33,35,28,13,14,29,30,34	3196.4
Region 6	BAY SOUND CLAY, EL42 TO -70	36,37,38,39,15,41,40,16	7000
Region	EMBANKMENT FILL 2, EL	20,19,26,9,10,25,11,12,27	439.7656

Point 28	235	-15
Point 29	235	-28
Point 30	200	-27
Point 31	184.8	1.7
Point 32	181.4	-6
Point 33	181.4	-15
Point 34	181.4	-28
Point 35	200	-16
Point 36	60	-70
Point 37	181.4	-70
Point 38	235	-70
Point 39	310	-70
Point 40	181.4	-42
Point 41	235	-42
Point 42	199	2.5
Point 43	181.37561	0
Point 44	153.58689	-6
Point 45	70	-13
Point 46	201	2.5
Point 47	200	10
Point 48	200.7	10

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.63	(224.765, - 2.284)	32.99613	(183.574, 0.746208)	(264.266, - 3.04014)
2	6393	1.70	(224.765, - 2.284)	33.555	(183.329, 0.555675)	(266.194, - 3.08661)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)		
1	Optimize	184.18685	-	445.41575	583.03121	0	403.75		

	d		2.661954				
2	Optimize d	185.09715	- 3.267923 5	432.54686	792.29991	0	404.97
3	Optimize d	187.0947	-4.732865	412.92286	922.96382	0	407.65
4	Optimize d	189.26895	-6.35309	433.54024	1162.2673	0	231.73
5	Optimize d	190.8782	- 7.375442 5	499.93209	1299.7172	0	238.22
6	Optimize d	193.149	- 8.713967 5	598.18859	1434.1655	0	247.37
7	Optimize d	195.4633	- 10.03452 5	695.5133	1574.6777	0	256.71
8	Optimize d	197.8211	- 11.33711 5	755.20828	1702.4948	0	266.21
9	Optimize d	199.4301	- 12.22603 5	778.33642	1788.7879	0	272.7
10	Optimize d	199.9301	-12.4875	785.34333	1874.341	0	274.72
11	Optimize d	200.25	-12.59662	785.51419	1350.4302	0	274.46
12	Optimize d	200.6	-12.71601	786.35676	1526.3849	0	273.71
13	Optimize d	200.85	-12.80129	787.19266	1534.5714	0	273.18
14	Optimize d	202.9011	- 13.50096 5	795.90493	1938.8577	0	268.78
15	Optimize d	206.59715	-14.95485	814.36503	2032.0368	0	260.86
16	Optimize d	209.1645	- 16.10680	842.23992	2133.387	0	260.58

			5				
33	Optimize d	258.106	-7.963395	170.55807	681.05661	0	200
34	Optimize d	260.2733	-6.43619	73.636842	527.51272	0	200
35	Optimize d	261.69305	- 5.228527 5	-2.7006984	500.71723	0	400
36	Optimize d	263.4329	-3.748597	-96.160266	323.84184	0	400

Slices of Slip Surface: 6393

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	6393	184.06435	-2.852096	444.25448	648.97583	0	403.58
2	6393	186.03585	-3.9449	422.15309	902.37435	0	406.23
3	6393	188.5075	5.314966 5	413.94358	1050.641	0	409.55
4	6393	191.2861	-6.855176	478.5873	1261.0679	0	239.86
5	6393	194.37165	- 8.565527 5	611.81167	1433.9478	0	252.31
6	6393	197.4572	- 10.27588 2	727.68853	1603.5396	0	264.75
7	6393	199.5	-11.40821	756.45863	1713.9923	0	272.98
8	6393	200.25	-11.82394	764.68006	1227.249	0	274.46
9	6393	200.6	-12.01795	766.60422	1406.476	0	273.71
10	6393	200.85	- 12.15652 5	768.00361	1419.6828	0	273.18
11	6393	202.60055	-13.12688	784.06504	1845.5323	0	269.43
12	6393	205.8017	-14.9013	821.00465	2002.5803	0	262.57
13	6393	208.8017	- 16.56422 5	867.50495	2150.0911	0	267.67

			5				
17	Optimize d	211.46845	- 17.08351 5	870.75266	2229.9734	0	270.57
18	Optimize d	214.60135	-18.3725	916.45287	2301.6429	0	283.99
19	Optimize d	217.70505	- 19.37661 5	954.29491	2370.0713	0	293.72
20	Optimize d	220.7098	- 20.06714 5	980.37244	2349.0212	0	299.29
21	Optimize d	223.61475	-20.40522	990.16184	2378.0996	0	299.98
22	Optimize d	226.41985	-20.39084	981.71293	2290.6516	0	295.61
23	Optimize d	229.5468	-20.02999	953.2117	2224.8613	0	285.52
24	Optimize d	232.4048	- 19.44384 5	912.43013	2076.6351	0	272.3
25	Optimize d	234.2692	- 18.95280 5	879.44593	2018.4364	0	261.94
26	Optimize d	236.61775	-18.12191	825.11054	1894.4501	0	248.03
27	Optimize d	239.85325	- 16.97722 5	749.9654	1744.3929	0	230.42
28	Optimize d	243.2347	-15.70244	666.79291	1590.1946	0	210.81
29	Optimize d	246.8016	-14.28182	574.48554	1407.3492	0	200
30	Optimize d	249.7392	-12.98184	490.58211	1268.8699	0	200
31	Optimize d	252.00805	-11.81824	416.06728	1123.8797	0	200
32	Optimize d	254.797	- 10.14542	309.33266	948.35777	0	200

14	6393	211.60055	-18.11566	922.1908	2286.2744	0	285.09
15	6393	214	-19.44569	976.25058	2377.9162	0	300.4
16	6393	216.35595	-20	994.22353	2555.7688	0	304.84
17	6393	219.0678	-20	982.90291	2472.9476	0	300.77
18	6393	221.77965	-20	973.02041	2390.0526	0	296.7
19	6393	224.49155	-20	964.42854	2307.047	0	292.63
20	6393	227.2034	-20	957.05354	2223.9676	0	288.57
21	6393	229.91525	-20	950.67417	2140.8145	0	284.52
22	6393	232.1356	-20	946.0843	2075.416	0	281.2
23	6393	234	- 19.49047 5	912.21267	2130.798	0	270.6
24	6393	236.3022	-18.31746	837.51549	1960.8742	0	251.04
25	6393	238.90655	- 16.99047 5	752.32703	1792.379	0	230.62
26	6393	241.5109	-15.66349	667.00172	1623.8837	0	210.21
27	6393	244.28505	-14.25	575.93233	1446.1413	0	200
28	6393	247.22895	-12.75	479.32315	1259.188	0	200
29	6393	250.17285	-11.25	382.77451	1072.2347	0	200
30	6393	253.11675	-9.75	286.38022	885.28145	0	200
31	6393	256.06065	-8.25	190.16753	698.32816	0	200
32	6393	259.00455	-6.75	94.157627	511.37488	0	200
33	6393	261.53825	5.459023 5	11.778666	420.77755	0	400
34	6393	264.3972	- 4.002329 5	-81.00232	247.2508	0	400

R12 Slope Stability Global (Block) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 765 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 1:07:19 PM File Name: 17thReach12.gsz Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/27/2013 Last Solved Time: 1:07:58 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global (Block) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: Yes Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant

Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL, EL. +2.4 TO -3 Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 500 psf Phi-B: 0 ° MARSH 1b, EL. -5 TO -8 Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion Spatial Fn: Marsh 1b Phi-B: 0 ° BEACH SAND, EL. -25 TO -42 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Phi-B: 0 ° BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Phi: 0

Restrict Block Crossing: Yes

Sheet Pile

Model: Undrained (Phi=0)

Unit Weight: 0.1 pcf

```
Cohesion: 0.01 psf
MARSH 2, EL. -8 TO -15
     Model: Spatial Mohr-Coulomb
      Unit Weight: 105 pcf
      Cohesion Spatial Fn: Marsh 2
     Phi-B: 0°
Lacustrine 1, EL. -15 TO -19
     Model: Spatial Mohr-Coulomb
      Unit Weight: 105 pcf
      Cohesion Spatial Fn: Lacustrine 1
      Phi-B: 0°
Lacustrine 2, EL. -19 TO -25
Model: Spatial Mohr-Coulomb
      Unit Weight: 100 pcf
     Cohesion Spatial Fn: Lacustrine 2
      Phi-B: 0 °
MARSH 1a, EL. -0.4 TO -5
      Model: Spatial Mohr-Coulomb
      Weight Spatial Fn: Marsh 1a unit wt
      Cohesion Spatial Fn: Marsh 1a
     Phi: 0 °
Phi-B: 0 °
Slip Surface Limits
      Left Coordinate: (40, -12) ft
      Right Coordinate: (310, -1.8) ft
Slip Surface Block
     Left Grid
           Upper Left: (190, -5) ft
           Lower Left: (190, -35) ft
Lower Right: (220, -35) ft
```

X Increments: 6 Y Increments: 6

Starting Angle: 135 °

Ending Angle: 175 °

Angle Increments: 5

Right Grid

Upper Left: (230, -5) ft Lower Left: (230, -35) ft Lower Right: (260, -35) ft X Increments: 6 Y Increments: 6 Starting Angle: 15 ° Ending Angle: 45 ° Angle Increments: 5 **Unit Weight Functions** Clav Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (175.3, 102) Data Point: (200, 104) Data Point: (265, 102)

Spatial Functions

```
Marsh 1a unit wt
     Model: Linear Interpolation
      Limit Range By: Data Values
      Data Points: X (ft), Y (ft), Unit Weight (pcf)
            Data Point: (184.169, 0.445, 104)
            Data Point: (175.3, -3, 104)
            Data Point: (168.898, -5, 67)
            Data Point: (200, -5, 104)
            Data Point: (200, 0.4364, 104)
Data Point: (265, -1.2, 104)
            Data Point: (265, -3, 104)
Data Point: (265, -5, 67)
            Data Point: (310, -1.8, 104)
            Data Point: (310, -3, 104)
            Data Point: (310, -5, 67)
Lacustrine 1
      Model: Linear Internolation
      Limit Range By: Data Values
     Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (175.3, -15, 250)
```

Data Point: (175.3, -19, 290) Data Point: (200, -15, 275) Data Point: (200, -19, 311) Data Point: (265, -15, 250) Data Point: (265, -19, 290) Data Point: (40, -15, 250) Data Point: (40, -19, 290) Data Point: (310, -15, 250) Data Point: (310, -19, 290)

Lacustrine 2

Model: Linear Interpolation

Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (175.3, -19, 290)
Data Point: (175.3, -25, 350) Data Point: (200, -19, 290)
Data Point: (200, -25, 365)
Data Point: (265, -19, 290)
Data Point: (265, -25, 350) Data Point: (40, -19, 290) Data Point: (40, -25, 350)

Data Point: (310, -19, 290) Data Point: (310, -25, 350)

Marsh 1a

Model: Linear Interpolation Limit Range By: Data Values
Data Points: X (ft), V (ft), Cohesion (psf)
Data Point: (175.3, -3, 700)
Data Point: (168.898, -5, 275) Data Point: (168.898, -5, 275)
Data Point: (265, -1.2, 700)
Data Point: (265, -3, 700)
Data Point: (310, -3, 700)
Data Point: (310, -5, 275)
Data Point: (200, 0.4364, 500) Data Point: (200, -5, 500) Data Point: (184.169, 0.445, 700) Data Point: (265, -5, 275) Data Point: (310, -1.8, 700)

Marsh 1b

Model: Linear Interpolation Data Point: (156.5, -8, 150)

Data Point: (175.5, -8, 150)

Data Point: (175.3, -8, 150)

Data Point: (175.3, -8, 150)

Data Point: (200, -5, 275) Data Point: (200, -8, 275) Data Point: (265, -5, 150) Data Point: (265, -8, 150)
Data Point: (310, -5, 150) Data Point: (310, -8, 150)

Marsh 2

Model: Linear Interpolation Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), V (ft), Cohesion (psf)
Data Point: (40, -12, 250)
Data Point: (40, -15, 250)
Data Point: (175.3, -8, 250)
Data Point: (175.3, -15, 250)
Data Point: (200, -8, 275)
Data Point: (200, -8, 275)
Data Point: (200, -15, 275)
Data Point: (265, -8, 250)
Data Point: (265, -15, 250)
Data Point: (310, -8, 250)
Data Point: (310, -8, 250)
Data Point: (310, -8, 250)

Data Point: (310, -15, 250)

Regions

5

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL25 TO -42	15,14,33,35,13,12,32	4590
Region 2	Sheet Pile	16,17,6,21,5	8.275
Region 3	Lacustrine 1, EL15 TO -19	24,37,31,38,25,30	1080
Region 4	Lacustrine 2, EL19 TO -25	15,32,12,38,31,37	1620
Region 5	BAY SOUND CLAY, EL42 TO -70	22,34,36,23,13,35,33,14	7560
Region 6	MARSH 2, EL8 TO -15	24,1,18,45,42,49,11,25,30	1489.9512
Region 7	MARSH 1a, EL0.4 TO -5	27,29,28,26	155
Region 8	MARSH 1a, EL0.4 TO -5	27,40,39	31.102
Region 9	EMBANKMENT FILL, EL. +2.4 TO -3	5,46,44,8,7,6,21	109.67894
Region 10	EMBANKMENT FILL, EL. +2.4 TO -3	5,46,43,4,20	27.4692
Region 11	MARSH 1a, EL0.4 TO -5	46,27,29,28,10,9,19,44	331.06608
Region 12	MARSH 1a, EL0.4 TO -5	46,27,39,3,43	92.535792
Region 13	MARSH 1b, EL5 TO -8	47,48,26,27	110
Region 14	MARSH 1b, EL5 TO -8	41,47,27,40	32.692
Region 15	MARSH 1b, EL5 TO -8	41,2,42,49,11,48,47	297.52797

6

Points

	X (ft)	Y (ft)
Point 1	40	-12
Point 2	165.4	-6.1
Point 3	181.3	-1.1
Point 4	187.8	2.4
Point 5	200	2.4
Point 6	201	5.5
Point 7	211.5	5
Point 8	225	2
Point 9	284.9	-1.8
Point 10	310	-1.8
Point 11	310	-8
Point 12	310	-25
Point 13	310	-42
Point 14	40	-42
Point 15	40	-25
Point 16	200	12.4
Point 17	200.5	12.4
Point 18	140.9	-11.4
Point 19	265	-1.2
Point 20	199	2.4
Point 21	201	2.4
Point 22	40	-70
Point 23	310	-70
Point 24	40	-15
Point 25	310	-15
Point 26	310	-5
Point 27	200	-5
Point 28	310	-3
Point 29	265	-3
Point 30	175.3	-15
Point 31	175.3	-19
Point 32	175.3	-25
Point 33	175.3	-42

Point 34	175.3	-70
Point 35	265	-42
Point 36	265	-70
Point 37	40	-19
Point 38	310	-19
Point 39	175.3	-3
Point 40	168.898	-5
Point 41	165.718	-6
Point 42	156.61698	-8
Point 43	184.16903	0.44486
Point 44	244.84451	0.41244
Point 45	149	-9.64775
Point 46	200	0.4364
Point 47	200	-6
Point 48	310	-6
Point 49	200	-8

Critical Slip Surfaces

 interest only our faces									
	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)			
1	Optimized	2.55	(232.91, - 1.501)	45.80698	(173.325, - 3.61686)	(286.555, - 1.8)			
2	8421	2.66	(232.91, - 1.501)	46.358	(175.307, - 2.99779)	(290.533, - 1.8)			

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	174.3127	- 3.968278 5	726.50639	684.09067	0	509.52
2	Optimize d	176.2556	- 4.659849 5	731.15536	783.01105	0	392.63
3	Optimize	178.6159	-5.5	738.41275	905.44427	0	166.78

4	d timize d	180.6603 182.00355 183.43805 184.5821 186.3976 188.25175 191.0523	-7.811562 -7.811562 -7.81552 -7.35526 -7.10124	746.40055 753.01689 764.29371 776.40063 798.97108 824.39192 876.95812	983.22219 1035.1555 1095.5644 1156.6225 1268.4732 1397.7694 1538.9026	0 0 0 0 0 0 0 0 0 0	177.13 183.92 191.18 196.97 261.23 263.11
4 5 Op 6 Op 7 Op 8 Op 10 Op 11 Op 12 Op	d titimize titimize d titimize tit	182.00355 183.43805 184.5821 186.3976 188.25175 191.0523	5 6.705811 5 -7.289682 -7.811562 -	753.01689 764.29371 776.40063 798.97108 824.39192	1035.1555 1095.5644 1156.6225 1268.4732 1397.7694	0 0 0 0	183.92 191.18 196.97 261.23 263.11
6 Op	d timize	183.43805 184.5821 186.3976 188.25175 191.0523	5 -7.289682 -7.811562 - 8.639731 5 - 9.485526 5 -11.0124	764.29371 776.40063 798.97108 824.39192	1095.5644 1156.6225 1268.4732 1397.7694	0 0 0	191.18 196.97 261.23 263.11
6 7 0p 8 0p 9 0p 10 0p 11 0p 12 0p	d timize d	184.5821 186.3976 188.25175 191.0523	-7.811562 - 8.639731 5 - 9.485526 5 -11.0124	776.40063 798.97108 824.39192	1156.6225 1268.4732 1397.7694	0 0	196.97 261.23 263.11
9 Op 10 Op 11 Op 12 Op	d timize d timize d timize d timize	186.3976 188.25175 191.0523	8.639731 5 - 9.485526 5 -11.0124	798.97108 824.39192	1268.4732	0	261.23
9 Op 10 Op 11 Op 12 Op	d timize d timize d timize	188.25175 191.0523	5 - 9.485526 5 -11.0124	824.39192	1397.7694	0	263.11
10 Op 11 Op 12 Op	d ditimize d	191.0523	5 -11.0124 -				
10 Op	d timize		-	876.95812	1538.9026	0	265.94
11 Op		195.7499	12 65/01				
12 On			5	961.64248	1811.2507	0	270.7
13 Ор	timize d	198.12435	-14.98741	994.8151	1961.6492	0	273.1
	timize d	198.575	- 15.20877 5	1000.5912	1983.9709	0	275.45
14 Op	timize d	199.5	- 15.66316 5	1012.1726	2030.7179	0	280.48
15 Op	timize d	200.25	- 16.03158 5	1020.6994	1638.3608	0	284.19
16 Op	timize d	200.75	-16.2772	1026.6053	1750.8783	0	286.22
17 Op	timize d	203.51605	- 17.63596 5	1060.8426	2190.855	0	297.51
18 Op		208.76605		1143.7434	2423.0889	0	305.61

	d		20.28308				
19	Optimize d	212.30425	- 22.10936 5	1215.74	2565.8379	0	327.4
20	Optimize d	215.49915	-23.34443	1269.326	2654.3455	0	341.72
21	Optimize d	220.29005	- 24.57614 5	1327.8417	2708.0374	0	355.35
22	Optimize d	223.84515	- 24.98590 5	1348.3785	2711.2613	0	359.33
23	Optimize d	226.97805	-24.98046	1347.0973	2666.238	0	358.55
24	Optimize d	231.0035	-24.82167	1336.7568	2634.0647	0	355.83
25	Optimize d	235.0983	-24.51097	1317.1541	2566.125	0	351.45
26	Optimize d	239.0704	-24.08148	1290.0725	2503.6578	0	345.88
27	Optimize d	242.9198	-23.5332	1255.4552	2412.9482	0	339.18
28	Optimize d	245.2591	- 23.20000 5	1234.1671	2357.6568	0	335.19
29	Optimize d	247.9565	- 22.58564 5	1195.5497	2294.2228	0	328.21
30	Optimize d	252.5221	- 21.47503 5	1125.2971	2138.0113	0	315.94
31	Optimize d	257.6261	- 19.91716 5	1026.7548	1954.0454	0	299.43
32	Optimize d	262.72365	- 17.77653 5	891.68255	1706.0556	0	278.54
33	Optimize	266.6386	-	768.23186	1463.9746	0	258.19

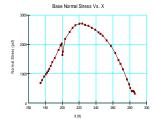
	d		15.81923 5				
34	Optimize d	268.8635	- 14.70688 5	697.94087	1335.5282	0	250
35	Optimize d	271.8078	- 12.89143 5	583.47133	1153.4573	0	250
36	Optimize d	276.52385	-9.84677	391.43332	808.75081	0	250
37	Optimize d	279.07265	-8.16222	285.18346	645.16193	0	250
38	Optimize d	280.4394	-7	212.02416	516.68338	0	150
39	Optimize d	282.2034	-5.5	117.62709	406.34401	0	150
40	Optimize d	283.8457	- 4.103508 5	29.706837	411.22705	0	465.5
41	Optimize d	285.02175	3.103508 5	-33.244589	388.89661	0	678
42	Optimize	285.8491	-2.4	-77.546748	320.88645	0	700

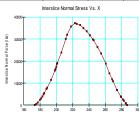
Slices	of Slip	Surface:	8421

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	8421	177.113	- 3.998896 5	702.1266	682.53766	0	523.98
2	8421	179.82105	-5.5	728.37809	904.12161	0	172.88
3	8421	181.01155	- 6.159892 5	741.30235	963.97959	0	178.9
4	8421	182.7345	- 7.114949	762.60922	1058.5562	0	187.62

			5				
5	8421	185.9845	-8.916454	810.62579	1276.7242	0	260.81
6	8421	190.0899	- 11.19209 7	884.09941	1561.3539	0	264.97
7	8421	194.66965	-13.7307	966.21863	1823.9444	0	269.6
8	8421	197.97975	-15.56553	1015.736	2011.5406	0	278.09
9	8421	199.5	-16.40821	1038.7859	2097.1633	0	287.2
10	8421	200.25	-16.82394	1049.4737	1713.5026	0	291.33
11	8421	200.75	- 17.10109 5	1056.8031	1825.6813	0	293.65
12	8421	202.58785	- 18.11983 5	1085.1385	2234.8604	0	302.21
13	8421	206.0068	-20.01498	1144.1977	2407.3792	0	302.45
14	8421	209.66895	-22.04494	1219.7149	2582.6784	0	326.93
15	8421	213.25	-24.02996	1305.6824	2723.0661	0	350.31
16	8421	216.66665	-25	1351.2901	2880.1803	0	361.15
17	8421	220	-25	1350.3001	2802.0603	0	360.38
18	8421	223.33335	-25	1349.3101	2723.7603	0	359.62
19	8421	226.98445	-25	1348.1814	2666.9845	0	358.77
20	8421	230.95335	-25	1346.9972	2631.9622	0	357.86
21	8421	234.92225	-25	1345.7878	2596.688	0	356.94
22	8421	238.89115	-25	1344.5784	2561.1618	0	356.03
23	8421	242.86005	-25	1343.369	2525.1316	0	355.11
24	8421	246.88485	-24	1281.6899	2506.1234	0	343.48
25	8421	250.8878	-22	1158.2885	2264.005	0	321.63
26	8421	254.81305	-20	1033.6455	2017.7152	0	300.39
27	8421	258.7383	-18	908.0944	1766.7038	0	282.12
28	8421	262.6635	-16	782.02125	1509.6317	0	260.86
29	8421	264.81305	- 14.90474 5	712.8387	1368.9372	0	250.07
30	8421	267.2274	- 13.67457 5	634.99416	1227.8061	0	250

31	8421	271.6822	- 11.40474 5	491.24643	969.67217	0	250
32	8421	276.137	-9.134915	347.37869	711.53828	0	250
33	8421	280.327	-7	212.08391	486.33727	0	150
34	8421	283.2709	-5.5	117.066	374.07914	0	150
35	8421	284.5761	- 4.834967 5	74.960978	358.14124	0	310.07
36	8421	286.5387	- 3.834967 5	11.632671	321.23125	0	522.57
37	8421	289.355	-2.4	-79.187296	212.92155	0	700





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File Information

Created By: USACE St. Louis District Revision Number: 763 Last Edited By: Redell, Chris MVS Date: 2/26/2013 Time: 4:03:48 PM File Name: 17thReach12.gsz

Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_Hlgh_water_ analyses\High water cases\

Last Solved Date: 2/26/2013 Last Solved Time: 4:05:46 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global (Entry/ Exit)

Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution

FOS Calculation Option: Constant

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +2.4 TO -3 Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 500 psf Phi: 0 Phi-B: 0° MARSH 1b, EL. -5 TO -8 Model: Snatial Mohr-Coulomb

Unit Weight: 67 pcf Cohesion Spatial Fn: Marsh 1b Phi-B: 0 °

BEACH SAND, EL. -25 TO -42

Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi-B: 0 °

BAY SOUND CLAY, EL. -42 TO -70

Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

MARSH 2, EL. -8 TO -15

Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Marsh 2 Phi-B: 0°

Lacustrine 1, EL. -15 TO -19

Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Lacustrine 1 Phi-B: 0 °

Lacustrine 2, EL. -19 TO -25

Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine 2

MARSH 1a, EL. -0.4 TO -5

Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh 1a unit wt Cohesion Spatial Fn: Marsh 1a Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (152.93666, -8.79615) ft Left-Zone Right Coordinate: (201.72, 5.46571) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (225.16483, 1.98681) ft Right-Zone Right Coordinate: (284.9, -1.8) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (40, -12) ft Right Coordinate: (310, -1.8) ft

Unit Weight Functions

Clav

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (175.3, 102) Data Point: (200, 104) Data Point: (265, 102)

Spatial Functions

Marsh 1a unit wt Model: Linear Interpolation Limit Range By: Data Values
Data Points: X (ft), Y (ft), Unit Weight (pcf)
Data Point: (184.169, 0.445, 104)
Data Point: (175.3, -3, 104)

Data Point: (168.898, -5, 67) Data Point: (200, -5, 104) Data Point: (200, 0.4364, 104) Data Point: (265, -1.2, 104) Data Point: (265, -3, 104) Data Point: (265, -5, 67) Data Point: (310, -1.8, 104) Data Point: (310, -3, 104) Data Point: (310, -5, 67)

Lacustrine 1

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (175.3, -15, 250) Data Point: (175.3, -19, 290) Data Point: (200, -15, 275) Data Point: (200, -19, 311) Data Point: (265, -15, 250) Data Point: (265, -19, 290) Data Point: (40, -15, 250) Data Point: (40, -19, 290) Data Point: (310, -15, 250) Data Point: (310, -19, 290)

Lacustrine 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (175.3, -19, 290)
Data Point: (175.3, -25, 350)
Data Point: (200, -19, 290)
Data Point: (200, -25, 365)
Data Point: (265, -19, 290)
Data Point: (265, -25, 350)
Data Point: (40, -19, 290)
Data Point: (40, -19, 290)
Data Point: (40, -25, 350)
Data Point: (310, -19, 290)

Data Point: (310, -25, 350)

Marsh 1a

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (175.3, -3, 700)
Data Point: (168.898, -5, 275)
Data Point: (265, -1.2, 700)
Data Point: (265, -3, 700)
Data Point: (310, -3, 700)
Data Point: (310, -5, 275)
Data Point: (300, 0.4364, 500)
Data Point: (200, 0.4364, 500)
Data Point: (200, 0.4564, 500)

Data Point: (200, 0.4364, 500)
Data Point: (200, -5, 500)
Data Point: (184.169, 0.445, 700)
Data Point: (265, -5, 275)
Data Point: (310, -1.8, 700)

Marsh 1b

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (156.5, -8, 150)
Data Point: (175.3, -8, 150)
Data Point: (175.3, -8, 150)
Data Point: (200, -8, 275)
Data Point: (200, -8, 275)
Data Point: (265, -5, 150)
Data Point: (265, -8, 150)
Data Point: (310, -5, 150)
Data Point: (310, -8, 150)

Marsh 2

Model: Linear Interpolation

Point 5	200	2.4
Point 6	201	5.5
Point 7	211.5	5
Point 8	225	2
Point 9	284.9	-1.8
Point 10	310	-1.8
Point 11	310	-8
Point 12	310	-25
Point 13	310	-42
Point 14	40	-42
Point 15	40	-25
Point 16	200	12.4
Point 17	200.5	12.4
Point 18	140.9	-11.4
Point 19	265	-1.2
Point 20	199	2.4
Point 21	201	2.4
Point 22	40	-70
Point 23	310	-70
Point 24	40	-15
Point 25	310	-15
Point 26	310	-5
Point 27	200	-5
Point 28	310	-3
Point 29	265	-3
Point 30	175.3	-15
Point 31	175.3	-19
Point 32	175.3	-25
Point 33	175.3	-42
Point 34	175.3	-70
Point 35	265	-42
Point 36	265	-70
Point 37	40	-19
Point 38	310	-19
Point 39	175.3	-3
Point 40	168.898	-5

Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (40, -12, 250)
Data Point: (40, -15, 250)
Data Point: (175.3, -8, 250)
Data Point: (175.3, -15, 250)
Data Point: (200, -8, 275)
Data Point: (200, -8, 275)
Data Point: (200, -8, 275)

Data Point: (17-3, -7-8, 250)
Data Point: (17-3, -15, 250)
Data Point: (200, -8, 275)
Data Point: (200, -15, 275)
Data Point: (265, -8, 250)
Data Point: (265, -15, 250)
Data Point: (310, -8, 250)
Data Point: (310, -15, 250)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL25 TO -42	15,14,33,35,13,12,32	4590
Region 2	Sheet Pile	16,17,6,21,5	8.275
Region 3	Lacustrine 1, EL15 TO -19	24,37,31,38,25,30	1080
Region 4	Lacustrine 2, EL19 TO -25	15,32,12,38,31,37	1620
Region 5	BAY SOUND CLAY, EL42 TO -70	22,34,36,23,13,35,33,14	7560
Region 6	MARSH 2, EL8 TO -15	24,1,18,45,42,49,11,25,30	1489.9512
Region 7	MARSH 1a, EL0.4 TO -5	27,29,28,26	155
Region 8	MARSH 1a, EL0.4 TO -5	27,40,39	31.102
Region 9	EMBANKMENT FILL, EL. +2.4 TO -3	5,46,44,8,7,6,21	109.67894
Region 10	EMBANKMENT FILL, EL. +2.4 TO -3	5,46,43,4,20	27.4692
Region 11	MARSH 1a, EL0.4 TO -5	46,27,29,28,10,9,19,44	331.06608
Region 12	MARSH 1a, EL0.4 TO -5	46,27,39,3,43	92.53579
Region 13	MARSH 1b, EL5 TO -8	47,48,26,27	110
Region 14	MARSH 1b, EL5 TO -8	41,47,27,40	32.692
Region 15	MARSH 1b, EL5 TO -8	41,2,42,49,11,48,47	297.52797

Points

	X (ft)	Y (ft)
Point 1	40	-12
Point 2	165.4	-6.1
Point 3	181.3	-1.1
Point 4	187.8	2.4

5

Point 41	165.718	-6
Point 42	156.61698	-8
Point 43	184.16903	0.44486
Point 44	244.84451	0.41244
Point 45	149	-9.64775
Point 46	200	0.4364
Point 47	200	-6
Point 48	310	-6
Point 49	200	-8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.54	(233.926, 44.289)	43.32051	(181.251, - 1.11551)	(284.664, - 1.79289)
2	4399	2.58	(233.926, 44.289)	68.72	(181.999, - 0.723572)	(284.9, -1.8)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	181.2755	- 1.134470 5	569.21043	353.30469	0	689.38
2	Optimize d	182.7345	- 2.263995 5	588.2601	502.73859	0	656.77
3	Optimize d	184.41685	-3.566417	615.59118	679.29448	0	627.89
4	Optimize d	185.46665	- 4.379136 5	640.15247	814.17929	0	512.42
5	Optimize d	186.91445	-5.5	676.31886	1019.498	0	208.78
6	Optimize	187.68015	-	696.26387	1074.8776	0	212.65

8

	d		6.092783 5				
7	Optimize d	188.07955	- 6.401983 5	707.56902	1105.7419	0	214.67
8	Optimize d	189.29585	-7.3092	741.15123	1169.0111	0	220.83
9	Optimize d	191.605	-9.012035	805.22173	1306.6637	0	266.5
10	Optimize d	194.2704	- 10.95215 5	875.87852	1508.1032	0	269.2
11	Optimize d	196.8564	- 12.80832 5	931.42004	1697.2208	0	271.82
12	Optimize d	198.5747	-13.93982	959.22956	1856.7547	0	273.56
13	Optimize d	199.5	-14.38237	968.61496	1902.9491	0	274.49
14	Optimize d	200.25	-14.74108	974.71335	1510.6857	0	274.9
15	Optimize d	200.6457	- 14.93032 5	978.18952	1617.1771	0	274.75
16	Optimize d	200.8957	- 15.04989 5	980.6253	1629.0573	0	275.11
17	Optimize d	201.173	-15.18253	983.60869	1956.7618	0	276.19
18	Optimize d	202.9736	-16.19895	1008.9743	2031.9381	0	284.7
19	Optimize d	206.22885	- 18.06631 5	1061.1484	2203.8621	0	300.49
20	Optimize d	209.14295	- 19.73796 5	1117.6748	2357.1907	0	298.97
21	Optimize d	210.9647	- 20.70657	1154.0712	2472.7523	0	310.61

			5				
22	Optimize d	213.7309	-21.89841	1201.8575	2533.8013	0	324.7
23	Optimize d	217.45505	- 23.17316 5	1257.7885	2626.0099	0	339.36
24	Optimize d	220.44155	-23.8003	1286.7566	2618.3418	0	346.23
25	Optimize d	223.4674	- 24.12370 5	1301.5764	2631.5678	0	349.42
26	Optimize d	226.8193	- 24.14521 5	1300.5009	2581.709	0	349.01
27	Optimize d	230.5229	-23.97997	1288.8244	2557.8081	0	346.4
28	Optimize d	234.2915	23.62613 5	1265.9719	2488.3789	0	341.73
29	Optimize d	238.06005	-23.2723	1242.7496	2418.6856	0	337.15
30	Optimize d	242.3944	-22.62281	1201.2455	2337.2468	0	329.38
31	Optimize d	247.1986	-21.69618	1142.1459	2198.536	0	318.81
32	Optimize d	251.3954	-20.68159	1077.6228	2080.5069	0	307.7
33	Optimize d	255.0862	- 19.55888 5	1006.4205	1930.3488	0	295.8
34	Optimize d	258.9205	-18.135	916.28562	1768.8559	0	283.4
35	Optimize d	262.89295	- 16.41157 5	807.28373	1542.6539	0	264.88
36	Optimize d	264.9396	-15.51441	750.4515	1450.9348	0	255.17
37	Optimize d	265.40805	-15.23948	733.1353	1418.6954	0	252.39
							10

9		

38	Optimize d	267.46175	- 14.03423 5	657.11741	1281.4012	0	250
39	Optimize d	270.75305	-12.1027	535.16405	1062.4145	0	250
40	Optimize d	274.72715	-9.568465	375.16565	788.15955	0	250
41	Optimize d	278.5401	-7	213.07936	507.67632	0	150
42	Optimize d	280.3392	-5.78809	136.56668	418.08385	0	150
43	Optimize d	280.9592	-5.28809	105.07265	403.00975	0	150
44	Optimize d	282.3246	-4	24.037549	435.60531	0	487.5
45	Optimize d	284.0244	- 2.396445 5	-76.846158	351.63456	0	700

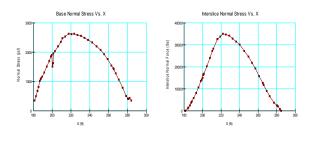
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	4399	183.08405	-1.917406	571.59736	391.86126	0	659.09
2	4399	184.4868	- 3.440422 5	610.21353	602.32373	0	628.65
3	4399	185.42195	- 4.384802 5	640.64759	766.51674	0	511.02
4	4399	186.56495	-5.5	678.32006	991.79273	0	207.01
5	4399	187.4453	- 6.325749 5	706.13668	1068.1076	0	211.46
6	4399	188.56725	- 7.325749 5	742.94794	1153.0207	0	217.14

265.84

7 4399 190.9454 -9.292225 814.34112 1326.1158

8	4399	194.16725	- 11.72783 5	901.21329	1589.9431	0	269.1
9	4399	197.3891	- 13.88302 5	962.95702	1824.5377	0	272.36
10	4399	199.0894	- 14.94741 5	989.24001	1940.7883	0	274.08
11	4399	199.5894	-15.23684	996.3433	1972.8129	0	276.72
12	4399	200.25	- 15.61422 5	1005.5529	1587.1829	0	280.43
13	4399	200.75	- 15.89258 5	1012.5025	1702.4327	0	282.76
14	4399	202.537	- 16.81990 5	1035.9792	2110.0964	0	290.47
15	4399	205.61105	- 18.30470 5	1074.9472	2258.2843	0	302.87
16	4399	209.32405	- 19.83484 5	1121.1826	2408.5871	0	300.14
17	4399	213.1875	- 21.20404 5	1169.8325	2506.9735	0	316.43
18	4399	216.5625	-22.17923	1208.9699	2537.3116	0	327.72
19	4399	219.9375	- 22.97102 5	1243.6398	2549.5617	0	336.59
20	4399	223.3125	-23.58586	1272.4483	2544.1355	0	343.21
21	4399	226.6537	- 24.02577 5	1293.9455	2546.1305	0	347.67
22	4399	229.9611	-24.29742	1307.2679	2556.1888	0	350.11
23	4399	233.26855	-24.40885	1312.0206	2550.0594	0	350.69
24	4399	236.576	-	1307.7207	2527.7042	0	349.47

			24.36084				
			5				
25	4399	239.8834	- 24.15306 5	1293.9453	2488.9425	0	346.51
26	4399	243.1908	-23.78405	1270.3458	2433.4988	0	341.85
27	4399	246.43045	- 23.26541 5	1237.4995	2362.8401	0	335.7
28	4399	249.60235	-22.60016	1195.5146	2277.1502	0	328.13
29	4399	252.77425	-21.776	1143.5326	2174.7099	0	319.07
30	4399	255.94615	-20.78688	1081.1189	2054.7291	0	308.49
31	4399	259.11805	- 19.62511 5	1007.8609	1916.2908	0	296.39
32	4399	262.852	-18.00254	905.56556	1720.9187	0	280.75
33	4399	266.8366	-16.00254	779.45483	1489.6359	0	260.03
34	4399	270.31395	- 13.97530 5	651.66786	1270.3026	0	250
35	4399	273.5954	- 11.78997 5	513.99671	1035.88	0	250
36	4399	276.87685	-9.31467	358.12776	769.57396	0	250
37	4399	279.63955	-7	212.46562	521.5162	0	150
38	4399	281.28715	-5.5	118.10535	416.24969	0	150
39	4399	282.8008	-4	23.783246	445.95142	0	487.5
40	4399	284.3444	-2.4	-76.790442	387.89598	0	700



R13 Slope Stability Global (Block) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 552 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 3:09:41 PM File Name: 17thReach13.gsz Directory: Y\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_Hlgh_water_analyses\High water cases\ Last Solved Date: 2/27/2013

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Last Solved Time: 3:11:42 PM

Analysis Settings

Slope Stability Global (Block) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: Tension Crack Line Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf

FOS Distribution FOS Calculation Option: Constant Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 **Ending Optimization Points: 16** Complete Passes per Insertion: Driving Side Maximum Convex Angle: 30 ° Resisting Side Maximum Convex Angle: 10 °

Materials EMBANKMENT FILL, EL. +3.0 TO 2.0 Model: Undrained (Phi=0) Unit Weight: 108 pcf Cohesion: 750 psf BEACH SAND, EL. -21.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand **Sheet Pile** Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf EMBANKMENT FILL , EL -1.6 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: FILL 2 Phi-B: 0 ° MARSH 1, EL. -7.0 TO -15.0

Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Phi-B: 0 °

Lacustrine, EL. -15.0 TO -21.0

Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine Phi-B: 0 °

BAY SOUND CLAY, EL. -42 TO -70

Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: Clay Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (56.6, -11.8) ft Right Coordinate: (310, -1.9) ft

Slip Surface Block

Left Grid

Upper Left: (191, -2) ft Lower Left: (191, -32) ft Lower Right: (221, -32) ft X Increments: 6 Y Increments: 6 Starting Angle: 135 ° Ending Angle: 175 ° Angle Increments: 5 Right Grid Upper Left: (223, -2) ft Lower Left: (223, -32) ft Lower Right: (253, -32) ft X Increments: 6 Starting Angle: 0

Angle Increments: 5

Tension Crack Line

Г	X (ft)	Y (ft)
Г	190	-2
П	205	-2

Cohesion Functions

FILL 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 680 Data Points: X (ft), Cohesion (psf) Data Point: (0, 680) Data Point: (184.5, 680) Data Point: (200, 450) Data Point: (310, 680) MARSH 1 Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 200 Data Points: X (ft), Cohesion (psf) Data Point: (0, 200) Data Point: (175.1, 200) Data Point: (200, 350) Data Point: (242.2, 200) Data Point: (310, 200)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (0, 0) Data Point: (10000, 5773) **Estimation Properties** Intact Rock Param : 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf

Spatial Functions

Lacustrine Model: Linear Interpolation

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (175.1, -15, 200)
Data Point: (175.1, -21, 260)
Data Point: (200, -15, 350)
Data Point: (200, -21, 450)
Data Point: (242.2, -15, 200)
Data Point: (242.2, -15, 200)
Data Point: (56.6, -15, 200)
Data Point: (56.6, -15, 200)
Data Point: (310, -15, 200)
Data Point: (310, -12, 200)
Data Point: (310, -21, 260) Data Point: (310, -21, 260)

Clay

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (175.1, -42, 420)
Data Point: (175.1, -70, 670)
Data Point: (200, -70, 850)
Data Point: (200, -70, 850)
Data Point: (242.2, -42, 420)
Data Point: (242.2, -70, 670)
Data Point: (58.3, -42, 420)
Data Point: (58.3, -70, 670)
Data Point: (310, -42, 420)
Data Point: (310, -70, 670)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	8,7,34,22,21,19	7.425
Region 2	BEACH SAND, EL21.0 TO -42.0	18,17,16,15	5321.4
Region 3	MARSH 1, EL7.0 TO -15.0	23,1,2,3,4,33,29,28,25,13,14	1558.5203
Region 4	BAY SOUND CLAY, EL42 TO -70	17,16,27,26	7095.2
Region 5	Lacustrine, EL15.0 TO -21.0	23,14,15,18	1520.4
Region 6	EMBANKMENT FILL , EL -1.6 TO -7.0	33,32,35,28,29	51.522975

5

Point 29 174.4 Point 30 Point 32 162.72973 Point 33 159.82432 Point 34 200 Point 36 180.3182 0.40126 Point 37 231.10097 0.40041

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.23	(227.499, - 1.764)	25.93801	(195.874, 3.17413)	(257.596, - 1.79489)
2	6617	2.31	(227.499, - 1.764)	26.018	(196.094, 3.18299)	(258.905, - 1.81146)

Slices of Slip Surface: Optimized

		Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
	1	Optimize d	196.6556	-2.637777	490.54933	632.80378	0	499.63
	2	Optimize d	198.21855	3.913330 5	590.02533	840.25199	0	476.43
	3	Optimize d	199.30995	- 4.804058 5	711.89508	927.45082	0	460.24
	4	Optimize d	199.80995	-5.198449	788.01062	983.03998	0	452.82
ľ	5	Optimize d	200.25	-5.525933	667.15485	655.26573	0	451.64
	6	Optimize d	200.75	- 5.898023	635.43447	762.8936	0	454.93

Region 7	EMBANKMENT FILL , EL -1.6 TO -7.0	32,31,20,35	125.83784
Region 8	EMBANKMENT FILL , EL -1.6 TO -7.0	28,35,20,10,11,12,13,25	589.875
Region 9	EMBANKMENT FILL, EL. +3.0 TO 2.0	20,31,5,36,6,30,7	99.583923
Region 10	EMBANKMENT FILL, EL. +3.0 TO 2.0	22,9,24,37,10,20,7,34	182.65003

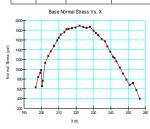
Points

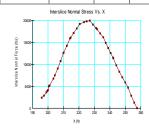
	X (ft)	Y (ft)
Point 1	56.6	-11.8
Point 2	97	-11.5
Point 3	138.4	-11.8
Point 4	157.5	-7.8
Point 5	179	-0.4
Point 6	184.1	2.7
Point 7	200	3.3
Point 8	200	6
Point 9	210	5.5
Point 10	242.2	-1.6
Point 11	265.9	-1.9
Point 12	310	-1.9
Point 13	310	-7
Point 14	310	-15
Point 15	310	-21
Point 16	310	-42
Point 17	56.6	-42
Point 18	56.6	-21
Point 19	200	12.3
Point 20	200	-2
Point 21	200.5	12.3
Point 22	201	6
Point 23	56.6	-15
Point 24	225	1.5
Point 25	242.2	-7
Point 26	56.6	-70
Point 27	310	-70
Point 28	200	-8

			5				
7	Optimize d	202.2321	-7.000989	396.74879	1130.2148	0	464.67
8	Optimize d	203.9563	- 8.284094 5	384.21501	1273.2171	0	335.94
9	Optimize d	205.37365	- 9.310171 5	430.09154	1366.6333	0	330.9
10	Optimize d	207.2242	- 10.62995 6	495.78567	1478.1179	0	324.32
11	Optimize d	209.07475	-11.94974	565.3866	1589.6026	0	317.74
12	Optimize d	210.0418	-12.63944	602.31976	1646.9133	0	314.31
13	Optimize d	211.1233	-13.21968	633.74691	1712.8295	0	310.46
14	Optimize d	213.2027	-14.32054	694.31222	1757.5415	0	303.07
15	Optimize d	214.42335	- 14.93548 5	729.07688	1820.8573	0	298.73
16	Optimize d	215.59955	- 15.35482 5	752.32018	1828.2261	0	299.59
17	Optimize d	217.59005	- 16.06447 5	792.54362	1841.0502	0	302.26
18	Optimize d	219.58055	- 16.77412 5	833.5242	1853.9691	0	304.48
19	Optimize d	221.9654	-17.33811	866.09506	1891.1628	0	302.78
20	Optimize d	224.1775	- 17.64387 5	883.40524	1866.1875	0	298.03
21	Optimize d	225.99575	- 17.85743	895.50825	1844.5764	0	293.49

			5				
22	Optimize d	228.0189	-17.81363	891.80317	1864.9635	0	284.85
23	Optimize d	230.07365	-17.49211	870.93497	1790.7708	0	272.8
24	Optimize d	231.39675	-17.28507	857.51318	1743.0868	0	265.15
25	Optimize d	232.70185	-17.02925	841.11909	1701.6389	0	257.1
26	Optimize d	234.7206	- 16.61016 5	814.24907	1617.7792	0	244.59
27	Optimize d	236.50285	- 16.05046 5	778.78655	1572.4818	0	231.7
28	Optimize d	238.0486	- 15.35015 5	734.59089	1466.4122	0	218.49
29	Optimize d	239.62165	-14.63749	689.62848	1361.3844	0	209.16
30	Optimize d	241.22195	- 13.91246 5	643.92266	1257.1661	0	203.48
31	Optimize d	242.11105	13.49309 5	617.44094	1228.2514	0	200.32
32	Optimize d	243.1638	-12.82023	575.12993	1158.8276	0	200
33	Optimize d	245.09135	-11.58821	497.67076	1034.9891	0	200
34	Optimize d	247.0189	- 10.35619 4	420.13728	911.15058	0	200
35	Optimize d	248.9465	- 9.124178 5	342.65189	787.26837	0	200
36	Optimize d	250.8108	-7.754085	256.55281	676.28832	0	200
37	Optimize	252.72375	-6.152235	156.0292	717.91532	0	680

19	6617	232.2508	-17	839.46572	1663.451	0	258.51
20	6617	234.55045	-17	838.50906	1618.2273	0	249.61
21	6617	236.85015	-17	837.63937	1573.0035	0	240.71
22	6617	239.3764	-16	774.52468	1559.5119	0	220.48
23	6617	241.4764	-14.47426	678.80386	1353.527	0	202.57
24	6617	243.1564	-13.25367	602.12172	1215.4941	0	200
25	6617	245.06915	- 11.86396 5	514.86567	1075.1992	0	200
26	6617	246.9819	- 10.47425 9	427.52503	934.90437	0	200
27	6617	248.8947	9.084556 5	340.19708	794.5672	0	200
28	6617	250.80745	-7.694852	252.85644	654.27233	0	200
29	6617	252.95405	-6.135243	154.89605	669.31188	0	680
30	6617	255.33455	-4.405729	46.278155	498.33046	0	680
31	6617	257.715	- 2.676215 5	-62.353331	327.31505	0	680





	d						
38	Optimize d	254.70125	- 4.427075 5	47.803914	572.38191	0	680
39	Optimize d	256.63135	-2.672286	-62.271594	397.8037	0	680

Slices of Slip Surface: 6617

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	6617	197.54715	- 3.094790 5	531.26519	736.19629	0	486.4
2	6617	199.5	-4.566358	719.6263	926.73639	0	457.4
3	6617	200.25	5.131523 5	614.39033	619.45368	0	451.6
4	6617	200.75	- 5.508300 5	583.72272	729.77719	0	454.9
5	6617	202.46645	-6.801746	382.60947	1111.6124	0	466.2
6	6617	204.9441	- 8.668781 5	396.67982	1303.2976	0	332.4
7	6617	206.96645	-10.19274	471.15847	1432.1543	0	325.2
8	6617	208.9888	-11.7167	551.99507	1561.0111	0	318.0
9	6617	210.8365	-13.10901	627.94573	1660.5188	0	311.4
10	6617	212.50945	-14.36967	698.88441	1730.5982	0	305.5
11	6617	214.67295	-16	792.53027	1821.8748	0	312.1
12	6617	217.125	-17	849.68889	2034.3111	0	317.0
13	6617	219.375	-17	847.46667	1969.0667	0	308.3
14	6617	221.625	-17	845.64444	1903.8222	0	299.6
15	6617	223.875	-17	844.04444	1838.5778	0	290.9
16	6617	226.01685	-17	842.66914	1785.9944	0	282.6
17	6617	228.0505	-17	841.53817	1746.0172	0	274.7
18	6617	230.08415	-17	840.50555	1706.0399	0	266.8

R13 Slope Stability Global (Entry & Exit) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 552 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 3:09:41 PM File Name: 17thReach13.gsz

Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_Hlgh_water_ analyses\High water cases\

Last Solved Date: 2/27/2013 Last Solved Time: 3:12:32 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global (Entry & Exit) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Tension Crack Tension Crack Option: (none) FOS Distribution

FOS Calculation Option: Constant

Optimize Critical Slip Surface Location: Yes

Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine Phi-R·∩° BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: Clay

Slip Surface Entry and Exit

Phi-B: 0 °

Left Projection: Rang Left-Zone Left Coordinate: (150, -9.37068) ft Left-Zone Right Coordinate: (189.80149, 2.92959) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (210.44478, 5.38139) ft Right-Zone Right Coordinate: (283.9, -1.9) ft Right-Zone Increment: 25 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (56.6, -11.8) ft Right Coordinate: (310, -1.9) ft

Cohesion Functions

FILL 2 Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 680 Data Points: X (ft), Cohesion (psf) Data Point: (0, 680) Data Point: (184.5, 680) Data Point: (200, 450) Data Point: (235, 680) Data Point: (310, 680)

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 30 $^{\circ}$ Resisting Side Maximum Convex Angle: 10 °

Materials EMBANKMENT FILL, EL. +3.0 TO 2.0 Model: Undrained (Phi=0) Unit Weight: 108 pcf Cohesion: 750 psf BEACH SAND, EL. -21.0 TO -42.0 Model: Shear/Normal Fn Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 ° Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf EMBANKMENT FILL, EL-1.6 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: FILL 2 Phi: 0 ° Phi-B: 0° MARSH 1, EL. -7.0 TO -15.0 Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion Fn: MARSH 1 Phi-B: 0 °

Lacustrine, EL. -15.0 TO -21.0 Model: Spatial Mohr-Coulomb

MARSH 1 Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 200 Data Points: X (ft), Cohesion (psf) Data Point: (0, 200) Data Point: (175.1, 200) Data Point: (200, 350) Data Point: (242.2, 200) Data Point: (310, 200)

Shear/Normal Strength Functions

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (0, 0)
Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 Sigma3: 300000 nsf Num. Points: 20

Spatial Functions

Lacustrine

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (175.1, -15, 200) Data Point: (175.1, -21, 260) Data Point: (200, -15, 350) Data Point: (200, -21, 450) Data Point: (242.2, -15, 200) Data Point: (242.2, -21, 260)

Data Point: (56.6, -15, 200) Data Point: (56.6, -21, 260) Data Point: (310, -15, 200) Data Point: (310, -21, 260)

Clay

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (175.1, -42, 420)
Data Point: (175.1, -70, 670)
Data Point: (200, -42, 600)
Data Point: (200, -70, 850)
Data Point: (242.2, -42, 420)
Data Point: (242.2, -42, 420)
Data Point: (58.3, -70, 670)
Data Point: (58.3, -70, 670)
Data Point: (310, -42, 420)
Data Point: (310, -670)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	8,7,34,22,21,19	7.425
Region 2	BEACH SAND, EL21.0 TO -42.0	18,17,16,15	5321.4
Region 3	MARSH 1, EL7.0 TO -15.0	23,1,2,3,4,33,29,28,25,13,14	1558.5203
Region 4	BAY SOUND CLAY, EL42 TO -70	17,16,27,26	7095.2
Region 5	Lacustrine, EL15.0 TO -21.0	23,14,15,18	1520.4
Region 6	EMBANKMENT FILL , EL -1.6 TO -7.0	33,32,35,28,29	51.522975
Region 7	EMBANKMENT FILL , EL -1.6 TO -7.0	32,31,20,35	125.83784
Region 8	EMBANKMENT FILL , EL -1.6 TO -7.0	28,35,20,10,11,12,13,25	589.875
Region 9	EMBANKMENT FILL, EL. +3.0 TO 2.0	20,31,5,36,6,30,7	99.583923
Region 10	EMBANKMENT FILL, EL. +3.0 TO 2.0	22,9,24,37,10,20,7,34	182.65003

Points

	X (ft)	Y (ft)
Point 1	56.6	-11.8
Point 2	97	-11.5
Point 3	138.4	-11.8
Point 4	157.5	-7.8

Point 5	179	-0.4
Point 6	184.1	2.7
Point 7	200	3.3
Point 8	200	6
Point 9	210	5.5
Point 10	242.2	-1.6
Point 11	265.9	-1.9
Point 12	310	-1.9
Point 13	310	-7
Point 14	310	-15
Point 15	310	-21
Point 16	310	-42
Point 17	56.6	-42
Point 18	56.6	-21
Point 19	200	12.3
Point 20	200	-2
Point 21	200.5	12.3
Point 22	201	6
Point 23	56.6	-15
Point 24	225	1.5
Point 25	242.2	-7
Point 26	56.6	-70
Point 27	310	-70
Point 28	200	-8
Point 29	174.4	-7
Point 30	199	3.3
Point 31	174.35135	-2
Point 32	162.72973	-6
Point 33	159.82432	-7
Point 34	201	3.3
Point 35	200	-6
Point 36	180.3182	0.40126
Point 37	231.10097	0.40041

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.46	(225.468, 39.359)	36.01987	(179.823, 0.0999941)	(265.703, - 1.8975)
2	8620	2.55	(225.468, 39.359)	60.015	(179.988, 0.200253)	(269.051, - 1.9)

5

Slices of Slip Surface: Optimized

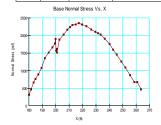
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	180.0704	- 0.06464839 5	481.72868	308.76682	0	750
2	Optimize d	181.6508	-1.1146455	435.96298	463.7146	0	750
3	Optimize d	183.5417	-2.370915	410.8326	661.16344	0	680
4	Optimize d	184.86625	-3.250895	390.64746	765.71751	0	674.57
5	Optimize d	187.0544	-4.87998	382.61131	890.88133	0	642.1
6	Optimize d	189.46705	-6.78037	383.94597	1077.981	0	606.3
7	Optimize d	191.92235	-8.412852	426.01862	1356.3427	0	301.34
8	Optimize d	194.79015	-10.081422	517.14904	1512.9196	0	318.62
9	Optimize d	197.5967	-11.714345	600.17869	1666.198	0	335.52
10	Optimize d	199.4573	-12.796875	652.74916	1768.575	0	346.73
11	Optimize d	199.9573	-13.06409	665.63582	1904.2246	0	349.74
12	Optimize d	200.25	-13.07199	665.23772	1565.8097	0	349.11

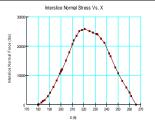
13	Optimize d	200.7203	-13.084685	664.58637	1613.5158	0	347.44
14	Optimize d	200.9703	-13.10701	665.0563	1514.581	0	346.55
15	Optimize d	202.7009	-14.061695	710.86973	1880.6208	0	340.4
16	Optimize d	205.8471	-15.79728	798.50163	2027.2733	0	341.77
17	Optimize d	208.6462	-17.306355	879.51251	2161.5315	0	354.56
18	Optimize d	210.65215	-18.36103	938.24711	2236.9722	0	362.5
19	Optimize d	212.49215	-19.12026	981.22364	2297.6388	0	366.14
20	Optimize d	214.8678	-19.952965	1029.2103	2311.86	0	368.07
21	Optimize d	217.2203	-20.52699	1062.7006	2350.236	0	365.87
22	Optimize d	219.56045	-20.843785	1081.1417	2314.7088	0	359.81
23	Optimize d	222.86795	-20.97221	1088.076	2265.375	0	346.68
24	Optimize d	226.52525	-20.91955	1083.8793	2168.283	0	329.57
25	Optimize d	229.57575	-20.875625	1080.3392	2103.9065	0	315.35
26	Optimize d	231.566	-20.846965	1078.0023	2061.9335	0	306.09
27	Optimize d	233.54615	-20.56744	1060.164	2026.1431	0	294.05
28	Optimize d	236.57645	-20.021775	1025.4455	1909.9385	0	274.67
29	Optimize d	240.1458	-18.826325	950.06054	1760.2809	0	246.81
30	Optimize d	242.78915	-17.639105	875.39262	1594.1637	0	226.39
31	Optimize d	245.50375	-16.18725	784.09635	1455.6274	0	211.87

32	Optimize d	248.87455	-14.30438	665.67586	1260.301	0	200
33	Optimize d	251.90315	-12.513385	553.08017	1089.9144	0	200
34	Optimize d	255.4697	-10.322635	415.34768	873.07826	0	200
35	Optimize d	258.6369	-8.11363	276.59981	675.17397	0	200
36	Optimize d	260.7756	-6.392655	168.60915	673.68306	0	680
37	Optimize d	263.61655	-3.841406	8.6373221	464.46341	0	680

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strength (psf)	Cohesiv e Strengt h (psf)
1	8620	180.15285	0.00984095	478.74278	166.60233	0	750
2	8620	181.1485	-1.0902855	447.20751	324.27822	0	750
3	8620	183.0394	-3.0608315	413.34104	619.92823	0	680
4	8620	185.1343	-5.0608315	389.38051	866.65793	0	670.59
5	8620	187.089	-6.7658085	384.41542	1054.4457	0	641.58
6	8620	189.3832	-8.566018	436.38336	1342.7896	0	286.04
7	8620	192.13085	-10.518645	541.02059	1537.8843	0	302.6
8	8620	194.8785	-12.25113	631.55838	1713.1162	0	319.15
9	8620	197.62615	-13.78512	709.21666	1870.4505	0	335.7
10	8620	199.5	-14.74483	756.48927	1970.7613	0	346.99
11	8620	200.0162	-14.992405	768.56753	940.25661	0	349.94
12	8620	200.2662	-15.108165	774.33566	1719.3311	0	350.85
13	8620	200.75	-15.329325	785.3677	1742.5238	0	352.78
14	8620	202.5	-16.06393	821.61139	2099.1877	0	358.43
15	8620	205.5	-17.21496	879.77683	2207.096	0	365.44
16	8620	208.5	-18.186665	930.78219	2297.7007	0	368.62
17	8620	211.5	-18.988035	974.27258	2337.7161	0	368.35
18	8620	214.5	-19.62603	1009.8577	2327.3755	0	364.96
19	8620	217.5	-20.10592	1037.1645	2300.9043	0	358.78

20	8620	220.5	-20.43153	1055.7622	2258.5511	0	350.07
21	8620	223.5	-20.60538	1065.4264	2200.3488	0	339.08
22	8620	226.52525	-20.62771	1065.8944	2139.8518	0	325.93
23	8620	229.57575	-20.496135	1056.8863	2076.7835	0	310.8
24	8620	232.48835	-20.227985	1039.4241	2001.4309	0	294.82
25	8620	235.2631	-19.834935	1014.2247	1915.027	0	278.31
26	8620	238.03785	-19.308085	980.67614	1814.2984	0	260.71
27	8620	240.8126	-18.64378	938.50014	1698.756	0	242.17
28	8620	243.6505	-17.815455	886.06946	1592.3167	0	228.15
29	8620	246.55145	-16.809715	822.53541	1493.8085	0	218.1
30	8620	249.4524	-15.63263	748.30901	1377.1818	0	206.33
31	8620	252.48775	-14.20045	658.08968	1239.4529	0	200
32	8620	255.6575	-12.477865	549.7326	1078.2828	0	200
33	8620	258.82725	-10.494303	425.07112	891.77886	0	200
34	8620	261.997	-8.2168875	282.08431	676.57194	0	200
35	8620	264.74095	-5.9963625	142.77594	643.09667	0	680
36	8620	267.4757	-3.4463625	-17.084908	430.37263	0	680





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File Information
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Created By: USACE St. Louis District Revision Number: 504 Last Edited By: Redell, Chris MVS Date: 2/26/2013 Time: 4:17:51 PM File Name: 17thReach14.gsz Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/26/2013 Last Solved Time: 4:21:28 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global (Block) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: Search for Tension Crack Percentage Wet: 1 Tension Crack Fluid Unit Weight: 62.4 pcf

FOS Calculation Option: Constant Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 **Ending Optimization Points: 16** Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL, EL. +4.2 TO +2 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 860 psf Phi-R: 0 ° BEACH SAND, EL. -19 TO -46 Model: Shear/Normal Fn Unit Weight: 122 pcf Strength Function: Sand **Sheet Pile** Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf Fill 2, EL. -3.3 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Fill Phi-B: 0 °

FOS Distribution

MARSH 1, EL. -7 TO -16 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf

Cohesion Spatial Fn: Marsh 1 Cohesion

Phi: 0° Phi-B: 0 °

BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Cohesion Phi-B: 0 °

Silty Sand El. -16 to -19 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0

Slip Surface Limits

Left Coordinate: (54.7, -12.6) ft Right Coordinate: (310, -3.7) ft

Slip Surface Block Left Grid Upper Left: (192, -3) ft Lower Left: (192, -33) ft Lower Right: (222, -33) ft X Increments: 6 Y Increments: 6 Starting Angle: 135° Ending Angle: 175 Angle Increments: 5 Right Grid Upper Left: (225, -3) ft Lower Left: (225, -33) ft Lower Right: (255, -33) ft X Increments: 6 Y Increments: 6 Starting Angle: 15 ° Ending Angle: 45 °

Angle Increments: 5

Cohesion Functions

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 500

Data Points: X (ft), Cohesion (psf) Data Point: (0, 500) Data Point: (176, 500) Data Point: (200, 450) Data Point: (400, 500)

Shear/Normal Strength Functions

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-10000, 0) Data Point: (0, 0)
Data Point: (10000, 5773) **Estimation Properties** Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 nsf Num. Points: 20

Unit Weight Functions

Bay Sound Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 104 Data Points: X (ft), Unit Weight (pcf)

Data Point: (0, 104) Data Point: (176, 104) Data Point: (200, 102) Data Point: (240, 104) Data Point: (400, 104)

Spatial Functions

Marsh 1 Cohesion

Arsh 1 Cohesion

Model: Linear Interpolation
Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -7.150)
Data Point: (181.4, -16, 210)
Data Point: (200, -7, 350)
Data Point: (200, -16, 350)
Data Point: (200, -16, 350)
Data Point: (245.3, -7, 150)
Data Point: (245.3, -16, 210)
Data Point: (0, -7, 150)
Data Point: (0, -7, 150)
Data Point: (310, -16, 210)

Bay Sound Cohesion

y Sound Cohesion
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -46, 490)
Data Point: (181.4, -70, 710)
Data Point: (200, -70, 920)
Data Point: (200, -70, 920)
Data Point: (245.3, -46, 490)
Data Point: (245.3, -46, 490)
Data Point: (0, -46, 490)
Data Point: (0, -70, 710)
Data Point: (310, -46, 490)
Data Point: (310, -46, 490)
Data Point: (310, -70, 710)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	8,9,10,22,17	6.675
Region	BEACH SAND, EL19	25,23,42,32,24,26,31,41	6893.1

Point 17	200	4.2
Point 18	290.7	-3.7
Point 19	199	4.2
Point 20	54.7	-70
Point 21	310	-70
Point 22	201	4.2
Point 23	54.7	-46
Point 24	310	-46
Point 25	54.7	-19
Point 26	310	-19
Point 27	310	-16
Point 28	54.7	-16
Point 29	310	-7
Point 30	245.3	-16
Point 31	245.3	-19
Point 32	245.3	-46
Point 33	245.3	-70
Point 34	245.3	-7
Point 35	200	2
Point 36	200	-7
Point 37	200	-4.5
Point 38	181.4	-4.5
Point 39	181.4	-7
Point 40	181.4	-16
Point 41	181.4	-19
Point 42	181.4	-46
Point 43	181.4	-70
Point 44	181.4	-3.3
Point 45	181.38889	2
Point 46	167	-2.6
Point 47	164.76472	-3.33
Point 48	161.1815	-4.5
Point 49	153.52503	-7
Point 50	222	2
Point 51	177.96971	0.4
Point 52	227.04519	0.4

2	TO -46		
Region 3	Silty Sand El16 to - 19	28,25,41,31,26,27,30,40	765.9
Region 4	EMBANKMENT FILL, EL. +4.2 TO +2	45,11,16,19,17,35	27.803888
Region 5	EMBANKMENT FILL, EL. +4.2 TO +2	17,35,50,4,3,10,22	55
Region 6	MARSH 1, EL7 TO - 16	28,40,30,27,29,34,36,39,49,15,13,2,1	1813.045
Region 7	BAY SOUND CLAY, EL46 TO -70	23,42,32,24,21,33,43,20	6127.2
Region 8	Fill 2, EL3.3 TO -7	35,53,51,12,45	31.903683
Region 9	Fill 2, EL3.3 TO -7	53,37,38,48,47,46,51	150.77277
Region 10	Fill 2, EL3.3 TO -7	35,53,37,38,48,49,39,36,34,29,7,18,6,14,5,52,50	670.08058

Points

	X (ft)	Y (ft)
Point 1	54.7	-12.6
Point 2	111	-12.5
Point 3	210	5.2
Point 4	219	3
Point 5	230.2	-0.6
Point 6	245.3	-3.5
Point 7	310	-3.7
Point 8	200	12.5
Point 9	200.5	12.5
Point 10	201	6
Point 11	182.4	2.7
Point 12	179.8	0.9
Point 13	134.7	-12
Point 14	242.5	-1.7
Point 15	152.3	-7.4
Point 16	193	3.8

6

Point 53	200	0.4

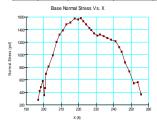
Critical Slip Surfaces

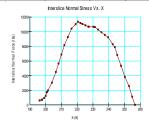
		Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
ſ	1	Optimized	1.90	(227.222, 3.388)	26.20435	(196.071, 4.00474)	(256.655, - 3.55002)
ſ	2	4565	2.05	(227.222, 3.388)	25.667	(197, 4.06667)	(256.67, - 3.55009)

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	196.82945	1.26461	327.58191	282.09967	0	456.61
2	Optimize d	197.6629	0.46461	397.06232	422.97294	0	454.8
3	Optimize d	198.369	-0.142834	452.29994	485.19405	0	453.4
4	Optimize d	199.5	-1.115802	547.60999	584.54387	0	451.0
5	Optimize d	200.25	-1.761003	342.10847	356.83047	0	450.3
6	Optimize d	200.75	-2.191137	333.61792	469.23927	0	450.9
7	Optimize d	201.2473	-2.618927	380.79746	696.07973	0	451.5
8	Optimize d	202.7386	-3.8605025	396.6891	812.58082	0	453.4
9	Optimize d	205.22665	-5.9182075	377.73424	990.26706	0	456.5
10	Optimize d	207.30785	-7.550625	392.26753	1202.1844	0	318.3
11	Optimize d	209.0725	-8.731254	407.37645	1318.054	0	312.2
12	Optimize	210.90815	-9.873324	435.96637	1389.2376	0	306.4

	d						
13	Optimize d	212.9538	-10.933695	464.0561	1482.5212	0	300.31
14	Optimize d	215.2288	-11.92442	496.21562	1513.3911	0	293.8
15	Optimize d	217.68315	-12.735075	526.37409	1576.9437	0	286.85
16	Optimize d	219.7294	-13.225015	545.54472	1560.5563	0	280.97
17	Optimize d	221.2294	-13.417785	551.78462	1582.7547	0	276.32
18	Optimize d	222.6465	-13.451115	550.4922	1535.5021	0	271.52
19	Optimize d	224.23105	-13.495925	549.59633	1484.7518	0	266.18
20	Optimize d	226.10715	-13.55513	549.59633	1427.853	0	259.92
21	Optimize d	227.1889	-13.589265	549.6793	1394.9973	0	256.33
22	Optimize d	228.7663	-13.728585	555.40066	1340.3086	0	251.48
23	Optimize d	230.67975	-13.90847	563.3168	1305.2538	0	245.74
24	Optimize d	232.20955	-13.91434	561.85977	1322.6164	0	240.57
25	Optimize d	234.30965	-13.835885	554.81749	1294.9707	0	233.04
26	Optimize d	236.4098	-13.75743	547.87038	1267.2774	0	225.46
27	Optimize d	238.50995	-13.678975	541.11359	1239.6317	0	217.83
28	Optimize d	241.03	-13.38062	520.61264	1216.5493	0	207.38
29	Optimize d	243.1653	-13.004215	495.66469	1119.6678	0	197.57
30	Optimize d	244.5653	-12.452345	460.50034	1049.0092	0	189
31	Optimize	246.4999	-11.30798	388.2454	879.17409	0	178.72

20	4565	226.20435	-13	517.84769	1380.3048	0	257.45
21	4565	227.8339	-13	514.75683	1325.7851	0	251.69
22	4565	229.4113	-13	512.04351	1273.0402	0	246.12
23	4565	231.225	-13	509.21951	1236.878	0	239.71
24	4565	233.275	-13	506.19512	1217.3171	0	232.47
25	4565	235.325	-13	503.60976	1197.7561	0	225.23
26	4565	237.375	-13	501.21951	1178.1951	0	217.99
27	4565	239.425	-13	498.97561	1158.6341	0	210.75
28	4565	241.475	-13	496.97561	1139.0244	0	203.51
29	4565	243.75	-13	494.88	1044.68	0	195.47
30	4565	245.15	-12.87853	486.18248	1092.6671	0	189.72
31	4565	246.18865	-12.03743	433.48607	993.12773	0	183.58
32	4565	247.966	- 10.59816 6	343.00576	841.83895	0	173.99
33	4565	249.74335	-9.158899	252.21938	690.55018	0	164.39
34	4565	251.5207	-7.719633	161.14004	539.21768	0	154.8
35	4565	253.47445	- 6.137521 5	60.894212	530.61256	0	500
36	4565	255.6046	-4.412565	-48.446123	334.23411	0	500





	d						
32	Optimize d	248.9536	-9.6986575	286.43426	734.65203	0	167.99
33	Optimize d	251.51805	-7.8587625	169.78352	543.33827	0	155.73
34	Optimize d	253.7853	-6.0763205	56.792079	561.52599	0	500
35	Optimize d	255.69855	-4.392122	-49.797034	369.55653	0	500

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	4565	197.8	1.2	357.90205	298.15595	0	454.58
2	4565	198.8	0.2	447.58093	431.37051	0	452.5
3	4565	199.5	-0.5	511.30168	501.33148	0	451.04
4	4565	200.25	-1.25	299.20516	282.85685	0	450.31
5	4565	200.75	-1.75	281.01837	404.69134	0	450.94
6	4565	201.83335	- 2.833333 5	375.39727	685.44091	0	452.29
7	4565	203.5	-4.5	367.98114	829.94523	0	454.38
8	4565	205.16665	- 6.166666 5	391.64658	974.44955	0	456.46
9	4565	207	-8	416.48591	1179.6663	0	320.13
10	4565	209	-10	464.25098	1336.2905	0	314.24
11	4565	211	-12	527.78452	1476.4744	0	309.53
12	4565	212.875	-13	560.88	1802.0571	0	304.53
13	4565	214.625	-13	552.25143	1753.8286	0	298.34
14	4565	216.375	-13	545.15429	1705.6571	0	292.16
15	4565	218.125	-13	538.53143	1657.4857	0	285.98
16	4565	219.75	-13	533.58667	1605.2667	0	280.24
17	4565	221.25	-13	529.14667	1549.0667	0	274.94
18	4565	222.84085	-13	525.227	1492.808	0	269.33
19	4565	224.5226	-13	521.27274	1436.5564	0	263.39

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File Information

Created By: USACE St. Louis District Revision Number: 504 Last Edited By: Redell, Chris MVS Date: 2/26/2013 Time: 4:17:51 PM File Name: 17thReach14.gsz Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/26/2013

Last Solved Time: 4:23:22 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global (Entry & Exit) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution

FOS Calculation Option: Constant

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +4.2 TO +2 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 860 psf Phi-B: 0°

BEACH SAND, EL. -19 TO -46 Model: Shear/Normal Fn Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 °

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Fill 2, EL. -3.3 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Fill Phi: 0 Phi-B: 0 °

MARSH 1, EL. -7 TO -16 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Spatial Fn: Marsh 1 Cohesion Phi-B: 0 °

BAY SOUND CLAY, EL. -46 TO -70

Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound

Cohesion Spatial Fn: Bay Sound Cohesion

Phi-B: 0°

Silty Sand El. -16 to -19

Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0°

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (166.75, -2.68165) ft Left-Zone Right Coordinate: (200, 4.2) ft Left-Zone Increment: 25 Right Projection: Range Right-Zone Left Coordinate: (213, 4.46667) ft

Right-Zone Right Coordinate: (275.01484, -3.6309) ft

Right-Zone Increment: 25 Radius Increments: 25

Slip Surface Limits

Left Coordinate: (54.7, -12.6) ft Right Coordinate: (310, -3.7) ft

Cohesion Functions

Model: Spline Data Point Function Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 500 Data Points: X (ft), Cohesion (psf) Data Point: (0, 500) Data Point: (176, 500) Data Point: (200, 450) Data Point: (240, 500) Data Point: (400, 500)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (0, 0) Data Point: (10000, 5773) Estimation Properties Intact Rock Param : 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Unit Weight Functions

Bay Sound Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 104
Data Points: X (ft), Unit Weight (pcf) Data Point: (0, 104) Data Point: (176, 104) Data Point: (200, 102) Data Point: (240, 104) Data Point: (400, 104)

Spatial Functions

Marsh 1 Cohesion

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -7, 150) Data Point: (181.4, -16, 210) Data Point: (200, -7, 350)

Data Point: (200, -16, 350)
Data Point: (245.3, -7, 150)
Data Point: (245.3, -16, 210)
Data Point: (0, -7, 150)
Data Point: (0, -16, 210)
Data Point: (310, -7, 150)
Data Point: (310, -16, 210)

Bay Sound Cohesion

y Sound Cohesion
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -46, 490)
Data Point: (181.4, -70, 710)
Data Point: (200, -70, 920)
Data Point: (200, -70, 920)
Data Point: (245.3, -46, 490)
Data Point: (245.3, -46, 490)
Data Point: (0, -46, 490)
Data Point: (0, -70, 710)
Data Point: (310, -46, 490)
Data Point: (310, -46, 490)
Data Point: (310, -70, 710)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	8,9,10,22,17	6.675
Region 2	BEACH SAND, EL19 TO -46	25,23,42,32,24,26,31,41	6893.1
Region 3	Silty Sand El16 to - 19	28,25,41,31,26,27,30,40	765.9
Region 4	EMBANKMENT FILL, EL. +4.2 TO +2	45,11,16,19,17,35	27.803888
Region 5	EMBANKMENT FILL, EL. +4.2 TO +2	17,35,50,4,3,10,22	55
Region 6	MARSH 1, EL7 TO - 16	28,40,30,27,29,34,36,39,49,15,13,2,1	1813.045
Region 7	BAY SOUND CLAY, EL46 TO -70	23,42,32,24,21,33,43,20	6127.2
Region 8	Fill 2, EL3.3 TO -7	35,53,51,12,45	31.903683
Region	Fill 2, EL3.3 TO -7	53,37,38,48,47,46,51	150.77277

5

Point 30	245.3	-16
Point 31	245.3	-19
Point 32	245.3	-46
Point 33	245.3	-70
Point 34	245.3	-7
Point 35	200	2
Point 36	200	-7
Point 37	200	-4.5
Point 38	181.4	-4.5
Point 39	181.4	-7
Point 40	181.4	-16
Point 41	181.4	-19
Point 42	181.4	-46
Point 43	181.4	-70
Point 44	181.4	-3.3
Point 45	181.38889	2
Point 46	167	-2.6
Point 47	164.76472	-3.33
Point 48	161.1815	-4.5
Point 49	153.52503	-7
Point 50	222	2
Point 51	177.96971	0.4
Point 52	227.04519	0.4
Point 53	200	0.4

Critical Slip Surfaces

itida one cariacco										
	Slip Surface		Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)				
1	Optimized	1.91	(224.004, 49.659)	32.41303	(180.757, 1.56255)	(258.25, - 3.55705)				
2	7290	1.97	(224.004, 49.659)	65.606	(179.975, 1.0214)	(262.348, - 3.5751)				

Slices of Slip Surface: Optimized

 01110	ec. openin					
Slip	X (ft)	Y (ft)	DM/D (pcf)	Base	Friction	Cohesiv
Surface	X (IL)	Y (IL)	PWP (psf)	Normal	al	e

9			
Region 10	Fill 2, EL3.3 TO -7	35,53,37,38,48,49,39,36,34,29,7,18,6,14,5,52,50	670.08058

Points

	X (ft)	Y (ft)
Point 1	54.7	-12.6
Point 2	111	-12.5
Point 3	210	5.2
Point 4	219	3
Point 5	230.2	-0.6
Point 6	245.3	-3.5
Point 7	310	-3.7
Point 8	200	12.5
Point 9	200.5	12.5
Point 10	201	6
Point 11	182.4	2.7
Point 12	179.8	0.9
Point 13	134.7	-12
Point 14	242.5	-1.7
Point 15	152.3	-7.4
Point 16	193	3.8
Point 17	200	4.2
Point 18	290.7	-3.7
Point 19	199	4.2
Point 20	54.7	-70
Point 21	310	-70
Point 22	201	4.2
Point 23	54.7	-46
Point 24	310	-46
Point 25	54.7	-19
Point 26	310	-19
Point 27	310	-16
Point 28	54.7	-16
Point 29	310	-7

					Stress (psf)	Strengt h (psf)	Strengt h (psf)
1	Optimize d	181.07295	1.359065	391.26359	255.2986	0	489.43
2	Optimize d	181.89445	0.8299671	374.83817	336.22438	0	487.72
3	Optimize d	182.481	0.4521771	372.84526	405.05249	0	486.5
4	Optimize d	184.1188	-0.60269	360.84541	520.39611	0	483.09
5	Optimize d	186.68145	-2.329035	394.73541	687.1069	0	477.75
6	Optimize d	188.69315	-3.776345	435.23227	843.46932	0	473.56
7	Optimize d	190.13915	-4.816665	469.17965	955.87978	0	470.54
8	Optimize d	191.78965	-6.0200535	511.49131	1081.7663	0	467.1
9	Optimize d	194.364	-7.9060735	574.25023	1330.1197	0	291.23
10	Optimize d	197.364	-9.62673	610.38906	1559.5165	0	324.14
11	Optimize d	199.5	-10.56856	612.67439	1647.8223	0	345.26
12	Optimize d	200.25	-10.899265	612.26253	1389.4628	0	349.04
13	Optimize d	200.75	-11.119735	610.65213	1467.9148	0	347.14
14	Optimize d	202.73445	-11.994755	609.5721	1727.7716	0	339.94
15	Optimize d	205.8517	-13.26328	616.13824	1837.4408	0	329.56
16	Optimize d	208.61725	-14.270765	634.28093	1904.2698	0	321.18
17	Optimize d	210.15485	-14.83092	650.70683	1938.7714	0	316.87
18	Optimize d	211.7553	-15.25686	664.7061	1967.0422	0	312.38

19	Optimize d	214.6334	-15.81149	686.33583	1977.7978	0	304.37
20	Optimize d	216.31475	-15.996555	694.18549	1986.6793	0	299.57
21	Optimize d	217.7818	-15.996695	693.32655	1946.2972	0	295.04
22	Optimize d	220.5	-15.99709	691.73333	1856.6667	0	286.64
23	Optimize d	223.2613	-15.997495	690.16231	1758.4273	0	278.1
24	Optimize d	225.7839	-15.99786	688.73521	1674.1887	0	270.31
25	Optimize d	228.6226	-15.99827	687.17292	1579.4295	0	261.53
26	Optimize d	231.69995	-15.99872	685.46304	1512.5322	0	252.03
27	Optimize d	234.41325	-15.91075	678.67287	1495.0284	0	243.19
28	Optimize d	236.83995	-15.73437	666.67187	1454.8333	0	234.71
29	Optimize d	239.165	-15.467475	649.05796	1425.9203	0	225.89
30	Optimize d	241.38835	-15.11007	625.83292	1369.745	0	216.67
31	Optimize d	242.9408	-14.860505	609.5242	1304.6515	0	210.09
32	Optimize d	244.3408	-14.270455	572.35067	1224.0557	0	201.68
33	Optimize d	245.6417	-13.56632	528.09343	1085.4375	0	193.78
34	Optimize d	247.1566	-12.542305	463.77838	1012.4505	0	186.95
35	Optimize d	249.50305	-10.864175	358.08586	840.86047	0	175.76
36	Optimize d	252.67125	-8.45071	205.53972	603.10275	0	159.67
37	Optimize d	256.4579	-5.2166785	0.98260083	463.97922	0	500

255.60585

246.77225

249.7168 252.66135

-11.849355

-9.3343605

-7.8095905

421.36616

346.29265 260.45956

163.2207

885.37853

651.49256

506.40438

182.33

165.56

155.4

10

0

0

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7290

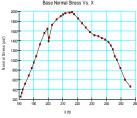
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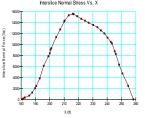
31 7290

28

Slices of Slip Surface: 7290

	Base No	rmal Stress Vs. X		Inters	slice Normal Stress Vs	. Х		
33	7290	261.0306	-4.476223	-48.556143	299.90098	0	500	
32	/290	258.3956	-6.1886/2	60.108804	469.30819	0	500	





 	10 0 01						
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	7290	180.32355	0.7106995	431.58117	238.55416	0	490.99
2	7290	181.0303	0.08912225	422.26859	328.19818	0	489.52
3	7290	181.89445	-0.64495475	415.35373	437.54375	0	487.72
4	7290	183.54445	-1.9650975	415.21727	620.0578	0	484.28
5	7290	185.83335	-3.6810205	443.01034	823.41869	0	479.51
6	7290	188.9539	-5.75	493.02071	1072.9231	0	473.01
7	7290	191.965	-7.579347	550.19218	1338.8909	0	265.27
8	7290	194.5	-8.914258	591.6478	1476.7975	0	294.63
9	7290	197.5	-10.332516	616.36134	1625.1328	0	326.1
10	7290	199.5	-11.196535	622.00899	1717.4031	0	345.38
11	7290	200.25	-11.49497	621.61327	1458.5158	0	349.06
12	7290	200.75	-11.686845	620.27215	1538.0849	0	347.21
13	7290	202.5	-12.30219	617.97461	1786.1242	0	340.91
14	7290	205.5	-13.26388	618.60635	1861.8951	0	330.79
15	7290	208.5	-14.06991	627.4004	1922.5898	0	321.32
16	7290	211.5	-14.72614	642.36514	1942.9656	0	312.3
17	7290	214.5	-15.237125	659.1029	1923.285	0	303.56
18	7290	217.5	-15.606285	673.56361	1889.5405	0	294.9
19	7290	220.5	-15.83602	683.12313	1827.0207	0	286.15
20	7290	223.2613	-15.93055	686.47119	1749.0785	0	277.87
21	7290	225.7839	-15.910595	683.80566	1672.6609	0	269.98
22	7290	228.6226	-15.765005	673.64159	1574.244	0	260.55
23	7290	231.7375	-15.47109	654.29805	1489.4396	0	249.44
24	7290	234.8125	-15.031645	625.82916	1428.1389	0	237.45
25	7290	237.8875	-14.44176	587.83389	1351.5253	0	224.22
26	7290	240.9625	-13.69722	539.98272	1258.9649	0	209.52
27	7290	243.9	-12.840005	484.91519	1072.0951	0	193.91

Reach 14 Slope Stability Global (Block) Extreme Water Level

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File Information
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Created By: USACE St. Louis District
Revision Number: 503
Last Edited By: Goltz, Amanda MVS
Date: 12/4/2014
Time: 2:17:40 PM
File Name: 17thReach14.gsz
Directory: Y\EC-G\Support For Others (SFP)\MVN\17th Street Canal\Extreme water level April
2013\
Last Solved Date: 12/4/2014
Last Solved Time: 2:20:32 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Slope Stability Global (Block) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer Settings PWP Conditions Source: Parent Analysis Slip Surface Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes

Tension Crack

```
MARSH 1, EL. -7 TO -16

Model: Spatial Mohr-Coulomb
Unit Weight: 94 pcf
Cohesion Spatial Fn: Marsh 1 Cohesion
Phi: 0 *
Phi-B: 0 *

BAY SOUND CLAY, EL. -46 TO -70
Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound
Cohesion Spatial Fn: Bay Sound Cohesion
Phi: 0 *
Phi: B: 0 *

Silty Sand El. -16 to -19
Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Sand
Phi-B: 0 *
```

Slip Surface Limits

Left Coordinate: (54.7, -12.6) ft Right Coordinate: (310, -3.7) ft

Slip Surface Block

Upper Left: (192, -3) ft
Lower Left: (192, -3) ft
Lower Right: (222, -33) ft
X Increments: 6
Y Increments: 6
Starting Angle: 135 *
Ending Angle: 175 *
Angle Increments: 5
Right Grid
Upper Left: (225, -3) ft
Lower Right: (225, -33) ft
X Increments: 6
Y Increments: 6
Starting Angle: 15 *
Ending Angle: 15 *
Ending Angle: 15 *
Angle Increments: 5

Tension Crack Option: Search for Tension Crack Percentage Wet: 1 Tension Crack Fluid Unit Weight: 62.4 pcf FOS Distribution FOS Calculation Option: Constant Restrict Block Crossing: Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

```
EMBANKMENT FILL, EL. +4.2 TO +2
     Model: Spatial Mohr-Coulomb
     Unit Weight: 112 pcf
Cohesion: 860 psf
     Phi-B: 0 °
BEACH SAND, EL. -19 TO -46
     Model: Shear/Normal Fn
Unit Weight: 122 pcf
     Strength Function: Sand
     Phi-B: 0 °
Sheet Pile
     Model: Undrained (Phi=0)
     Unit Weight: 0.1 pcf
     Cohesion: 0.01 psf
Fill 2, EL. -3.3 TO -7
     Model: Spatial Mohr-Coulomb
     Unit Weight: 105 pcf
     Cohesion Fn: Fill
     Phi-B: 0 °
```

Cohesion Functions

Fill

Model: Spline Data Point Function
Function: Cohesion vs. X

Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 500
Data Points: X (ft), Cohesion (psf)
Data Point: (0, 500)
Data Point: (200, 450)
Data Point: (240, 500)
Data Point: (400, 500)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-10000, 0)
Data Point: (10000, 5773)
Estimation Properties
Intact Rock Param: 10
Geological Strength: 100
Disturbance Factor: 0
Sigmac: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Bay Sound
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 104
Data Points: X (ft), Unit Weight (pcf)

Data Point: (0, 104) Data Point: (176, 104) Data Point: (200, 102) Data Point: (240, 104) Data Point: (400, 104)

Spatial Functions

Marsh 1 Cohesion

Arsh 1 Cohesion

Model: Linear Interpolation
Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -7.150)
Data Point: (181.4, -16, 210)
Data Point: (200, -7, 350)
Data Point: (200, -16, 350)
Data Point: (200, -16, 350)
Data Point: (245.3, -7, 150)
Data Point: (245.3, -16, 210)
Data Point: (0, -7, 150)
Data Point: (0, -7, 150)
Data Point: (310, -16, 210)

Bay Sound Cohesion

y Sound Cohesion
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -46, 490)
Data Point: (181.4, -70, 710)
Data Point: (200, -70, 920)
Data Point: (200, -70, 920)
Data Point: (245.3, -46, 490)
Data Point: (245.3, -46, 490)
Data Point: (0, -46, 490)
Data Point: (0, -70, 710)
Data Point: (310, -46, 490)
Data Point: (310, -46, 490)
Data Point: (310, -70, 710)

Regions

	Material	Points	Area (ft²)	
Region 1	Sheet Pile	8,9,10,22,17	6.675	
Region	BEACH SAND, FL19	25.23.42.32.24.26.31.41	6893.1	

Point 17	200	4.2
Point 18	290.7	-3.7
Point 19	199	4.2
Point 20	54.7	-70
Point 21	310	-70
Point 22	201	4.2
Point 23	54.7	-46
Point 24	310	-46
Point 25	54.7	-19
Point 26	310	-19
Point 27	310	-16
Point 28	54.7	-16
Point 29	310	-7
Point 30	245.3	-16
Point 31	245.3	-19
Point 32	245.3	-46
Point 33	245.3	-70
Point 34	245.3	-7
Point 35	200	2
Point 36	200	-7
Point 37	200	-4.5
Point 38	181.4	-4.5
Point 39	181.4	-7
Point 40	181.4	-16
Point 41	181.4	-19
Point 42	181.4	-46
Point 43	181.4	-70
Point 44	181.4	-3.3
Point 45	181.38889	2
Point 46	167	-2.6
Point 47	164.76472	-3.33
Point 48	161.1815	-4.5
Point 49	153.52503	-7
Point 50	222	2
Point 51	177.96971	0.4
Point 52	227.04519	0.4

2	TO -46		
Region 3	Silty Sand El16 to -	28,25,41,31,26,27,30,40	765.9
Region 4	EMBANKMENT FILL, EL. +4.2 TO +2	45,11,16,19,17,35	27.803888
Region 5	EMBANKMENT FILL, EL. +4.2 TO +2	17,35,50,4,3,10,22	55
Region 6	MARSH 1, EL7 TO - 16	28,40,30,27,29,34,36,39,49,15,13,2,1	1813.045
Region 7	BAY SOUND CLAY, EL46 TO -70	23,42,32,24,21,33,43,20	6127.2
Region 8	Fill 2, EL3.3 TO -7	35,53,51,12,45	31.903683
Region 9	Fill 2, EL3.3 TO -7	53,37,38,48,47,46,51	150.77277
Region 10	Fill 2, EL3.3 TO -7	35,53,37,38,48,49,39,36,34,29,7,18,6,14,5,52,50	670.08058

Points

	X (ft)	Y (ft)
Point 1	54.7	-12.6
Point 2	111	-12.5
Point 3	210	5.2
Point 4	219	3
Point 5	230.2	-0.6
Point 6	245.3	-3.5
Point 7	310	-3.7
Point 8	200	12.5
Point 9	200.5	12.5
Point 10	201	6
Point 11	182.4	2.7
Point 12	179.8	0.9
Point 13	134.7	-12
Point 14	242.5	-1.7
Point 15	152.3	-7.4
Point 16	193	3.8

Point 53	200	0.4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.84	(218.964, 2.83)	31.48157	(181.249, 1.90284)	(256.482, - 3.54926)
2	4397	2.05	(218.964, 2.83)	30.822	(180.744, 1.55376)	(256.67, - 3.55009)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	181.31875	1.859682	432.74699	265.12885	0	488.92
2	Optimize d	181.89445	1.5055565	407.56584	320.7893	0	487.72
3	Optimize d	183.0459	0.797296	391.59163	430.00572	0	485.32
4	Optimize d	184.50075	-0.09757	382.30698	527.79381	0	482.29
5	Optimize d	186.3958	-1.325875	401.78606	644.48485	0	478.34
6	Optimize d	188.56795	-2.787345	441.24275	802.57901	0	473.82
7	Optimize d	190.3547	-4.00904	480.40358	925.894	0	470.09
8	Optimize d	192.0277	-5.181316	526.37674	1052.1218	0	466.61
9	Optimize d	193.77855	-6.408176	569.01944	1183.6909	0	462.96
10	Optimize d	195.6898	-7.5495665	616.42811	1393.3408	0	304.5
11	Optimize d	197.91125	-8.718119	631.78337	1500.6074	0	328.83
12	Optimize	199.3866	-9.4941925	627.09542	1572.1167	0	343.95

	d				I	I	
	_						
13	Optimize d	199.8866	-9.7288565	625.11397	1668.2599	0	348.89
14	Optimize d	200.25	-9.829151	619.90354	1287.8701	0	349
15	Optimize d	200.75	-9.9671495	613.0787	1403.6803	0	347.02
16	Optimize d	201.379	-10.140755	606.67786	1613.2127	0	344.55
17	Optimize d	202.8093	-10.63548	597.09758	1616.725	0	339.1
18	Optimize d	204.9119	-11.415725	584.03287	1668.8501	0	331.51
19	Optimize d	207.0145	-12.19597	582.11552	1720.9306	0	324.39
20	Optimize d	209.0329	-12.903395	588.70139	1779.9571	0	317.97
21	Optimize d	211.0536	-13.56638	601.75282	1803.9959	0	311.88
22	Optimize d	213.4396	-14.175665	617.52687	1835.9414	0	304.86
23	Optimize d	215.829	-14.62183	631.47375	1820.6786	0	297.87
24	Optimize d	217.943	-14.98695	645.27136	1797.7447	0	291.87
25	Optimize d	219.9218	-15.328715	660.23289	1767.2134	0	286.46
26	Optimize d	221.4218	-15.518785	668.70681	1763.6859	0	282.28
27	Optimize d	223.01335	-15.603745	671.85652	1716.4959	0	277.53
28	Optimize d	225.04005	-15.71193	676.24162	1659.3417	0	271.55
29	Optimize d	226.5493	-15.740065	676.6773	1640.2895	0	266.93
30	Optimize d	228.6226	-15.631555	668.91876	1560.2723	0	259.99
31	Optimize	231.39525	-15.486445	658.38258	1481.9457	0	250.6

12	4397	200.75	-9.5355685	611.81401	1288.8747	0	346.97
13	4397	202.5	-10.505608	598.44399	1554.8407	0	340.25
14	4397	205.5	-12.168535	597.33614	1677.6665	0	329.9
15	4397	208.5	-13	596.63333	1896	0	319.98
16	4397	211.125	-13	578.26667	1849.8667	0	310.71
17	4397	213.375	-13	565.15556	1787.9111	0	302.76
18	4397	215.625	-13	554.08889	1726	0	294.81
19	4397	217.875	-13	544.88889	1664.0444	0	286.87
20	4397	220.5	-13	536.3	1576.8667	0	277.59
21	4397	223.2613	-13	528.70159	1478.4379	0	267.84
22	4397	225.7839	-13	522.83462	1394.0407	0	258.93
23	4397	228.6226	-13	517.21023	1299.1274	0	248.9
24	4397	231.43	-13	512.39837	1234.6748	0	238.99
25	4397	233.89	-13	508.69919	1211.1789	0	230.3
26	4397	236.35	-13	505.4065	1187.7236	0	221.61
27	4397	238.81	-13	502.52033	1164.2276	0	212.92
28	4397	241.27	-13	499.9187	1140.7724	0	204.23
29	4397	243.75	-13	497.48	1044.48	0	195.47
30	4397	245.15	-12.87853	488.69525	1090.4393	0	189.72
31	4397	246.4849	-11.79755	420.94134	965.94166	0	181.98
32	4397	248.8547	-9.878531	300.09615	764.58767	0	169.19
33	4397	251.2245	-7.959511	178.62132	563.23368	0	156.4
34	4397	253.47445	-6.1375215	63.101449	529.11674	0	500
35	4397	255.6046	-4.412565	-46.348336	333.12501	0	500

	d						
32	Optimize d	233.7857	-15.361335	649.15018	1447.0213	0	242.41
33	Optimize d	236.17615	-15.236225	639.83423	1412.0969	0	234.13
34	Optimize d	238.65355	-14.85798	615.13703	1396.734	0	224.04
35	Optimize d	241.21785	-14.2266	574.69589	1309.5281	0	211.86
36	Optimize d	243.34145	-13.70373	540.92727	1187.4182	0	201.41
37	Optimize d	244.74145	-13.105315	503.0076	1120.1898	0	192.67
38	Optimize d	246.6863	-11.74304	417.38883	939.47197	0	181.62
39	Optimize d	249.92245	-9.32069	264.45513	702.86033	0	165.47
40	Optimize d	252.24615	-7.43469	145.04766	524.25237	0	152.9
41	Optimize d	254.6008	-5.274629	8.2548604	485.30461	0	500

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	4397	181.0666	1.375115	445.97455	332.42859	0	489.44
2	4397	181.89445	0.91623635	422.88572	406.4419	0	487.72
3	4397	182.6129	0.51800135	415.90445	484.53711	0	486.22
4	4397	184.2991	-0.4166665	395.51561	587.26276	0	482.71
5	4397	187.2457	-2.05	419.38012	766.78084	0	476.57
6	4397	190.1923	-3.6833335	469.92894	946.29892	0	470.43
7	4397	192.3328	-4.8698365	522.21999	1076.6875	0	465.97
8	4397	194.58785	-6.1198365	577.25701	1212.2397	0	461.28
9	4397	197.58785	-7.782764	631.74344	1409.655	0	324.74
10	4397	199.5	-8.8426825	627.08487	1506.4451	0	344.95
11	4397	200.25	-9.258414	619.70308	1148.7956	0	348.98

Reach 14 Slope Stability Global (Entry & Exit) Extreme Water Level

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File Information
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Created By: USACE St. Louis District
Revision Number: 503
Last Edited By: Goltz, Amanda MVS
Date: 12/4/2014
Time: 2:17:40 PM
File Name: 17thReach14.gsz
Directory: Yt\EC-G\Support For Others (SFP)\MVN\17th Street Canal\Extreme water level April
2013\
Last Solved Date: 12/4/2014
Last Solved Time: 2:22:04 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Slope Stability Global (Entry & Exit)
Kind: SLOPE/W
Parent: Seepage Analysis (Gap)
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes

Tension Crack

Phi: 0 °
Phi-B: 0 °
Phi-B: 0 °

BAY SOUND CLAY, EL. -46 TO -70
Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound
Cohesion Spatial Fn: Bay Sound Cohesion
Phi: 0 °
Phi-B: 0 °

Silty Sand El. -16 to -19
Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Sand
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (166.75, -2.68165) ft Left-Zone Right Coordinate: (200, 4.2) ft Left-Zone Increment: 25 Right Projection: Range Right-Zone Left Coordinate: (213, 4.46667) ft Right-Zone Right Coordinate: (275.01484, -3.6309) ft Right-Zone Increment: 25 Radius Increments: 25

Slip Surface Limits

Left Coordinate: (54.7, -12.6) ft Right Coordinate: (310, -3.7) ft

Cohesion Functions

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 500
Data Points: X (ft), Cohesion (psf)
Data Point: (0, 500)
Data Point: (176, 500)
Data Point: (200, 450)

Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL, EL. +4.2 TO +2 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 860 psf Phi-B·∩° BEACH SAND, EL. -19 TO -46 Model: Shear/Normal Fn Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 ° Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf Fill 2. EL. -3.3 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Fill Phi-B: 0 ° MARSH 1, EL. -7 TO -16 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Spatial Fn: Marsh 1 Cohesion

Data Point: (240, 500)
Data Point: (400, 500)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-10000, 0)
Data Point: (10000, 5773)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
Sigma2: 600000 psf
Sigma3: 300000 psf
Num. Points: 20

Unit Weight Functions

Bay Sound
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 104
Data Points: X (ft), Unit Weight (pcf)
Data Points: (0, 104)
Data Point: (176, 104)
Data Point: (200, 102)
Data Point: (240, 104)
Data Point: (240, 104)

Spatial Functions

Marsh 1 Cohesion Model: Linear Interpolation Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -7, 150)
Data Point: (181.4, -16, 210)
Data Point: (200, -7, 350)
Data Point: (200, -16, 350)
Data Point: (245.3, -7, 150)
Data Point: (245.3, -16, 210)
Data Point: (0, -7, 150)
Data Point: (0, -16, 210)
Data Point: (310, -7, 150)
Data Point: (310, -7, 150)
Data Point: (310, -7, 150)

Bay Sound Cohesion

y Sound Cohesion
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -46, 490)
Data Point: (181.4, -70, 710)
Data Point: (200, -46, 710)
Data Point: (200, -70, 920)
Data Point: (200, -70, 920)
Data Point: (245.3, -46, 490)
Data Point: (245.3, -70, 710)
Data Point: (0, -46, 490)
Data Point: (0, -70, 710)
Data Point: (310, -46, 490)
Data Point: (310, -46, 490)
Data Point: (310, -70, 710)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	8,9,10,22,17	6.675
Region 2	BEACH SAND, EL19 TO -46	25,23,42,32,24,26,31,41	6893.1
Region 3	Silty Sand El16 to - 19	28,25,41,31,26,27,30,40	765.9
Region 4	EMBANKMENT FILL, EL. +4.2 TO +2	45,11,16,19,17,35	27.803888
Region 5	EMBANKMENT FILL, EL. +4.2 TO +2	17,35,50,4,3,10,22	55
Region 6	MARSH 1, EL7 TO - 16	28,40,30,27,29,34,36,39,49,15,13,2,1	1813.045
Region 7	BAY SOUND CLAY, EL46 TO -70	23,42,32,24,21,33,43,20	6127.2

Point 27	310	-16
Point 28	54.7	-16
Point 29	310	-7
Point 30	245.3	-16
Point 31	245.3	-19
Point 32	245.3	-46
Point 33	245.3	-70
Point 34	245.3	-7
Point 35	200	2
Point 36	200	-7
Point 37	200	-4.5
Point 38	181.4	-4.5
Point 39	181.4	-7
Point 40	181.4	-16
Point 41	181.4	-19
Point 42	181.4	-46
Point 43	181.4	-70
Point 44	181.4	-3.3
Point 45	181.38889	2
Point 46	167	-2.6
Point 47	164.76472	-3.33
Point 48	161.1815	-4.5
Point 49	153.52503	-7
Point 50	222	2
Point 51	177.96971	0.4
Point 52	227.04519	0.4
Point 53	200	0.4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.81	(224.004, 49.659)	32.85242	(179.933, 0.991919)	(259.412, - 3.56217)
2	7290	1.86	(224.004, 49.659)	65.606	(179.975, 1.0214)	(262.348, - 3.5751)

Region 8	Fill 2, EL3.3 TO -7	35,53,51,12,45	31.903683
Region 9	Fill 2, EL3.3 TO -7	53,37,38,48,47,46,51	150.77277
Region 10	Fill 2, EL3.3 TO -7	35,53,37,38,48,49,39,36,34,29,7,18,6,14,5,52,50	670.08058

Points

	X (ft)	Y (ft)
Point 1	54.7	-12.6
Point 2	111	-12.5
Point 3	210	5.2
Point 4	219	3
Point 5	230.2	-0.6
Point 6	245.3	-3.5
Point 7	310	-3.7
Point 8	200	12.5
Point 9	200.5	12.5
Point 10	201	6
Point 11	182.4	2.7
Point 12	179.8	0.9
Point 13	134.7	-12
Point 14	242.5	-1.7
Point 15	152.3	-7.4
Point 16	193	3.8
Point 17	200	4.2
Point 18	290.7	-3.7
Point 19	199	4.2
Point 20	54.7	-70
Point 21	310	-70
Point 22	201	4.2
Point 23	54.7	-46
Point 24	310	-46
Point 25	54.7	-19
Point 26	310	-19

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	180.3805	0.6959595	484.64494	337.1358	0	490.87
2	Optimize d	181.10855	0.21470337	470.21232	407.73261	0	489.36
3	Optimize d	181.89445	-0.30477143	456.75023	486.27068	0	487.72
4	Optimize d	183.5602	-1.4058398	441.8546	637.29167	0	484.25
5	Optimize d	186.2521	-3.336365	467.559	814.64124	0	478.64
6	Optimize d	188.6351	-5.14672	509.82397	1007.7687	0	473.68
7	Optimize d	190.4159	-6.39672	543.35736	1178.4926	0	469.97
8	Optimize d	192.1727	-7.536944	579.25667	1356.7361	0	267.34
9	Optimize d	193.67215	-8.510134	604.80431	1445.5251	0	285.38
10	Optimize d	195.5082	-9.57687	630.19084	1570.2645	0	305.85
11	Optimize d	197.83605	-10.83785	642.16462	1685.6207	0	329.71
12	Optimize d	199.45305	-11.71375	646.57778	1766.0582	0	345.04
13	Optimize d	199.95305	-11.97378	647.36823	1862.5791	0	349.58
14	Optimize d	200.25	-12.066255	646.00088	1482.7276	0	349.08
15	Optimize d	200.75	-12.221965	643.99585	1599.6685	0	347.27
16	Optimize d	202.61525	-12.80283	640.07117	1834.5633	0	340.69
17	Optimize	205.84575	-13.80885	641.22381	1896.8651	0	330.05

	d						
18	Optimize d	208.7305	-14.65507	654.07413	1960.7396	0	321.29
19	Optimize d	211.0379	-15.278875	671.62034	1978.6804	0	314.72
20	Optimize d	213.7769	-15.779725	689.33352	1996.5836	0	306.98
21	Optimize d	217.239	-15.999085	697.12439	1963.8335	0	296.72
22	Optimize d	220.5	-15.997425	695	1859.0333	0	286.64
23	Optimize d	223.2613	-15.996015	693.21473	1760.5283	0	278.1
24	Optimize d	225.7839	-15.99473	691.58941	1676.0518	0	270.29
25	Optimize d	228.6226	-15.993285	689.80382	1581.0461	0	261.51
26	Optimize d	230.7826	-15.992185	688.43061	1522.7037	0	254.83
27	Optimize d	231.71995	-15.995405	688.06525	1511.3702	0	251.95
28	Optimize d	233.8722	-15.931765	682.98986	1496.768	0	244.98
29	Optimize d	236.80805	-15.73604	669.4148	1468.3656	0	234.81
30	Optimize d	239.0848	-15.4789	652.39356	1421.5354	0	226.21
31	Optimize d	241.3616	-15.221755	635.19774	1374.6615	0	217.43
32	Optimize d	242.627	-15.07884	625.59983	1341.1467	0	212.48
33	Optimize d	243.3459	-14.86924	612.25963	1319.2104	0	208.83
34	Optimize d	244.6189	-14.28157	575.29346	1224.1572	0	200.82
35	Optimize d	246.3465	-13.286235	512.73389	1074.3607	0	191.91
36	Optimize	249.001	-11.61842	407.50753	920.21677	0	180.79

25	7290	237.8875	-14.44176	590.63083	1357.7231	0	224.22
26	7290	240.9625	-13.69722	542.65295	1265.7504	0	209.52
27	7290	243.9	-12.840005	487.53561	1079.0035	0	193.91
28	7290	246.77225	-11.849355	423.85041	892.28983	0	182.33
29	7290	249.7168	-10.67696	348.63584	784.40721	0	174.51
30	7290	252.66135	-9.3343605	262.67122	658.6102	0	165.56
31	7290	255.60585	-7.8095905	165.29489	513.27864	0	155.4
32	7290	258.3956	-6.188672	62.054156	486.3381	0	500
33	7290	261.0306	-4.476223	-46.726791	317.25477	0	500

	d						
37	Optimize d	252.21705	-9.48864	272.64818	701.69899	0	166.59
38	Optimize d	254.64315	-7.711875	160.02527	547.38813	0	154.75
39	Optimize d	257.4365	-5.2810835	6.2110402	474.47329	0	500

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	7290	180.32355	0.7106995	486.2159	274.10585	0	490.99
2	7290	181.0303	0.08912225	473.73393	363.74455	0	489.52
3	7290	181.89445	-0.64495475	463.35879	473.11906	0	487.72
4	7290	183.54445	-1.9650975	457.82218	659.843	0	484.28
5	7290	185.83335	-3.6810205	480.38678	863.56639	0	479.51
6	7290	188.9539	-5.75	525.20305	1113.7444	0	473.01
7	7290	191.965	-7.579347	578.60388	1382.3094	0	265.27
8	7290	194.5	-8.914258	617.33926	1520.976	0	294.63
9	7290	197.5	-10.332516	637.857	1670.1365	0	326.1
10	7290	199.5	-11.196535	640.33884	1763.506	0	345.38
11	7290	200.25	-11.49497	638.70889	1406.8934	0	349.06
12	7290	200.75	-11.686845	636.46763	1530.9971	0	347.21
13	7290	202.5	-12.30219	631.51563	1779.0388	0	340.91
14	7290	205.5	-13.26388	628.2321	1856.0429	0	330.79
15	7290	208.5	-14.06991	634.29918	1917.9907	0	321.32
16	7290	211.5	-14.72614	647.56794	1939.7261	0	312.3
17	7290	214.5	-15.237125	663.32454	1921.372	0	303.56
18	7290	217.5	-15.606285	677.21221	1888.9434	0	294.9
19	7290	220.5	-15.83602	686.41842	1827.7197	0	286.15
20	7290	223.2613	-15.93055	689.60268	1750.8623	0	277.87
21	7290	225.7839	-15.910595	686.85695	1675.3556	0	269.98
22	7290	228.6226	-15.765005	676.64539	1577.8801	0	260.55
23	7290	231.7375	-15.47109	657.20446	1494.0252	0	249.44
24	7290	234.8125	-15.031645	628.71597	1433.5597	0	237.45

R15A Slope Stability Global (Block) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

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File Information
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Created By: USACE St. Louis District Revision Number: 620 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 7:52:37 AM File Name: 17thReach15A.gsz Directory: Y\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/27/2013 Last Solved Time: 7:55:26 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

```
Slope Stability Global (Block)
     Kind: SLOPE/W
     Parent: Seepage Analysis (Gap)
     Method: Spencer
          PWP Conditions Source: Parent Analysis
          Direction of movement: Left to Right
          Use Passive Mode: No
          Slip Surface Option: Block
          Critical slip surfaces saved: 1
          Optimize Critical Slip Surface Location: Yes
          Tension Crack
               Tension Crack Option: Tension Crack Line
               Percentage Wet: 1
               Tension Crack Fluid Unit Weight: 62.4 pcf
```

```
Advanced
          Number of Slices: 30
          Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
          Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
          Starting Optimization Points: 8
          Ending Optimization Points: 16
          Complete Passes per Insertion:
          Driving Side Maximum Convex Angle: 5
          Resisting Side Maximum Convex Angle: 1 °
Materials
EMBANKMENT FILL 1, EL. +5.9 TO +2.0
     Model: Spatial Mohr-Coulomb
     Unit Weight: 114 pcf
     Cohesion: 800 psf
     Phi-R: 0 °
MARSH, EL. -5.0 TO -13.0
     Model: Spatial Mohr-Coulomb
     Unit Weight: 94 pcf
Cohesion Fn: MARSH 1
     Phi-B: 0 °
BEACH SAND, EL. -13 TO -46
     Model: Shear/Normal Fn
     Unit Weight: 122 pcf
     Strength Function: Sand
BAY SOUND CLAY, EL. -46 TO -70
     Model: Spatial Mohr-Coulomb
     Weight Fn: Clay
     Cohesion Spatial Fn: Clay
     Phi-B: 0 °
Sheet Pile
     Model: Undrained (Phi=0)
```

FOS Distribution

FOS Calculation Option: Constant Restrict Block Crossing: Yes

EMBANKMENT FILL 2, EL. +2.0 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi-B: 0 ° EMBANKMENT FILL 3, EL. -3.0 TO -5.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf

Cohesion: 500 psf Phi-B: 0 °

Slip Surface Limits

Unit Weight: 0.1 pcf

Left Coordinate: (67.1, -12.2) ft Right Coordinate: (310, -3.2) ft

Slip Surface Block

Left Grid Upper Left: (173, -8) ft Lower Left: (173, -52) ft Lower Right: (223, -52) ft X Increments: 8 Y Increments: 9 Starting Angle: 115 Ending Angle: 180 ° Angle Increments: 5 Right Grid Upper Left: (228, -8) ft Lower Left: (228, -52) ft Lower Right: (278, -52) ft X Increments: 8 Y Increments: 9 Starting Angle: 0 Angle Increments: 5

Tension Crack Line

```
X (ft) Y (ft)
```

Cohesion Functions

MARSH 1

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 200
Data Points: X (ft), Cohesion (psf) Data Point: (67.1, 200) Data Point: (168 1 200) Data Point: (200, 350) Data Point: (264.2, 200) Data Point: (310, 200)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0)
Data Point: (0, 0) Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Unit Weight Functions

Model: Spline Data Point Function Function: Unit Weight vs. X

Curve Fit to Data: 100 %

Segment Curvature: 0 %
Y-Intercept: 104
Data Points: X (ft), Unit Weight (pcf)
Data Point: (167.1, 104)
Data Point: (168.8, 104)
Data Point: (200, 102) Data Point: (264.2, 104)
Data Point: (310, 104)

Spatial Functions

Clay Model: Linear Interpolation Limit Range By: Data Values

Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)

Data Point: (67.1, -46, 520)

Data Point: (67.1, -70, 740)

Data Point: (168.1, -46, 520)

Data Point: (168.1, -70, 740)

Data Point: (200, -46, 735)

Data Point: (200, -70, 945)

Data Point: (260, -46, 520) Data Point: (264.2, -46, 520)
Data Point: (264.2, -70, 740)
Data Point: (310, -46, 520)
Data Point: (310, -70, 740)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	3,6,7,8,39,20	7.775
Region 2	EMBANKMENT FILL 1, EL. +5.9 TO +2.0	10,20,39,8,4,22	58.84
Region 3	EMBANKMENT FILL 3, EL3.0 TO - 5.0	23,24,25,5,13,26	102.66
Region 4	BEACH SAND, EL13 TO -46	17,16,1,29,32,27,14,15,28,33	8037.6009
Region 5	EMBANKMENT FILL 1, EL. +5.9 TO +2.0	18,19,38,20,10,40	19.57
Region 6	EMBANKMENT FILL 3, EL3.0 TO - 5.0	42,30,31,41	3.4
Region 7	EMBANKMENT FILL 3, EL3.0 TO - 5.0	31,30,9,11,23,26,21	176.45

Point 22 220.5 2.3 Point 23 298.4 Point 26 264.2 264.2 Point 28 264.2 -46 Point 29 121.85217 Point 30 168.1 -4.5 Point 32 168.1 Point 33 168.1 -46 Point 34 -70 168.1 Point 36 264.2 -70 Point 37 -70 Point 38 199 3.6 Point 39 201 3.6 Point 40 183.7 Point 42 162 -4.5 Point 43 -2.1 Point 44 200 0.4 Point 45 235 Point 46 226.6 1.1 Point 47 181 0.4 Point 48 182.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.30	(236.462, 2.588)	30.86084	(197.709, 3.55547)	(272.983, - 2.3223)
2	5327	2.40	(236.462, 2.588)	30.429	(198.858, 3.59509)	(273.755, - 2.35063)

Region 8	MARSH, EL5.0 TO -13.0	1,2,12,41,31,21,26,13,14,27,32,29	1379.1041
Region 9	BAY SOUND CLAY, EL46 TO -70	17,33,28,15,37,36,35,34	5829.6
Region 10	EMBANKMENT FILL 2, EL. +2.0 TO - 3.0	11,44,46,45,23	163.39
Region 11	EMBANKMENT FILL 2, EL. +2.0 TO - 3.0	44,10,22,46	34.495
Region 12	EMBANKMENT FILL 2, EL. +2.0 TO - 3.0	11,43,47,44	72.2
Region 13	EMBANKMENT FILL 2, EL. +2.0 TO - 3.0	47,48,40,10,44	28.71125
Region 14	EMBANKMENT FILL 3, EL3.0 TO - 5.0	42,30,9,11,43	66.975

Points

	X (ft)	Y (ft)
Point 1	67.1	-12.2
Point 2	131.7	-11.2
Point 3	200	6.5
Point 4	207.9	6.4
Point 5	310	-3.2
Point 6	200	13
Point 7	200.5	13
Point 8	201	6.5
Point 9	200	-4.5
Point 10	200	2
Point 11	200	-3
Point 12	151.6	-8.3
Point 13	310	-5
Point 14	310	-13
Point 15	310	-46
Point 16	67.1	-18
Point 17	67.1	-46
Point 18	184.6	2.5
Point 19	190.3	3.3
Point 20	200	3.6
Point 21	200	-5

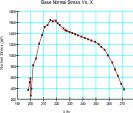
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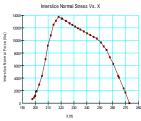
Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	198.3544	1.0084536	336.65148	368.92508	0	375
2	Optimize d	199.42225	0.0300136	368.94502	510.17067	0	375
3	Optimize d	199.92225	-0.42001955	491.08201	578.25746	0	375
4	Optimize d	200.25	-0.6861933	522.30894	265.60239	0	375
5	Optimize d	200.75	-1.0922618	508.80215	391.97622	0	375
6	Optimize d	202.0647	-2.159978	456.00345	816.82543	0	375
7	Optimize d	204.17975	-4.01233	365.13867	940.43409	0	500
8	Optimize d	206.56505	-6.2552815	403.39766	1210.8751	0	334.6
9	Optimize d	208.8379	-8.3924965	506.90194	1366.173	0	329.3
10	Optimize d	210.8633	-9.918725	583.37315	1513.5345	0	324.6
11	Optimize d	213.0383	-11.207315	649.55048	1553.407	0	319.5
12	Optimize d	215.11135	-12.12334	697.03452	1641.0536	0	314.6
13	Optimize d	217.08245	-12.6668	723.78711	1619.8276	0	310.0
14	Optimize d	219.284	-12.961435	735.44617	1630.6111	0	304.9
15	Optimize d	220.694	-12.987995	733.16382	1583.6431	0	301.6
16	Optimize d	222.316	-12.992605	728.92514	1552.0384	0	297.8
17	Optimize	225.172	-12.994515	721.15199	1487.9625	0	291.1

d 18 Optimize d 226.60715 -12.995475 717.2028 1455.8741 19 Optimize d 227.6821 -12.99612 714.28672 1445.665 20 Optimize d 229.81765 -12.997395 708.48027 1425.3424 21 Optimize d 231.9532 -12.99867 702.627 1405.0199	0 0 0 0	287.83 285.32 280.33
18 d 226.60715 -12.995475 717.2028 1455.8741 19 Optimize d 227.6821 -12.99612 714.28672 1445.665 20 Optimize d 229.81765 -12.997395 708.48027 1425.3424 21 Optimize 231.9532 -12.99867 702.627 1405.0199	0	285.32
19 d 227.6821 -12.99612 714.28672 1445.665 20 Optimize d 229.81765 -12.997395 708.48027 1425.3424 21 Optimize 231.9532 -12.99867 702.627 1405.0199	0	
20 d 229.81765 -12.997395 708.48027 1425.3424 Optimize 231 9532 -12.99867 702.627 1405.0199		280.33
1 21 I 1 231 9532 I -12 99867 I 702 627 I 1405 0199 I	_	
	١	275.34
22 Optimize d 234.0105 -12.999235 696.9576 1385.5273	0	270.54
23 Optimize d 236.27225 -12.99907 690.69241 1364.0144	0	265.25
24 Optimize d 238.8168 -12.998885 683.65777 1339.9629	0	259.31
25 Optimize d 241.36135 -12.998695 676.58382 1315.9115	0	253.36
26 Optimize d 243.9059 -12.99851 669.54917 1291.8601	0	247.42
27 Optimize d 246.45045 -12.998325 662.47522 1267.8087	0	241.47
28 Optimize d 249.32505 -12.869005 646.45459 1244.0145	0	234.75
29 Optimize d 251.98305 -12.576275 620.83863 1204.8407	0	228.54
30 Optimize d 254.09435 -12.24926 594.62711 1153.2602	0	223.61
31 Optimize d 256.47865 -11.68117 552.56694 1102.5419	0	218.04
32 Optimize d 259.13595 -10.872005 494.75063 998.24931	0	211.83
33 Optimize d 262.3323 -9.556338 403.81044 868.39817	0	204.36
34 Optimize d 264.50855 -8.494738 331.56183 744.34655	0	200
35 Optimize d 266.63895 -7.224385 246.41288 628.7398	0	200
36 Optimize 269.12105 -5.552275 135.21151 481.63945	0	200

	Base Normal Stress Vs. X			Int	erslice Normal Stress V	's. X		
	34	5327	271.9314	-3.675315	10.441328	344.54628	0	500
ı	33	5327	268.6311	-6.073126	169.06295	519.74286	0	200
ı	32	5327	265.67705	-8.2193775	311.13914	746.33958	0	200
ı	31	5327	262.9625	-10.191602	441.70697	962.38708	0	202.89
ı	30	5327	260.4875	-11.989795	560.72237	1167.8611	0	208.67
ı	29	5327	258.0375	-12.88889	623.58763	1148.0825	0	214.4





	d						
37	Optimize d	271.382	-3.6611505	11.081382	379.96184	0	500

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	5327	198.92885	1.542389	324.34322	33.229559	0	375
2	5327	199.5	1.0798858	335.47826	421.50828	0	375
3	5327	200.16445	0.5418245	455.01599	90.303791	0	375
4	5327	200.41445	0.3393785	452.09955	243.25514	0	375
5	5327	200.75	0.06765565	446.57914	272.12542	0	375
6	5327	202.7263	-1.5327177	378.03954	752.20752	0	375
7	5327	205.7303	-3.9653225	320.11065	972.86145	0	500
8	5327	207.454	-5.36115	343.94369	1161.4068	0	332.58
9	5327	209.00625	-6.6181235	402.64057	1234.4413	0	328.96
10	5327	211.21875	-8.409771	493.54468	1317.2666	0	323.79
11	5327	213.43125	-10.201418	588.6287	1400.0919	0	318.62
12	5327	215.64375	-11.993065	687.54136	1482.9172	0	313.45
13	5327	217.6875	-12.88889	735.46667	1687.84	0	308.67
14	5327	219.5625	-12.88889	730.24	1618.1333	0	304.29
15	5327	222.025	-12.88889	723.37705	1548.9836	0	298.54
16	5327	225.075	-12.88889	714.88525	1480.3607	0	291.41
17	5327	228	-12.88889	706.78571	1432.6429	0	284.58
18	5327	230.8	-12.88889	699	1405.8571	0	278.04
19	5327	233.6	-12.88889	691.25	1379.0357	0	271.5
20	5327	236.2125	-12.88889	684	1354.1856	0	265.39
21	5327	238.6375	-12.88889	677.27835	1331.299	0	259.73
22	5327	241.0625	-12.88889	670.59794	1308.3711	0	254.06
23	5327	243.4875	-12.88889	663.87629	1285.4845	0	248.39
24	5327	245.9125	-12.88889	657.15464	1262.5979	0	242.73
25	5327	248.3375	-12.88889	650.43299	1239.6701	0	237.06
26	5327	250.7625	-12.88889	643.71134	1216.7835	0	231.4
27	5327	253.1875	-12.88889	637.03093	1193.8969	0	225.73
28	5327	255.6125	-12.88889	630.30928	1170.9691	0	220.06

R15A Slope Stability Global (Entry &

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File Information

Created By: USACE St. Louis District Revision Number: 620 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 7:52:37 AM File Name: 17thReach15A.gsz
Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_Hlgh_water_ analyses\High water cases\ Last Solved Date: 2/27/2013 Last Solved Time: 7:56:20 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Slope Stability Global (Entry & Exit) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer Settings PWP Conditions Source: Parent Analysis Slip Surface Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes

Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL 1, EL. +5.9 TO +2.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi-B: 0 ° MARSH. EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi-B: 0 ° BEACH SAND, EL. -13 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Tension Crack Option: Tension Crack Line

Tension Crack Fluid Unit Weight: 62.4 pcf

Percentage Wet: 1

Number of Slices: 30

FOS Calculation Option: Constant

FOS Distribution

Advanced

BAY SOUND CLAY, EL. -46 TO -70

Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Tension Crack

EMBANKMENT FILL 2, EL. +2.0 TO -3.0

Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf

EMBANKMENT FILL 3, EL. -3.0 TO -5.0

Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (148.6, -8.73719) ft Left-Zone Right Coordinate: (199.8, 3.6) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (223.52189, 1.70553) ft Right-Zone Right Coordinate: (299.4, -3.2) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (67.1, -12.2) ft Right Coordinate: (310, -3.2) ft

Tension Crack Line

	X (ft)	Y (ft)
Г	190	1.6
Г	200	1.6

Cohesion Functions

MARSH 1

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 200 Data Points: X (ft), Cohesion (psf) Data Point: (67.1, 200) Data Point: (168.1, 200) Data Point: (200, 350) Data Point: (264.2, 200) Data Point: (310, 200)

Shear/Normal Strength Functions

Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-10000, 0) Data Point: (0, 0)
Data Point: (10000, 5773) **Estimation Properties** Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 nsf Num. Points: 20

Unit Weight Functions

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 104 Data Points: X (ft), Unit Weight (pcf)

Data Point: (67.1, 104)
Data Point: (168.8, 104)
Data Point: (200, 102)
Data Point: (264.2, 104)
Data Point: (310, 104)

Spatial Functions

Clay

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Points: (671, -70, 740)
Data Point: (671, -70, 740)
Data Point: (168.1, -46, 520)
Data Point: (168.1, -70, 740)
Data Point: (200, -46, 735)
Data Point: (200, -46, 735)
Data Point: (200, -70, 945)
Data Point: (264.2, -46, 520)
Data Point: (264.2, -70, 740)
Data Point: (310, -46, 520)
Data Point: (310, -70, 740)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	3,6,7,8,39,20	7.775
Region 2	EMBANKMENT FILL 1, EL. +5.9 TO +2.0	10,20,39,8,4,22	58.84
Region 3	EMBANKMENT FILL 3, EL3.0 TO - 5.0	23,24,25,5,13,26	102.66
Region 4	BEACH SAND, EL13 TO -46	17,16,1,29,32,27,14,15,28,33	8037.6009
Region 5	EMBANKMENT FILL 1, EL. +5.9 TO +2.0	18,19,38,20,10,40	19.57
Region 6	EMBANKMENT FILL 3, EL3.0 TO - 5.0	42,30,31,41	3.4
Region 7	EMBANKMENT FILL 3, EL3.0 TO - 5.0	31,30,9,11,23,26,21	176.45
Region 8	MARSH, EL5.0 TO -13.0	1,2,12,41,31,21,26,13,14,27,32,29	1379.1041
Region 9	BAY SOUND CLAY, EL46 TO -70	17,33,28,15,37,36,35,34	5829.6
Region	EMBANKMENT FILL 2, EL. +2.0 TO -	11,44,46,45,23	163.39

5

Point 25	298.4	-3.2
Point 26	264.2	-5
Point 27	264.2	-13
Point 28	264.2	-46
Point 29	121.85217	-13
Point 30	168.1	-4.5
Point 31	168.1	-5
Point 32	168.1	-13
Point 33	168.1	-46
Point 34	67.1	-70
Point 35	168.1	-70
Point 36	264.2	-70
Point 37	310	-70
Point 38	199	3.6
Point 39	201	3.6
Point 40	183.7	2
Point 41	160.6	-5
Point 42	162	-4.5
Point 43	171.5	-2.1
Point 44	200	0.4
Point 45	235	0.4
Point 46	226.6	1.1
Point 47	181	0.4
Point 48	182.9	1.875

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.31	(232.921, 40.579)	29.02601	(197.943, 3.56357)	(267.876, - 2.1349)
2	8178	2.47	(232.921, 40.579)	53.449	(196.351, 3.50865)	(265.182, - 2.03603)

Slices of Slip Surface: Optimized

 01110	ec. optiliz					
Slip	X (ft)	Y (ft)	DWD (nef)	Base	Friction	Cohesiv
Surface	X (IL)	Y (It)	PWP (psf)	Normal	al	e

10	3.0		
Region 11	EMBANKMENT FILL 2, EL. +2.0 TO - 3.0	44,10,22,46	34.495
Region 12	EMBANKMENT FILL 2, EL. +2.0 TO - 3.0	11,43,47,44	72.2
Region 13	EMBANKMENT FILL 2, EL. +2.0 TO - 3.0	47,48,40,10,44	28.71125
Region 14	EMBANKMENT FILL 3, EL3.0 TO - 5.0	42,30,9,11,43	66.975

Points

	X (ft)	Y (ft)
Point 1	67.1	-12.2
Point 2	131.7	-11.2
Point 3	200	6.5
Point 4	207.9	6.4
Point 5	310	-3.2
Point 6	200	13
Point 7	200.5	13
Point 8	201	6.5
Point 9	200	-4.5
Point 10	200	2
Point 11	200	-3
Point 12	151.6	-8.3
Point 13	310	-5
Point 14	310	-13
Point 15	310	-46
Point 16	67.1	-18
Point 17	67.1	-46
Point 18	184.6	2.5
Point 19	190.3	3.3
Point 20	200	3.6
Point 21	200	-5
Point 22	220.5	2.3
Point 23	264.2	-2
Point 24	275.1	-2.4

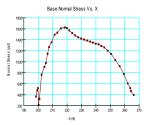
					Stress (psf)	Strengt h (psf)	Strengt h (psf)
1	Optimize d	198.4717	1.2061411	332.07653	370.22845	0	375
2	Optimize d	199.2765	0.6061411	346.55156	480.68371	0	375
3	Optimize d	199.7765	0.23336852	391.79317	520.94412	0	375
4	Optimize d	200.25	-0.11964923	489.05977	215.067	0	375
5	Optimize d	200.6019	-0.38201775	480.60188	328.00026	0	375
6	Optimize d	200.8519	-0.5894618	474.80388	325.04522	0	375
7	Optimize d	202.2529	-1.8331583	427.13718	765.90423	0	375
8	Optimize d	204.2074	-3.5682615	360.55149	907.30754	0	500
9	Optimize d	205.30475	-4.595565	343.51307	979.18103	0	500
10	Optimize d	206.4127	-5.727895	374.95195	1146.6848	0	335.02
11	Optimize d	207.51245	-6.8027625	426.24259	1267.9143	0	332.45
12	Optimize d	209.12695	-8.2481825	496.59781	1353.2867	0	328.68
13	Optimize d	211.29345	-9.918755	581.38689	1494.0793	0	323.61
14	Optimize d	213.17255	-11.063	640.56645	1531.2597	0	319.22
15	Optimize d	215.69575	-12.174055	698.23724	1608.268	0	313.33
16	Optimize d	218.2789	-12.85566	731.82702	1626.739	0	307.29
17	Optimize d	219.8892	-12.998315	736.00845	1616.4469	0	303.53
18	Optimize d	221.51665	-12.99827	731.50832	1570.8199	0	299.73

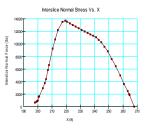
19	Optimize d	223.55	-12.998215	725.85258	1525.0822	0	294.98
20	Optimize d	225.58335	-12.99816	720.24602	1479.3445	0	290.23
21	Optimize d	227.65	-12.998105	714.52381	1446.381	0	285.4
22	Optimize d	229.75	-12.99805	708.71429	1426.2857	0	280.49
23	Optimize d	231.85	-12.99799	702.85714	1406.1429	0	275.58
24	Optimize d	233.95	-12.997935	697.04762	1386.0476	0	270.68
25	Optimize d	235.97215	-12.99788	691.47131	1366.7925	0	265.95
26	Optimize d	237.9164	-12.997825	686.07079	1348.4308	0	261.41
27	Optimize d	239.9101	-12.98919	679.99411	1330.5743	0	256.75
28	Optimize d	241.8666	-12.90906	669.62131	1318.5519	0	252.18
29	Optimize d	243.73635	-12.766015	655.48978	1287.1426	0	247.81
30	Optimize d	245.797	-12.49739	633.05316	1261.6876	0	243
31	Optimize d	248.04855	-12.103195	602.25362	1202.1885	0	237.74
32	Optimize d	250.58985	-11.48848	556.87696	1141.2963	0	231.8
33	Optimize d	253.421	-10.65324	496.91394	1032.8208	0	225.18
34	Optimize d	256.4257	-9.594405	422.56624	919.12972	0	218.16
35	Optimize d	259.3436	-8.2254675	329.07882	779.00116	0	211.35
36	Optimize d	262.0012	-6.7700225	230.9215	608.70604	0	205.14
37	Optimize d	263.765	-5.6683945	157.30715	523.19206	0	201.02

38	Optimize d	264.3713	-5.1472445	123.11548	465.30756	0	200
39	Optimize d	266.2093	-3.567449	19.624545	397.02284	0	500

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	8178	197.012	1	336.19337	376.25212	0	375
2	8178	198.33665	0.163079 3	370.42528	548.35998	0	375
3	8178	199.5	- 1.126837 8	424.8467	662.33103	0	375
4	8178	200.25	-1.720612	583.02208	385.59486	0	375
5	8178	200.75	-2.102147	563.07813	517.67221	0	375
6	8178	201.4666	-2.630238	528.42567	891.07719	0	375
7	8178	203.46905	- 3.984944 5	385.33699	1020.8117	0	500
8	8178	206.45245	-5.825675	380.11257	1257.2908	0	334.92
9	8178	209.16	-7.276963	440.05171	1358.9675	0	328.6
10	8178	211.68	- 8.448476 5	493.23684	1390.4647	0	322.71
11	8178	214.2	- 9.465733 5	541.67182	1406.9195	0	316.82
12	8178	216.72	-10.33801	584.38379	1409.2294	0	310.93
13	8178	219.24	- 11.07267 5	620.5064	1397.9807	0	305.05
14	8178	221.51665	-11.62851	647.53328	1391.8338	0	299.73
15	8178	223.55	-12.0317	666.37971	1393.5727	0	294.98
16	8178	225.58335	-12.35374	680.44344	1387.3875	0	290.23

17	8178	227.65	-12.59876	689.76236	1386.5854	0	285.4
18	8178	229.75	- 12.76526 5	694.25034	1391.0676	0	280.49
19	8178	231.85	- 12.84874 5	693.62252	1387.5307	0	275.58
20	8178	233.95	- 12.84958 5	687.82497	1376.0784	0	270.68
21	8178	236.17445	-12.75774	675.95505	1355.0547	0	265.48
22	8178	238.52335	- 12.56230 5	657.26384	1323.4611	0	259.99
23	8178	240.87225	-12.26178	632.03583	1281.5429	0	254.5
24	8178	243.22115	-11.85436	600.09516	1229.1403	0	249.02
25	8178	245.57005	- 11.33752 5	561.3818	1165.8641	0	243.53
26	8178	247.91895	-10.70795	515.59535	1091.3803	0	238.04
27	8178	250.26785	-9.961418	462.51163	1005.1554	0	232.55
28	8178	252.61675	-9.092645	401.8113	906.55879	0	227.06
29	8178	254.96565	8.095062 5	333.07673	794.82193	0	221.58
30	8178	257.31455	- 6.960536 5	255.80052	668.99868	0	216.09
31	8178	259.66345	-5.678956	169.34485	527.79746	0	210.6
32	8178	262.51895	-3.880897	49.457934	401.3134	0	500
33	8178	264.6909	-2.398912	-48.852443	221.46015	0	500





R15B Slope Stability Global Block Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 700 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 7:40:46 AM File Name: 17thReach15B.gsz Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/27/2013 Last Solved Time: 7:42:20 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

```
Slope Stability Global Block
     Kind: SLOPE/W
     Parent: Seepage Analysis (Gap)
     Method: Spencer
          PWP Conditions Source: Parent Analysis
          Direction of movement: Left to Right
          Use Passive Mode: No
          Slip Surface Option: Block
          Critical slip surfaces saved: 1
          Optimize Critical Slip Surface Location: Yes
Tension Crack
                Tension Crack Option: Tension Crack Line
                Percentage Wet: 1
                Tension Crack Fluid Unit Weight: 62.4 pcf
```

FOS Distribution FOS Calculation Option: Constant Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 **Ending Optimization Points: 16** Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 °

Materials

```
FILL top, EL. +6.5 to 2
    Model: Spatial Mohr-Coulomb
     Unit Weight: 114 pcf
    Cohesion: 800 psf
    Phi-B·∩°
MARSH, EL. -5 to -13
    Model: Spatial Mohr-Coulomb
    Unit Weight: 94 pcf
Cohesion Fn: MARSH 1
    Phi-B: 0 °
BEACH SAND, EL. -13 to -46
     Model: Mohr-Coulomb
     Unit Weight: 122 pcf
    Cohesion: 0 psf
     Phi-B: 0 °
BAY SOUND CLAY, EL. -46 to -70
     Model: Spatial Mohr-Coulomb
     Weight En: Clay
     Cohesion Spatial Fn: Clay
     Phi: 0 °
     Phi-B: 0 °
```

Sheet Pile Model: Undrained (Phi=0)

Unit Weight: 0.1 pcf Cohesion: 0.01 psf FILL middle, EL. 2 to -3 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf FILL bottom, EL. -3 to -5

Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf

Cohesion: 500 psf Phi: 0 Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (67.1, -15.6) ft Right Coordinate: (310, -3) ft

Upper Left: (170, -4) ft

Slip Surface Block Left Grid

Lower Left: (170, -46) ft Lower Right: (220, -46) ft X Increments: 10 Y Increments: 10 Starting Angle: 135 ° Ending Angle: 180 ° Angle Increments: 5 Right Grid Upper Left: (225, -4) ft Lower Left: (225, -46) ft Lower Right: (285, -46) ft X Increments: 12 Y Increments: 10 Starting Angle: 0 Ending Angle: 45 ° Angle Increments: 5

Tension Crack Line

X (ft)	Y (ft)	Ī
192	2	
199	2	

Cohesion Functions

MARSH 1

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercent: 200 Data Points: X (ft), Cohesion (psf) Data Point: (157, 200) Data Point: (200, 350) Data Point: (264, 200)

Unit Weight Functions

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 104 Data Points: X (ft), Unit Weight (pcf)
Data Point: (67.2, 104) Data Point: (157.5, 104) Data Point: (200, 102) Data Point: (264, 104) Data Point: (310, 104)

Spatial Functions

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (67.2, -46, 520)
Data Point: (67.2, -70, 740) Data Point: (157.5, -46, 520)

Data Point: (157.5, -70, 740)
Data Point: (200, -46, 735)
Data Point: (200, -70, 945)
Data Point: (264, -46, 520)
Data Point: (264, -70, 740)
Data Point: (310, -46, 520)
Data Point: (310, -70, 740)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	7,8,9,35,4,21	4.275
Region 2	FILL top, EL. +6.5 to 2	11,4,35,9,5,40,23	97.81
Region 3	BEACH SAND, EL13 to -46	18,17,1,2,3,39,31,28,15,16	7921.135
Region 4	FILL top, EL. +6.5 to 2	19,20,34,21,4,11,36	82.845
Region 5	BAY SOUND CLAY, EL46 to -70	16,33,32,18	5829.6
Region 6	MARSH, EL5 to -13	13,39,31,28,15,14,27,22,30,37	1436.19
Region 7	FILL bottom, EL3 to -5	12,10,29,38,37,30,22,27,14,6,26,25,24	267.885
Region 8	FILL bottom, EL3 to -5	42,12,10,29,38	89.578
Region 9	FILL middle, EL. 2 to -3	42,43,41,12	92.934
Region 10	FILL middle, EL. 2 to -3	43,36,11,41	36
Region 11	FILL middle, EL. 2 to -3	41,11,23,45,44	47.86
Region 12	FILL middle, EL. 2 to -3	12,41,44,46,47,48,24	146.875

Points

	X (ft)	Y (ft)
Point 1	67.1	-15.6
Point 2	101.1	-14.9
Point 3	117.4	-13.3
Point 4	200	7.3
Point 5	207.9	7.3
Point 6	310	-3
Point 7	200	13
Point 8	200.5	13
Point 9	201	7.3
Point 10	200	-4.5
Point 11	200	2

Point 12 200 Point 13 138.2 -6.3 Point 14 Point 15 -13 310 -46 Point 16 310 Point 17 67.1 -18 Point 18 -46 Point 19 3.1 179.1 6.7 Point 20 190.3 Point 21 -5 Point 22 200 Point 23 2 227 -2.6 Point 24 264.2 -2.6 Point 26 296.4 Point 27 264.2 Point 28 264.2 -13 Point 29 160.3 -4.5 Point 30 160.3 Point 32 67.1 -70 Point 33 310 -70 Point 34 199 Point 35 7.3 200.9 Point 36 2 178.2 Point 37 145.7 -4.5 Point 38 148.6 -13 Point 39 118.3 Point 40 4.5 0.4 Point 41 200 Point 42 162.46 Point 43 176.8 0.4 Point 44 233.6 0.4 1.4 228.7 Point 45 Point 46 235.6 0 Point 47 245.2

Point 48 254.5 -1.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.81	(225.009, 2.975)	24.81089	(196.113, 7.23455)	(253.788, - 1.8847)
2	14609	1.90	(225.009, 2.975)	25.046	(195.18, 7.14874)	(254.453, - 1.899)

5

Slices of Slip Surface: Optimized

	1	e: Optimize	-		1		
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	197.0138	1.2	261.05588	488.99725	0	375
2	Optimize d	198.4572	- 0.0821507 5	300.53574	681.20884	0	375
3	Optimize d	199.47595	- 0.9870907 5	326.4747	779.83064	0	375
4	Optimize d	199.97595	-1.429457	252.86377	845.92694	0	375
5	Optimize d	200.25	-1.65258	257.45762	812.27881	0	375
6	Optimize d	200.7	- 2.0189625	276.06899	852.77012	0	375
7	Optimize d	200.95	-2.222508	286.26642	874.19244	0	375
8	Optimize d	201.44525	-2.625719	306.36069	917.10522	0	375
9	Optimize d	202.39745	- 3.4009805	346.62704	952.74443	0	500
10	Optimize d	203.67185	-4.40687	396.2259	1074.2051	0	500
11	Optimize	205.167	-5.562445	457.01624	1245.0143	0	337.89

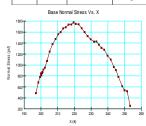
	d						
12	Optimize d	206.89735	-6.80884	525.9524	1382.0927	0	333.83
13	Optimize d	208.72945	-8.058585	595.00155	1473.8091	0	329.54
14	Optimize d	210.30645	-9.03592	648.66657	1561.3465	0	325.84
15	Optimize d	211.8016	-9.859	693.25471	1598.4349	0	322.34
16	Optimize d	213.33515	- 10.595205	732.47582	1668.5021	0	318.75
17	Optimize d	214.9071	-11.24453	766.2833	1688.0222	0	315.06
18	Optimize d	216.51	-11.81165	794.94493	1735.2308	0	311.3
19	Optimize d	218.14385	-12.29657	818.4154	1738.0472	0	307.48
20	Optimize d	219.4804	-12.62478	833.41087	1775.1114	0	304.34
21	Optimize d	220.8271	-12.84702	841.79673	1749.0858	0	301.19
22	Optimize d	222.54515	-12.98453	843.45896	1743.4852	0	297.16
23	Optimize d	224.3271	-12.98657	836.38804	1670.9242	0	292.98
24	Optimize d	226.10905	-12.98861	829.37325	1598.4193	0	288.81
25	Optimize d	227.85	-12.9906	822.4701	1527.9403	0	284.73
26	Optimize d	229.7072	- 12.992725	815.1722	1470.2984	0	280.37
27	Optimize d	231.7216	-12.99503	807.22947	1423.4363	0	275.65
28	Optimize d	233.1644	- 12.924895	797.03254	1427.9251	0	272.27
29	Optimize d	234.6	-12.68995	776.56892	1371.6029	0	268.91
30	Optimize	236.1893	-12.42985	753.87963	1311.1169	0	265.18

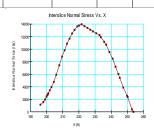
6

	d						
31	Optimize d	237.801	- 11.992395	719.95513	1279.4872	0	261.4
32	Optimize d	239.8458	-11.31036	668.78492	1169.9097	0	256.61
33	Optimize d	241.764	- 10.499015	609.88175	1096.265	0	252.12
34	Optimize d	243.55555	-9.558365	543.1659	964.36533	0	247.92
35	Optimize d	244.82565	- 8.8208115	491.33751	905.85869	0	244.94
36	Optimize d	246.3372	-7.74175	416.85439	785.22069	0	241.4
37	Optimize d	248.6116	- 6.1180835	304.77355	614.27783	0	236.07
38	Optimize d	249.9296	-5.153125	238.50089	537.55033	0	232.98
39	Optimize d	251.48545	- 3.8353255	140.87387	522.89065	0	500
40	Optimize d	253.32445	-2.277674	27.355986	257.40086	0	375

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	14609	196.2812	1.2	263.55185	534.95797	0	375
2	14609	198.19115	- 0.187659 8	304.54502	735.60705	0	375
3	14609	199.5	- 1.138590 8	331.13874	841.29676	0	375
4	14609	200.25	- 1.683497 5	259.19286	841.83071	0	375
5	14609	200.7	- 2.010441	275.59163	878.32951	0	375

30	14609	244.33335	-9.251649	520.55572	962.23229	0	246.09
31	14609	246.03085	-8.018316	435.59332	815.42298	0	242.12
32	14609	247.6926	6.810989 5	352.40547	687.81992	0	238.22
33	14609	249.35435	-5.603663	269.24684	560.16818	0	234.33
34	14609	250.9879	-4.416829	183.47024	546.08678	0	500
35	14609	252.59325	- 3.250486 5	96.66885	399.57668	0	500
36	14609	253.92465	- 2.283156	26.482244	220.60376	0	375





			5				
6	14609	200.95	- 2.192077 5	284.57172	897.52344	0	375
7	14609	201.52225	- 2.607833 5	305.00099	941.95013	0	375
8	14609	203.42965	-3.993631	373.94777	1050.8502	0	500
9	14609	205.5861	-5.560387	454.88849	1259.2466	0	336.91
10	14609	207.1287	-6.681161	517.01433	1359.206	0	333.29
11	14609	208.7875	- 7.886354 5	584.13297	1444.7902	0	329.4
12	14609	210.5625	9.175967 5	656.19244	1515.8925	0	325.24
13	14609	212.3375	- 10.46558 2	728.57097	1586.9948	0	321.08
14	14609	214.1125	- 11.75519 5	801.17738	1658.1427	0	316.92
15	14609	215.83335	-12.4	834.17983	1903.2596	0	312.89
16	14609	217.5	-12.4	827.45983	1859.0996	0	308.98
17	14609	219.16665	-12.4	820.73984	1814.9996	0	305.08
18	14609	220.875	-12.4	813.82857	1757.2	0	301.07
19	14609	222.625	-12.4	806.74286	1685.7143	0	296.97
20	14609	224.375	-12.4	799.71429	1614.2857	0	292.87
21	14609	226.125	-12.4	792.62857	1542.8571	0	288.77
22	14609	227.85	-12.4	785.70588	1472.8235	0	284.73
23	14609	229.925	-12.4	777.34694	1409.9184	0	279.86
24	14609	232.375	-12.4	767.42857	1352.6122	0	274.12
25	14609	234.6	-12.4	758.45	1301.1	0	268.91
26	14609	236.7	-12.4	749.95455	1255.8636	0	263.98
27	14609	238.9	-12.4	741.04545	1211.1818	0	258.83
28	14609	240.86665	-11.77033	693.48309	1294.2715	0	254.22
29	14609	242.6	-10.51099	607.13609	1128.2519	0	250.16

10

R15B Slope Stability Global Entry & Exit

File Information

Created By: USACE St. Louis District Revision Number: 700 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 7:40:46 AM

File Name: 17thReach15B.gsz

Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/27/2013

Last Solved Time: 7:42:42 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global Entry & Exit

Kind: SLOPE/W

Parent: Seepage Analysis (Gap)

Method: Spencer

PWP Conditions Source: Parent Analysis

Direction of movement: Left to Right Use Passive Mode: No

Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1

Optimize Critical Slip Surface Location: Yes

Tension Crack

Tension Crack Option: Tension Crack Line

Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf

FOS Distribution FOS Calculation Option: Constant Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

FILL top, EL. +6.5 to 2 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0°

Phi-B: 0°

MARSH, EL. -5 to -13 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0

Phi-B: 0 °

BEACH SAND, EL. -13 to -46

Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi-B: 0°

BAY SOUND CLAY, EL. -46 to -70

Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0)

Unit Weight: 0.1 pcf Cohesion: 0.01 psf

FILL middle, EL. 2 to -3 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf

Phi-B: 0 °

FILL bottom, EL. -3 to -5 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf

Cohesion: 500 psf Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (166.55099, -1.39393) ft Left-Zone Right Coordinate: (208.2, 7.23058) ft Left-Zone Increment: 20

Right Projection: Range

Right-Zone Left Coordinate: (224.7, 2.82143) ft

Right-Zone Right Coordinate: (304.9, -3) ft Right-Zone Increment: 20

Radius Increments: 20

Slip Surface Limits

Left Coordinate: (67.1, -15.6) ft Right Coordinate: (310, -3) ft

Tension Crack Line

	X (ft)	Y (ft)
	184	-0.5
Г	196	1
Г	200	1

Cohesion Functions

MARSH 1

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 200 Data Points: X (ft), Cohesion (psf) Data Point: (157, 200) Data Point: (200, 350) Data Point: (264, 200)

Unit Weight Functions

Clay

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 104 Data Points: X (ft), Unit Weight (pcf)
Data Point: (67.2, 104) Data Point: (157.5, 104) Data Point: (200, 102) Data Point: (264, 104) Data Point: (310, 104)

Spatial Functions

Clay

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (67.2, -46, 520)
Data Point: (67.2, -70, 740)
Data Point: (157.5, -46, 520) Data Point: (157.5, -70, 740) Data Point: (200, -46, 735) Data Point: (200, -70, 945) Data Point: (264, -46, 520) Data Point: (264, -70, 740) Data Point: (310, -46, 520) Data Point: (310, -70, 740)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	7,8,9,35,4,21	4.275
Region 2	FILL top, EL. +6.5 to 2	11,4,35,9,5,40,23	97.81
Region 3	BEACH SAND, EL13 to -46	18,17,1,2,3,39,31,28,15,16	7921.135
Region 4	FILL top, EL. +6.5 to 2	19,20,34,21,4,11,36	82.845
Region 5	BAY SOUND CLAY, EL46 to -70	16,33,32,18	5829.6
Region 6	MARSH, EL5 to -13	13,39,31,28,15,14,27,22,30,37	1436.19
Region 7	FILL bottom, EL3 to -5	12,10,29,38,37,30,22,27,14,6,26,25,24	267.885
Region 8	FILL bottom, EL3 to -5	42,12,10,29,38	89.578
Region 9	FILL middle, EL. 2 to -3	42,43,41,12	92.934
Region 10	FILL middle, EL. 2 to -3	43,36,11,41	36
Region 11	FILL middle, EL. 2 to -3	41,11,23,45,44	47.86
Region 12	FILL middle, EL. 2 to -3	12,41,44,46,47,48,24	146.875

Points

	X (ft)	Y (ft)
Point 1	67.1	-15.6
Point 2	101.1	-14.9
Point 3	117.4	-13.3
Point 4	200	7.3
Point 5	207.9	7.3
Point 6	310	-3
Point 7	200	13
Point 8	200.5	13
Point 9	201	7.3
Point 10	200	-4.5
Point 11	200	2
Point 12	200	-3
Point 13	138.2	-6.3
Point 14	310	-5
Point 15	310	-13
Point 16	310	-46
Point 17	67.1	-18
Point 18	67.1	-46

Point 19	179.1	3.1
Point 20	190.3	6.7
Point 21	200	7.5
Point 22	200	-5
Point 23	227	2
Point 24	264.2	-2.6
Point 25	275.1	-2.6
Point 26	296.4	-3
Point 27	264.2	-5
Point 28	264.2	-13
Point 29	160.3	-4.5
Point 30	160.3	-5
Point 31	160.3	-13
Point 32	67.1	-70
Point 33	310	-70
Point 34	199	7.5
Point 35	200.9	7.3
Point 36	178.2	2
Point 37	145.7	-5
Point 38	148.6	-4.5
Point 39	118.3	-13
Point 40	220	4.5
Point 41	200	0.4
Point 42	162.46	-2.11
Point 43	176.8	0.4
Point 44	233.6	0.4
Point 45	228.7	1.4
Point 46	235.6	0
Point 47	245.2	-1.7
Point 48	254.5	-1.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.79	(229.296,	25.86928	(197.198,	(259.345, -

			39.058)		7.3343)	2.24963)
2	4168	1.84	(229.296,	51.83	(194.338,	(260.492, -
2	4100	1.84	39.058)	31.83	7.07134)	2.33241)

Slices of Slip Surface: Optimized

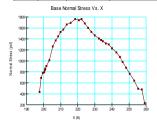
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	197.5618	0.7	276.62997	437.90644	0	375
2	Optimize d	198.4628	- 0.0429629 5	299.26845	691.05922	0	375
3	Optimize d	199.5	- 0.8982254 5	323.63166	784.87255	0	375
4	Optimize d	200.25	-1.516675	249.86606	793.32822	0	375
5	Optimize d	200.6589	- 1.8538375	267.03268	830.71978	0	375
6	Optimize d	200.8589	- 2.0183975	275.31217	850.32934	0	375
7	Optimize d	200.95	- 2.0927375	279.03625	858.13798	0	375
8	Optimize d	201.5232	-2.56039	302.36366	907.96472	0	375
9	Optimize d	203.25775	-3.97552	373.75167	1011.106	0	500
10	Optimize d	205.3397	-5.576006	457.02509	1263.7801	0	337.49
11	Optimize d	207.05515	- 6.7823325	523.60862	1372.4394	0	333.46
12	Optimize d	208.49195	- 7.7927065	579.63514	1448.4142	0	330.1
13	Optimize d	209.89135	-8.686835	628.81385	1526.792	0	326.82
14	Optimize d	211.5063	-9.642565	681.09066	1572.7807	0	323.03

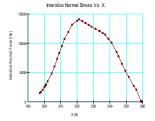
15	Optimize d	213.4606	- 10.602875	732.42452	1662.9352	0	318.45
16	Optimize d	215.7542	-11.56777	782.86034	1693.036	0	313.08
17	Optimize d	218.4505	- 12.397015	823.41498	1761.8605	0	306.76
18	Optimize d	220.5696	- 12.871285	844.33696	1743.1053	0	301.79
19	Optimize d	222.116	- 12.998535	846.02222	1762.9899	0	298.17
20	Optimize d	224.0696	-12.99809	838.13939	1683.189	0	293.59
21	Optimize d	226.0232	- 12.997645	830.25656	1603.3882	0	289.01
22	Optimize d	227.85	- 12.997225	822.88235	1529.1765	0	284.73
23	Optimize d	229.925	-12.99675	814.53061	1466.2041	0	279.86
24	Optimize d	232.375	-12.99619	804.65306	1408.8571	0	274.12
25	Optimize d	233.63455	-12.9959	799.56585	1379.4067	0	271.17
26	Optimize d	234.63455	- 12.970125	793.95854	1361.1088	0	268.83
27	Optimize d	236.33855	-12.92465	784.25746	1319.5937	0	264.83
28	Optimize d	238.0533	-12.74639	766.15743	1302.7457	0	260.81
29	Optimize d	240.00575	- 12.429285	738.40286	1231.9185	0	256.24
30	Optimize d	242.5227	-11.77255	686.85505	1155.8334	0	250.34
31	Optimize d	244.6317	-10.99887	629.50932	1074.0421	0	245.39
32	Optimize d	246.24805	- 10.215289	573.45338	981.32735	0	241.61
33	Optimize d	248.3441	- 9.1991255	500.73066	874.69026	0	236.69

34	Optimize d	250.44015	-8.182962	428.06805	768.09611	0	231.78
35	Optimize d	252.9941	- 6.7819015	329.42921	642.60829	0	225.8
36	Optimize d	255.28685	- 5.4223315	234.62215	494.69824	0	220.42
37	Optimize d	257.4775	- 3.7944395	115.96604	480.24845	0	500
38	Optimize d	259.11305	- 2.4413835	14.52052	231.27722	0	375

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	4168	194.55555	0.59614815	290.19928	298.7426	0	375
2	4168	195.8228	-0.4888475	322.02108	725.91574	0	375
3	4168	197.93645	-2.1863725	369.83924	938.75332	0	375
4	4168	199.5	-3.3463895	398.52102	1044.4332	0	500
5	4168	200.25	-3.8669005	386.04091	1051.3014	0	500
6	4168	200.7	-4.168383	402.16076	1090.4295	0	500
7	4168	200.95	-4.333358	408.63944	1110.8637	0	500
8	4168	201.4988	-4.683011	423.69892	1154.8272	0	500
9	4168	202.98135	-5.5799395	468.53799	1298.4295	0	343.01
10	4168	204.9488	-6.6835125	527.13614	1414.9538	0	338.4
11	4168	206.91625	-7.678222	579.53103	1521.3492	0	333.79
12	4168	209.11	-8.661163	630.56895	1597.2967	0	328.65
13	4168	211.53	-9.614704	679.26128	1640.762	0	322.98
14	4168	213.95	-10.431595	719.8217	1670.7694	0	317.3
15	4168	216.37	-11.11853	752.49618	1688.0644	0	311.63
16	4168	218.79	-11.680805	777.55451	1693.0505	0	305.96
17	4168	221.16665	-12.1167	795.05831	1669.9865	0	300.39
18	4168	223.5	-12.433375	805.29933	1619.3718	0	294.92
19	4168	225.83335	-12.64286	808.95867	1557.8377	0	289.45
20	4168	227.85	-12.74474	807.1558	1496.9456	0	284.73
21	4168	229.925	-12.75361	799.36984	1445.9754	0	279.86

2	2 4168	232.375	-12.66584	784.04098	1392.9633	0	274.12
2	3 4168	234.6	-12.49004	764.06649	1335.5994	0	268.91
2	4 4168	236.8	-12.211525	737.72411	1272.1969	0	263.75
2	5 4168	239.2	-11.80223	702.30917	1195.2589	0	258.13
2	6 4168	241.6	-11.275225	659.37767	1106.3832	0	252.5
2	7 4168	244	-10.626765	608.65615	1005.1576	0	246.88
2	8 4168	246.3625	-9.8661245	550.92682	914.15028	0	241.34
2	9 4168	248.6875	-8.991461	486.20091	833.44169	0	235.89
3	0 4168	251.0125	-7.985681	413.31383	739.42719	0	230.44
3	1 4168	253.3375	-6.840136	331.74861	631.13466	0	224.99
3	2 4168	255.5476	-5.6156115	245.7762	507.77317	0	219.81
3	3 4168	257.4712	-4.432491	160.07025	489.52801	0	500
3	4 4168	259.2232	-3.245266	69.969367	350.13108	0	500
3	5 4168	260.2956	-2.4789815	11.28179	199.90272	0	375





Slope Stability Global Entry & Exit

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File Information

Created By: USACE St. Louis District Revision Number: 717 Last Edited By: Goetz, Ryan MVS Date: 7/30/2014 Time: 11:46:04 AM File Name: 17thReach15B.gsz Directory: C:\Users\B3ECGANG\Desktop\ Last Solved Date: 7/30/2014 Last Solved Time: 11:46:28 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Slope Stability Global Entry & Exit Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer Settings PWP Conditions Source: Parent Analysis Slip Surface Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: Tension Crack Line Percentage Wet: 1 Tension Crack Fluid Unit Weight: 62.4 pcf FOS Distribution

FILL middle, EL. 2 to -3 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi: 0 * Phi-B: 0 * FILL bottom, EL. -3 to -5 Model: Spatial Mohr-Coulomb

Cohesion: 0.01 psf

FILL bottom, EL. -3 to -5 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 ° Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (166.55099, -1.39393) ft Left-Zone Right Coordinate: (208.2, 7.23058) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (224.7, 2.82143) ft Right-Zone Right Coordinate: (304.9, -3) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (67.1, -15.6) ft Right Coordinate: (310, -3) ft

Tension Crack Line

	X (ft)	Y (ft)
Г	179.1	1.1
Г	190.3	4.7
Г	199	5.5

Cohesion Functions

MARSH 1

Model: Spline Data Point Function

```
Advanced
          Number of Slices: 30
          Optimization Tolerance: 0.01
          Minimum Slip Surface Depth: 0.1 ft
          Optimization Maximum Iterations: 2000
          Optimization Convergence Tolerance: 1e-007
          Starting Optimization Points: 8
Ending Optimization Points: 16
          Complete Passes per Insertion:
          Driving Side Maximum Convex Angle: 5
          Resisting Side Maximum Convex Angle: 1 °
Materials
FILL top, EL. +6.5 to 2
    Model: Spatial Mohr-Coulomb
     Unit Weight: 114 pcf
     Cohesion: 800 psf
     Phi: 0°
    Phi-B: 0 °
MARSH, EL. -5 to -13
    Model: Spatial Mohr-Coulomb
     Unit Weight: 94 pcf
     Cohesion Fn: MARSH 1
     Phi: 0 °
    Phi-B: 0 °
BEACH SAND, EL. -13 to -46
    Model: Mohr-Coulomb
Unit Weight: 122 pcf
     Cohesion: 0 psf
     Phi: 30 °
     Phi-B: 0 °
BAY SOUND CLAY, EL. -46 to -70
     Model: Spatial Mohr-Coulomb
     Weight Fn: Clay
     Cohesion Spatial Fn: Clay
     Phi: 0
     Phi-B: 0 °
Sheet Pile
     Model: Undrained (Phi=0)
    Unit Weight: 0.1 pcf
```

FOS Calculation Option: Constant

```
Function: Cohesion vs. X

Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 200
Data Points: X (ft), Cohesion (psf)
Data Point: (157, 200)
Data Point: (200, 350)
Data Point: (264, 200)
```

Unit Weight Functions

Clay

Model: Spline Data Point Function
Function: Unit Weight vs. X

Curve Fit to Data: 100 %

Segment Curvature: 0 %
V-Intercept: 104

Data Points: X (ft), Unit Weight (pcf)

Data Points: (67.2, 104)

Data Point: (157.5, 104)

Data Point: (200, 102)

Data Point: (264, 104)

Data Point: (264, 104)

Spatial Functions

Clay

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (67.2, -46, 520)
Data Point: (12.2, -70, 740)
Data Point: (157.5, -46, 520)
Data Point: (157.5, -46, 520)
Data Point: (200, -46, 735)
Data Point: (200, -70, 945)
Data Point: (264, -70, 740)
Data Point: (310, -46, 520)
Data Point: (310, -46, 520)
Data Point: (310, -70, 740)

Regions

Material	Points	Area (ft²)

Region 1	Sheet Pile	7,8,9,35,4,21	4.275
Region 2	FILL top, EL. +6.5 to 2	11,4,35,9,5,40,23	97.81
Region 3	BEACH SAND, EL13 to -46	18,17,1,2,3,39,31,28,15,16	7921.135
Region 4	FILL top, EL. +6.5 to 2	19,20,34,21,4,11,36	82.845
Region 5	BAY SOUND CLAY, EL46 to -70	16,33,32,18	5829.6
Region 6	MARSH, EL5 to -13	13,39,31,28,15,14,27,22,30,37	1436.19
Region 7	FILL bottom, EL3 to -5	12,10,29,38,37,30,22,27,14,6,26,25,24	267.885
Region 8	FILL bottom, EL3 to -5	42,12,10,29,38	89.578
Region 9	FILL middle, EL. 2 to -3	42,43,41,12	92.934
Region 10	FILL middle, EL. 2 to -3	43,36,11,41	36
Region 11	FILL middle, EL. 2 to -3	41,11,23,45,44	47.86
Region 12	FILL middle, EL. 2 to -3	12,41,44,46,47,48,24	146.875

Points

	X (ft)	Y (ft)
Point 1	67.1	-15.6
Point 2	101.1	-14.9
Point 3	117.4	-13.3
Point 4	200	7.3
Point 5	207.9	7.3
Point 6	310	-3
Point 7	200	13
Point 8	200.5	13
Point 9	201	7.3
Point 10	200	-4.5
Point 11	200	2
Point 12	200	-3
Point 13	138.2	-6.3
Point 14	310	-5
Point 15	310	-13
Point 16	310	-46
Point 17	67.1	-18
Point 18	67.1	-46
Point 19	179.1	3.1
Point 20	190.3	6.7

Point 22	200	-5
Point 23	227	2
Point 24	264.2	-2.6
Point 25	275.1	-2.6
Point 26	296.4	-3
Point 27	264.2	-5
Point 28	264.2	-13
Point 29	160.3	-4.5
Point 30	160.3	-5
Point 31	160.3	-13
Point 32	67.1	-70
Point 33	310	-70
Point 34	199	7.5
Point 35	200.9	7.3
Point 36	178.2	2
Point 37	145.7	-5
Point 38	148.6	-4.5
Point 39	118.3	-13
Point 40	220	4.5
Point 41	200	0.4
Point 42	162.46	-2.11
Point 43	176.8	0.4
Point 44	233.6	0.4
Point 45	228.7	1.4
Point 46	235.6	0
Point 47	245.2	-1.7
Point 48	254.5	-1.9

Point 21 200

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.86	(221.445, 35.695)	28.33773	(185.606, 5.19117)	(252.042, - 1.84715)
2	3244	1.91	(221.445,	48.685	(185.291,	(252.432, -

		35.695)	5.08983)	1.85552)
_				

Slices of Slip Surface: Optimized

Les of S	Slip Surrac	e: Optimize			Base	Friction	Cohesiv
	Surface	X (ft)	Y (ft)	PWP (psf)	Normal Stress (psf)	Strengt h (psf)	Strengt h (psf)
1	Optimize d	186.3085	2.625885	327.8185	189.62507	0	800
2	Optimize d	188.2065	1.28867	356.22351	589.32538	0	375
3	Optimize d	189.48415	0.45837	374.81623	684.7566	0	375
4	Optimize d	189.9332	0.1396083	382.18541	726.48018	0	375
5	Optimize d	191.4396	-0.9297517	407.13932	855.77966	0	375
6	Optimize d	193.2958	-2.2983825	441.10377	993.36747	0	375
7	Optimize d	195.06355	-3.6790225	475.53408	1105.2184	0	500
8	Optimize d	196.3894	-4.714555	501.32399	1222.534	0	500
9	Optimize d	197.83205	-5.711394	543.45603	1409.0589	0	342.44
10	Optimize d	199.4228	-6.776864	598.24533	1509.3201	0	347.99
11	Optimize d	199.9228	-7.0942485	614.75422	1604.3889	0	349.73
12	Optimize d	200.25	-7.239187	621.77075	1481.3365	0	349.41
13	Optimize d	200.7	-7.4385185	631.49449	1511.6598	0	348.36
14	Optimize d	200.95	-7.549258	636.90267	1521.5115	0	347.77
15	Optimize d	202.15	-8.080809	662.87822	1570.3555	0	344.96
16	Optimize d	204.45	-9.0996145	713.68232	1663.9734	0	339.57

17	Optimize d	206.75	-10.118419	765.36099	1757.5913	0	334.18
18	Optimize d	208.5459	-10.913935	806.14682	1814.2196	0	329.97
19	Optimize d	210.1042	-11.493875	834.91821	1865.2384	0	326.32
20	Optimize d	211.929	-12.081525	863.1383	1872.6977	0	322.04
21	Optimize d	213.85835	-12.530185	882.39083	1917.5499	0	317.52
22	Optimize d	215.89225	-12.83986	892.69527	1893.49	0	312.75
23	Optimize d	218.4546	-12.993585	891.07793	1888.1172	0	306.75
24	Optimize d	220.9452	-12.99179	880.1405	1808.4724	0	300.91
25	Optimize d	223.1678	-12.991705	870.43655	1717.388	0	295.7
26	Optimize d	225.7226	-12.9929	859.39855	1613.2315	0	289.71
27	Optimize d	227.85	-12.993895	850.17647	1526.9412	0	284.73
28	Optimize d	230.34525	-12.99506	839.4063	1454.3206	0	278.88
29	Optimize d	232.79525	-12.84121	819.08647	1432.181	0	273.14
30	Optimize d	234.6	-12.49445	789.5087	1356.2914	0	268.91
31	Optimize d	235.9474	-12.235565	767.29951	1300.8924	0	265.75
32	Optimize d	237.4249	-11.73148	729.08281	1269.2313	0	262.29
33	Optimize d	239.68515	-10.856795	663.76656	1136.0818	0	256.99
34	Optimize d	241.91095	-9.7584	584.18363	1029.8918	0	251.77
35	Optimize d	244.1023	-8.4363	490.21255	851.20998	0	246.64

36	Optimize d	245.199	-7.7743965	443.06707	810.89705	0	244.06
37	Optimize d	246.91375	-6.3249515	342.81151	657.16866	0	240.05
38	Optimize d	249.8646	-3.7789845	151.73197	520.28611	0	500
39	Optimize d	251.5721	-2.2643795	32.17495	260.89861	0	375

	Slip Surfac	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strength	Cohesiv e Strengt
	e				Stress (psr)	(psf)	h (psf)
1	3244	185.79735	2.544915	334.68392	76.089878	0	800
2	3244	187.10775	1.2	367.12073	505.47941	0	375
3	3244	189.1057	-0.6623065	412.10321	759.35975	0	375
4	3244	190.9709	-2.263228	451.70994	976.86647	0	375
5	3244	192.8084	-3.6509215	485.72707	1113.9807	0	500
6	3244	194.34815	-4.75	512.2569	1259.2412	0	500
7	3244	195.791	-5.6634935	551.98318	1414.159	0	335.32
8	3244	197.93035	-6.917256	615.03328	1553.9126	0	342.78
9	3244	199.5	-7.7600255	657.33625	1648.1609	0	348.26
10	3244	200.25	-8.1334225	675.987	1552.2278	0	349.41
11	3244	200.7	-8.3485205	686.69175	1587.6552	0	348.36
12	3244	200.95	-8.465927	692.5159	1600.172	0	347.77
13	3244	202.15	-8.985745	717.95965	1657.4502	0	344.96
14	3244	204.45	-9.910899	763.41289	1760.5594	0	339.57
15	3244	206.75	-10.703655	801.33698	1851.1204	0	334.18
16	3244	209.11	-11.384885	832.60083	1900.1638	0	328.65
17	3244	211.53	-11.953675	856.97468	1907.2875	0	322.98
18	3244	213.95	-12.39403	873.58638	1901.6713	0	317.3
19	3244	216.37	-12.70947	882.55976	1883.6846	0	311.63
20	3244	218.79	-12.902425	883.97134	1853.5588	0	305.96
21	3244	221.16665	-12.975185	878.12868	1795.6424	0	300.39
22	3244	223.5	-12.93254	865.32726	1710.2299	0	294.92
23	3244	225.83335	-12.7776	845.49893	1613.3583	0	289.45

24	3244	227.85	-12.55914	823.0743	1521.3026	0	284.73
25	3244	229.925	-12.229545	793.42878	1437.6249	0	279.86
26	3244	232.375	-11.73045	751.44339	1344.9059	0	274.12
27	3244	234.6	-11.167395	706.24957	1250.0776	0	268.91
28	3244	236.8	-10.48768	653.61002	1147.722	0	263.75
29	3244	239.2	-9.618489	587.85762	1025.9673	0	258.13
30	3244	241.6	-8.602284	512.44787	889.16077	0	252.5
31	3244	244	-7.428631	426.69957	736.06322	0	246.88
32	3244	246.68405	-5.900491	316.75714	570.08795	0	240.58
33	3244	249.7864	-3.839861	156.64973	466.30313	0	500
34	3244	251.9181	-2.2676185	31.678267	235.48507	0	375

Slope Stability Global Block Report generated using GeoStudio 2007, version 7.22. Copyright © 1991-2013 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 714 Last Edited By: Goetz, Ryan MVS Date: 7/30/2014 Time: 10:55:48 AM File Name: 17thReach15B.gsz Directory: C:\Users\B3ECGANG\Desktop\
Last Solved Date: 7/30/2014 Last Solved Time: 10:56:38 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

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Slope Stability Global Block
     Kind: SLOPE/W
Parent: Seepage Analysis (Gap)
     Method: Spencer
     Settings
           PWP Conditions Source: Parent Analysis
     Slip Surface
           Direction of movement: Left to Right
           Use Passive Mode: No
           Slip Surface Option: Block
           Critical slip surfaces saved: 1
           Optimize Critical Slip Surface Location: Yes
           Tension Crack
Tension Crack Option: Tension Crack Line
                Percentage Wet: 1
                Tension Crack Fluid Unit Weight: 62.4 pcf
     FOS Distribution
```

```
Cohesion: 0.01 psf
FILL middle, EL. 2 to -3
    Model: Spatial Mohr-Coulomb
    Unit Weight: 114 pcf
    Cohesion: 375 psf
    Phi-B: 0 °
FILL bottom, EL. -3 to -5
    Unit Weight: 114 pcf
    Cohesion: 500 psf
    Phi-B: 0 °
```

Unit Weight: 0.1 pcf

Slip Surface Limits

Left Coordinate: (67.1, -15.6) ft Right Coordinate: (310, -3) ft

Slip Surface Block

Left Grid Upper Left: (170, -4) ft Lower Left: (170, -46) ft Lower Right: (220, -46) ft X Increments: 10 Starting Angle: 135 Ending Angle: 180 ° Angle Increments: 5 Right Grid Upper Left: (225, -4) ft Lower Left: (225, -46) ft Lower Right: (285, -46) ft X Increments: 12 Y Increments: 10 Starting Angle: 0 Angle Increments: 5

```
Restrict Block Crossing: Yes
     Advanced
          Number of Slices: 30
          Optimization Tolerance: 0.01
          Minimum Slip Surface Depth: 0.1 ft
          Optimization Maximum Iterations: 2000
          Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
          Ending Optimization Points: 16
          Complete Passes per Insertion: 1
          Driving Side Maximum Convex Angle: 5 °
          Resisting Side Maximum Convex Angle: 1 °
Materials
FILL top, EL. +6.5 to 2
    Model: Spatial Mohr-Coulomb
Unit Weight: 114 pcf
     Cohesion: 800 psf
     Phi: 0°
     Phi-B: 0 °
MARSH, EL. -5 to -13
    Model: Spatial Mohr-Coulomb
     Unit Weight: 94 pcf
     Cohesion Fn: MARSH 1
     Phi: 0
     Phi-B: 0 °
BEACH SAND, EL. -13 to -46
    Model: Mohr-Coulomb
     Unit Weight: 122 pcf
    Cohesion: 0 psf
Phi: 30 °
    Phi-B: 0 °
BAY SOUND CLAY, EL. -46 to -70
    Model: Spatial Mohr-Coulomb
     Weight Fn: Clay
     Cohesion Spatial Fn: Clav
     Phi-B: 0 °
Sheet Pile
    Model: Undrained (Phi=0)
```

FOS Calculation Option: Constant

Cohesion Functions

MARSH 1 Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 200 Data Points: X (ft), Cohesion (psf) Data Point: (157, 200) Data Point: (200, 350) Data Point: (264, 200)

Unit Weight Functions

```
Clay
     Model: Spline Data Point Function
     Function: Unit Weight vs. X
           Curve Fit to Data: 100 %
           Segment Curvature: 0 %
     Y-Intercept: 104
     Data Points: X (ft), Unit Weight (pcf)
           Data Point: (67.2, 104)
          Data Point: (157.5, 104)
Data Point: (200, 102)
           Data Point: (264, 104)
           Data Point: (310, 104)
```

Spatial Functions

```
Clay
        Model: Linear Interpolation
        Limit Range By: Data Values
        Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (67.2, -46, 520)
Data Point: (67.2, -70, 740)
Data Point: (157.5, -46, 520)
                 Data Point: (157.5, -70, 740)
                Data Point: (200, -46, 735)
Data Point: (200, -70, 945)
                 Data Point: (264, -46, 520)
                 Data Point: (264, -70, 740)
                Data Point: (310, -46, 520)
Data Point: (310, -70, 740)
```

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	7,8,9,35,4,21	4.275
Region 2	FILL top, EL. +6.5 to 2	11,4,35,9,5,40,23	97.81
Region 3	BEACH SAND, EL13 to -46	18,17,1,2,3,39,31,28,15,16	7921.135
Region 4	FILL top, EL. +6.5 to 2	19,20,34,21,4,11,36	82.845
Region 5	BAY SOUND CLAY, EL46 to -70	16,33,32,18	5829.6
Region 6	MARSH, EL5 to -13	13,39,31,28,15,14,27,22,30,37	1436.19
Region 7	FILL bottom, EL3 to -5	12,10,29,38,37,30,22,27,14,6,26,25,24	267.885
Region 8	FILL bottom, EL3 to -5	42,12,10,29,38	89.578
Region 9	FILL middle, EL. 2 to -3	42,43,41,12	92.934
Region 10	FILL middle, EL. 2 to -3	43,36,11,41	36
Region 11	FILL middle, EL. 2 to -3	41,11,23,45,44	47.86
Region 12	FILL middle, EL. 2 to -3	12,41,44,46,47,48,24	146.875

Points

	X (ft)	Y (ft)
Point 1	67.1	-15.6
Point 2	101.1	-14.9
Point 3	117.4	-13.3
Point 4	200	7.3
Point 5	207.9	7.3
Point 6	310	-3
Point 7	200	13
Point 8	200.5	13
Point 9	201	7.3
Point 10	200	-4.5
Point 11	200	2
Point 12	200	-3
Point 13	138.2	-6.3
Point 14	310	-5
Point 15	310	-13
Point 16	310	-46
Point 17	67.1	-18
Point 18	67.1	-46

I				2.506)		1.49024)	2.48002)
	2	13756	2.06	(221.136, 2.506)	34.091	(177.749, 1.48492)	(264.234, -2.6)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesi ve Strengt h (psf)
1	Optimiz ed	177.977	1.4067345	478.93925	394.74538	0	375
2	Optimiz ed	178.65	1.1547256	471.1531	464.87855	0	375
3	Optimiz ed	179.8828	0.6931126	455.71109	584.8401	0	375
4	Optimiz ed	181.9892	-0.095615	452.18934	707.25781	0	375
5	Optimiz ed	184.4278	-1.120952	458.82503	836.35929	0	375
6	Optimiz ed	186.7128	-2.206507	474.90727	993.4722	0	375
7	Optimiz ed	189.0914	-3.4695575	499.28195	1110.539	0	500
8	Optimiz ed	190.5762	-4.3383875	518.36383	1229.0262	0	500
9	Optimiz ed	191.27965	-4.75	527.56819	1277.1534	0	500
10	Optimiz ed	191.945	-5.139325	540.29571	1364.9128	0	321.9
11	Optimiz ed	193.3778	-5.896045	578.15138	1456.5697	0	326.9
12	Optimiz ed	195.7672	-7.130835	639.34991	1577.4795	0	335.23
13	Optimiz ed	197.98095	-8.276534	696.37859	1689.1765	0	342.96
14	Optimiz ed	199.4999	-9.063999	736.10921	1764.6411	0	348.26
15	Optimiz ed	199.9999	-9.3231885	749.27591	1855.0906	0	350

Point 19	179.1	3.1
Point 20	190.3	6.7
Point 21	200	7.5
Point 22	200	-5
Point 23	227	2
Point 24	264.2	-2.6
Point 25	275.1	-2.6
Point 26	296.4	-3
Point 27	264.2	-5
Point 28	264.2	-13
Point 29	160.3	-4.5
Point 30	160.3	-5
Point 31	160.3	-13
Point 32	67.1	-70
Point 33	310	-70
Point 34	199	7.5
Point 35	200.9	7.3
Point 36	178.2	2
Point 37	145.7	-5
Point 38	148.6	-4.5
Point 39	118.3	-13
Point 40	220	4.5
Point 41	200	0.4
Point 42	162.46	-2.11
Point 43	176.8	0.4
Point 44	233.6	0.4
Point 45	228.7	1.4
Point 46	235.6	0
Point 47	245.2	-1.7
Point 48	254.5	-1.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.94	(221.136,	33.91197	(177.754,	(262.537, -

16	Optimiz ed	200.25	-9.3981515	752.58019	1724.4993	0	349.41
17	Optimiz ed	200.7	-9.5330335	758.53347	1748.8537	0	348.36
18	Optimiz ed	200.95	-9.607968	761.8336	1755.5354	0	347.77
19	Optimiz ed	202.725	-10.140003	785.64079	1804.8415	0	343.61
20	Optimiz ed	206.175	-11.174095	832.84143	1900.8253	0	335.53
21	Optimiz ed	208.9148	-11.99531	871.11862	1950.8488	0	329.11
22	Optimiz ed	211.9536	-12.61304	895.87968	1974.6313	0	321.98
23	Optimiz ed	215.4832	-12.905385	898.55285	1961.774	0	313.71
24	Optimiz ed	218.4944	-12.862955	882.81323	1877.9622	0	306.65
25	Optimiz ed	220.8404	-12.8299	870.51602	1800.5815	0	301.16
26	Optimiz ed	221.79415	-12.818435	865.66245	1755.5365	0	298.92
27	Optimiz ed	223.1056	-12.90066	865.03771	1691.5618	0	295.85
28	Optimiz ed	225.65185	-12.97848	858.80269	1614.9096	0	289.88
29	Optimiz ed	227.85	-12.971915	848.81953	1524.9928	0	284.73
30	Optimiz ed	230.77945	-12.963165	835.5116	1441.2984	0	277.86
31	Optimiz ed	233.22945	-12.959215	824.6037	1381.5131	0	272.12
32	Optimiz ed	234.6	-12.9676	819.13485	1350.725	0	268.91
33	Optimiz ed	236.6737	-12.98029	810.92131	1307.2812	0	264.05
34	Optimiz ed	238.8211	-12.99343	802.39951	1264.9981	0	259.01

35	Optimiz ed	241.24885	-13.008285	792.74525	1217.1625	245.03741	0
36	Optimiz ed	243.90145	-12.570015	753.43501	1198.4248	0	247.11
37	Optimiz ed	246.4913	-11.679405	685.49982	1080.9594	0	241.04
38	Optimiz ed	249.46195	-10.4535	594.48571	977.92562	0	234.07
39	Optimiz ed	252.82065	-8.8897985	480.39304	814.78956	0	226.2
40	Optimiz ed	255.57745	-7.606314	386.90847	674.44999	0	219.74
41	Optimiz ed	257.9935	-6.05234	277.74238	551.27378	0	214.08
42	Optimiz ed	260.8512	-3.8057	108.72572	411.38272	0	500
43	Optimiz ed	262.45385	-2.545711	5.4231445	185.68437	0	375

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	13756	177.97465	1.370102	480.44284	373.35047	0	375
2	13756	178.65	1.0259956	475.6389	453.02714	0	375
3	13756	179.4893	0.59835455	466.95742	562.15933	0	375
4	13756	181.38275	-0.3664005	467.08156	699.1118	0	375
5	13756	184.39105	-1.8992015	482.06845	916.68829	0	375
6	13756	187.6953	-3.582801	510.29436	1130.3989	0	500
7	13756	189.8977	-4.704988	533.0937	1289.741	0	500
8	13756	190.38835	-4.954988	538.33907	1326.8104	0	500
9	13756	191.89725	-5.723808	575.1654	1440.2342	0	321.73
10	13756	194.73835	-7.171424	646.98267	1582.238	0	331.65
11	13756	197.57945	-8.6190395	719.01947	1724.2731	0	341.56
12	13756	199.5	-9.59761	768.36855	1818.7229	0	348.26
13	13756	200.25	-9.9797565	787.828	1717.4151	0	349.41
14	13756	200.7	-10.209045	799.56697	1750.2932	0	348.36

15	13756	200.95	-10.336425	806.08486	1761.6094	0	347.77
16	13756	203	-11.38095	859.99949	1857.0358	0	342.97
17	13756	206.45	-12.4	906.89655	2110.3103	0	334.88
18	13756	209.4125	-12.4	893.85124	2070.1488	0	327.94
19	13756	212.4375	-12.4	880.56198	1990.0826	0	320.85
20	13756	215.4625	-12.4	867.33884	1910.0165	0	313.76
21	13756	218.4875	-12.4	854.08264	1829.9504	0	306.67
22	13756	221.75	-12.4	839.82857	1718.5429	0	299.02
23	13756	225.25	-12.4	824.54286	1575.7143	0	290.82
24	13756	227.85	-12.4	813.17647	1470.0588	0	284.73
25	13756	229.925	-12.4	804.08163	1407.1837	0	279.86
26	13756	232.375	-12.4	793.34694	1349.9592	0	274.12
27	13756	234.6	-12.4	783.55	1298.45	0	268.91
28	13756	237.16665	-12.4	772.27668	1243.7874	0	262.89
29	13756	240.3	-12.4	758.48944	1180.2767	0	255.55
30	13756	243.43335	-12.4	744.70221	1116.7342	0	248.2
31	13756	245.1	-12.349045	734.14498	1185.1726	0	244.3
32	13756	246.75	-11.50833	673.48603	1095.7082	0	240.43
33	13756	249.85	-9.9288035	559.40844	931.10191	0	233.16
34	13756	252.95	-8.3492725	445.44582	766.49562	0	225.9
35	13756	255.75585	-6.919631	342.49518	609.95402	0	219.32
36	13756	258.2675	-5.639877	250.34224	461.49191	0	213.44
37	13756	260.6925	-4.404278	154.38682	392.43525	0	500
38	13756	263.03085	-3.2128335	53.147751	231.06011	0	500
39	13756	264.2168	-2.6085555	0.65800802	149.34853	0	500

R16 Slope Stability Global (Block) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

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File Information
```

Created By: USACE St. Louis District Revision Number: 632 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 8:58:40 AM File Name: 17thReach16.gsz Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/27/2013 Last Solved Time: 9:02:26 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global (Block) Kind: SLOPE/W Parent: Seepage Analysis (Global) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: Tension Crack Line Percentage Wet: 1 Tension Crack Fluid Unit Weight: 62.4 pcf

FOS Distribution FOS Calculation Option: Constant Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 **Ending Optimization Points: 16** Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 °

Materials

FILL top, EL. +10.2 TO 4 Model: Spatial Mohr-Coulomb Unit Weight: 119 pcf Cohesion: 800 psf Phi-R: 0 ° MARSH, EL. -4 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion Fn: MARSH 1 Phi-B: 0 ° BEACH SAND, EL. -9 TO -46 Model: Shear/Normal Fn Unit Weight: 122 pcf Strength Function: Sand BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi-B: 0 ° Sheet Pile Model: Undrained (Phi=0)

```
Unit Weight: 0.1 pcf
     Cohesion: 0.01 psf
Fill (protected), EL. -3.1 TO -4
     Model: Spatial Mohr-Coulomb
     Weight Fn: Fill 2
```

Cohesion Fn: Fill Phi-B: 0 °

FILL bottom, EL. 4 TO -4 Unit Weight: 119 pcf Cohesion: 700 psf Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (45.2. -9.4) ft Right Coordinate: (310, -3.1) ft

Slip Surface Block

Left Grid Upper Left: (160, -4) ft Lower Left: (160, -48) ft Lower Right: (215, -48) ft X Increments: 10 Y Increments: 10 Starting Angle: 115 Ending Angle: 165 ° Angle Increments: 5 Right Grid Upper Left: (220, -4) ft Lower Left: (220, -48) ft Lower Right: (265, -48) ft X Increments: 10 Y Increments: 10 Starting Angle: 15 Angle Increments: 5

Tension Crack Line

X (ft) Y (ft)

Г	190	-1
Г	198	1.2
	201	1.2

Cohesion Functions

MARSH 1 Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 250 Data Points: X (ft), Cohesion (psf) Data Point: (167, 250) Data Point: (200, 400) Data Point: (244, 250) Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 600 Data Points: X (ft), Cohesion (psf) Data Point: (177.4, 600) Data Point: (200, 700) Data Point: (244, 600)

Shear/Normal Strength Functions

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (0, 0) Data Point: (10000, 5773) Estimation Properties
Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0

Unit Weight Functions

Fill 2

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 114
Data Points: X (ft), Unit Weight (pcf)
Data Point: (177.43556, 114)
Data Point: (200, 119) Data Point: (244, 114)

MARSH

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Segment Curvature. 0 70
Y-Intercept: 101
Data Points: X (ft), Unit Weight (pcf)
Data Point: (0, 101)
Data Point: (167, 101)
Data Point: (200, 100)
Data Point: (244, 101)
Data Point: (244, 101) Data Point: (400, 101)

Spatial Functions

Bay Sound Cohesion

Model: Linear Interpolation Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), V (ft), Cohesion (psf)
Data Point: (177.4, -46, 535)
Data Point: (177.4, -70, 770)
Data Point: (200, -46, 875)
Data Point: (200, -70, 1110)
Data Point: (244, -46, 535)
Data Point: (244, -70, 770)
Data Point: (45, -46, 535)
Data Point: (310, -46, 535)
Data Point: (45, -70, 770)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	3,10,11,12,20,34	2.625
Region 2	BEACH SAND, EL9 TO -46	15,14,13,19,29,1	9764
Region 3	Fill (protected), EL3.1 TO -4	7,21,22,8	59.4
Region 4	FILL top, EL. +10.2 TO 4	20,23,25,5,4,12	88.179645
Region 5	BAY SOUND CLAY, EL46 TO -70	32,13,14,33	6355.2
Region 6	MARSH, EL4 TO -9	28,24,21,22,19,29	840.75
Region 7	FILL bottom, EL. 4 TO -4	27,26,23,9	172.05221
Region 8	FILL top, EL. +10.2 TO 4	26,30,2,18,31,17,3,34,20,23	75.42177
Region 9	FILL bottom, EL. 4 TO -4	7,6,16,25,23,9,36	244.73286
Region 10	Fill (protected), EL3.1 TO -4	36,24,21,7	39.6
Region 11	Fill (protected), EL3.1 TO -4	35,36,24,28	41.535
Region 12	FILL bottom, EL. 4 TO -4	35,36,9,27	67.84

Points

	X (ft)	Y (ft)
Point 1	127.2	-9.4
Point 2	192.2	8.4
Point 3	200	10.2
Point 4	206.8	9.9
Point 5	219	5.5
Point 6	236.8	0
Point 7	244	-3.1
Point 8	310	-3.1
Point 9	200	-1.5
Point 10	200	13.4
Point 11	200.5	13.4
Point 12	201	9.9
Point 13	310	-46
Point 14	45.2	-46
Point 15	45.2	-9.4
Point 16	229.9	2

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Point 17	199	10.2
Point 18	195.2	9.4
Point 19	310	-9
Point 20	200	9.9
Point 21	244	-4
Point 22	310	-4
Point 23	200	4
Point 24	200	-4
Point 25	222.89286	4
Point 26	177.43556	4
Point 27	160	-1.5
Point 28	152.5	-4
Point 29	131.2	-9
Point 30	189.18	7.5
Point 31	198.05	10
Point 32	310	-70
Point 33	45.2	-70
Point 34	200	10
Point 35	155.2	-3.1
Point 36	200	-3.1

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.54	(222.942, 1.729)	21.84505	(197.462, 9.87613)	(251.429, - 3.1)
2	8153	1.70	(222.942, 1.729)	21.139	(196.413, 9.65538)	(249.045, - 3.1)

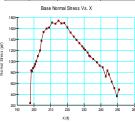
Slices of Slip Surface: Optimized

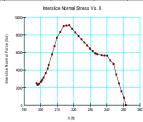
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimiz ed	197.7558	0.86192225	308.87287	238.3039 5	0	700

2	Optimiz ed	198.3438	0.48214525	316.88382	834.9635	0	700
3	Optimiz ed	198.8188	0.1516111	322.75657	813.7875 6	0	700
4	Optimiz ed	199.5	-0.3775877	330.02023	874.6839 2	0	700
5	Optimiz ed	200.25	-0.9602173	308.68224	905.3247 1	0	700
6	Optimiz ed	200.75	-1.348637	329.07258	946.8635	0	700
7	Optimiz ed	201.3782	-1.8366635	346.29986	999.0820 3	0	700
8	Optimiz ed	202.3983	-2.61524	378.74992	1094.503 5	0	700
9	Optimiz ed	203.6361	-3.55	425.38944	1197.931 2	0	691.74
10	Optimiz ed	204.4958	-4.199225	460.62632	1374.830 8	0	384.67
11	Optimiz ed	205.7798	-4.949425	499.79711	1533.976 1	0	380.3
12	Optimiz ed	207.5565	-5.908955	549.80913	1594.452 9	0	374.24
13	Optimiz ed	209.0695	-6.726065	592.60586	1611.376 2	0	369.08
14	Optimiz ed	210.8289	-7.469425	629.77932	1702.692 9	0	363.08
15	Optimiz ed	212.8347 5	-8.139035	661.3203	1685.385 6	0	356.25
16	Optimiz ed	214.6825 5	-8.5996075	680.80971	1737.616 1	0	349.95
17	Optimiz ed	216.3722	-8.8511425	688.18564	1691.311 6	0	344.19
18	Optimiz ed	218.1085	-8.974678	687.4423	1698.330 8	0	338.27
19	Optimiz ed	219.9732	-8.9700095	678.0598	1614.386 5	0	331.91
20	Optimiz ed	221.9196 5	-8.965136	668.29837	1524.016 2	0	325.27

21	Optimiz	223.7510	-8.9605505	659.11478	1449.201	0	319.03
_	ed Optimiz	5			9 1389.949		
22	ed	225.4674	-8.9562535	650.49205	7	0	313.18
23	Optimiz ed	227.1838	-8.951956	641.86932	1330.639 3	0	307.33
24	Optimiz ed	228.9002	-8.9476585	633.24658	1271.387 1	0	301.48
25	Optimiz ed	229.8292	-8.9462445	628.61941	1234.625 4	0	298.31
26	Optimiz ed	230.641	-8.9546695	625.19441	1207.393 9	0	295.54
27	Optimiz ed	232.1229 5	-8.97005	618.94625	1157.462 5	0	290.49
28	Optimiz ed	232.9811 5	-8.98887	615.96237	1100.800 3	0	287.56
29	Optimiz ed	233.6057	-9.04817	616.65797	1085.911 4	270.9017 6	-8.7998e- 006
30	Optimiz ed	235.4565	-9.2459635	619.99229	1041.063 3	243.0858 6	-7.8952e- 006
31	Optimiz ed	237.6312	-9.488158	624.50753	981.9582 7	206.3576 5	6.8415e- 006
32	Optimiz ed	239.2936	-9.6732995	627.97502	919.6629 6	168.3925 4	-5.4684e- 006
33	Optimiz ed	241.0636 5	-9.5744025	613.23731	889.0166 8	159.2084 6	-5.1739e- 006
34	Optimiz ed	242.9689 5	-9.1858425	579.7169	722.2129	82.26347	2.7886e- 008
35	Optimiz ed	243.9677	-8.9650885	560.15067	832.9052 5	0	250.11
36	Optimiz ed	244.8114 5	-8.3466305	500.39633	761.3538 4	0	250
37	Optimiz ed	246.4343 5	-7.157037	383.89727	627.4708 6	0	250
38	Optimiz ed	248.0198 5	-5.92168	262.1356	513.0838 9	0	250
39	Optimiz ed	249.5679	-4.64056	140.59792	366.7479 8	0	250

30	8153	241.55	-8.4	526.57895	695.26316	0	258.35
31	8153	243.25	-7.792662	462.96666	758.4946	0	252.56
32	8153	244.9834	-6.388993	323.79142	551.84895	0	250
33	8153	246.95015	-4.796331	161.31486	368.88846	0	250
34	8153	248.48925	-3.55	41.568714	444.03453	0	600





ı									
	40	Optimiz ed	250.8857	-3.55	40.484204	484.0692	0	600	

	Slip Surfac	X (ft)	Y (ft)	PWP (psf)	Base Normal	Friction al	Cohesiv e
	е	X (1t)	1 (11)	r wr (psi)	Stress (psf)	Strengt h (psf)	Strengt h (psf)
1	8153	197.2315	0.19048145	332.42809	622.86168	0	700
2	8153	198.525	-0.71522235	346.56163	959.70117	0	700
3	8153	199.3229	-1.2739105	352.38142	1030.6966	0	700
4	8153	199.8229	-1.624014	357.17234	1068.4182	0	700
5	8153	200.25	-1.92308	364.7684	1068.633	0	700
6	8153	200.75	-2.273184	375.59759	1106.1993	0	700
7	8153	201.4654	-2.774118	394.27413	1159.9766	0	700
8	8153	202.57345	-3.55	431.43148	1245.2345	0	694.15
9	8153	204.1121	-4.62736	488.99744	1440.7528	0	385.98
10	8153	205.90405	-5.88208	556.60773	1556.1794	0	379.87
11	8153	207.475	-6.98208	616.36629	1631.2045	0	374.52
12	8153	208.825	-7.92736	667.94252	1665.7909	0	369.91
13	8153	210.45	-8.4	689.15789	1969.5263	0	364.38
14	8153	212.35	-8.4	679.84211	1887.3684	0	357.9
15	8153	214.25	-8.4	670.57895	1805.2632	0	351.42
16	8153	216.15	-8.4	661.31579	1723.1579	0	344.94
17	8153	218.05	-8.4	652	1641.0526	0	338.47
18	8153	219.9732	-8.4	642.61237	1555.0521	0	331.91
19	8153	221.91965	-8.4	633.10779	1465.1953	0	325.27
20	8153	223.76875	-8.4	624.04918	1390.2962	0	318.97
21	8153	225.5205	-8.4	615.4294	1330.2432	0	313
22	8153	227.2723	-8.4	606.80963	1270.1901	0	307.03
23	8153	229.0241	-8.4	598.07568	1210.1942	0	301.05
24	8153	230.7625	-8.4	589.33333	1150.1449	0	295.13
25	8153	232.4875	-8.4	580.57971	1090.1449	0	289.25
26	8153	234.2125	-8.4	571.3971	1030.1449	0	283.37
27	8153	235.9375	-8.4	561.9942	970.08696	0	277.49
28	8153	237.75	-8.4	551.42105	891.10526	0	271.31
29	8153	239.65	-8.4	539.31579	793.21053	0	264.83

R16 Slope Stability Global (Entry & Exit) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 629 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 8:40:53 AM

File Name: 17thReach16.gsz

Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_Hlgh_water_ analyses\High water cases\

Last Solved Date: 2/27/2013 Last Solved Time: 8:45:40 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global (Entry & Exit)

Kind: SLOPE/W

Parent: Seepage Analysis (Global)

Method: Spencer

PWP Conditions Source: Parent Analysis

Direction of movement: Left to Right

Use Passive Mode: No

Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1

Optimize Critical Slip Surface Location: Yes Tension Crack

Tension Crack Option: Tension Crack Line

Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf

FOS Distribution FOS Calculation Option: Constant Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

FILL top, EL. +10.2 TO 4 Model: Spatial Mohr-Coulomb Unit Weight: 119 pcf Cohesion: 800 psf

Phi: 0° Phi-B: 0°

MARSH, EL. -4 TO -9

Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion Fn: MARSH 1 Phi: 0

Phi-B: 0 °

BEACH SAND, EL. -9 TO -46

Model: Shear/Normal En Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 °

BAY SOUND CLAY, EL. -46 TO -70

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf

Cohesion Spatial Fn: Bay Sound Cohesion

Sheet Pile

Model: Undrained (Phi=0)

Unit Weight: 0.1 pcf

Cohesion: 0.01 psf

Fill (protected), EL. -3.1 TO -4

Model: Spatial Mohr-Coulomb Weight Fn: Fill 2

Cohesion Fn: Fill Phi: 0 ° Phi-B: 0°

Phi-B: 0°

FILL bottom, EL. 4 TO -4 $\,$

Model: Spatial Mohr-Coulomb Unit Weight: 119 pcf Cohesion: 700 psf

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (118, -9.4) ft

Left-Zone Right Coordinate: (208, 9.46721) ft

Left-Zone Increment: 20

Right Projection: Range

Right-Zone Left Coordinate: (220, 5.11468) ft Right-Zone Right Coordinate: (275, -3.1) ft

Right-Zone Increment: 20

Radius Increments: 20

Slip Surface Limits

Left Coordinate: (45.2, -9.4) ft Right Coordinate: (310, -3.1) ft

Tension Crack Line

	X (ft)	Y (ft)
	190	4
	199	6
Г	204	6

Cohesion Functions

Model: Spline Data Point Function

Function: Cohesion vs. X Curve Fit to Data: 100 %

Segment Curvature: 0 %

Y-Intercept: 250 Data Points: X (ft), Cohesion (psf)

Data Point: (167, 250) Data Point: (200, 400)

Data Point: (244, 250)

Model: Spline Data Point Function Function: Cohesion vs. X

Curve Fit to Data: 100 %

Segment Curvature: 0 %

Y-Intercept: 600 Data Points: X (ft), Cohesion (psf)

Data Point: (177.4, 600) Data Point: (200, 700)

Data Point: (244, 600)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function

Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 %

Segment Curvature: 0 %

Y-Intercept: 0

Data Points: Normal Stress (psf), Shear Stress (psf)

Data Point: (-10000, 0) Data Point: (10000, 5773)

Estimation Properties

Intact Rock Param.: 10 Geological Strength: 100

Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Unit Weight Functions

Model: Spline Data Point Function Function: Unit Weight vs. X

Curve Fit to Data: 100 %

Segment Curvature: 0 %
Y-Intercept: 114
Data Points: X (ft), Unit Weight (pcf)
Data Point: (177.43556, 114)
Data Point: (200, 119)
Data Point: (244, 114)

MARSH

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 %

Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 101
Data Points: X (ft), Unit Weight (pcf)
Data Point: (0, 101)
Data Point: (167, 101)
Data Point: (200, 100)
Data Point: (244, 101)
Data Point: (440, 101)

Spatial Functions

Bay Sound Cohesion

y Sound Cohesion
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), V (ft), Cohesion (psf)
Data Point: (177.4, -46, 535)
Data Point: (177.4, -70, 770)
Data Point: (200, -46, 875)
Data Point: (200, -70, 1110)
Data Point: (244, -46, 535)
Data Point: (244, -70, 770)
Data Point: (244, -70, 770)
Data Point: (35, -46, 535)

Data Point: (244, -70, 770)
Data Point: (45, -46, 535)
Data Point: (310, -46, 535)
Data Point: (45, -70, 770)
Data Point: (310, -70, 770)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	3,10,11,12,20,34	2.625
Region 2	BEACH SAND, EL9 TO -46	15,14,13,19,29,1	9764
Region 3	Fill (protected), EL3.1 TO -4	7,21,22,8	59.4

Point 24 200 Point 25 Point 26 Point 27 160 Point 28 152.5 -4 -9 Point 30 189.18 10 Point 31 198.05 -70 Point 32 310 45.2 -70 Point 34 200 10 Point 35 -3.1 Point 36 200

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.70	(235.224, 37.064)	27.7319	(196.469, 9.66708)	(259.697, - 3.1)
2	7403	1.77	(235.224, 37.064)	49.245	(197.319, 9.84612)	(263.718, - 3.1)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	Optimiz ed	196.6582	5.290259	172.61523	54.557759	0	800
2	Optimiz ed	197.4489	4.5873475	192.75557	226.0074	0	800
3	Optimiz ed	198.525	3.5925075	221.93109	397.21591	0	700
4	Optimiz ed	199.5	2.6911205	247.87186	506.64049	0	700
5	Optimiz ed	200.25	1.997746	131.60842	549.94833	0	700
6	Optimiz	200.6347	1.6420955	150.29911	588.72897	0	700

Region 4	FILL top, EL. +10.2 TO 4	20,23,25,5,4,12	88.179645
Region 5	BAY SOUND CLAY, EL46 TO -70	32,13,14,33	6355.2
Region 6	MARSH, EL4 TO -9	28,24,21,22,19,29	840.75
Region 7	FILL bottom, EL. 4 TO -4	27,26,23,9	172.05221
Region 8	FILL top, EL. +10.2 TO 4	26,30,2,18,31,17,3,34,20,23	75.42177
Region 9	FILL bottom, EL. 4 TO -4	7,6,16,25,23,9,36	244.73286
Region 10	Fill (protected), EL3.1 TO -4	36,24,21,7	39.6
Region 11	Fill (protected), EL3.1 TO -4	35,36,24,28	41.535
Region 12	FILL bottom, EL. 4 TO -4	35,36,9,27	67.84

Points

	X (ft)	Y (ft)
Point 1	127.2	-9.4
Point 2	192.2	8.4
Point 3	200	10.2
Point 4	206.8	9.9
Point 5	219	5.5
Point 6	236.8	0
Point 7	244	-3.1
Point 8	310	-3.1
Point 9	200	-1.5
Point 10	200	13.4
Point 11	200.5	13.4
Point 12	201	9.9
Point 13	310	-46
Point 14	45.2	-46
Point 15	45.2	-9.4
Point 16	229.9	2
Point 17	199	10.2
Point 18	195.2	9.4
Point 19	310	-9
Point 20	200	9.9
Point 21	244	-4
Point 22	310	-4
Point 23	200	4

	ed						
7	Optimiz ed	200.8847	1.414586	162.30011	627.03995	0	700
8	Optimiz ed	202.1568	0.27840895	220.11244	751.47056	0	700
9	Optimiz ed	204.4704	-1.787977	320.31711	977.90139	0	700
10	Optimiz ed	205.8089	-2.960585	377.88278	1167.1816	0	700
11	Optimiz ed	206.3953	-3.4105045	401.72638	1222.1469	0	685.47
12	Optimiz ed	206.9818	-3.8605045	426.43077	1264.9354	0	684.13
13	Optimiz ed	208.1684	-4.77094	476.44127	1419.6513	0	372.15
14	Optimiz ed	210.1545 5	-5.9627935	539.98573	1569.2457	0	365.38
15	Optimiz ed	212.1172 5	-6.80462	582.26869	1570.5568	0	358.69
16	Optimiz ed	214.0799 5	-7.6464465	624.69213	1571.9616	0	352
17	Optimiz ed	216.0459 5	-8.2025175	649.55416	1647.1269	0	345.3
18	Optimiz ed	218.0153	-8.472833	656.69765	1590.6833	0	338.58
19	Optimiz ed	220.1853 5	-8.7706905	664.63343	1525.0128	0	331.19
20	Optimiz ed	221.5227	-8.966695	670.3394	1457.1841	0	326.63
21	Optimiz ed	222.1419	-9.102365	675.7781	1436.8804	439.38722	-7.1937e- 005
22	Optimiz ed	222.751	-9.2469755	681.84996	1399.4019	414.2454	-6.7812e- 005
23	Optimiz ed	224.0562 5	-9.635636	699.75409	1401.8149	405.30231	-6.6347e- 005
24	Optimiz ed	226.383	-10.328466	731.67718	1408.8586	390.93933	- 0.0001153
25	Optimiz	228.7232	-10.91981	757.21368	1433.8559	390.62808	-

	ed						0.0001152
							3
26	Optimiz ed	231.3876 5	-11.474365	778.85438	1412.3358	365.71117	-5.9879e- 005
27	Optimiz ed	233.8565	-11.889475	792.74521	1413.2713	358.232	-5.8666e- 005
28	Optimiz ed	235.8188 5	-12.10045	796.39328	1371.9265	332.25748	-5.4417e- 005
29	Optimiz ed	237.6101 5	-12.293035	799.65046	1320.8255	300.87627	-4.9275e- 005
30	Optimiz ed	239.2813	-12.31379	792.86732	1292.4768	288.42641	-9.3737e- 006
31	Optimiz ed	241.0033	-12.181105	776.19244	1181.7741	234.14382	7.7674e- 006
32	Optimiz ed	242.9321 5	-11.77181	741.25029	1082.2067	196.83541	-6.4014e- 006
33	Optimiz ed	245.3983 5	-10.97976	679.8608	909.86278	132.781	-4.3185e- 006
34	Optimiz ed	248.0603	-10.147995	614.98645	795.25219	104.06809	3.5304e- 008
35	Optimiz ed	250.6226 5	-9.372015	554.1196	692.06919	79.638809	2.7018e- 008
36	Optimiz ed	252.8056 5	-8.3689775	464.82637	706.35881	0	250
37	Optimiz ed	254.5742	-7.1495325	351.45703	574.43441	0	250
38	Optimiz ed	257.0234 5	-5.269905	184.04492	395.26094	0	250
39	Optimiz ed	259.1429 5	-3.55	37.425604	403.262	0	600

	Slip Surfa ce	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	7403	197.6845 5	5.195964	171.2664 1	1.4946742	0	800
2	7403	198.3896	4.382734	196.4944 1	191.59866	0	800

				8			005
23	7403	235.65	-12.16566	801.2743 9	1424.5554	359.82247	-5.8943e- 005
24	7403	238	-12.08792	784.9989 1	1325.5541	312.06451	-5.1119e- 005
25	7403	240.4	-11.893265	761.1740 7	1184.6885	244.49646	8.1094e- 006
26	7403	242.8	-11.57949	729.9080 7	1022.9582	169.17893	-5.4964e- 006
27	7403	245.0794 5	-11.172035	693.3968 7	911.68595	126.0191	4.18e-006
28	7403	247.2383 5	-10.67984	652.1864 1	856.16592	117.75813	3.9916e- 008
29	7403	249.3972 5	-10.083698	604.4790 1	785.77392	104.66223	3.547e- 008
30	7403	251.5561 5	-9.379598	550.0558 2	699.10574	86.047075	2.9165e- 008
31	7403	253.8567 5	-8.500625	471.7188 5	653.78179	0	250
32	7403	256.2990 5	-7.4227345	369.0315 7	553.59176	0	250
33	7403	258.7414	-6.1801115	256.7183	435.51936	0	250
34	7403	261.1837 5	-4.758002	134.9134 3	297.75091	0	250
35	7403	263.0614 5	-3.55	35.84829	337.51428	0	600

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3	7403	198.8646	3.8517585	212.4946 7	324.21195	0	700
4	7403	199.5	3.176432	232.4946	415.96038	0	700
5	7403	200.25	2.397137	109.9771 1	486.2309	0	700
6	7403	200.75	1.899839	135.6465	551.64633	0	700
7	7403	201.9549	0.77923308	193.3784 7	700.14546	0	700
8	7403	203.8647	-0.88534542	274.0068 8	922.39781	0	700
9	7403	205.8098	-2.412203	347.2941 8	1128.6018	0	700
10	7403	207.4212 5	-3.575	406.5112 5	1267.0429	0	683.13
11	7403	209.2636 5	-4.758002	470.0158 4	1429.5286	0	368.42
12	7403	211.7059 5	-6.1801115	545.6581 3	1492.3768	0	360.09
13	7403	214.1482 5	-7.4227345	610.5013 3	1536.1145	0	351.77
14	7403	216.5906	-8.500625	665.3786 3	1562.2394	0	343.44
15	7403	218.4059	-9.2158955	701.0232 1	1554.1996	492.54193	-8.0675e- 005
16	7403	219.9732	-9.7488355	726.6826 3	1565.8164	484.43506	-7.9351e- 005
17	7403	221.9196 5	-10.33902	754.0431 4	1569.027	470.49325	-7.7068e- 005
18	7403	224.0607 5	-10.88405	777.6323 4	1571.9857	458.58317	-7.5115e- 005
19	7403	226.3964 5	-11.36879	796.5246 2	1572.9582	448.23798	-7.3422e- 005
20	7403	228.7321 5	-11.73699	808.1358 5	1558.8933	433.41507	-7.0994e- 005
21	7403	231.05	-11.99018	812.6724 7	1529.4739	413.81216	- 0.0001221 2
22	7403	233.35	-12.13182	810.3253	1484.619	389.27221	-6.3765e-

R17 Slope Stability Global Block Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 561 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 9:36:37 AM File Name: 17thReach17.gsz Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/27/2013 Last Solved Time: 9:41:40 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global Block Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: Tension Crack Line Percentage Wet: 1 Tension Crack Fluid Unit Weight: 62.4 pcf FOS Distribution FOS Calculation Option: Constant Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 5000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 **Ending Optimization Points: 16** Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 °

Materials EMBANKMENT FILL, EL. +9.6 TO +4.5 Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 800 psf Phi-B·∩° MARSH, EL. -3.0 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 1 Phi-B: 0 ° BEACH SAND, EL. -12 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Clay Phi-B: 0 °

Model: Undrained (Phi=0)

Unit Weight: 0.1 pcf

EMBANKMENT FILL 2, EL. +4.5 TO -3.0

Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 650 psf Phi-B: 0 °

EMBANKMENT FILL 3, EL. +1.2 TO -3.0

Unit Weight: 113 pcf Cohesion Fn: Fill Phi-B: 0 °

MARSH, EL. -7.0 TO -12.0

Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 2 Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (58.7, -8.4) ft Right Coordinate: (310, -1.4) ft

Slip Surface Block

Upper Left: (190, -10) ft Lower Left: (190, -30) ft Lower Right: (224, -30) ft X Increments: 10 Y Increments: 8 Starting Angle: 125 ° Ending Angle: 155 ° Angle Increments: 6 Right Grid Upper Left: (230, -10) ft Lower Left: (230, -30) ft Lower Right: (275, -30) ft X Increments: 10

Y Increments: 8 Starting Angle: 15 ° Ending Angle: 45 °

Sheet Pile

Tension Crack Line

Г	X (ft)	Y (ft)
Γ	185.05	3.64802
Γ	196.6	6.84447
Γ	199.05	6.79992

Angle Increments: 6

Cohesion Functions

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 800 Data Points: X (ft), Cohesion (psf) Data Point: (177, 800) Data Point: (200, 650) Data Point: (239.2, 800)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (10000, 5773) **Estimation Properties** Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Spatial Functions

Bay Sound Clay

Model: Linear Interpolation

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (116.5, -46, 555)
Data Point: (116.5, -70, 790)
Data Point: (177, -46, 555)
Data Point: (177, -70, 790)
Data Point: (200, -46, 835)
Data Point: (200, -46, 835) Data Point: (200, -46, 83)

Data Point: (200, -70, 1070)

Data Point: (239.2, -46, 555)

Data Point: (239.2, -70, 790)

Data Point: (310, -46, 555)

Marsh 1

Model: Linear Interpolation

Limit Range By: Data Values

Data Point: (310, -70, 790)

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (177, -3, 425) Data Point: (200, -3, 450)
Data Point: (239.2, -3, 425) Data Point: (177, -7, 425) Data Point: (200, -7, 450) Data Point: (239.2, -7, 425)
Data Point: (310, -3, 425)
Data Point: (310, -7, 425)
Data Point: (143, -7, 425) Data Point: (154.7, -3, 425)

Marsh 2

Model: Linear Interpolation Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (200, -7, 450)
Data Point: (239, -7, 320)
Data Point: (177, -12, 320)
Data Point: (200, -12, 450) Data Point: (239.2, -12, 320) Data Point: (310, -7, 320) Data Point: (310, -12, 320) Data Point: (116.5, -8.4, 320) Data Point: (116.5, -12, 320)

5

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	12,47,13,14,15,25	2.725
Region 2	EMBANKMENT FILL, EL. +9.6 TO +4.5	4,5,38,12,43,45	63.226664
Region 3	BEACH SAND, EL12 TO -46	22,21,30,27,18,19,34,36	8544.2
Region 4	EMBANKMENT FILL, EL. +9.6 TO +4.5	44,7,6,15,25,12,43	84.332835
Region 5	MARSH, EL7.0 TO -12.0	21,1,2,40,33,32,17,18,27,30	1141.5954
Region 6	BAY SOUND CLAY, EL46 TO -70	22,23,37,35,20,19,34,36	6031.2
Region 7	MARSH, EL3.0 TO -7.0	40,41,29,28,26,24,46,17,32,33	644.89156
Region 8	EMBANKMENT FILL 3, EL. +1.2 TO - 3.0	41,42,51,52,16,28,29	76.72322
Region 9	EMBANKMENT FILL 3, EL. +1.2 TO - 3.0	52,8,9,10,11,24,26,28,16	186.725
Region 10	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	51,3,48,39,45,43,49,52	172.96918
Region 11	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	8,50,44,43,49,52	176.91624

Points

	X (ft)	Y (ft)
Point 1	58.7	-8.4
Point 2	138.7	-8.4
Point 3	163.3	-0.1
Point 4	185	6.1
Point 5	196.6	9.9
Point 6	208	10
Point 7	220	5.5
Point 8	239.2	-1.2
Point 9	250.6	-1.3
Point 10	274.1	-1.4
Point 11	310	-1.4
Point 12	200	9.9
Point 13	200	13.5
Point 14	200.5	13.5
Point 15	201	10

6

Point 52 200 -1.2

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.02	(219.947, 7.173)	24.94337	(192.37, 8.51431)	(246.465, - 1.26373)
2	4093	2.21	(219.947, 7.173)	24.598	(191.686, 8.2902)	(246.97, - 1.26816)

Slices of Slip Surface: Optimized

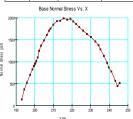
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	193.0364	5.08691	125.34536	143.91462	0	800
2	Optimize d	194.35475	3.92585	132.40745	373.62441	0	650
3	Optimize d	195.80335	2.6264795	151.82422	526.45576	0	650
4	Optimize d	197.5163	1.0671145	197.30813	705.7124	0	650
5	Optimize d	198.7163	-0.0179608	275.27859	830.19207	0	650
6	Optimize d	199.5	-0.7111148	407.66797	903.96462	0	650
7	Optimize d	200.0264	-1.176669	693.84103	947.57311	0	650
8	Optimize d	200.2764	-1.397781	672.88435	971.05639	0	651.0
9	Optimize d	200.75	-1.8166735	614.0039	1014.7656	0	652.8
10	Optimize d	201.54395	-2.5188925	321.75842	1099.0819	0	655.9
11	Optimize d	202.3209	-3.20605	201.49995	1249.7048	0	448.5
12	Optimize	203.33615	-4.0100835	215.84549	1367.5563	0	447.8

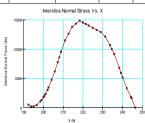
Point 16 200 -2.5 -46 Point 19 Point 20 -70 58.7 -12 58.7 -46 58.7 -70 -3 Point 25 201 9.9 Point 26 Point 27 239.2 -12 Point 28 200 Point 30 Point 32 Point 33 177 -46 Point 34 -46 Point 36 Point 37 -70 Point 38 199 177 3.7 Point 39 Point 40 154.70482 Point 41 156 18675 -2 5 Point 43 200 4.5 4.5 Point 44 Point 45 179.66667 4.5 Point 46 -3.4 Point 47 200 10 Point 48 165.10004 0.4 Point 49 200 Point 50 234.61639 0.40305 160.05 -1.2

	d						
	_						
13	Optimize d	204.90065	-5.20605	249.33999	1490.444	0	446.87
14	Optimize d	206.46515	-6.4020165	293.4475	1613.3824	0	445.88
15	Optimize d	207.6237	-7.287643	332.59929	1711.0294	0	424.72
16	Optimize d	208.4234	-7.898938	360.30364	1757.0936	0	422.07
17	Optimize d	209.8938	-8.86185	405.88311	1845.6754	0	417.19
18	Optimize d	211.82415	-9.894215	457.94129	1927.4118	0	410.79
19	Optimize d	213.5909	-10.68042	499.45056	1936.2545	0	404.93
20	Optimize d	215.4314	-11.300055	533.28236	1992.7171	0	398.82
21	Optimize d	217.34555	-11.753125	558.70097	1959.4695	0	392.48
22	Optimize d	219.1513	-11.98125	571.40989	1983.1939	0	386.49
23	Optimize d	220.7164	-11.98418	570.95778	1917.4533	0	381.3
24	Optimize d	222.14925	-11.986865	570.54601	1859.5263	0	376.55
25	Optimize d	223.8794	-11.990105	570.06728	1790.7945	0	370.81
26	Optimize d	225.90685	-11.9939	569.47541	1711.0896	0	364.08
27	Optimize d	227.93435	-11.9977	568.88354	1631.4341	0	357.36
28	Optimize d	230.1076	-11.86772	559.99918	1564.2272	0	350.15
29	Optimize d	232.50015	-11.38563	529.174	1462.6594	0	342.22
30	Optimize d	234.1748	-10.840575	494.64588	1376.4564	0	336.67
31	Optimize	235.1842	-10.395215	466.5412	1284.8071	0	333.32

9				

17	4093	218.96665	-10	453.32896	1778.7578	0	387.1
18	4093	220.7164	-10	451.58026	1704.5926	0	381.3
19	4093	222.14925	-10	450.27515	1646.4562	0	376.55
20	4093	223.8352	-10	448.88361	1579.0166	0	370.95
21	4093	225.77425	-10	447.46023	1502.3813	0	364.52
22	4093	227.7133	-10	446.13484	1425.746	0	358.09
23	4093	229.65235	-10	444.95901	1349.1108	0	351.66
24	4093	231.5914	-10	443.86054	1272.4755	0	345.23
25	4093	233.53045	-10	442.8188	1195.8402	0	338.8
26	4093	234.5582	-9.9592515	439.78295	1333.277	0	335.39
27	4093	235.6584	-9.188877	391.3759	1197.5817	0	331.75
28	4093	237.7424	-7.7296255	299.54086	940.47978	0	324.83
29	4093	238.9922	-6.8545125	244.39178	825.44813	0	425.13
30	4093	240.08285	-6.090854	196.22862	728.27785	0	425
31	4093	241.84855	-4.8545125	118.24193	584.83059	0	425
32	4093	243.6142	-3.618171	40.290959	441.3323	0	425
33	4093	245.7337	-2.1340805	-53.279344	405.184	0	800





	d						
32	Optimize d	237.0604	-9.28446	396.61227	1136.7679	0	327.1
33	Optimize d	238.7844	-8.0625685	319.71589	975.47517	0	321.38
34	Optimize d	239.6217	-7.3339485	273.92151	873.05158	0	320
35	Optimize d	241.07495	-6.058215	193.69333	779.74149	0	425
36	Optimize d	243.13805	-4.240685	79.34167	568.28494	0	425
37	Optimize d	244.35375	-3.16596	11.732784	448.44216	0	425
38	Optimize	245.5014	-2.1318635	-53.311949	515.34627	0	800

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strength (psf)	Cohesiv e Strengt h (psf)
1	4093	192.3889	4.9922435	130.56972	230.41818	0	800
2	4093	193.9689	3.8858925	132.9362	446.77415	0	650
3	4093	195.72295	2.6576775	150.99508	608.08059	0	650
4	4093	197.8	1.2033208	201.38512	778.74055	0	650
5	4093	199.5	0.0129678	312.53097	905.98186	0	650
6	4093	200.25	-0.51218785	622.68661	956.49107	0	650
7	4093	200.75	-0.86229185	565.98491	993.79525	0	650
8	4093	201.11615	-1.118672	515.33432	1032.0086	0	650
9	4093	202.51765	-2.1	244.79607	1134.3431	0	659.63
10	4093	204.85225	-3.734699	176.66367	1361.924	0	446.91
11	4093	206.95075	-5.204097	225.53524	1512.3641	0	445.57
12	4093	208.7578	-6.469398	280.99853	1610.7866	0	444.41
13	4093	210.5867	-7.75	342.19573	1674.155	0	414.89
14	4093	212.7289	-9.25	419.4756	1741.1105	0	407.79
15	4093	214.83335	-10	458.62251	1959.0481	0	400.81
16	4093	216.9	-10	455.79186	1868.9029	0	393.95

R17 Slope Stability Global Entry & Exit

File Information

Created By: USACE St. Louis District Revision Number: 561 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 9:36:37 AM File Name: 17thReach17.gsz

Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/27/2013

Last Solved Time: 9:42:20 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global Entry & Exit

Kind: SLOPE/W Parent: Seepage Analysis (Gap)

Method: Spencer

PWP Conditions Source: Parent Analysis

Direction of movement: Left to Right

Use Passive Mode: No

Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1

Optimize Critical Slip Surface Location: Yes

Tension Crack Tension Crack Option: Tension Crack Line

Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf

FOS Distribution FOS Calculation Option: Constant Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +9.6 TO +4.5

Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 800 psf Phi: 0° Phi-B: 0°

MARSH, EL. -3.0 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 1

Phi-B: 0 °

BEACH SAND, EL. -12 TO -46

Model: Shear/Normal En Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 °

BAY SOUND CLAY, EL. -46 TO -70

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf

Cohesion Spatial Fn: Bay Sound Clay

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf

Cohesion: 0.01 psf

EMBANKMENT FILL 2, EL. +4.5 TO -3.0

Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 650 psf Phi-B: 0°

EMBANKMENT FILL 3, EL. +1.2 TO -3.0

Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion Fn: Fill

MARSH, EL. -7.0 TO -12.0

Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 2

Phi-B: 0 °

Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Rang Left-Zone Left Coordinate: (128, -8.4) ft Left-Zone Right Coordinate: (199.82542, 9.9) ft Left-Zone Increment: 20 Right Projection: Range

Right-Zone Left Coordinate: (222.6, 4.59271) ft Right-Zone Right Coordinate: (255.0143, -1.31878) ft

Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (58.7, -8.4) ft Right Coordinate: (310, -1.4) ft

Tension Crack Line

	X (ft)	Y (ft)
	185	-3
Г	196	1

199

Cohesion Functions

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 800 Data Points: X (ft), Cohesion (psf) Data Point: (177, 800) Data Point: (200, 650) Data Point: (239.2, 800)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (0, 0)
Data Point: (10000, 5773) **Estimation Properties** Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Spatial Functions

Bay Sound Clay

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (116.5, -46, 555) Data Point: (116.5, -70, 790)

Data Point: (177, -46, 555) Data Point: (177, -70, 790) Data Point: (200, -46, 835) Data Point: (200, -40, 833)

Data Point: (200, -70, 1070)

Data Point: (239.2, -46, 555)

Data Point: (239.2, -70, 790)

Data Point: (310, -46, 555) Data Point: (310, -70, 790)

Marsh 1

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (177, -3, 425)

Data Point: (200, -3, 450) Data Point: (239.2, -3, 425) Data Point: (177, -7, 425)
Data Point: (200, -7, 450)
Data Point: (239.2, -7, 425)
Data Point: (310, -3, 425)
Data Point: (310, -7, 425)
Data Point: (310, -7, 425)
Data Point: (414, -7, 425) Data Point: (154.7, -3, 425)

Marsh 2

Model: Linear Interpolation Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (177, -7, 320)
Data Point: (200, -7, 450)
Data Point: (239.2, -7, 320) Data Point: (239.2, -7, 320)
Data Point: (177, -12, 320)
Data Point: (200, -12, 450)
Data Point: (200, -12, 450)
Data Point: (310, -7, 320)
Data Point: (310, -7, 320)
Data Point: (310, -12, 320)
Data Point: (116.5, -8.4, 320)
Data Point: (116.5, -12, 320)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	12,47,13,14,15,25	2.725
Region 2	EMBANKMENT FILL, EL. +9.6 TO +4.5	4,5,38,12,43,45	63.226664
Region 3	BEACH SAND, EL12 TO -46	22,21,30,27,18,19,34,36	8544.2
Region 4	EMBANKMENT FILL, EL. +9.6 TO +4.5	44,7,6,15,25,12,43	84.332835

5

58.7 Point 23 -70 201 9.9 239.2 Point 27 239.2 Point 28 200 -3 Point 30 -2.5 Point 32 Point 34 239.2 -46 Point 35 239.2 -70 -46 Point 37 -70 Point 38 199 9.9 Point 39 Point 40 142.8494 Point 41 -3 Point 42 4.5 Point 43 200 Point 44 222.86567 4.5 Point 45 179.66667 4.5 -3.4 Point 46 Point 47 200 10 Point 48 165.10004 0.40634 0.4 Point 50 234.61639 0.40305 -1.2 160.05 Point 52 200 -1.2

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.89	(223.768,	21.26153	(198.424,	(248.092, -

Region 5	MARSH, EL7.0 TO -12.0	21,1,2,40,33,32,17,18,27,30	1141.5954
Region 6	BAY SOUND CLAY, EL46 TO -70	22,23,37,35,20,19,34,36	6031.2
Region 7	MARSH, EL3.0 TO -7.0	40,41,29,28,26,24,46,17,32,33	644.89156
Region 8	EMBANKMENT FILL 3, EL. +1.2 TO - 3.0	41,42,51,52,16,28,29	76.72322
Region 9	EMBANKMENT FILL 3, EL. +1.2 TO - 3.0	52,8,9,10,11,24,26,28,16	186.725
Region 10	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	51,3,48,39,45,43,49,52	172.96918
Region 11	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	8,50,44,43,49,52	176.91624

Points

	X (ft)	Y (ft)
Point 1	58.7	-8.4
Point 2	138.7	-8.4
Point 3	163.3	-0.1
Point 4	185	6.1
Point 5	196.6	9.9
Point 6	208	10
Point 7	220	5.5
Point 8	239.2	-1.2
Point 9	250.6	-1.3
Point 10	274.1	-1.4
Point 11	310	-1.4
Point 12	200	9.9
Point 13	200	13.5
Point 14	200.5	13.5
Point 15	201	10
Point 16	200	-2.5
Point 17	310	-7
Point 18	310	-12
Point 19	310	-46
Point 20	310	-70
Point 21	58.7	-12
Point 22	58.7	-46

22.402) 9.9) 1.278)

22.402)

34.123

9.9)

6

1.28013)

Slices of Slip Surface: Optimized

1.93

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	198.7118	0.78912645	231.87094	372.64573	0	650
2	Optimize d	199.1906	0.43879145	252.09038	814.85299	0	650
3	Optimize d	199.6906	0.0309097	319.47115	804.17085	0	650
4	Optimize d	200.25	-0.4543914	619.1305	849.20074	0	650
5	Optimize d	200.75	-0.8881531	567.1158	894.23583	0	650
6	Optimize d	201.05475	-1.152517	526.75814	932.2359	0	650
7	Optimize d	202.1436	-2.097115	301.11076	1027.4544	0	658.2
8	Optimize d	203.9838	-3.6493165	187.83458	1283.2788	0	447.46
9	Optimize d	205.5924	-4.956604	227.56766	1414.2779	0	446.43
10	Optimize d	207.19745	-6.2610065	280.58797	1545.0155	0	445.41
11	Optimize d	208.0534	-6.956604	312.53156	1612.5786	0	444.86
12	Optimize d	208.2017	-7.07714	318.03547	1626.3549	0	422.8
13	Optimize d	209.19075	-7.7254825	346.93974	1715.5662	0	419.52
14	Optimize d	210.97905	-8.8678875	402.90004	1760.0516	0	413.59
15	Optimize d	212.86495	-9.8652	454.17277	1864.6626	0	407.34

16	Optimize d	214.8484	-10.717425	500.09681	1871.2867	0	400.76
17	Optimize d	216.82215	-11.350325	535.27222	1939.8636	0	394.21
18	Optimize d	218.7863	-11.76389	558.58824	1900.306	0	387.7
19	Optimize d	219.8842	-11.97119	570.51629	1955.8585	0	384.06
20	Optimize d	220.7164	-11.974925	570.40205	1922.1146	0	381.3
21	Optimize d	222.14925	-11.98136	570.21361	1864.537	0	376.55
22	Optimize d	223.8953	-11.9892	570.00754	1795.5869	0	370.76
23	Optimize d	225.873	-11.989885	569.23174	1720.5628	0	364.2
24	Optimize d	227.76925	-11.98202	568.01882	1644.6758	0	357.91
25	Optimize d	229.6655	-11.974155	566.75315	1568.736	0	351.62
26	Optimize d	231.5205	-11.764495	553.05446	1547.5417	0	345.47
27	Optimize d	233.33425	-11.353045	526.7997	1427.9085	0	339.45
28	Optimize d	234.42875	-11.06539	508.48037	1419.7448	0	335.82
29	Optimize d	235.35275	-10.66192	483.02298	1335.1379	0	332.76
30	Optimize d	236.8255	-10.01884	442.38266	1200.2925	0	327.87
31	Optimize d	238.38095	-9.0889005	383.79945	1119.7213	0	322.72
32	Optimize d	240.19655	-7.7402505	298.9493	925.15433	0	320
33	Optimize d	242.01935	-6.38627	213.67274	815.89526	0	425
34	Optimize d	244.07	-4.73976	110.02903	653.23203	0	425

35	Optimize d	245.7016	-3.35349	22.806259	495.4508	0	425
36	Optimize d	247.10055	-2.1390015	-53.583387	555.85863	0	800

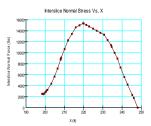
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	8288	198.0955	-0.034916	242.58902	597.68732	0	650
2	8288	199.062	-1.134916	406.66089	863.48206	0	650
3	8288	199.562	-1.640962	561.84837	930.86305	0	652.8
4	8288	200.25	-2.319749	727.23821	1018.2668	0	650.9
5	8288	200.75	- 2.786034 5	335.65613	1080.8762	0	652.8
6	8288	201.9084	-3.773114	233.59487	1295.942	0	448.7
7	8288	203.7252	-5.191547	263.80282	1475.7745	0	447.6
8	8288	205.54195	- 6.425680 5	302.94022	1634.7559	0	446.4
9	8288	207.22515	- 7.429670 5	342.30148	1770.7915	0	426.0
10	8288	208.85715	- 8.275949 5	378.27969	1848.9022	0	420.6
11	8288	210.57145	9.052170 5	414.34648	1883.6523	0	414.9
12	8288	212.28575	- 9.718191 5	447.02965	1905.3264	0	409.2
13	8288	214	-10.28078	476.05847	1914.6966	0	403.5
14	8288	215.71425	- 10.74521 5	500.73123	1912.4116	0	397.8
15	8288	217.42855	-11.11559	520.99555	1899.0313	0	392.2

9

11

	2000	Г					
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	1600		-/		->	4	
8	1400		-/-) bq	
888	1200-		1			__	
Normal Stress (psf)	1000		1			<u>,</u>	
Norm	800-		/			1	\
							7
	600						∀
	400-	•					
	200 1	90 2	00 2	10 2	20 2	30 2	40 250
				X (ft)			

Base Normal Stress Vs. X



12

16 8288 219.14285 -11.39501 536.42103 1874.974 386.52 0 17 8288 220.7164 11.57665 546.44022 1846.1673 0 381.3 222.14925 -11.67503 1814.4224 376.55 8288 551.6675 8288 223.705 11.71061 553.10819 1772.5864 0 371.39 19 20 8288 -11.67237 225.38365 550.01904 1719.3078 0 365.82 21 8288 227.06235 11.55113 541.82574 1656.2737 0 360.25 22 8288 228.74105 -11.34602 528.43557 1583.4503 0 354.69 23 8288 230.4197 11.05547 509.70858 1500.5898 349.12 0 232.09835 -10.67724 485.51081 1407.384 343.55 24 8288 0 8288 233.77705 10.20825 455.61324 1303.5013 0 337.98 25 26 8288 235.38035 -9.674087 0 27 8288 236.9082 9.078661 383.88547 1079.1097 0 327.6 28 8288 238.43605 8.395962 340.64271 953.84923 0 322.53 240.1429 285.01162 839.15876 29 8288 0 320 30 8288 241.9969 -6.423855 216.02632 775.76334 425 31 8288 243.81905 659.94528 425 0 32 8288 245.6412 -3.761672 48.293618 524.49312 0 425 33 8288 247.4437 2.140066 -53.669964 588.85578 800

R18 Slope Stability Global Block

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File Information

Created By: USACE St. Louis District Revision Number: 720 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 10:21:28 AM File Name: 17thReach18.gsz Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/27/2013

Last Solved Time: 10:22:16 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global Block

Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: Tension Crack Line Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf

FOS Distribution FOS Calculation Option: Constant Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 3000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 **Ending Optimization Points: 16** Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +8.6 TO 0

Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 800 psf Phi-B·∩° MARSH 1, EL. -3 TO -7/-8 Model: Spatial Mohr-Coulomb

Unit Weight: 107 pcf Cohesion Fn: Marsh 1

Phi-B: 0 °

BEACH SAND, EL. -17 TO -46

Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi-B: 0 °

BAY SOUND CLAY, EL. -46 TO -70

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion

Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

MARSH 2, EL. -7/-8 TO -17

Unit Weight: 107 pcf Cohesion Fn: MARSH 2

Fill 2, El. 0 to -3

Model: Spatial Mohr-Coulomb Weight Fn: Fill

Cohesion Fn: Fill Phi: 0 Phi-B: 0°

Fill 2, El -1.3 to -3 (Protected)

Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 800 psf Phi-B: 0°

Slip Surface Limits

Left Coordinate: (59.5, -8.9) ft Right Coordinate: (310, -1.4) ft

Slip Surface Block

Left Grid Upper Left; (192, -2) ft Lower Left: (192, -32) ft Lower Right: (222, -32) ft X Increments: 6 Y Increments: 6 Starting Angle: 135 ° Ending Angle: 175 ° Angle Increments: 5 Right Grid Upper Left: (225, -2) ft Lower Left: (225, -32) ft Lower Right: (255, -32) ft Y Increments: 6 Starting Angle: 0 ' Ending Angle: 45 °

Tension Crack Line

	X (ft)	Y (ft)
	180	4.375
Г	183.1	0.5
	195.9	3

Angle Increments: 5

Cohesion Functions

Fill

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 800 Data Points: X (ft), Cohesion (psf) Data Point: (163.4, 800) Data Point: (200, 500) Data Point: (244, 800)

MARSH 2

Model: Spline Data Point Function Function: Cohesion vs. X

Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 280 Data Points: X (ft), Cohesion (psf) Data Point: (163.4, 280) Data Point: (200, 500)

Marsh 1

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 480

Data Point: (244, 280)

Data Points: X (ft), Cohesion (psf) Data Point: (163.4, 480)

Data Point: (200, 650) Data Point: (244, 480)

Unit Weight Functions

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %
Y-Intercept: 115
Data Points: X (ft), Unit Weight (pcf)
Data Point: (163.4, 115)
Data Point: (200, 112)

Data Point: (244, 115)

Spatial Functions

Bay Sound Cohesion

y South Corneston
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), V (ft), Cohesion (psf)
Data Point: (163.4, -70, 795)
Data Point: (200, -46, 780)
Data Point: (200, -70, 1015)
Data Point: (200, -70, 1015)
Data Point: (244, -46, 560) Data Point: (244, -46, 560)
Data Point: (59.5, -46, 560)
Data Point: (59.5, -70, 795)
Data Point: (310, -46, 560)
Data Point: (310, -47, 795)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL17 TO -46	20,19,33,44,26,16,17,36,34	7792.5
Region 2	Fill 2, El -1.3 to -3 (Protected)	7,27,22,9,8	111.3
Region 3	Sheet Pile	11,10,24,13,12	3.6
Region 4	MARSH 1, EL3 TO -7/-8	15,22,27,28,31,41,2,43,32,30,25	799.65271
Region 5	MARSH 2, EL7/-8 TO -17	1,19,33,44,26,16,15,25,30,32,43	1744.5767
Region 6	BAY SOUND CLAY, EL46 TO -70	20,21,35,37,18,17,36,34	6012

Point 28 200 Point 29 Point 30 -3 Point 31 163.4 Point 32 163.4 -8 163.4 Point 34 163.4 -46 -70 Point 35 163.4 -46 Point 36 244 -2.5 Point 38 163.4 Point 39 168.1 1.4 Point 40 155.08434 -3 Point 42 163.42771 0 Point 43 108.885 -8 Point 44 200 Point 45 160.1 Point 46 163.4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.26	(220.891, 2.945)	24.31738	(194.413, 7.97834)	(249.802, - 1.08144)
2	4889	2.44	(220.891, 2.945)	24.652	(191.492, 7.24808)	(250.024, - 1.08455)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	194.92435	2.3307595	207.98356	408.11498	0	800
2	Optimize	196.16765	1.3074207	235.16224	590.91683	0	800

Region 7	EMBANKMENT FILL, EL. +8.6 TO 0	45,42,39,3,23,10,24,29,46	193.86675
Region 8	Fill 2, El. 0 to -3	29,14,28,27,7	110
Region 9	EMBANKMENT FILL, EL. +8.6 TO 0	7,6,5,4,13,24,29	211.6
Region 10	Fill 2, El. 0 to -3	40,38,14,28,31,41	22.875
Region 11	Fill 2, El. 0 to -3	40,38,14,29,46,45	81.911745

Points

	X (ft)	Y (ft)
Point 1	59.5	-8.9
Point 2	140.4	-6.9
Point 3	196.9	8.6
Point 4	212	8.3
Point 5	220	5.5
Point 6	234	0
Point 7	244	-1
Point 8	272.5	-1.4
Point 9	310	-1.4
Point 10	200	8.6
Point 11	200	13.3
Point 12	200.5	13.3
Point 13	201	8.5
Point 14	200	-2.5
Point 15	310	-8
Point 16	310	-11
Point 17	310	-46
Point 18	310	-70
Point 19	59.5	-17
Point 20	59.5	-46
Point 21	59.5	-70
Point 22	310	-3
Point 23	199	8.6
Point 24	200	8.5
Point 25	244	-8
Point 26	244	-11
Point 27	244	-3

	d						
3	Optimize d	197.312	0.30038801	275.8064	710.24203	0	800
4	Optimize d	198.362	-0.62362464	340.14198	903.68782	0	513.4
5	Optimize d	199.4774	-1.605182	556.22299	1009.6205	0	504.2
6	Optimize d	199.9774	-2.041571	728.22655	1102.4394	0	500.1
7	Optimize d	200.25	-2.2378285	718.06338	1020.8219	0	501
8	Optimize d	200.75	-2.597802	635.39845	1066.837	0	505.3
9	Optimize d	201.1543	-2.8888945	392.88216	1096.5835	0	507.8
10	Optimize d	202.29305	-3.708735	273.50914	1142.4037	0	641.3
11	Optimize d	204.2369	-5.10353	290.67882	1284.2942	0	633.0
12	Optimize d	206.15575	-6.4756495	331.87492	1422.1939	0	626.
13	Optimize d	207.4582	-7.4069795	367.47818	1558.2042	0	462.
14	Optimize d	208.4291	-8.07922	393.2656	1636.8452	0	457.8
15	Optimize d	209.79275	-8.9309345	428.52695	1755.3762	0	451.0
16	Optimize d	211.26425	-9.7804245	465.51074	1841.3617	0	443.6
17	Optimize d	212.795	-10.6641	506.54534	1901.8055	0	436.0
18	Optimize d	214.38495	-11.581965	551.559	1936.6116	0	428.0
19	Optimize d	215.98325	-12.28885	586.59842	2037.0818	0	420.0
20	Optimize d	217.58995	-12.784745	611.4873	2026.9121	0	412.0
21	Optimize	219.19665	-13.28064	637.65482	2016.683	0	404.0

	d						
22	Optimize d	220.0135	-13.532755	651.27732	2011.4465	0	399.93
23	Optimize d	221.1309	-13.56743	652.17696	2057.3186	0	394.35
24	Optimize d	223.33865	-13.628455	654.1239	1964.4997	0	383.31
25	Optimize d	225.4278	-13.524565	646.71026	1910.1635	0	372.86
26	Optimize d	227.3984	-13.25576	629.56454	1790.596	0	363.01
27	Optimize d	229.369	-12.986955	612.41883	1670.9782	0	353.16
28	Optimize d	231.3396	-12.718145	595.27311	1551.3605	0	343.3
29	Optimize d	233.16245	-12.234345	564.94405	1489.3278	0	334.19
30	Optimize d	234.7087	-11.589325	524.71395	1369.054	0	326.46
31	Optimize d	236.12605	-10.998075	487.61763	1285.5108	0	319.37
32	Optimize d	237.64635	-10.243347	440.36603	1217.9664	0	311.77
33	Optimize d	239.26965	-9.325141	382.88059	1093.6228	0	303.65
34	Optimize d	240.92555	-8.388489	324.14106	966.8405	0	295.37
35	Optimize d	242.8849	-7.029521	238.97944	914.21878	0	484.31
36	Optimize d	244.64925	-5.634906	151.56843	739.08263	0	480
37	Optimize d	246.48105	-4.060855	52.896415	585.86705	0	480
38	Optimize d	248.73295	-2.040718	-73.679407	489.43258	0	800

4889

4889

 	10 0 0							
	Slip	X (ft)	Y (ft)	DM(D (==f)	Base	Friction	Cohesiv	
	Surfac	X (IL)	Y (IL)	PWP (psf)	Normal	al	e	

-3.6152795

4889 192.5117 1.574085 195.69376 585.33095 0 800 4889 194.55045 0.4439991 213.566 800.69018 0 800 4889 -0.48971595 247.20329 974.03238 3 196.2349 0 -1.4404126 5 4889 199.43075 -2.2612185 636.19959 1178.7189 0 504.67 500.57 6 4889 199.93075 -2.538373 733,91551 1209.0213 0 1124.1838 -2.9269505 383.33641 1155.8827 0 504.31 4889 200.8818 0 646.59 10 4889 201.9151 -3.638312 285.12814 1201.6135 0 642.6 203.74535 -4.6528265 0 635.53 11 4889 4889 205.5756 -5.667341 297.19445 1405.5222 628.46 329.36969 621.39 4889 207.4058 0 13 14 4889 209.2407 7.6989475 366.4107 1639,4222 0 453.8 211.08025 -8.718619 1742.2635 444.6 4889 408.29843 0 452.34284 435.83 16 4889 -9.6903775 1809.8332 0 214.5 -10.614225 427.5 -11.538075 543,55869 1874.4326 18 4889 216.16665 0 419.17 19 4889 -12 0 411.25 1979.8667 20 4889 563.22667 0 403.75 560.2 4889 4889 1814.3 0 385 1724 225 0 24 1633.7 4889 552.4 1543.35 355 25 229 0 26 4889 231 -12 551.4 1453.05 0 345 1362.7 335 233 28 4889 550.13 327.5 1311.8 0 29 4889 235.93525 -11.3205 507.63924 1400.9494 0 320.32 30 4889 237.80575 -9.9614965 422.84095 1220.5054 0 31 4889 239.67625 -8.602491 337.89129 1040.1047 301.62 32 4889 241.45865 -7.307521 256.73374 937.54492 0 489.82 4889 774.8092 483.27 0 34 4889 -4.845838 621.95762 480 10

е

Stress (psf) Strength

(psf)

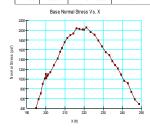
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h (psf)

25.086086	479.09031	0	480

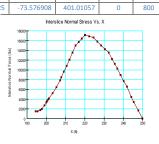
0

800



246.54055

248,7056



401.01057

R18 Slope Stability Global Entry & Exit

File Information

Created By: USACE St. Louis District Revision Number: 720 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 10:21:28 AM File Name: 17thReach18.gsz

Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/27/2013

Last Solved Time: 10:22:38 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global Entry & Exit

Kind: SLOPE/W

Parent: Seepage Analysis (Gap) Method: Spencer

PWP Conditions Source: Parent Analysis

Direction of movement: Left to Right

Use Passive Mode: No

Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1

Optimize Critical Slip Surface Location: Yes Tension Crack

Tension Crack Option: Tension Crack Line

Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf

FOS Distribution FOS Calculation Option: Constant Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 3000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +8.6 TO 0

Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 800 psf Phi: 0° Phi-B: 0°

MARSH 1, EL. -3 TO -7/-8

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: Marsh 1 Phi: 0

Phi-B: 0 °

BEACH SAND, EL. -17 TO -46

Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi-B: 0°

BAY SOUND CLAY, EL. -46 TO -70

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0)

Unit Weight: 0.1 pcf Cohesion: 0.01 psf

MARSH 2, EL. -7/-8 TO -17

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: MARSH 2

Phi-B: 0 °

Fill 2, El. 0 to -3

Model: Spatial Mohr-Coulomb

Weight Fn: Fill Cohesion Fn: Fill Phi: 0 Phi-B: 0 °

Fill 2, El -1.3 to -3 (Protected)

Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 800 psf Phi: 0

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (167.6243, 1.25746) ft

Left-Zone Right Coordinate: (200, 8.6) ft

Left-Zone Increment: 20

Right Projection: Range

Right-Zone Left Coordinate: (222.12125, 4.66665) ft Right-Zone Right Coordinate: (265.1, -1.29614) ft

Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (59.5, -8.9) ft Right Coordinate: (310, -1.4) ft

Tension Crack Line

	X (ft)	Y (ft)
Г	190	0

Cohesion Functions

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 800 Data Points: X (ft), Cohesion (psf) Data Point: (163.4, 800) Data Point: (200, 500) Data Point: (244, 800)

MARSH 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 280 Data Points: X (ft), Cohesion (psf) Data Point: (163.4, 280) Data Point: (200, 500) Data Point: (244, 280)

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 480 Data Points: X (ft), Cohesion (psf) Data Point: (163.4, 480) Data Point: (200, 650) Data Point: (244, 480)

Unit Weight Functions

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 %

Segment Curvature: 0 %
Y-Intercept: 115
Data Points: X (ft), Unit Weight (pcf)
Data Point: (163.4, 115)
Data Point: (200, 112)
Data Point: (244, 115)

Spatial Functions

Bay Sound Cohesion

y Sound Cohesion
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (163.4, -46, 560)
Data Point: (163.4, -70, 795)
Data Point: (200, -46, 780)
Data Point: (200, -70, 1015)
Data Point: (200, -70, 1015)
Data Point: (244, -46, 560)
Data Point: (59.5, -46, 560)
Data Point: (59.5, -46, 560)
Data Point: (310, -46, 560)
Data Point: (310, -46, 560)
Data Point: (310, -70, 795)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL17 TO -46	20,19,33,44,26,16,17,36,34	7792.5
Region 2	Fill 2, El -1.3 to -3 (Protected)	7,27,22,9,8	111.3
Region 3	Sheet Pile	11,10,24,13,12	3.6
Region 4	MARSH 1, EL3 TO -7/-8	15,22,27,28,31,41,2,43,32,30,25	799.65271
Region 5	MARSH 2, EL7/-8 TO -17	1,19,33,44,26,16,15,25,30,32,43	1744.5767
Region 6	BAY SOUND CLAY, EL46 TO -70	20,21,35,37,18,17,36,34	6012
Region 7	EMBANKMENT FILL, EL. +8.6 TO 0	45,42,39,3,23,10,24,29,46	193.86675
Region 8	Fill 2, El. 0 to -3	29,14,28,27,7	110
Region 9	EMBANKMENT FILL, EL. +8.6 TO 0	7,6,5,4,13,24,29	211.6
Region 10	Fill 2, El. 0 to -3	40,38,14,28,31,41	22.875
Region 11	Fill 2, El. 0 to -3	40,38,14,29,46,45	81.911745

Point 34	163.4	-46
Point 35	163.4	-70
Point 36	244	-46
Point 37	244	-70
Point 38	163.4	-2.5
Point 39	168.1	1.4
Point 40	155.08434	-2.5
Point 41	153.41566	-3
Point 42	163.42771	0
Point 43	108.885	-8
Point 44	200	-17
Point 45	160.1	-1
Point 46	163.4	-1

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.21	(223.912, 24.692)	24.52426	(194.273, 7.94312)	(251.906, - 1.11097)
2	6481	2.25	(223.912, 24.692)	38.087 (193.982, 7.87057)		(251.927, - 1.11126)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	195.14695	0.5559997	225.70848	601.00618	0	800
2	Optimize d	196.4607	-0.44264495	253.52194	901.30766	0	529.01
3	Optimize d	196.9623	-0.82393715	247.17138	950.03984	0	524.9
4	Optimize d	198.0123	-1.586163	354.2875	1043.8674	0	516.29
5	Optimize d	199.13745	-2.400518	597.11987	1132.4738	0	507.07

Points

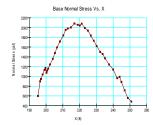
	X (ft)	Y (ft)
Point 1	59.5	-8.9
Point 2	140.4	-6.9
Point 3	196.9	8.6
Point 4	212	8.3
Point 5	220	5.5
Point 6	234	0
Point 7	244	-1
Point 8	272.5	-1.4
Point 9	310	-1.4
Point 10	200	8.6
Point 11	200	13.3
Point 12	200.5	13.3
Point 13	201	8.5
Point 14	200	-2.5
Point 15	310	-8
Point 16	310	-11
Point 17	310	-46
Point 18	310	-70
Point 19	59.5	-17
Point 20	59.5	-46
Point 21	59.5	-70
Point 22	310	-3
Point 23	199	8.6
Point 24	200	8.5
Point 25	244	-8
Point 26	244	-11
Point 27	244	-3
Point 28	200	-3
Point 29	200	0
Point 30	200	-7
Point 31	163.4	-3
Point 32	163.4	-8
Point 33	163.4	-17

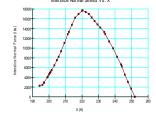
6	Optimize d	199.63745	-2.762404	511.83342	1171.8297	0	502.97
7	Optimize d	200.25	-3.205751	340.78566	1075.2716	0	649.03
8	Optimize d	200.75	-3.567637	327.66232	1121.5273	0	647.1
9	Optimize d	201.29845	-3.96459	317.65454	1161.5983	0	644.98
10	Optimize d	202.4039	-4.753435	310.80528	1245.7877	0	640.71
11	Optimize d	204.01795	-5.899105	332.44919	1360.7267	0	634.48
12	Optimize d	205.34155	-6.802539	358.88087	1477.8695	0	629.36
13	Optimize d	206.57255	-7.590419	385.35987	1595.0418	0	467.14
14	Optimize d	208.30875	-8.653465	424.43871	1717.7918	0	458.46
15	Optimize d	210.3522	-9.864995	475.54142	1840.2026	0	448.24
16	Optimize d	211.68695	-10.623335	509.17814	1952.5459	0	441.57
17	Optimize d	212.94295	-11.23549	537.43298	1979.8983	0	435.29
18	Optimize d	214.8288	-12.154655	582.38192	2003.5883	0	425.86
19	Optimize d	216.8288	-12.876305	618.09561	2084.2535	0	415.86
20	Optimize d	218.94295	-13.400435	644.90745	2057.0284	0	405.29
21	Optimize d	220.14755	-13.69908	660.83751	2040.8304	0	399.26
22	Optimize d	221.2462	-13.72866	661.59296	2081.9808	0	393.77
23	Optimize d	223.14835	-13.71466	659.38503	1994.5043	0	384.26
24	Optimize d	224.9662	-13.59011	650.89065	1940.611	0	375.17

25	Optimize d	226.6998	-13.35501	635.85735	1835.4922	0	366.5
26	Optimize d	228.4334	-13.119905	620.8812	1730.3734	0	357.83
27	Optimize d	230.167	-12.8848	605.8479	1625.1974	0	349.17
28	Optimize d	232.2224	-12.586775	586.90298	1502.9408	0	338.89
29	Optimize d	233.7055	-12.3008	568.86202	1459.2123	0	331.47
30	Optimize d	235.1954	-11.76708	535.45151	1371.3119	0	324.02
31	Optimize d	237.58615	-10.910635	481.74098	1246.6436	0	312.07
32	Optimize d	239.96495	-9.8590535	415.79117	1139.9025	0	300.18
33	Optimize d	242.38525	-8.5842085	335.88853	965.38892	0	288.07
34	Optimize d	243.81105	-7.785709	285.78816	992.23878	0	480.73
35	Optimize d	244.9462	-6.902536	230.47221	887.27214	0	480
36	Optimize d	246.8386	-5.430212	138.20826	716.06541	0	480
37	Optimize d	248.7591	-3.847025	38.996388	557.66113	0	480
38	Optimize d	250.81985	-2.055483	-73.234985	487.63122	0	800

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strength (psf)	Cohesiv e Strengt h (psf)
1	6481	194.50615	0.5009985	212.45426	375.15576	0	800
2	6481	195.965	-1.1470945	221.76586	880.15866	0	533.07
3	6481	197.07195	-2.329198	200.89922	1044.8484	0	524
4	6481	197.5037	-2.75	267.26821	1099.0143	0	520.46

5	6481	198.38175	-3.5587365	304.1294	1156.3853	0	642.48
6	6481	199.5	-4.5351055	359.26278	1276.6454	0	647.68
7	6481	200.25	-5.150962	373.82873	1252.0144	0	649.03
8	6481	200.75	-5.54072	371.64576	1310.5002	0	647.1
9	6481	201.9435	-6.398934	380.26028	1418.9268	0	642.49
10	6481	203.7983	-7.632672	416.43103	1610.6522	0	481.01
11	6481	205.6209	-8.6989385	448.95241	1742.849	0	471.9
12	6481	207.4435	-9.6353535	482.00346	1860.3512	0	462.78
13	6481	209.2661	-10.45234	512.9805	1964.4585	0	453.67
14	6481	211.0887	-11.1581	541.14986	2056.0595	0	444.56
15	6481	213	-11.78325	567.4494	2101.9483	0	435
16	6481	215	-12.3232	591.20427	2101.2008	0	425
17	6481	217	-12.748605	610.48254	2087.0282	0	415
18	6481	219	-13.063345	625.3291	2059.9864	0	405
19	6481	221.03465	-13.27189	634.92706	2014.4092	0	394.83
20	6481	223.1039	-13.372295	639.02086	1950.0137	0	384.48
21	6481	225.17315	-13.359995	636.93098	1872.3945	0	374.13
22	6481	227.2424	-13.23488	628.3392	1781.514	0	363.79
23	6481	229.05745	-13.03762	615.60426	1691.4786	0	354.71
24	6481	230.8784	-12.73755	596.60611	1589.2332	0	345.61
25	6481	232.95945	-12.28935	568.37011	1459.8295	0	335.2
26	6481	234.94735	-11.74792	534.38442	1355.4341	0	325.26
27	6481	236.84205	-11.119	494.8759	1277.1023	0	315.79
28	6481	238.73675	-10.376499	448.2789	1185.8399	0	306.32
29	6481	240.63145	-9.5129895	394.10806	1080.6036	0	296.84
30	6481	242.52615	-8.518987	331.79357	960.22851	0	287.37
31	6481	243.73675	-7.8275435	288.40965	940.52194	0	481.02
32	6481	245.01025	-6.9944015	236.17882	858.2441	0	480
33	6481	247.03075	-5.549461	145.59307	719.7475	0	480
34	6481	249.05125	-3.8885865	41.521949	558.70489	0	480
35	6481	250.99425	-2.0556275	-73.263371	539.12559	0	800





R19 Slope Stability Global Block

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File Information

Created By: USACE St. Louis District
Revision Number: 946
Last Edited By: Redell, Chris MVS
Date: 2/27/2013
Time: 10:36:05 AM
File Name: 17thReach19.gsz
Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case
_LWL_and_Hlgh_water_analyses\High water cases\
Last Solved Date: 2/27/2013

Last Solved Time: 10:38:34 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Slope Stability Global Block
Kind: SLOPE/W
Parent: Seepage Analysis (Gap)
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Block
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: (none)
FOS Distribution

FOS Calculation Option: Constant

Restrict Block Crossing: Yes
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

Phi-B: 0 °

EMBANKMENT FILL 2, EL. +2.0 TO -5.0

Model: Spatial Mohr-Coulomb

Weight Fn: Fill (2)
Cohesion: 500 psf
Phi: 0 °
Phi-B: 0 °

MARSH 1, EL. -5.0 TO -13.0

Model: Spatial Mohr-Coulomb

Weight Fn: Marsh 1
Cohesion Spatial Fn: Marsh 1

BEACH SAND, EL. -36 TO -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 °

BAY SOUND CLAY 1, EL. -40 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf

Cohesion Fn: Bay Sound 1 Phi: 0 ° Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Lacustrine 1, EL. -13.0 TO -36.0

Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1 Phi: 0 * Phi-B: 0 *

Pleistocene, EL. -60 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 124 pcf Cohesion: 1000 psf Phi: 0 ° Phi-B: 0 °

EMBANKMENT FILL, EL. +7.2 TO 0.0

Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion Spatial Fn: Embankment Fill Phi: 0 °

MARSH 2, EL. -13.0 TO -16.0 Model: Spatial Mohr-Coulomb

Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion Fn: MARSH 2 Phi: 0 ° Phi-B: 0 °

BAY SOUND CLAY 2, EL. -50 TO -60

Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Bay Sound 2 Phi: 0 ° Phi-B: 0 °

Rip Rap

Model: Spatial Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 0 psf Phi: 40 ° Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (62, -13.9) ft Right Coordinate: (310, -0.5) ft

Slip Surface Block

Left Grid
Upper Left: (180, -3.5) ft
Lower Left: (180, -49) ft
Lower Right: (219, -49) ft
X Increments: 10
Y Increments: 10
Starting Angle: 135 °
Ending Angle: 180 °
Angle Increments: 5
Right Grid
Upper Left: (230, -49) ft
Lower Right: (269, -49) ft
X Increments: 10
Y Increments: 10
Starting Angle: 0 °
Ending Angle: 0 °

Angle Increments: 5

Cohesion Functions

MARSH 2

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 150
Data Points: X (ft), Cohesion (psf)
Data Points: (190, 150)
Data Point: (200, 340)
Data Point: (228.6, 180)

ay Sound 1
Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 200
Data Points: X (ft), Cohesion (psf)
Data Point: (190, 200)
Data Point: (200, 650)
Data Point: (228.6, 410)

Bay Sound

Model: Spline Data Point Function

```
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 625
Data Points: X (ft), Cohesion (psf)
Data Point: (190, 625)
Data Point: (200, 650)
Data Point: (228.6, 410)
```

Shear/Normal Strength Functions

```
and

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
V-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-10000, 0)
Data Point: (10000, 5773)
Estimation Properties
Intact Rock Param.: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
Sigma3: 300000 psf
```

Unit Weight Functions

Num. Points: 20

```
Fill

Model: Spline Data Point Function
Function: Unit Weight vs. X

Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 101
Data Points: X (ft), Unit Weight (pcf)
Data Point: (188.6, 101)
Data Point: (200, 115)
Data Point: (228.6, 101)

Fill (2)

Model: Spline Data Point Function
Function: Unit Weight vs. X
```

Spatial Functions

Lacustrine 1

Curve Fit to Data: 100 %

Segment Curvature: 0 %

Data Points: X (ft), Unit Weight (pcf)
Data Point: (190, 101)

Data Point: (200, 103) Data Point: (228.6, 101)

Model: Spline Data Point Function

Data Points: X (ft), Unit Weight (pcf)

Data Point: (190, 74)

Data Point: (200, 96)

Data Point: (228.6, 99)

Model: Spline Data Point Function

Curve Fit to Data: 100 %

Segment Curvature: 0 %

Data Points: X (ft), Unit Weight (pcf)

Data Point: (190, 100)

Data Point: (200, 100)

Data Point: (228.6, 99)

Model: Spline Data Point Function

Y-Intercept: 98
Data Points: X (ft), Unit Weight (pcf)

Data Point: (190, 98)

Data Point: (200, 90)

Data Point: (228.6, 98)

Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Function: Unit Weight vs. X

Y-Intercept: 100

Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 74

Lacustrine 1

Marsh 1

Y-Intercept: 101

Marsh 2

Model: Linear Interpolation Limit Range By: Data Values

Data Point: (190, -16, 280) Data Point: (190, -36, 280) Data Point: (200, -18, 340) Data Point: (200, -36, 480) Data Point: (228.6, -13, 180) Data Point: (228.6, -36, 180) Data Point: (310, -13, 180) Data Point: (310, -36, 180) Data Point: (62, -13, 280) Data Point: (62, -36, 280) Marsh 1 Model: Linear Interpolation Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf) Data Point: (190, -5, 200) Data Point: (190, -13, 250) Data Point: (200, -5, 400) Data Point: (200, -15, 400) Data Point: (228.6, -5, 200) Data Point: (228.6, -13, 250) Data Point: (62, -5, 200) Data Point: (62, -13, 250) Data Point: (310, -5, 200) Data Point: (310, -13, 250) Embankment Fill Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (200, 7.2, 1000) Data Point: (190, 2, 500) Data Point: (200, 0, 1000)

Data Point: (228.6, 2, 500)

Data Points: X (ft), Y (ft), Cohesion (psf)

Regions

~B	510113									
		Material	Points	Area (ft²)						
F	Regio n 1	Sheet Pile	7,8,9,10,52,6	6.275						
R	Regio n 2	Lacustrine 1, EL13.0 TO -36.0	16,14,44,20,38	2446.4						
F	Regio	Lacustrine	44,14,16,31,26,27,21	2762.1						

TO -36.0 MARSH 2. Regio FL. -13.0 TO 31.16.57 42.9 -16.0 MARSH 1, Regio EL. -5.0 TO 15,57,31,26,25,74 908.6 n 5 13.0 BEACH Regio SAND, EL. 21,27,28,33,18,40,22 992 n 6 36 TO -40 Pleistocene. Regio EL. -60 TO -23,41,19,34,29,30,35,42,24 2480 n 7 70 BAY SOUND Regio CLAY 2. EL. 41.56.55.23 1280 50 TO -60 Regio CLAY 1, EL. -22,40,18,33,28,29,34,19,41,56,55 3680 n 9 40 TO -60 MARSH 2, Regio EL. -13.0 TO 61,37,57,16,38,20,58,59,60 264.03029 n 10 -16.0 MARSH 1, EL. -5.0 TO -63,64,47,48,15,57,37,61,62 301.62504 n 11 13.0 EMBANKME Regio 6.67.45.12.11.10.52 140.32 NT FILL, EL. n 12 +7.2 TO 0.0 Regio 6,67,66,68,65,70,69,73,64,63,62,61,60,59,58,1,2,54,51,3,50, Rip Rap 135.30281 n 13 36.4.53.5.49 EMBANKME Regio NT FILL, EL. n 14 +7.2 TO 0.0 NT FILL 2, Regio 65,68,45,71 7.0102262 EL. +2.0 TO n 15 5.0 Regio EMBANKME 71.15.48.47.64.73.69.70.65 97.436825

6

8

n 16	NT FILL 2,		
	EL. +2.0 TO -		
	5.0		
	EMBANKME		
Regio	NT FILL 2,	12,46,13,72,71,45	202.61875
n 17	EL. +2.0 TO -	12,40,13,72,71,43	202.010/3
	5.0		
	EMBANKME		
Regio	NT FILL 2,	71 15 74 25 72	368.15625
n 18	EL. +2.0 TO -	71,15,74,25,72	500.15025
	5.0		

Points

	X (ft)	Y (ft)
Point 1	62	-13.9
Point 2	135.6	-13.9
Point 3	166	-8.1
Point 4	181.9	-1
Point 5	190.8	2.3
Point 6	200	4.9
Point 7	200	7.2
Point 8	200	12.5
Point 9	200.5	12.5
Point 10	201	7.2
Point 11	219.5	6.4
Point 12	228.6	2
Point 13	310	-0.5
Point 14	200	-33.8
Point 15	200	-5
Point 16	200	-18
Point 17	200	-36
Point 18	200	-40
Point 19	200	-60
Point 20	62	-16
Point 21	62	-36
Point 22	62	-40

Point 23	62	-60
Point 24	62	-70
Point 25	310	-5
Point 26	310	-13
Point 27	310	-36
Point 28	310	-40
Point 29	310	-60
Point 30	310	-70
Point 31	228.6	-13
Point 32	228.6	-36
Point 33	228.6	-40
Point 34	228.6	-60
Point 35	228.6	-70
Point 36	176.2	-3.7
Point 37	190	-13
Point 38	190	-16
Point 39	190	-36
Point 40	190	-40
Point 41	190	-60
Point 42	190	-70
Point 43	190	-33.8
Point 44	62	-33.8
Point 45	200	0
Point 46	254.9	-0.5
Point 47	180.21184	-5
Point 48	190	-5
Point 49	199	4.9
Point 50	173.44082	-5
Point 51	145.7	-12.2
Point 52	201	4.9
Point 53	189.99091	2
Point 54	140.94706	-13
Point 55	62	-50
Point 56	190	-50
Point 57	200	-15
Point 58	62	-14.9

9			

Point 59	135.6	-14.9
Point 60	140.94706	-14
Point 61	145.7	-13
Point 62	166	-9.1
Point 63	173.44082	-6
Point 64	175.41256	-5
Point 65	189.99091	1
Point 66	199	3.9
Point 67	200	3.9
Point 68	191.5	1.5
Point 69	181.9	-2
Point 70	188.475	0.43792
Point 71	200	-0.75
Point 72	310	-2.55625
Point 73	175.5775	-4.92373
Point 74	228.155	-5

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.71	(236.787, - 0.195)	46.66695	(183.631, - 0.358133)	(286.78, -0.5)
2	34475	1.81	(236.787, - 0.195)	47.32	(183.906, - 0.256148)	(289.667, - 0.5)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	184.0158	- 0.715491 7	543.85026	561.12411	14.494485	0
2	Optimize d	186.5143	3.036425	676.56187	587.4489	0	500
3	Optimize d	189.3095	-5.63297	830.67258	1042.225	0	200

4	Optimize d	190.1127	-6.37906	877.60174	1120.3087	0	210.75
5	Optimize d	190.51725	- 6.734367 5	900.22107	1166.1161	0	220.49
6	Optimize d	191.15	- 7.276323 5	934.76561	1219.6558	0	235.24
7	Optimize d	193.01935	- 8.877386	1036.3957	1376.3705	0	276.12
8	Optimize d	196.05805	- 11.47997	1204.1836	1634.2384	0	335.03
9	Optimize d	198.2887	- 13.35924	1327.2386	1832.461	0	373.18
10	Optimize d	199.5	- 14.34349 5	1392.4654	1924.7097	0	392.36
11	Optimize d	200.14175	- 14.86497	1332.002	1746.2597	0	399.25
12	Optimize d	200.39175	- 15.06811	1237.8967	1807.4905	0	337.81
13	Optimize d	200.75	- 15.35919	1254.8646	1835.7701	0	335.8
14	Optimize d	202.1459	- 16.49342 5	1320.8812	2199.9673	0	328
15	Optimize d	204.07915	- 18.06431	1411.7645	2343.462	0	322.17
16	Optimize d	206.37075	- 20.04884 5	1526.8131	2509.0456	0	322.36
17	Optimize d	209.37925	- 22.73834	1682.0889	2760.3218	0	318.08
18	Optimize d	212.38775	- 25.42783 5	1835.2089	3013.8284	0	308.45
19	Optimize d	215.28215	- 28.04324 5	1983.2185	3258.2413	0	294.6
							12

10

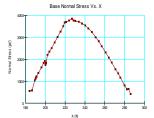
20	Optimize d	218.06245	30.58457 5	2127.4009	3501.9523	0	277.33
21	Optimize d	219.4763	- 31.87112 5	2200.6413	3675.6847	0	267.09
22	Optimize d	220.97575	- 32.87697 5	2256.3986	3703.8756	0	254.6
23	Optimize d	223.9273	- 34.85691	2366.6933	3760.7112	0	227.84
24	Optimize d	226.77905	- 35.85554 5	2416.9914	3841.968	0	199.04
25	Optimize d	228.3775	- 35.86561	2411.1883	3765.7682	0	182.33
26	Optimize d	230.3223	- 35.87785 5	2403.9472	3739.6928	0	180
27	Optimize d	233.71525	- 35.61711 5	2373.852	3707.6852	0	180
28	Optimize d	237.0565	- 35.07395	2326.2615	3621.721	0	180
29	Optimize d	240.3086	- 34.26787 5	2262.4737	3537.5674	0	180
30	Optimize d	243.4716	- 33.19888 5	2182.5033	3400.6892	0	180
31	Optimize d	246.96035	- 31.66562	2071.923	3242.5616	0	180
32	Optimize d	250.7748	- 29.66808	1930.7664	3006.3716	0	180
33	Optimize d	253.791	- 27.86705	1805.1599	2826.7177	0	180
34	Optimize d	256.83505	- 25.66494	1654.2753	2595.7832	0	180
35	Optimize	260.70515	-	1462.5487	2315.8766	0	180
							13

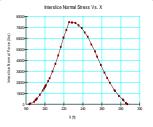
	d		22.86524				
36	Optimize d	264.06335	- 20.37154 5	1292.3365	2072.5462	0	180
37	Optimize d	266.90965	- 18.18385 5	1143.6707	1853.6841	0	180
38	Optimize d	270.79205	- 15.04500 5	931.69178	1547.6661	0	180
39	Optimize d	273.48585	- 12.80499	781.11591	1357.9692	0	248.78
40	Optimize d	275.78275	- 10.91223 8	654.08889	1163.1159	0	236.95
41	Optimize d	279.90745	- 7.516752 5	426.76282	816.03415	0	215.73
42	Optimize d	282.34015	- 5.409505	286.3464	637.03676	0	202.56
43	Optimize d	283.9989	- 3.575228	165.64598	648.09619	0	500
44	Optimize d	286.03355	- 1.325228	17.702599	417.33589	0	500

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	34475	184.2709	- 0.6209018 5	537.94729	553.57228	13.110919	0
2	34475	186.64285	- 2.9928281	673.93089	579.16486	0	500
3	34475	189.32045	-5.670455	832.97606	1040.64	0	200
4	34475	190.39545	-6.745455	900.69619	1150.2098	0	218.28
5	34475	191.15	-7.5	948.60394	1223.1937	0	236.44
6	34475	193.20315	-9.553125	1078.4559	1419.4656	0	281.97

7	34475	196.6094	- 12.959375	1296.9039	1747.7292	0	346.66
8	34475	198.65625	-15.00625	1430.6699	1981.0304	0	314.47
9	34475	199.5	-15.85	1486.2673	2057.2558	0	330.5
10	34475	200.25	-16.6	1363.4574	1908.1983	0	338.6
11	34475	200.75	-17.1	1358.3945	1966.1811	0	335.8
12	34475	201.20225	-17.55223	1384.8104	2267.8365	0	333.27
13	34475	203.16405	- 19.514015	1502.521	2447.7728	0	336.17
14	34475	206.68315	- 23.033125	1711.2508	2773.888	0	337.32
15	34475	210.20225	- 26.552235	1915.2989	3104.0219	0	329.98
16	34475	213.72135	-30.07134	2115.4287	3437.9735	0	314.9
17	34475	217.24045	33.590445	2316.3623	3774.9391	0	292.78
18	34475	219.25	-35.35	2416.4	4161.4	0	276.68
19	34475	221.66375	-35.35	2406.4702	4048.5269	0	251.74
20	34475	225.99125	-35.35	2388.9081	3831.7735	0	207
21	34475	228.3775	-35.35	2379.1011	3715.9551	0	182.3
22	34475	230.2375	-35.35	2371.3893	3689.4656	0	180
23	34475	233.5125	-35.35	2358.0153	3658.0153	0	180
24	34475	236.7875	-35.35	2344.6107	3626.5649	0	180
25	34475	240.0625	-35.35	2331.2366	3595.1145	0	180
26	34475	243.35	- 34.151205	2242.6934	3559.1847	0	180
27	34475	246.65	- 31.753615	2078.7326	3286.8157	0	180
28	34475	249.95	- 29.356025	1914.5756	3014.6917	0	180
29	34475	253.25	- 26.958435	1750.2716	2742.3227	0	180
30	34475	256.6562	- 24.483675	1580.6619	2478.3496	0	180
31	34475	260.16865	- 21.931745	1405.9106	2222.7755	0	180
32	34475	263.6811	-19.37982	1231.4127	1967.1094	0	180

33	34475	267.1935	- 16.827895	1057.2833	1711.4432	0	180
34	34475	270.7059	- 14.275965	883.66061	1455.777	0	180
35	34475	274.2973	- 11.666665	706.75304	1221.3003	0	241.67
36	34475	277.96765	- 8.9999985	526.47194	949.94185	0	225
37	34475	281.638	6.3333335	346.5876	678.56138	0	208.33
38	34475	285.41095	- 3.5921525	161.57076	523.40676	0	500
39	34475	288.5078	- 1.3421525	9.6377259	293.44864	0	500





R19 Slope Stability Global Entry/Exit

File Information

Created By: USACE St. Louis District Revision Number: 946 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 10:36:05 AM File Name: 17thReach19.gsz Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case

_LWL_and_Hlgh_water_ analyses\High water cases\ Last Solved Date: 2/27/2013

Last Solved Time: 10:39:50 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global Entry/Exit Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 2, EL. +2.0 TO -5.0 Model: Spatial Mohr-Coulomb Weight Fn: Fill (2) Cohesion: 500 psf Phi: 0 Phi-B: 0° MARSH 1, EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi-R·∩° BEACH SAND, EL. -36 TO -40 Model: Shear/Normal Fn.

Unit Weight: 122 pcf Strength Function: Sand

BAY SOUND CLAY 1, EL. -40 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Bay Sound 1

Phi-B: 0° **Sheet Pile**

> Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Lacustrine 1. EL. -13.0 TO -36.0

Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1 Phi-B: 0°

Pleistocene, EL. -60 TO -70 Unit Weight: 124 pcf Cohesion: 1000 psf Phi · ∩ ° Phi-B: 0 °

EMBANKMENT FILL, EL. +7.2 TO 0.0

Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion Spatial Fn: Embankment Fill

MARSH 2, EL. -13.0 TO -16.0

Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion Fn: MARSH 2 Phi-B: 0 °

BAY SOUND CLAY 2, EL. -50 TO -60

Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Bay Sound 2 Phi: 0 Phi-B: 0 °

Rip Rap

Model: Spatial Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 0 psf Phi: 40 ° Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (175.05437, -4.23977) ft Left-Zone Right Coordinate: (200, 11.2025) ft

Left-Zone Increment: 20

Right Projection: Range Right-Zone Left Coordinate: (225, 3.74066) ft Right-Zone Right Coordinate: (306.3, -0.5) ft Right-Zone Increment: 20

Radius Increments: 20

Slip Surface Limits

Left Coordinate: (62, -13.9) ft Right Coordinate: (310, -0.5) ft

Cohesion Functions

MARSH 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 150 Data Points: X (ft), Cohesion (psf) Data Point: (190, 150) Data Point: (200, 340) Data Point: (228.6, 180) Bay Sound 1

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 200

Data Points: X (ft), Cohesion (psf)
Data Point: (190, 200) Data Point: (200, 650) Data Point: (228.6, 410)

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 625

Data Points: X (ft), Cohesion (psf) Data Point: (190, 625) Data Point: (200, 650) Data Point: (228.6, 410)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 0

Data Points: Normal Stress (psf), Shear Stress (psf)

Data Point: (-10000, 0)
Data Point: (0, 0)
Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Unit Weight Functions

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 101
Data Points: X (ft), Unit Weight (pcf)

Data Point: (188.6, 101) Data Point: (200, 115)
Data Point: (228.6, 101)

Fill (2)

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 101

Data Points: X (ft), Unit Weight (pcf) Data Point: (190, 101) Data Point: (200, 103)

Data Point: (228.6, 101)

Model: Spline Data Point Function

Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 74
Data Points: X (ft), Unit Weight (pcf) Data Point: (190, 74) Data Point: (200, 96) Data Point: (228.6, 99)

Lacustrine 1

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 100 Data Points: X (ft), Unit Weight (pcf)

Data Point: (190, 100) Data Point: (200, 100) Data Point: (228.6, 99)

Marsh 1

Model: Spline Data Point Function Function: Unit Weight vs. X
Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 98
Data Points: X (ft), Unit Weight (pcf) Data Point: (190, 98) Data Point: (200, 90) Data Point: (228.6, 98)

Spatial Functions

Lacustrine 1

Model: Linear Interpolation Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf) Data Point: (190, -16, 280) Data Point: (190, -36, 280) Data Point: (200, -18, 340) Data Point: (200, -36, 480) Data Point: (228.6, -13, 180) Data Point: (228.6, -36, 180) Data Point: (310, -13, 180)

Data Point: (310, -36, 180) Data Point: (62, -13, 280)

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Data Point: (62, -36, 280)

Marsh 1

Model: Linear Internolation Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (190, -5, 200)
Data Point: (190, -13, 250)
Data Point: (200, -5, 400) Data Point: (200, -15, 400) Data Point: (228.6, -5, 200) Data Point: (228.6, -13, 250) Data Point: (62, -5, 200) Data Point: (62, -13, 250) Data Point: (310, -5, 200) Data Point: (310, -13, 250)

Embankment Fill

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf) Data Point: (200, 7.2, 1000)
Data Point: (190, 2, 500)
Data Point: (200, 0, 1000) Data Point: (228.6, 2, 500)

Regions

	Material	Points	Area (ft²)
Regio n 1	Sheet Pile	7,8,9,10,52,6	6.275
Regio n 2	Lacustrine 1, EL13.0 TO -36.0	16,14,44,20,38	2446.4
Regio n 3	Lacustrine 1, EL13.0 TO -36.0	44,14,16,31,26,27,21	2762.1
Regio n 4	MARSH 2, EL13.0 TO -16.0	31,16,57	42.9
Regio n 5	MARSH 1, EL5.0 TO - 13.0	15,57,31,26,25,74	908.6
Regio	BEACH	21,27,28,33,18,40,22	992

n 6	SAND, EL 36 TO -40		
Regio n 7	Pleistocene, EL60 TO - 70	23,41,19,34,29,30,35,42,24	2480
Regio n 8	BAY SOUND CLAY 2, EL 50 TO -60	41,56,55,23	1280
Regio n 9	BAY SOUND CLAY 1, EL 40 TO -60	22,40,18,33,28,29,34,19,41,56,55	3680
Regio n 10	MARSH 2, EL13.0 TO -16.0	61,37,57,16,38,20,58,59,60	264.03029
Regio n 11	MARSH 1, EL5.0 TO - 13.0	63,64,47,48,15,57,37,61,62	301.62504
Regio n 12	EMBANKME NT FILL, EL. +7.2 TO 0.0	6,67,45,12,11,10,52	140.32
Regio n 13	Rip Rap	6,67,66,68,65,70,69,73,64,63,62,61,60,59,58,1,2,54,51,3,50, 36,4,53,5,49	135.30281
Regio n 14	EMBANKME NT FILL, EL. +7.2 TO 0.0	68,66,67,45	17.775
Regio n 15	EMBANKME NT FILL 2, EL. +2.0 TO - 5.0	65,68,45,71	7.0102262
Regio n 16	EMBANKME NT FILL 2, EL. +2.0 TO - 5.0	71,15,48,47,64,73,69,70,65	97.436825
Regio n 17	EMBANKME NT FILL 2, EL. +2.0 TO - 5.0	12,46,13,72,71,45	202.61875
Regio n 18	EMBANKME NT FILL 2,	71,15,74,25,72	368.15625

EL. +2.0 TO -	
5.0	

Points

	X (ft)	Y (ft)
oint 1	62	-13.9
oint 2	135.6	-13.9
Point 3	166	-8.1
Point 4	181.9	-1
Point 5	190.8	2.3
oint 6	200	4.9
oint 7	200	7.2
oint 8	200	12.5
Point 9	200.5	12.5
oint 10	201	7.2
Point 11	219.5	6.4
Point 12	228.6	2
Point 13	310	-0.5
oint 14	200	-33.8
oint 15	200	-5
oint 16	200	-18
oint 17	200	-36
oint 18	200	-40
oint 19	200	-60
oint 20	62	-16
oint 21	62	-36
oint 22	62	-40
oint 23	62	-60
oint 24	62	-70
oint 25	310	-5
oint 26	310	-13
oint 27	310	-36
oint 28	310	-40
oint 29	310	-60
oint 30	310	-70

Point 31	228.6	-13
Point 32	228.6	-36
Point 33	228.6	-40
Point 34	228.6	-60
Point 35	228.6	-70
Point 36	176.2	-3.7
Point 37	190	-13
Point 38	190	-16
Point 39	190	-36
Point 40	190	-40
Point 41	190	-60
Point 42	190	-70
Point 43	190	-33.8
Point 44	62	-33.8
Point 45	200	0
Point 46	254.9	-0.5
Point 47	180.21184	-5
Point 48	190	-5
Point 49	199	4.9
Point 50	173.44082	-5
Point 51	145.7	-12.2
Point 52	201	4.9
Point 53	189.99091	2
Point 54	140.94706	-13
Point 55	62	-50
Point 56	190	-50
Point 57	200	-15
Point 58	62	-14.9
Point 59	135.6	-14.9
Point 60	140.94706	-14
Point 61	145.7	-13
Point 62	166	-9.1
Point 63	173.44082	-6
Point 64	175.41256	-5
Point 65	189.99091	1
Point 66	199	3.9

200	3.9
191.5	1.5
181.9	-2
188.475	0.43792
200	-0.75
310	-2.55625
175.5775	-4.92373
228.155	-5
	191.5 181.9 188.475 200 310 175.5775

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.75	(237.09, 29.07)	47.53889	(183.412, - 0.439278)	(291.771, - 0.5)
2	2995	1.95	(237.09, 29.07)	60.557	(184.073, - 0.194274)	(289.937, - 0.5)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	183.82835	0.785011 35	548.1802	566.80473	15.627829	0
2	Optimize d	186.3597	-2.888553	668.1489	603.63007	0	500
3	Optimize d	188.68675	- 4.822310 5	780.62242	829.98683	0	500
4	Optimize d	189.4447	-5.387307	815.60437	1050.3917	0	200
5	Optimize d	190.39545	- 6.064492 5	858.5993	1124.6918	0	214.24
6	Optimize d	191.15	-6.60192	893.04654	1180.4658	0	231.61

7	Optimize d	192.51235	- 7.572244 5	955.2955	1279.5875	0	261.57
8	Optimize d	194.8935	-9.25185	1063.7916	1456.3179	0	309.96
9	Optimize d	197.63115	- 11.16899 5	1189.4276	1658.1912	0	360.29
10	Optimize d	199.5	-12.47771	1276.2754	1789.7836	0	391.89
11	Optimize d	200.25	-13.00292	1151.9164	1618.9148	0	398.6
12	Optimize d	200.71925	-13.33152	1138.2689	1656.3856	0	396.02
13	Optimize d	200.96925	-13.51075	1148.1446	1639.0839	0	394.67
14	Optimize d	201.7696	- 14.17944 5	1185.2767	1955.5844	0	390.5
15	Optimize d	203.89205	-15.95275	1285.3257	2141.1317	0	318.23
16	Optimize d	205.4462	- 17.25127 5	1359.0826	2259.9284	0	310.75
17	Optimize d	207.0427	- 18.65974 5	1439.4991	2379.3893	0	310.98
18	Optimize d	209.8331	-21.14025	1581.3759	2610.833	0	307.63
19	Optimize d	212.8856	-23.82165	1733.5579	2867.1423	0	298.58
20	Optimize d	216.2002	-26.70395	1896.2661	3140.7889	0	282.98
21	Optimize d	218.67875	- 28.68794 5	2007.5028	3371.1826	0	267.37
22	Optimize d	220.8963	-30.15374	2088.3041	3446.1528	0	250.63
23	Optimize	223.68885	-	2190.5296	3496.3395	0	227.17

10

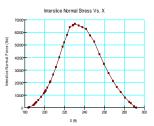
	d		31.99964 5				
24	Optimize d	226.62005	-33.19305	2252.2053	3558.3592	0	199.57
25	Optimize d	228.3775	-33.5027	2264.2239	3506.2164	0	182.22
26	Optimize d	229.43915	-33.68975	2271.3442	3506.1302	0	180
27	Optimize d	232.154	-33.7032	2260.8702	3518.6758	0	180
28	Optimize d	235.90545	-33.4344	2228.539	3455.9277	0	180
29	Optimize d	239.6569	-33.1656	2196.1812	3393.1797	0	180
30	Optimize d	243.5496	-32.30235	2125.9706	3313.1373	0	180
31	Optimize d	247.5836	- 30.84465 5	2017.8174	3129.1907	0	180
32	Optimize d	252.2503	-28.49809	1851.1856	2886.2969	0	180
33	Optimize d	257.22605	- 25.46025 5	1639.8114	2557.3491	0	180
34	Optimize d	261.8093	-22.53664	1437.4743	2272.9468	0	180
35	Optimize d	266.32375	- 19.52963 5	1230.6065	1972.628	0	180
36	Optimize d	270.4926	- 16.76959 5	1041.2045	1695.8451	0	180
37	Optimize d	274.3802	-14.21419	866.29296	1440.664	0	180
38	Optimize d	278.4797	- 11.27845 3	667.28431	1189.669	0	239.24
39	Optimize d	282.7267	- 8.004717	447.06296	856.19466	0	218.78

			5				
40	Optimize d	285.6568	-5.683925	291.35284	629.58918	0	204.27
41	Optimize d	288.1006	-3.611768	152.86189	567.74944	0	500
42	Optimize	290.75415	-1.361768	2.474289	337.90518	0	500

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	2995	184.30565	- 0.6080178 5	537.14373	547.58281	8.7594261	0
2	2995	185.782	-3.010881	675.71888	432.19239	0	500
3	2995	187.75035	- 6.0189115	853.03084	1014.8712	0	200
4	2995	189.23295	- 8.0159065	977.33664	1236.3488	0	207.87
5	2995	190.39545	-9.483949	1069.0335	1387.3435	0	234.56
6	2995	191.15	- 10.381469	1125.4245	1478.3529	0	251.93
7	2995	192.94965	- 12.334445	1248.191	1677.0679	0	289.09
8	2995	196.5306	- 15.806115	1471.7103	2069.25	0	274.08
9	2995	198.83095	-17.87017	1608.9348	2291.5389	0	333.69
10	2995	199.5	-18.40387	1645.1381	2352.7733	0	340.7
11	2995	200.25	- 18.991395	1508.5684	2200.3594	0	346.56
12	2995	200.75	-19.37057	1496.28	2249.5556	0	347.1
13	2995	202.85	- 20.827585	1583.1446	2657.4793	0	346.72
14	2995	206.55	-23.17839	1720.7707	2894.279	0	339.01
15	2995	210.25	- 25.175085	1829.5927	3094.8623	0	323.35

16	2995	213.95	- 26.855885	1916.1366	3262.5719	0	301.59
17	2995	217.65	-28.24876	1985.0515	3400.0494	0	275.16
18	2995	221.66375	-29.44659	2041.1401	3416.4987	0	242.54
19	2995	225.99125	30.420655	2082.6807	3314.7341	0	204.2
20	2995	228.3775	30.856665	2099.5018	3250.5474	0	182.09
21	2995	230.47855	- 31.095435	2105.3999	3250.4735	0	180
22	2995	234.2357	31.390535	2107.8471	3252.3105	0	180
23	2995	237.99285	-31.45118	2095.8276	3230.8191	0	180
24	2995	241.75	-31.27808	2069.2461	3186.2929	0	180
25	2995	245.50715	-30.8692	2027.9599	3118.073	0	180
26	2995	249.2643	30.219645	1971.642	3026.4365	0	180
27	2995	253.02145	- 29.321345	1899.7406	2910.017	0	180
28	2995	256.7391	- 28.177545	1812.6691	2787.7129	0	180
29	2995	260.4173	-26.77811	1709.8524	2658.176	0	180
30	2995	264.09555	-25.09294	1589.2175	2500.6855	0	180
31	2995	267.7738	-23.09416	1449.1137	2312.7141	0	180
32	2995	271.452	20.743725	1287.2243	2090.545	0	180
33	2995	275.1302	-17.98842	1100.3035	1829.2511	0	180
34	2995	278.8084	- 14.750875	883.58141	1521.5802	0	180
35	2995	282.27405	- 11.173771	646.84452	1218.0828	0	238.59
36	2995	285.52715	- 7.1737705	384.85062	831.28618	0	213.59
37	2995	288.04805	- 3.6052375	152.64923	733.64213	0	500
38	2995	289.43945	- 1.3552375	6.9880301	544.78834	0	500





R30 Slope Stability Global (Block) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 918 Last Edited By: Goltz, Amanda MVS Date: 2/25/2013 Time: 11:01:34 AM File Name: 17thReach30.gsz Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/25/2013 Last Solved Time: 11:04:12 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global (Block) Kind: SLOPE/W Parent: Steady-State Seepage Global Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: Search for Tension Crack Percentage Wet: 1 Tension Crack Fluid Unit Weight: 62.4 pcf

FOS Distribution FOS Calculation Option: Constant Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 **Ending Optimization Points: 16** Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL, EL. +8.2 TO +1.0 Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 850 psf Phi-B·∩° BEACH SAND, EL. -15 TO -46 Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi-B: 0 ° BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Clay Cohesion Spatial Fn: Bay Sound Cohesion Phi-B: 0 ° EMBANKMENT FILL 2, EL +1 TO -5 Model: Spatial Mohr-Coulomb

Unit Weight: 105 pcf Cohesion Fn: Emb. Fill

Phi: 0 °

Phi-B: 0 °

```
MARSH 1, EL. -7 TO -11
    Model: Spatial Mohr-Coulomb
     Unit Weight: 90 pcf
     Cohesion: 270 psf
     Phi · ∩ °
     Phi-B: 0°
MARSH 2, EL. -11 TO -13
     Unit Weight: 90 pcf
     Cohesion: 180 psf
     Phi · ∩ °
     Phi-B: 0 °
Embankment Fill 1, El. -3 to -5
    Model: Spatial Mohr-Coulomb
Unit Weight: 100 pcf
     Cohesion: 800 psf
     Phi: 0 °
Embankment Fill 2, El. -5 to -7
    Model: Spatial Mohr-Coulomb
Unit Weight: 100 pcf
     Cohesion: 500 psf
     Phi-B: 0 °
MARSH 3, EL. -13 TO -15
    Model: Spatial Mohr-Coulomb
     Unit Weight: 90 pcf
     Cohesion: 285 psf
     Phi-B: 0 °
MARSH 1, EL. -7 TO -11 CL
    Model: Spatial Mohr-Coulomb
     Unit Weight: 90 pcf
     Cohesion Fn: MARSH 1
    Phi-B: 0°
MARSH 2. EL. -11 TO -13 CL
    Model: Spatial Mohr-Coulomb
     Unit Weight: 90 pcf
```

Cohesion Fn: MARSH 2

```
Phi-B: 0°
MARSH 3, EL. -13 TO -15 CL
     Model: Spatial Mohr-Coulomb
     Unit Weight: 90 pcf
     Cohesion Fn: Marsh 3
     Phi-B: 0°
EMBANKMENT FILL 3, EL -5 TO -7
     Model: Spatial Mohr-Coulomb
      Unit Weight: 105 pcf
     Cohesion Fn: Emb. Fill 2
     Phi-B: 0°
Slip Surface Limits
     Left Coordinate: (61, -11) ft
Right Coordinate: (310, -3.8) ft
Slip Surface Block
     Left Grid
           Upper Left: (184, -10) ft
           Lower Left: (184, -46) ft
Lower Right: (214, -46) ft
            X Increments: 10
           Y Increments: 10
           Starting Angle: 115 °
           Ending Angle: 180
           Angle Increments: 5
     Right Grid
           Upper Left: (220, -10) ft
           Lower Left: (220, -46) ft
Lower Right: (250, -46) ft
           X Increments: 10
Y Increments: 10
           Starting Angle: 25 °
Ending Angle: 45 °
```

Cohesion Functions

MARSH 1

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 270 Data Points: X (ft), Cohesion (psf) Data Point: (181.1, 270)
Data Point: (200, 300) Data Point: (236.7, 270)

MARSH 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 180

Data Points: X (ft), Cohesion (psf)
Data Point: (181.1, 180) Data Point: (200, 300) Data Point: (236.7, 180)

Marsh 3

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 285 Data Points: X (ft), Cohesion (psf) Data Point: (181.1, 285)
Data Point: (200, 300) Data Point: (236.7, 285)

Emb. Fill

Model: Spline Data Point Function

Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 800 Data Points: X (ft), Cohesion (psf) Data Point: (181.6, 800) Data Point: (200, 280) Data Point: (236.7, 800)

Emb. Fill 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 500 Data Points: X (ft), Cohesion (psf)
Data Point: (181.6, 500)

Data Point: (200, 280) Data Point: (236.7, 500)

Unit Weight Functions

Bay Sound Clay

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 104

Data Points: X (ft), Unit Weight (pcf)
Data Point: (181.1, 104) Data Point: (200, 102)
Data Point: (236.7, 104)

Spatial Functions

Bay Sound Cohesion

Model: Linear Interpolation Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.1, -46, 490)
Data Point: (181.1, -70, 710)
Data Point: (200, -46, 765) Data Point: (200, -70, 975)
Data Point: (236.7, -46, 490)
Data Point: (236.7, -70, 710)

Regions

5

 -0							
	Points	Area (ft²)	Material				
Region 1	2,5,6,3	3.525					
Region 2	20,19,11,21	146.6	Embankment Fill 2, El5 to -7				
Region 3	10,20,21,4,15	95.04	Embankment Fill 1, El3 to -5				

Region 4	28,29,25,24	51.24255	Embankment Fill 2, El5 to -7
Region 5	27,39,28,24,23	35.173485	Embankment Fill 1, El3 to -5
Region 6	36,13,18,37	5976	BAY SOUND CLAY, EL46 TO -70
Region 7	2,7,22,31,14,3	89.05	EMBANKMENT FILL, EL. +8.2 TO +1.0
Region 8	2,16,34,33,17,26,7	79.944595	EMBANKMENT FILL, EL. +8.2 TO +1.0
Region 9	46,30,1,9,43,29,25,57	154.62147	MARSH 1, EL7 TO -11
Region 10	35,54,47,53	240.2	MARSH 3, EL13 TO -15
Region 11	48,19,11,50	293.2	MARSH 1, EL7 TO -11
Region 12	49,48,50,42,51	146.6	MARSH 2, EL11 TO -13
Region 13	52,49,51,12	146.6	MARSH 3, EL13 TO -15
Region 14	30,46,56,47,54,38	240.2	MARSH 2, EL11 TO -13
Region 15	36,35,53,55,52,12,13	7719	BEACH SAND, EL15 TO -46
Region 16	53,47,49,52,55	111.2	MARSH 3, EL13 TO -15 CL
Region 17	46,57,25,41,19,48	222.4	MARSH 1, EL7 TO -11 CL
Region 18	47,56,46,48,49	111.2	MARSH 2, EL11 TO -13 CL
Region 19	25,24,20,19,41	111.2	EMBANKMENT FILL 3, EL -5 TO -7
Region 20	24,23,27,8,44,26,7,22,32,10,20	330.52795	EMBANKMENT FILL 2, EL +1 TO -5

Points

	X (ft)	Y (ft)
Point 1	133.1	-10.6
Point 2	200	8.2
Point 3	201	8.2
Point 4	310	-3.8

Point 5	200	12.9
Point 6	200.5	12.9
Point 7	200	1
Point 8	178.4	-0.3
Point 9	140.6	-9.7
Point 10	236.7	-3
Point 11	310	-7
Point 12	310	-15
Point 13	310	-46
Point 14	203.5	7.7
Point 15	254.4	-3.8
Point 16	199	8.2
Point 17	191.5	6.1
Point 18	310	-70
Point 19	236.7	-7
Point 20	236.7	-5
Point 21	310	-5
Point 22	223.5	1
Point 23	181.1	-3
Point 24	181.1	-5
Point 25	181.1	-7
Point 26	181.06094	1
Point 27	167.54255	-3
Point 28	159.5	-5
Point 29	151.45745	-7
Point 30	128.58	-11
Point 31	212	4.6
Point 32	229.9	-1
Point 33	194.71429	7
Point 34	198.28572	8
Point 35	61	-15
Point 36	61	-46
Point 37	61	-70
Point 38	61	-11
Point 39	163.50524	-4
Point 40	200	-12.4

Point 41	200	-7
Point 42	310	-12.4
Point 43	141.50175	-9.47575
Point 44	179.74326	0.35625
Point 45	200	-3.74756
Point 46	181.1	-11
Point 47	181.1	-13
Point 48	236.7	-11
Point 49	236.7	-13
Point 50	310	-11
Point 51	310	-13
Point 52	236.7	-15
Point 53	181.1	-15
Point 54	61	-13
Point 55	200	-15
Point 56	181.1	-12.4
Point 57	181.1	-10.10499

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.47	(222.096, 2.151)	23.72698	(194.21, 6.85891)	(247.809, - 3.50208)
2	7220	1.67	(222.096, 2.151)	24.464	(193.593, 6.6861)	(250.036, - 3.60274)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	194.46235	0.7067154	-36.658184	167.66266	0	436.5
2	Optimize d	194.91425	0.1806804	-17.660863	479.42448	0	423.73
3	Optimize d	196.33925	-1.147705	36.248054	731.25848	0	383.46

Optimize

Optimize

Optimize 6

Optimize

Optimize 8

Optimize 9

Optimize 10

Optimize 11

Optimize 13

Optimize 14

Optimize 15

Optimize 16

Optimize 17

Optimize

Optimize 19

Optimize 20

Optimize

Optimize 22

18

21

12

197.925

198.64285

200.1094

200.3594

200.6244

200.8744

201.6545

202.9045

203.89195

205.07165

206.6472

207.6468

208.869

210.9397

212.893

214.7073

216.54985

218.39235

199.5

-2.617927

-3.363399

-4.2535275

-4.8863855

-5.146007

-5.421212

-5.667101

-6.391896

-7.5533215

-8.4707965

-9.3762125

-10.458738

-11.14553

-11.718295

-12.59388

-13.41984

-13.94992

-14.25486

-14.5598

101.6782

136.24454

176.05106

158.20458

67.27599

26.342001

41.689537

86.866342

159.54578

216.50933

271.37673

337.0696

378.61351

412.78807

465.4692

515.7417

547.76389

565.91559

584.12084

877.12467

975.94988

1085.8829

1153.8353

1178.3474

1203.7804

1257.4234

1311.1943

1385.2847

1433.9561

1540.628

1570.6026

1596.7334

1683.1033

1676.8097

1668.0513

1740.7433

1702.5123

1664.2277

338.64

318.35

294.13

281.55

282.15

283.74

285.24

289.92

297.63

296.82

295.85

294.57

275

271

264.23

294.73

293.99

293.24

292.48

10

0

0

0

0

0

0

0

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0

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0

0

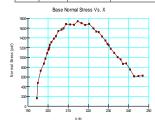
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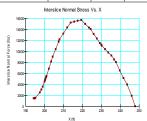
23	Optimize d	220.3602	-14.626055	587.39927	1687.0648	0	291.68
24	Optimize d	222.4534	-14.453625	575.82936	1595.3625	0	290.82
25	Optimize d	223.91445	-14.33327	567.70797	1532.6853	0	290.23
26	Optimize d	225.13865	-14.119135	553.87316	1520.4267	0	289.73
27	Optimize d	226.7581	-13.759145	530.78707	1432.9648	0	289.06
28	Optimize d	228.37755	-13.399155	507.70099	1345.5029	0	288.4
29	Optimize d	229.54365	-13.145265	491.40478	1278.1855	0	287.92
30	Optimize d	230.0721	-13.035685	484.3587	1250.7408	0	287.71
31	Optimize d	231.09155	-12.82429	470.75926	1180.596	0	198.34
32	Optimize d	232.7862	-12.472865	448.15616	1093.8699	0	192.8
33	Optimize d	234.48085	-12.12144	425.5415	1007.086	0	187.26
34	Optimize d	236.0141	-11.66706	396.57508	959.29027	0	182.24
35	Optimize d	237.188	-11.19013	366.35353	868.80456	0	180
36	Optimize d	238.70075	-10.32438	311.73892	880.10541	0	270
37	Optimize d	240.6815	-8.9926675	227.85501	754.73481	0	270
38	Optimize d	242.62665	-7.6412075	142.73687	615.09198	0	270
39	Optimize d	244.80245	-5.976985	37.994082	620.23387	0	500
40	Optimize d	246.8988	-4.251039	-70.582734	625.67176	0	800

Slic	es of S	Slip Surf	face: 7220					
		Slip	X (ft)	Y (ft)	PWP (psf)	Base	Friction	Cohesiv

	Surfac				Normal	al	e
	e				Stress (psf)	Strengt h (psf)	Strengt h (psf)
1	7220	194.15375	0.2825542	-11.956149	336.2286	0	445.22
2	7220	195.60595	-1.5761688	60.46393	667.19533	0	404.18
3	7220	197.39165	-3.8617795	164.86243	937.28018	0	353.71
4	7220	198.64285	-5.4632315	233.35112	1145.9399	0	296.23
5	7220	199.42175	-6.460175	273.30952	1255.4604	0	286.91
6	7220	199.92175	-7.100146	300.0779	1305.8377	0	299.88
7	7220	200.25	-7.5202775	237.73153	1339.5563	0	299.8
8	7220	200.75	-8.160248	200.41013	1391.2718	0	299.39
9	7220	201.98435	-9.7401165	300.01908	1498.4535	0	298.38
10	7220	203.23435	-11.340045	398.36926	1606.8715	0	289.42
11	7220	204.0156	-12.340045	458.53923	1664.007	0	286.87
12	7220	204.7656	-13.3	515.08325	1705.912	0	298.05
13	7220	205.875	-13.6	530.38857	2121.6	0	297.6
14	7220	207.625	-13.6	529.31429	2048.1714	0	296.88
15	7220	209.375	-13.6	528.51429	1974.7429	0	296.17
16	7220	211.125	-13.6	527.70857	1901.3143	0	295.45
17	7220	212.95835	-13.6	526.85208	1830.0519	0	294.7
18	7220	214.875	-13.6	525.96513	1761.0258	0	293.92
19	7220	216.79165	-13.6	525.13034	1691.9997	0	293.14
20	7220	218.70835	-13.6	524.29556	1622.9215	0	292.35
21	7220	220.625	-13.6	523.46078	1553.8954	0	291.57
22	7220	222.54165	-13.6	522.67817	1484.8171	0	290.79
23	7220	224.56665	-13.6	521.81258	1415.2971	0	289.96
24	7220	226.7	-13.6	520.92196	1345.2658	0	289.09
25	7220	228.83335	-13.6	520.03133	1275.1877	0	288.22
26	7220	230.95	-13.6	519.14286	1207.7143	0	287.35
27	7220	232.5412	-13.3	499.78224	1294.6843	0	286.7
28	7220	233.98445	-12.5	449.33617	1131.5943	0	188.88
29	7220	235.79325	-11.497375	386.09597	974.96986	0	182.96
30	7220	237.60085	-10.495406	322.87567	860.40631	0	270
31	7220	239.40255	-9.4967175	259.84038	756.95755	0	270
32	7220	241.2042	-8.4980305	196.78566	653.50879	0	270
33	7220	243.00585	-7.4993435	133.72609	550.01148	0	270

	34	7220	244.80875	-6.5	70.612533	535.32687	0	500
ľ	35	7220	246.6128	-5.5	7.4457074	421.17358	0	500
ſ	36	7220	248 77515	-4 301368	-68 252624	407 10083	0	800





R30 Slope Stability Global (Entry/Exit) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 918 Last Edited By: Goltz, Amanda MVS Date: 2/25/2013 Time: 11:01:34 AM File Name: 17thReach30.gsz

Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case

_LWL_and_Hlgh_water_ analyses\High water cases\ Last Solved Date: 2/25/2013

Last Solved Time: 11:05:20 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global (Entry/Exit)

Kind: SLOPE/W Parent: Steady-State Seepage Global Method: Spencer

PWP Conditions Source: Parent Analysis

Direction of movement: Left to Right Use Passive Mode: No

Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1

Optimize Critical Slip Surface Location: Yes

Tension Crack

Tension Crack Option: Search for Tension Crack

Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf

Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL, EL. +8.2 TO +1.0 Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 850 psf Phi-B: 0° BEACH SAND, EL. -15 TO -46 Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ⁴ Phi-B: 0 ° BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Clay Cohesion Spatial Fn: Bay Sound Cohesion Phi-B: 0° EMBANKMENT FILL 2, EL +1 TO -5 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Emb. Fill Phi-B: 0 ° MARSH 1. EL. -7 TO -11

FOS Distribution

Advanced

FOS Calculation Option: Constant

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000

Unit Weight: 90 pcf Cohesion: 270 psf Phi-B: 0°

MARSH 2, EL. -11 TO -13

Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 180 psf Phi-B: 0 °

Embankment Fill 1, El. -3 to -5

Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 800 psf Phi-B: 0 °

Embankment Fill 2, El. -5 to -7

Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 500 psf Phi-B: 0 °

MARSH 3, EL. -13 TO -15

Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 285 psf Phi-B: 0 °

MARSH 1, EL. -7 TO -11 CL

Model: Snatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1 Phi: 0 Phi-B: 0°

MARSH 2, EL. -11 TO -13 CL

Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Phi-B: 0 °

MARSH 3, EL. -13 TO -15 CL

Model: Spatial Mohr-Coulomb

Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi · ∩ ° Phi-B: 0°

EMBANKMENT FILL 3, EL -5 TO -7

Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Emb. Fill 2 Phi: ∩ ° Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (167.54255, -3) ft Left-Zone Right Coordinate: (199.04061, 8.2) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (224.45992, 0.70002) ft Right-Zone Right Coordinate: (254.4, -3.8) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (61, -11) ft Right Coordinate: (310, -3.8) ft

Cohesion Functions

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 270 Data Points: X (ft), Cohesion (psf) Data Point: (181.1, 270) Data Point: (200, 300) Data Point: (236.7, 270)

MARSH 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 180 Data Points: X (ft), Cohesion (psf)
Data Point: (181.1, 180)

Data Point: (200, 300) Data Point: (236.7, 180)

Marsh 3

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 285 Data Points: X (ft), Cohesion (psf)

Data Point: (181.1, 285)
Data Point: (200, 300) Data Point: (236.7, 285)

Emb. Fill

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 800 Data Points: X (ft), Cohesion (psf) Data Point: (181.6, 800)
Data Point: (200, 280) Data Point: (236.7, 800)

Emb. Fill 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 500 Data Points: X (ft), Cohesion (psf)

Data Point: (181.6, 500) Data Point: (200, 280) Data Point: (236.7, 500)

Unit Weight Functions

Bay Sound Clay Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 104
Data Points: X (ft), Unit Weight (pcf)
Data Point: (181.1, 104)
Data Point: (200, 102) Data Point: (236.7, 104)

Spatial Functions

Bay Sound Cohesion

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.1, -46, 490)
Data Point: (181.1, -70, 710)

Data Point: (183.1, -76, 710)

Data Point: (200, -46, 765)

Data Point: (200, -70, 975)

Data Point: (236.7, -46, 490)

Data Point: (236.7, -70, 710)

Regions

5

	Points	Area (ft²)	Material	
Region 1	2,5,6,3	3.525		
Region 2	20,19,11,21	146.6	Embankment Fill 2, El5 to -7	
Region 3	10,20,21,4,15	95.04	Embankment Fill 1, El3 to -5	
Region 4	28,29,25,24	51.24255	Embankment Fill 2, El5 to -7	
Region 5	27,39,28,24,23	35.173485	Embankment Fill 1, El3 to -5	
Region 6	36,13,18,37	5976	BAY SOUND CLAY, EL46 TO -70	
Region 7	2,7,22,31,14,3	89.05	EMBANKMENT FILL, EL. +8.2 TO +1.0	
Region 8	2,16,34,33,17,26,7	79.944595	EMBANKMENT FILL, EL. +8.2 TO +1.0	
Region 9	46,30,1,9,43,29,25,57	154.62147	MARSH 1, EL7 TO -11	
Region	35,54,47,53	240.2	MARSH 3, EL13 TO -15	

6

10			
Region 11	48,19,11,50	293.2	MARSH 1, EL7 TO -11
Region 12	49,48,50,42,51	146.6	MARSH 2, EL11 TO -13
Region 13	52,49,51,12	146.6	MARSH 3, EL13 TO -15
Region 14	30,46,56,47,54,38	240.2	MARSH 2, EL11 TO -13
Region 15	36,35,53,55,52,12,13	7719	BEACH SAND, EL15 TO -46
Region 16	53,47,49,52,55	111.2	MARSH 3, EL13 TO -15 CL
Region 17	46,57,25,41,19,48	222.4	MARSH 1, EL7 TO -11 CL
Region 18	47,56,46,48,49	111.2	MARSH 2, EL11 TO -13 CL
Region 19	25,24,20,19,41	111.2	EMBANKMENT FILL 3, EL -5 TO -7
Region 20	24,23,27,8,44,26,7,22,32,10,20	330.52795	EMBANKMENT FILL 2, EL +1 TO -5

Points

	X (ft)	Y (ft)
Point 1	133.1	-10.6
Point 2	200	8.2
Point 3	201	8.2
Point 4	310	-3.8
Point 5	200	12.9
Point 6	200.5	12.9
Point 7	200	1
Point 8	178.4	-0.3
Point 9	140.6	-9.7
Point 10	236.7	-3
Point 11	310	-7
Point 12	310	-15

Point 13	310	-46
Point 14	203.5	7.7
Point 15	254.4	-3.8
Point 16	199	8.2
Point 17	191.5	6.1
Point 18	310	-70
Point 19	236.7	-7
Point 20	236.7	-5
Point 21	310	-5
Point 22	223.5	1
Point 23	181.1	-3
Point 24	181.1	-5
Point 25	181.1	-7
Point 26	181.06094	1
Point 27	167.54255	-3
Point 28	159.5	-5
Point 29	151.45745	-7
Point 30	128.58	-11
Point 31	212	4.6
Point 32	229.9	-1
Point 33	194.71429	7
Point 34	198.28572	8
Point 35	61	-15
Point 36	61	-46
Point 37	61	-70
Point 38	61	-11
Point 39	163.50524	-4
Point 40	200	-12.4
Point 41	200	-7
Point 42	310	-12.4
Point 43	141.50175	-9.47575
Point 44	179.74326	0.35625
Point 45	200	-3.74756
Point 46	181.1	-11
Point 47	181.1	-13
Point 48	236.7	-11

Point 49	236.7	-13
Point 50	310	-11
Point 51	310	-13
Point 52	236.7	-15
Point 53	181.1	-15
Point 54	61	-13
Point 55	200	-15
Point 56	181.1	-12.4
Point 57	181.1	-10.10499

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.40	(224.23, 22.744)	22.46408	(196.205, 7.41738)	(248.561, - 3.5361)
2	7405	1.45	(224.23, 22.744)	35.632	(196.002, 7.36067)	(248.305, - 3.52452)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	197.2453	- 0.757936 5	12.873447	608.56109	0	357.85
2	Optimize d	198.64285	-2.115377	73.993763	864.3753	0	318.35
3	Optimize d	199.4854	- 2.933730 5	112.08681	967.32051	0	294.54
4	Optimize d	199.9854	- 3.419721 5	136.36274	1015.9034	0	280.41
5	Optimize d	200.25	- 3.682823 5	33.592951	1039.3023	0	283.54

21	Optimize d	222.4325	- 12.99693 5	485.19225	1433.7035	0	226.65
22	Optimize d	224.3	-12.99573	484.30625	1368.5	0	220.54
23	Optimize d	225.9	- 12.99469 5	483.5625	1315.5625	0	215.31
24	Optimize d	227.5	- 12.99366 5	482.81875	1262.625	0	210.08
25	Optimize d	229.1	- 12.99263 5	482.08125	1209.625	0	204.85
26	Optimize d	231.06215	-12.99137	481.17092	1146.9542	0	198.43
27	Optimize d	232.9774	-12.84404	471.19777	1121.4588	0	192.17
28	Optimize d	234.4836	-12.55088	452.29825	1046.1214	0	187.25
29	Optimize d	235.96835	-12.10075	423.61857	1007.8402	0	182.39
30	Optimize d	237.45205	-11.48519	384.62719	901.37116	0	180
31	Optimize d	238.3424	-11.08659	359.40737	907.09764	0	180
32	Optimize d	239.36615	- 10.44568 5	319.01176	890.29989	0	270
33	Optimize d	241.13705	-9.337055	249.12698	775.71584	0	270
34	Optimize d	243.28705	-7.84997	155.46803	652.97273	0	270
35	Optimize d	245.6884	-5.9586	36.455449	642.69457	0	500
36	Optimize d	247.69325	- 4.268051 5	-69.863431	668.29336	0	800

11

Sli

Optimize

Optimize

Optimize

200.75

201.2874

202.5374

-4.179965

-4.714268

5.957121

-51.482906

-18.262819

59.17988

1082.8429

1123.6038

1218.3681

0

0

0

290.63

298.24

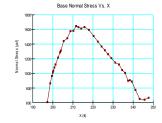
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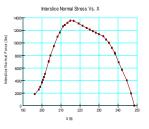
10

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	7405	197.14405	- 0.339620 5	-7.183366	539.02942	0	360.7
2	7405	198.64285	-2.047841	70.624923	849.00909	0	318.3
3	7405	199.5	- 2.898650 5	110.27279	973.38049	0	294.1
4	7405	200.25	-3.608356	29.396564	1062.2584	0	283.5
5	7405	200.75	- 4.054893 5	-59.3079	1111.2898	0	290.6
6	7405	201.4361	- 4.636967 5	-23.156711	1166.4271	0	300.3
7	7405	202.6861	- 5.618257 5	37.855136	1259.1148	0	296.1
8	7405	204.0556	- 6.618257 5	99.941403	1337.0519	0	304.3
9	7405	205.5348	-7.569621	158.46927	1390.0159	0	295.4
10	7405	207.382	-8.635151	222.98599	1433.3451	0	293.9
11	7405	209.2292	- 9.559958 5	278.58343	1462.59	0	292.4
12	7405	211.0764	- 10.35589 8	326.49386	1479.0778	0	290.9
13	7405	212.3933	-10.86147	357.17356	1486.9241	0	289.8
14	7405	213.67935	- 11.27688 5	382.31116	1497.1072	0	255.2
15	7405	215.4649	-11.78044	412.68077	1496.5615	0	249.4
16	7405	217.2505	-	437.01565	1486.2102	0	243.6

Optimize 203.5431 6.957121 121.42793 1288.9334 0 301.24 d Optimize d 204.0034 -7.41479 1312.1919 296.73 10 149.97692 0 Optimize 11 205.34575 8.479552 215.27369 1441.7177 0 295.63 d Optimize 12 9.779497 207.196 294.2827 1479.2631 0 294.12 d Optimize 13 208.7265 10.71473 350.76788 1576.3262 0 292.87 Optimize 210.22125 392.99291 1583.7908 14 11.41906 0 266.58 Optimize 211.5553 15 11.95384 425.4294 1646.8305 0 262.22 Optimize -12.25161 16 212.6996 443.3395 1630.6295 258.48 0 Optimize 17 214.09885 -12.61571 465.25091 1614.0299 0 253.9 Optimize 215.7377 0 18 12.89325 481.68485 1632.856 248.54 5 Optimize 19 217.9534 12.99387 486.95061 1594.1835 0 241.3 d Optimize 20 220.29745 -12.99831 233.63 486.17584 1511.1731 0

			12.18551 5				
17	7405	219.0361	- 12.49551 5	455.4798	1466.3692	0	237.76
18	7405	220.82165	- 12.71294 5	468.20585	1437.3357	0	231.92
19	7405	222.6072	12.83950 5	475.3028	1399.2724	0	226.08
20	7405	224.3	-12.87867	477.01786	1357.685	0	220.54
21	7405	225.9	- 12.83957 5	473.90371	1313.4927	0	215.31
22	7405	227.5	- 12.72830 5	466.29848	1262.0878	0	210.08
23	7405	229.1	- 12.54417 5	454.15259	1203.4706	0	204.85
24	7405	230.8624	-12.2514	435.17144	1131.8276	0	199.09
25	7405	232.7872	- 11.83084 5	408.15915	1045.1097	0	192.79
26	7405	234.712	- 11.29633 5	374.03331	946.88835	0	186.5
27	7405	236.1872	-10.8173	343.54745	892.93866	0	270.42
28	7405	237.5937	-10.27288	309.00954	813.98545	0	270
29	7405	239.38115	9.491108 5	259.50117	749.81519	0	270
30	7405	241.1686	-8.587914	202.40592	674.73561	0	270
31	7405	242.95605	-7.552385	137.05338	587.73196	0	270
32	7405	244.53455	-6.524988	72.289995	628.94516	0	500
33	7405	245.90405	-5.524988	9.3163005	546.23526	0	500
34	7405	247.44695	-4.262262	-70.11656	655.43741	0	800





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File Information

Created By: USACE St. Louis District Revision Number: 972 Last Edited By: Goltz, Amanda MVS Date: 7/30/2014

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File Name: 17thReach30_Modified.gsz Directory: C:\Users\B3ECGANG\Desktop\
Last Solved Date: 7/30/2014

Last Solved Time: 2:35:26 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Slope Stability Global (Entry/Exit) Kind: SLOPE/W Parent: Steady-State Seepage Global Method: Spencer Settings PWP Conditions Source: Parent Analysis Slip Surface Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes Tension Crack
Tension Crack Option: Tension Crack Line Percentage Wet: 1 Tension Crack Fluid Unit Weight: 62.4 pcf FOS Distribution

Cohesion: 270 psf Phi-B: 0 °

MARSH 2, EL. -11 TO -13 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf

Cohesion: 180 psf Phi-B: 0°

Embankment Fill 1, El. -3 to -5

Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 800 psf Phi-B: 0 °

Embankment Fill 2, El. -5 to -7

Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 500 psf Phi-B: 0 °

MARSH 3. EL. -13 TO -15

Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 285 psf Phi: 0° Phi-B: 0 °

Rock/Riprap

Model: Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 40 psf Phi: 0 ° Phi-B: 0 °

MARSH 1, EL. -7 TO -11 CL

Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Phi-B: 0 °

MARSH 2, EL. -11 TO -13 CL Model: Spatial Mohr-Coulomb FOS Calculation Option: Constant

Advanced

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +8.2 TO +1.0

Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 850 psf Phi: 0° Phi-B: 0 °

BEACH SAND, EL. -15 TO -46

Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Phi-B: 0 °

BAY SOUND CLAY, EL. -46 TO -70

Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Clay Cohesion Spatial Fn: Bay Sound Cohesion

EMBANKMENT FILL 2, EL +1 TO -5

Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Phi: 0

MARSH 1, EL. -7 TO -11

Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf

Unit Weight: 90 pcf Cohesion Fn: MARSH 2

Phi-B·∩°

MARSH 3, EL. -13 TO -15 CL

Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi-B: 0 °

EMBANKMENT FILL 3, EL -5 TO -7 Model: Spatial Mohr-Coulomb

Unit Weight: 105 pcf Cohesion Fn: Emb. Fill 2 Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (167.06946, -1.10764) ft Left-Zone Right Coordinate: (199.04061, 8.2) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (236.7, -3) ft Right-Zone Right Coordinate: (254.4, -3.8) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (61, -11) ft Right Coordinate: (310, -3.8) ft

Tension Crack Line

	X (ft)	Y (ft)
Г	191.5	-1
Г	198	1
	200	1

Cohesion Functions

MARSH 1

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 270 Data Points: X (ft), Cohesion (psf) Data Point: (181.1, 270)
Data Point: (200, 300) Data Point: (236.7, 270)

MARSH 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 180

Data Points: X (ft), Cohesion (psf)
Data Point: (181.1, 180) Data Point: (200, 300) Data Point: (236.7, 180)

Marsh 3

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 285 Data Points: X (ft), Cohesion (psf)

Data Point: (181.1, 285)
Data Point: (200, 300) Data Point: (236.7, 285)

Emb. Fill

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 800 Data Points: X (ft), Cohesion (psf) Data Point: (181.6, 800) Data Point: (200, 280) Data Point: (236.7, 800)

2			to -7
Region 3	10,20,21,4,15	95.04	Embankment Fill 1, El3 to -5
Region 4	28,29,25,24	51.24255	Embankment Fill 2, El5 to -7
Region 5	27,39,28,24,23	35.173485	Embankment Fill 1, El3 to -5
Region 6	36,13,18,37	5976	BAY SOUND CLAY, EL46 TO -70
Region 7	2,16,34,33,17,26,7	79.944595	EMBANKMENT FILL, EL. +8.2 TO +1.0
Region 8	46,30,1,9,43,29,25,57	154.62147	MARSH 1, EL7 TO -11
Region 9	35,54,47,53	240.2	MARSH 3, EL13 TO -15
Region 10	48,19,11,50	293.2	MARSH 1, EL7 TO -11
Region 11	49,48,50,42,51	146.6	MARSH 2, EL11 TO -13
Region 12	52,49,51,12	146.6	MARSH 3, EL13 TO -15
Region 13	30,46,56,47,54,38	240.2	MARSH 2, EL11 TO -13
Region 14	36,35,53,55,52,12,13	7719	BEACH SAND, EL15 TO - 46
Region 15	30,63,62,61,60,59,58,8,27,39,28,29,43,9,1	87.044896	Rock/Riprap
Region 16	7,2,3,14,31,22	89.05	EMBANKMENT FILL, EL. +8.2 TO +1.0
Region 17	64,45,7,22,32,10,20	193.4	EMBANKMENT FILL 2, EL +1 TO -5
Region 18	41,64,20,19	73.4	EMBANKMENT FILL 3, EL - 5 TO -7
Region 19	65,41,19,48	146.8	MARSH 1, EL7 TO -11 CL
Region 20	40,65,48,49,66	73.4	MARSH 2, EL11 TO -13 CL
Region	55,52,49,66	73.4	MARSH 3, EL13 TO -15

Emb. Fill 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 500 Data Points: X (ft), Cohesion (psf)
Data Point: (181.6, 500)

Data Point: (200, 280) Data Point: (236.7, 500)

Unit Weight Functions

Bay Sound Clay

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 104

Data Points: X (ft), Unit Weight (pcf)
Data Point: (181.1, 104)
Data Point: (200, 102)
Data Point: (236.7, 104)

Spatial Functions

Bay Sound Cohesion

Model: Linear Interpolation Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.1, -46, 490)
Data Point: (181.1, -70, 710)
Data Point: (200, -46, 765) Data Point: (200, -70, 975)
Data Point: (236.7, -46, 490)
Data Point: (236.7, -70, 710)

Regions

_	0.0			
		Points	Area (ft²)	Material
	Region 1	2,5,6,3	3.525	
	Region	20,19,11,21	146.6	Embankment Fill 2, El5

21			CL
Region 22	53,47,66,55	37.8	MARSH 3, EL13 TO -15 CL
Region 23	47,56,40,66	11.34	MARSH 2, EL11 TO -13 CL
Region 24	56,46,65,40	26.46	MARSH 2, EL11 TO -13 CL
Region 25	65,41,25,57,46	75.6	MARSH 1, EL7 TO -11 CL
Region 26	25,24,64,41	37.8	EMBANKMENT FILL 3, EL - 5 TO -7
Region 27	24,23,27,8,44,26,7,45,64	137.12795	EMBANKMENT FILL 2, EL +1 TO -5

Points

	X (ft)	Y (ft)
Point 1	133.1	-10.6
Point 2	200	8.2
Point 3	201	8.2
Point 4	310	-3.8
Point 5	200	12.9
oint 6	200.5	12.9
oint 7	200	1
Point 8	178.4	-0.3
oint 9	140.6	-9.7
oint 10	236.7	-3
oint 11	310	-7
oint 12	310	-15
oint 13	310	-46
oint 14	203.5	7.7
oint 15	254.4	-3.8
oint 16	199	8.2
Point 17	191.5	6.1
oint 18	310	-70
oint 19	236.7	-7
oint 20	236.7	-5

Point 21	310	-5
Point 22	223.5	1
Point 23	181.1	-3
Point 24	181.1	-5
Point 25	181.1	-7
Point 26	181.06094	1
Point 27	167.54255	-3
Point 28	159.5	-5
Point 29	151.45745	-7
Point 30	128.58	-11
Point 31	212	4.6
Point 32	229.9	-1
Point 33	194.71429	7
Point 34	198.28572	8
Point 35	61	-15
Point 36	61	-46
Point 37	61	-70
Point 38	61	-11
Point 39	163.50524	-4
Point 40	200	-12.4
Point 41	200	-7
Point 42	310	-12.4
Point 43	141.50175	-9.47575
Point 44	179.74326	0.35625
Point 45	200	-3.74756
Point 46	181.1	-11
Point 47	181.1	-13
Point 48	236.7	-11
Point 49	236.7	-13
Point 50	310	-11
Point 51	310	-13
Point 52	236.7	-15
Point 53	181.1	-15
Point 54	61	-13
Point 55	200	-15
Point 56	181.1	-12.4

7	Optimize d	201.08875	- 4.9026245	190.08477	1100.6965	0	295.43
8	Optimize d	201.26225	-5.093035	203.25563	1120.194	0	287.57
9	Optimize d	202.4235	- 6.0969425	272.03308	1265.3699	0	294.53
10	Optimize d	204.39895	- 7.7684775	366.07569	1357.594	0	296.4
11	Optimize d	206.326	-9.146855	378.60717	1482.6373	0	294.83
12	Optimize d	208.38215	- 10.382285	411.9368	1506.6497	0	293.15
13	Optimize d	209.63585	- 11.135575	440.0383	1529.4688	0	268.49
14	Optimize d	210.93075	- 11.609105	453.77226	1618.2775	0	264.26
15	Optimize d	213.0705	-12.28541	478.5812	1597.542	0	257.26
16	Optimize d	214.90595	-12.71781	496.54224	1639.4198	0	251.26
17	Optimize d	216.4359	-12.90591	504.01567	1601.858	0	246.26
18	Optimize d	217.9883	- 12.999275	506.47613	1597.5534	0	241.18
19	Optimize d	219.56305	- 12.997905	503.51064	1540.3392	0	236.03
20	Optimize d	221.1378	- 12.996535	500.67216	1483.125	0	230.88
21	Optimize d	222.7126	- 12.995165	498.90048	1425.9107	0	225.74
22	Optimize d	224.2907	-12.99379	497.12252	1371.0454	0	220.58
23	Optimize d	225.8721	-12.99241	495.33932	1318.6242	0	215.4
24	Optimize d	227.45355	- 12.991035	493.79008	1266.203	0	210.23
25	Optimize d	229.035	-12.98966	492.30407	1213.7818	0	205.06

Point 57	181.1	-10.10499
Point 58	176.4	-0.3
Point 59	170.28297	-0.3
Point 60	167.5	-1
Point 61	151.5	-5
Point 62	140.6	-7.7
Point 63	133.1	-8.6
Point 64	200	-5
Point 65	200	-11
Point 66	200	-13

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.35	(224.149, 22.715)	22.4636	(196.034, 7.36949)	(248.422, - 3.52978)
2	7342	1.39	(224.149, 22.715)	35.594	(196.346, 7.45686)	(248.205, - 3.52)

Slices of Slip Surface: Optimized

		Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
	1	Optimize d	196.7582	- 0.2751586 5	479.59538	537.69161	0	371.62
	2	Optimize d	197.8841	-1.386058	578.49285	776.10656	0	339.8
ľ	3	Optimize d	198.64285	- 2.2186605	654.48692	878.9013	0	318.35
	4	Optimize d	199.5	-3.159236	745.83687	989.66686	0	294.13
	5	Optimize d	200.25	- 3.9822425	471.96595	1023.7626	0	283.54
	6	Optimize d	200.75	- 4.5309135	165.56191	1070.71	0	290.63

26	Optimize d	229.86285	-12.98735	491.432	1198.0386	0	202.36
27	Optimize d	230.9966	- 12.937865	487.40757	1157.8891	0	198.65
28	Optimize d	232.86135	-12.7371	473.68031	1122.0676	0	192.55
29	Optimize d	234.3976	- 12.431305	453.76195	1044.3094	0	187.53
30	Optimize d	235.93285	-11.96277	423.72151	1004.1077	0	182.51
31	Optimize d	237.51715	-11.31092	382.29467	892.20387	0	180
32	Optimize d	239.2508	- 10.376793	323.19365	906.83749	0	270
33	Optimize d	241.0838	9.1809575	247.51953	782.32839	0	270
34	Optimize d	243.07805	-7.79152	159.69321	662.13527	0	270
35	Optimize d	244.7134	-6.59049	83.728003	687.80549	0	500
36	Optimize d	245.9727	-5.59049	20.422417	623.9365	0	500
37	Optimize d	247.54795	- 4.2648915	-63.318664	701.90083	0	800

Slices of Slip Surface: 7342

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	7342	197.3158	- 0.624090 3	516.53675	569.41512	0	355.86
2	7342	198.64285	- 2.106242 5	647.84475	895.21927	0	318.35
3	7342	199.5	- 2.953411 5	733.1006	1015.4785	0	294.13

4	7342	200.25	3.660110 5	450.48243	1053.1857	0	283.54
5	7342	200.75	- 4.104770 5	134.69979	1102.0453	0	290.63
6	7342	201.40755	-4.661446	170.36966	1155.1126	0	299.94
7	7342	202.65755	- 5.638592 5	234.87484	1247.8982	0	295.93
8	7342	204.0272	- 6.638592 5	297.64582	1327.2422	0	304.14
9	7342	205.4851	- 7.573524 5	328.72112	1380.1869	0	295.52
10	7342	207.3465	- 8.645722 5	343.08888	1425.3541	0	293.99
11	7342	209.2079	-9.575063	363.57865	1456.2941	0	292.47
12	7342	211.0693	-10.37365	389.7848	1474.2457	0	290.95
13	7342	212.36835	- 10.87078 5	409.74924	1482.813	0	289.89
14	7342	213.63365	-11.27748	424.09108	1493.697	0	255.42
15	7342	215.42755	- 11.78173 5	442.91631	1494.4386	0	249.56
16	7342	217.22145	-12.18656	461.47941	1485.2814	0	243.69
17	7342	219.0153	- 12.49539 5	475.55559	1466.5322	0	237.82
18	7342	220.80915	- 12.71075 5	484.52272	1438.4225	0	231.96
19	7342	222.60305	- 12.83434 5	489.5649	1401.1118	0	226.09
20	7342	224.3	-	489.76446	1360.1756	0	220.54

			12.86997				
			5				
21	7342	225.9	-12.82719	485.41768	1316.716	0	215.31
22	7342	227.5	-12.71213	476.95285	1265.9756	0	210.08
23	7342	229.1	-12.52408	464.07404	1207.8266	0	204.85
24	7342	230.8437	-12.23091	444.55129	1137.5268	0	199.15
25	7342	232.7311	-11.8156	417.49601	1053.1111	0	192.98
26	7342	234.6185	- 11.29053 5	383.64081	957.45629	0	186.81
27	7342	236.1311	-10.79659	351.80857	903.8727	0	270.47
28	7342	237.58055	- 10.23423 1	315.79567	822.57572	0	270
29	7342	239.3417	- 9.459488 5	266.36469	759.91236	0	270
30	7342	241.10285	- 8.566454 5	209.40508	686.51839	0	270
31	7342	242.86395	-7.544607	144.53763	601.42722	0	270
32	7342	244.42935	- 6.525017 5	79.893068	653.26696	0	500
33	7342	245.799	- 5.525017 5	16.492221	571.74345	0	500
34	7342	247.3444	-4.26	-63.480791	697.23143	0	800

Slope Stability Global (Block)

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File Information

Created By: USACE St. Louis District Revision Number: 972 Last Edited By: Goltz, Amanda MVS Date: 7/30/2014 Time: 2:30:29 PM

File Name: 17thReach30_Modified.gsz Directory: C:\Users\B3ECGANG\Desktop\ Last Solved Date: 7/30/2014 Last Solved Time: 2:33:20 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

FOS Distribution

Slope Stability Global (Block)
Kind: SLOPE/W
Parent: Steady-State Seepage Global
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Block
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack
Tension Crack Option: Tension Crack Line
Percentage Wet: 1
Tension Crack Fluid Unit Weight: 62.4 pcf

```
Unit Weight: 90 pcf
     Cohesion: 270 psf
    Phi-B: 0 °
MARSH 2, EL. -11 TO -13
    Model: Spatial Mohr-Coulomb
     Unit Weight: 90 pcf
     Cohesion: 180 psf
     Phi-B: 0 °
Embankment Fill 1, El. -3 to -5
     Model: Spatial Mohr-Coulomb
    Unit Weight: 100 pcf
Cohesion: 800 psf
     Phi-B: 0 °
Embankment Fill 2, El. -5 to -7
     Model: Spatial Mohr-Coulomb
     Unit Weight: 100 pcf
     Cohesion: 500 psf
     Phi-B: 0 °
MARSH 3, EL. -13 TO -15
    Model: Spatial Mohr-Coulomb
Unit Weight: 90 pcf
     Cohesion: 285 psf
     Phi: 0°
     Phi-B: 0 °
Rock/Riprap
    Model: Mohr-Coulomb
     Unit Weight: 132 pcf
     Cohesion: 40 psf
     Phi: 0
     Phi-B: 0°
MARSH 1, EL. -7 TO -11 CL
    Model: Spatial Mohr-Coulomb
     Unit Weight: 90 pcf
```

Cohesion Fn: MARSH 1

Phi-B: 0 °

```
FOS Calculation Option: Constant
     Restrict Block Crossing: Yes
     Advanced
          Number of Slices: 30
          Optimization Tolerance: 0.01
          Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
          Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
          Ending Optimization Points: 16
          Complete Passes per Insertion: 1
          Driving Side Maximum Convex Angle: 5 °
          Resisting Side Maximum Convex Angle: 1 °
Materials
EMBANKMENT FILL, EL. +8.2 TO +1.0
     Model: Spatial Mohr-Coulomb
Unit Weight: 115 pcf
     Cohesion: 850 psf
     Phi-B: 0°
BEACH SAND, EL. -15 TO -46
     Model: Spatial Mohr-Coulomb
Unit Weight: 122 pcf
     Cohesion: 0 psf
     Phi: 30 <sup>1</sup>
     Phi-B: 0 °
BAY SOUND CLAY, EL. -46 TO -70
     Model: Spatial Mohr-Coulomb
     Weight Fn: Bay Sound Clay
     Cohesion Spatial Fn: Bay Sound Cohesion
     Phi-B: 0 °
EMBANKMENT FILL 2, EL +1 TO -5
     Model: Spatial Mohr-Coulomb
     Unit Weight: 105 pcf
     Cohesion Fn: Emb. Fill
     Phi-B: 0 °
MARSH 1. FL. -7 TO -11
     Model: Spatial Mohr-Coulomb
```

```
MARSH 2, EL. -11 TO -13 CL
     Model: Spatial Mohr-Coulomb
     Unit Weight: 90 pcf
Cohesion Fn: MARSH 2
     Phi: ∩ °
     Phi-B: 0 °
MARSH 3, EL. -13 TO -15 CL
     Unit Weight: 90 pcf
     Cohesion Fn: Marsh 3
     Phi · ∩ °
     Phi-B: 0 °
EMBANKMENT FILL 3, EL -5 TO -7
     Model: Spatial Mohr-Coulomb
     Unit Weight: 105 pcf
     Cohesion Fn: Emb. Fill 2
     Phi: 0
     Phi-B: 0 °
Slip Surface Limits
     Left Coordinate: (61, -11) fi
      Right Coordinate: (310, -3.8) ft
Slip Surface Block
           Upper Left: (184, -10) ft
Lower Left: (184, -46) ft
           Lower Right: (214, -46) ft
X Increments: 10
           Y Increments: 10
           Starting Angle: 115
           Ending Angle: 180
           Angle Increments: 5
           Upper Left: (220, -10) ft
           Lower Left: (220, -46) ft
           Lower Right: (250, -46) ft
X Increments: 10
           Y Increments: 10
Starting Angle: 25
```

Ending Angle: 45 ° Angle Increments: 5

Tension Crack Line

ı	X (ft)	Y (ft)
ı	191.5	0
ı	198	2
ı	200	2

Cohesion Functions

MARSH 1

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 270
Data Points: X (ft), Cohesion (psf)

Data Point: (181.1, 270) Data Point: (200, 300) Data Point: (236.7, 270)

MARSH 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 180 Data Points: X (ft), Cohesion (psf)

Data Point: (181.1, 180) Data Point: (200, 300) Data Point: (236.7, 180)

Marsh 3

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 285 Data Points: X (ft), Cohesion (psf)

Data Point: (181.1, 285)
Data Point: (200, 300) Data Point: (236.7, 285)

Emb. Fill

Model: Spline Data Point Function Function: Cohesion vs. X

Re

	Points	Area (ft²)	Material
Region 1	2,5,6,3	3.525	
Region 2	20,19,11,21	146.6	Embankment Fill 2, El5 to -7
Region 3	10,20,21,4,15	95.04	Embankment Fill 1, El3 to -5
Region 4	28,29,25,24	51.24255	Embankment Fill 2, El5 to -7
Region 5	27,39,28,24,23	35.173485	Embankment Fill 1, El3 to -5
Region 6	36,13,18,37	5976	BAY SOUND CLAY, EL46 TO -70
Region 7	2,16,34,33,17,26,7	79.944595	EMBANKMENT FILL, EL. +8.2 TO +1.0
Region 8	46,30,1,9,43,29,25,57	154.62147	MARSH 1, EL7 TO -11
Region 9	35,54,47,53	240.2	MARSH 3, EL13 TO -15
Region 10	48,19,11,50	293.2	MARSH 1, EL7 TO -11
Region 11	49,48,50,42,51	146.6	MARSH 2, EL11 TO -13
Region 12	52,49,51,12	146.6	MARSH 3, EL13 TO -15
Region 13	30,46,56,47,54,38	240.2	MARSH 2, EL11 TO -13
Region 14	36,35,53,55,52,12,13	7719	BEACH SAND, EL15 TO 46
Region 15	30,63,62,61,60,59,58,8,27,39,28,29,43,9,1	87.044896	Rock/Riprap
Region 16	7,2,3,14,31,22	89.05	EMBANKMENT FILL, EL. +8.2 TO +1.0
Region 17	64,45,7,22,32,10,20	193.4	EMBANKMENT FILL 2, EL +1 TO -5
Region 18	41,64,20,19	73.4	EMBANKMENT FILL 3, EL 5 TO -7

Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 800 Data Points: X (ft), Cohesion (psf) Data Point: (181.6, 800)

Data Point: (200, 280) Data Point: (236.7, 800)

Emb. Fill 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %
Y-Intercept: 500
Data Points: X (ft), Cohesion (psf)
Data Point: (181.6, 500)

Data Point: (200, 280)
Data Point: (236.7, 500)

Unit Weight Functions

Bay Sound Clay

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 104 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.1, 104)
Data Point: (200, 102) Data Point: (236.7, 104)

Spatial Functions

Bay Sound Cohesion Model: Linear Interpolation

Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.1, -46, 490)
Data Point: (181.1, -70, 710) Data Point: (200, -46, 765) Data Point: (200, -70, 975) Data Point: (236.7, -46, 490) Data Point: (236.7, -70, 710)

Region	65,41,19,48	146.8	MARSH 1, EL7 TO -11 CL
19	05,41,15,40	140.0	WARSHI, EE. 7 TO II CE
Region	40,65,48,49,66	73.4	MARSH 2, EL11 TO -13
20	10,00,10,10,00		CL
Region	55,52,49,66	73.4	MARSH 3, EL13 TO -15
21	33,32,43,00	73.4	CL
Region	53,47,66,55	37.8	MARSH 3, EL13 TO -15
22	33,47,00,33	37.8	CL
Region	47,56,40,66	11.34	MARSH 2, EL11 TO -13
23	47,30,40,00	11.54	CL
Region	EC 40 CE 40	26,46	MARSH 2, EL11 TO -13
24	56,46,65,40	20.40	CL
Region	CE 44 35 57 46	75.6	MARCHA EL 7TO 11 CL
25	65,41,25,57,46	75.0	MARSH 1, EL7 TO -11 CL
Region	25 24 64 44	37.8	EMBANKMENT FILL 3, EL -
26	25,24,64,41	37.8	5 TO -7
Region	24 22 27 0 44 26 7 45 64	427 42705	EMBANKMENT FILL 2, EL
27	24,23,27,8,44,26,7,45,64	137.12795	+1 TO -5

Points

	X (ft)	Y (ft)
Point 1	133.1	-10.6
Point 2	200	8.2
Point 3	201	8.2
Point 4	310	-3.8
Point 5	200	12.9
Point 6	200.5	12.9
Point 7	200	1
Point 8	178.4	-0.3
Point 9	140.6	-9.7
Point 10	236.7	-3
Point 11	310	-7
Point 12	310	-15
Point 13	310	-46
Point 14	203.5	7.7
Point 15	254.4	-3.8

Point 16	199	8.2
Point 17	191.5	6.1
Point 18	310	-70
Point 19	236.7	-7
Point 20	236.7	-5
Point 21	310	-5
Point 22	223.5	1
Point 23	181.1	-3
Point 24	181.1	-5
Point 25	181.1	-7
Point 26	181.06094	1
Point 27	167.54255	-3
Point 28	159.5	-5
Point 29	151.45745	-7
Point 30	128.58	-11
Point 31	212	4.6
Point 32	229.9	-1
Point 33	194.71429	7
Point 34	198.28572	8
Point 35	61	-15
Point 36	61	-46
Point 37	61	-70
Point 38	61	-11
Point 39	163.50524	-4
Point 40	200	-12.4
Point 41	200	-7
Point 42	310	-12.4
Point 43	141.50175	-9.47575
Point 44	179.74326	0.35625
Point 45	200	-3.74756
Point 46	181.1	-11
Point 47	181.1	-13
Point 48	236.7	-11
Point 49	236.7	-13
Point 50	310	-11
Point 51	310	-13

5	Optimize d	199.31125	-3.8630075	780.6695	1102.5213	0	299.47
6	Optimize d	199.81125	-4.3398325	830.11019	1152.4471	0	285.33
7	Optimize d	200.25	-4.761716	524.51051	1142.6723	0	283.54
8	Optimize d	200.75	-5.2424785	218.90406	1188.1139	0	284.5
9	Optimize d	201.57035	-6.03128	274.58348	1248.7788	0	289.41
10	Optimize d	202.4009	-6.78985	325.53753	1350.5712	0	294.39
11	Optimize d	203.08055	-7.3387645	366.04366	1383.2706	0	297.48
12	Optimize d	204.43265	-8.4308095	403.81557	1429.505	0	296.38
13	Optimize d	206.12535	-9.635145	401.0473	1538.4729	0	294.99
14	Optimize d	207.64545	-10.537255	425.40805	1555.3319	0	293.75
15	Optimize d	209.3125	-11.30391	450.51954	1647.1794	0	269.55
16	Optimize d	211.10975	-11.92926	468.03305	1629.7769	0	263.67
17	Optimize d	212.26595	-12.331545	483.41768	1620.0814	0	259.89
18	Optimize d	213.4668	-12.510265	489.02013	1683.0737	0	255.97
19	Optimize d	215.3366	-12.682635	493.60007	1631.7358	0	249.85
20	Optimize d	217.20645	-12.855005	499.67648	1580.3979	0	243.74
21	Optimize d	218.91015	-12.95521	502.24967	1552.8219	0	238.17
22	Optimize d	220.44765	-12.983255	501.04014	1499.8234	0	233.14
23	Optimize d	222.3582	-12.986675	498.79843	1439.645	0	226.89

Point 52	236.7	-15
Point 53	181.1	-15
Point 54	61	-13
Point 55	200	-15
Point 56	181.1	-12.4
Point 57	181.1	-10.10499
Point 58	176.4	-0.3
Point 59	170.28297	-0.3
Point 60	167.5	-1
Point 61	151.5	-5
Point 62	140.6	-7.7
Point 63	133.1	-8.6
Point 64	200	-5
Point 65	200	-11
Point 66	200	-13

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.36	(221.983, 1.655)	23.28585	(194.085, 6.82379)	(247.918, - 3.50703)
2	8078	1.50	(221.983, 1.655)	24.305	(193.461, 6.64893)	(250.036, - 3.60274)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	194.39965	0.54080075	375.8896	288.87217	0	438.27
2	Optimize d	195.47475	-0.3290264	442.15246	699.35146	0	407.89
3	Optimize d	197.26045	-1.917102	586.09829	857.65563	0	357.42
4	Optimize d	198.64285	-3.2288045	714.17538	1024.6175	0	318.35

24	Optimize d	224.5669	-12.966165	495.20309	1361.047	0	219.67
25	Optimize d	226.7007	-12.94635	491.78208	1288.5965	0	212.7
26	Optimize d	228.8338	-12.922325	488.41171	1216.9029	0	205.72
27	Optimize d	231.15125	-12.89165	484.43507	1139.765	0	198.14
28	Optimize d	233.47685	-12.59129	464.30574	1103.3729	0	190.54
29	Optimize d	235.6256	-12.02369	427.72912	980.76094	0	183.51
30	Optimize d	236.7144	-11.73608	409.09551	898.51495	0	180
31	Optimize d	237.2954	-11.366135	385.86939	951.29531	0	180
32	Optimize d	238.85875	-10.355938	322.23651	899.22351	0	270
33	Optimize d	240.8522	-9.0678125	240.71988	765.53238	0	270
34	Optimize d	242.78685	-7.711875	154.97793	657.52459	0	270
35	Optimize d	244.36065	-6.51742	79.474596	685.3807	0	500
36	Optimize d	245.5945	-5.51742	16.191598	620.46927	0	500
37	Optimize d	247.05525	-4.2535145	-63.684162	707.84041	0	800

Slices of Slip Surface: 8078

		Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
	1	8078	194.0874	0.09556605	391.85448	469.51258	0	447.1
ſ	2	8078	195.60715	-1.1351141	487.5998	794.80857	0	404.15
ľ	3	8078	197.39285	-2.5811575	627.7347	980.85723	0	353.68
ĺ	4	8078	198.64285	-3.5933855	735.71444	1111.079	0	318.35

5	8078	199.5	-4.287484	813.04983	1195.0169	0	294.13
6	8078	200.18995	-4.846188	611.88167	1202.2012	0	282.69
7	8078	200.43995	-5.048634	286.60104	1221.7278	0	282.64
8	8078	200.75	-5.299714	223.47609	1245.1277	0	284.5
9	8078	201.92485	-6.25108	288.51826	1314.2769	0	291.54
10	8078	203.17485	-7.26331	357.37029	1379.2904	0	297.4
11	8078	204.5723	-8.394965	395.23443	1425.1559	0	296.26
12	8078	206.71695	-10.131655	415.63573	1486.7946	0	294.51
13	8078	209.0242	-12	487.28285	1562.6342	0	270.49
14	8078	210.62955	-13.3	534.79649	1597.425	0	295.66
15	8078	211.5	-13.6	549.2	1890.5	0	295.3
16	8078	212.95835	-13.6	547.25208	1835.0084	0	294.7
17	8078	214.875	-13.6	544.69556	1765.9301	0	293.92
18	8078	216.79165	-13.6	542.03469	1696.9041	0	293.14
19	8078	218.70835	-13.6	539.32165	1627.8258	0	292.35
20	8078	220.625	-13.6	536.55643	1558.7997	0	291.57
21	8078	222.54165	-13.6	534.62599	1489.7215	0	290.79
22	8078	224.56665	-13.6	532.82821	1420.1721	0	289.96
23	8078	226.7	-13.6	530.95321	1350.094	0	289.09
24	8078	228.83335	-13.6	529.31258	1280.0158	0	288.22
25	8078	230.95	-13.6	527.71429	1212.5238	0	287.35
26	8078	232.5412	-13.3	508.28257	1323.3689	0	286.7
27	8078	233.98445	-12.5	458.30031	1153.0714	0	188.88
28	8078	235.79325	-11.497375	395.23993	994.64673	0	182.96
29	8078	237.60085	-10.495406	331.90984	884.19321	0	270
30	8078	239.40255	-9.4967175	268.6124	779.77356	0	270
31	8078	241.2042	-8.4980305	205.06253	675.3539	0	270
32	8078	243.00585	-7.4993435	141.61461	570.93425	0	270
33	8078	244.80875	-6.5	78.020425	569.55444	0	500
34	8078	246.6128	-5.5	14.269889	454.3685	0	500
35	8078	248.77515	-4.301368	-61.906528	457.75856	0	800

R31 Slope Stability Global (Block) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

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File Information
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Created By: USACE St. Louis District Revision Number: 689 Last Edited By: Goltz, Amanda MVS Date: 2/25/2013 Time: 11:33:51 AM File Name: 17thReach31.gsz Directory: Y\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_Hlgh_water_analyses\High water cases\ Last Solved Date: 2/25/2013

Last Solved Time: 11:35:48 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global (Block)

Kind: SLOPE/W Parent: Seepage Analysis (Global) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: Tension Crack Line

Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf

```
FOS Distribution
     FOS Calculation Option: Constant
Restrict Block Crossing: Yes
Advanced
     Number of Slices: 30
     Optimization Tolerance: 0.01
     Minimum Slip Surface Depth: 0.1 ft
     Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
     Starting Optimization Points: 8
     Ending Optimization Points: 16
     Complete Passes per Insertion:
     Driving Side Maximum Convex Angle: 5
     Resisting Side Maximum Convex Angle: 1 °
```

Materials

EMBANKMENT FILL, EL. +8.5 TO -3.0

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: Emb. 8.1 TO -3 Phi-B·∩°

MARSH 1, EL. -3.0/-6.0 TO -10.0

Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: Marsh -3.0/-6.0 to -10.0

Phi-B: 0 °

BEACH SAND, EL. -10 TO -45

Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi-B: 0 °

BAY SOUND CLAY, EL. -45 TO -70

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: -45.0 to -70.0

Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

EMBANKMENT FILL, EL. -1.0 TO -6.0 (protected)

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 650 psf Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (44, -6) ft Right Coordinate: (310, -1) ft

Slip Surface Block

Upper Left: (182, -2) ft Lower Left: (182, -42) ft Lower Right: (212, -42) ft X Increments: 10 Y Increments: 10 Starting Angle: 115 Ending Angle: 180 ° Angle Increments: 5 Upper Left: (231, -2) ft Lower Left: (231, -42) ft Lower Right: (281, -42) ft X Increments: 10 Y Increments: 10

Starting Angle: 0 Angle Increments: 5

Tension Crack Line

X (ft)	Y (ft)	
190	0	
200	2	

Cohesion Functions

Marsh -3.0/-6.0 to -10.0

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 %

Segment Curvature: 0 % Y-Intercept: 265

Data Points: X (ft), Cohesion (psf)

Data Point: (140.6, 265) Data Point: (161.1, 265) Data Point: (200, 280) Data Point: (253.4, 265) Data Point: (310, 265)

-45.0 to -70.0

Model: Spline Data Point Function Function: Cohesion vs. Y Curve Fit to Data: 100 %

Segment Curvature: 0 % Y-Intercept: 740 Data Points: Y (ft), Cohesion (psf)

Data Point: (-70, 985) Data Point: (-45, 740)

Emb. 8.1 TO -3

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 650
Data Points: X (ft), Cohesion (psf) Data Point: (180.5, 650) Data Point: (200, 510) Data Point: (234, 650)

Regions

	Material	Points	Area (ft²)
Region 1	MARSH 1, EL3.0/-6.0 TO -10.0	22,12,13,18,23	101.82934
Region 2	Sheet Pile	15,6,14,20,16	3.6
Region 3	BEACH SAND, EL10 TO -45	26,25,1,24,10,11	9199.9976
Region 4	BAY SOUND CLAY, EL45 TO -70	27,26,11,19	6650
Region 5	EMBANKMENT FILL, EL. +8.5 TO -3.0	29,4,21,5,6,14,30	119.15

EMBANKMENT FILL, EL. +8.5 TO -3.0	14,20,28,31,30	178.26606
MARSH 1, EL3.0/-6.0 TO -10.0	13,12,17	64.08
MARSH 1, EL3.0/-6.0 TO -10.0	13,17,9,10,24,23,18	698.18104
EMBANKMENT FILL, EL1.0 TO -6.0 (protected)	7,34,35,8	83.485
EMBANKMENT FILL, EL1.0 TO -6.0 (protected)	35,9,17,34	199.515
EMBANKMENT FILL, EL. +8.5 TO -3.0	12,17,34,33	165.006
EMBANKMENT FILL, EL. +8.5 TO -3.0	30,33,34,7,31	90.984
EMBANKMENT FILL, EL. +8.5 TO -3.0	29,32,33,30	24.6205
EMBANKMENT FILL, EL. +8.5 TO -3.0	32,3,2,22,12,33	76.831502
	MARSH 1, EL3.0/-6.0 TO -10.0 MARSH 1, EL3.0/-6.0 TO -10.0 EMBANKMENT FILL, EL1.0 TO -6.0 (protected) EMBANKMENT FILL, EL1.0 TO -6.0 (protected) EMBANKMENT FILL, EL. +8.5 TO -3.0 EMBANKMENT FILL, EL. +8.5 TO -3.0 EMBANKMENT FILL, EL. +8.5 TO -3.0	MARSH 1, EL -3.0/-6.0 TO -10.0 13,12,17 MARSH 1, EL -3.0/-6.0 TO -10.0 13,17,9,10,24,23,18 EMBANKMENT FILL, EL -1.0 TO -6.0 7,34,35,8 EMBANKMENT FILL, EL -1.0 TO -6.0 35,9,17,34 (protected) 12,17,34,33 EMBANKMENT FILL, EL +8.5 TO -3.0 30,33,34,7,31 EMBANKMENT FILL, EL +8.5 TO -3.0 29,32,33,30

Points

	X (ft)	Y (ft)
Point 1	124.3	-15.6
Point 2	163.7	-2.1
Point 3	173.2	-1.5
Point 4	178	2.6
Point 5	199	8.5
Point 6	200	8.5
Point 7	253.4	-1
Point 8	310	-1
Point 9	310	-6
Point 10	310	-10
Point 11	310	-45
Point 12	200	-3
Point 13	200	-5.4
Point 14	200	8.1
Point 15	200	12.9
Point 16	200.5	12.9
Point 17	253.4	-6
Point 18	161.1	-5.4

Point 19	310	-70
Point 20	201	8.1
Point 21	197.9	8.2
Point 22	161.07333	-3
Point 23	154.06889	-5.4
Point 24	140.6437	-10
Point 25	44	-6
Point 26	44	-45
Point 27	44	-70
Point 28	204.3	7.52691
Point 29	175.45	0.4
Point 30	200	0.4
Point 31	245.3	0.4
Point 32	174.775	-0.27
Point 33	200	-0.9
Point 34	253.4	-1.92
Point 35	310	-3.03

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.66	(226.911, 1.583)	24.71285	(194.935, 7.36548)	(257.162, -1)
2	12431	2.74	(226.911, 1.583)	24.926	(195.334, 7.47783)	(258.387, -1)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	195.2887	0.6934479	312.59186	438.77652	0	543.82
2	Optimize d	196.3841	-0.214102	344.47526	683.74568	0	535.96
3	Optimize d	197.4986	-1.137487	377.43824	793.21335	0	527.96

6

525.18 521.13
521.13
514.68
279.94
279.93
279.79
279.5
279.23
278.99
278.53
278
277.47
276.88
276.23
275.59
274.96
274.33
273.73
273.15

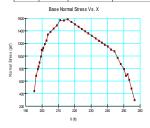
23	Optimize d	226.3465	-10	754.42115	1394.7903	0	272.6
24	Optimize d	228.2535	-10	747.18475	1360.8107	0	272.06
25	Optimize d	230.40345	-9.9993775	738.95146	1322.5651	0	271.46
26	Optimize d	232.7963	-9.9981325	729.79919	1279.771	0	270.79
27	Optimize d	234.86125	-9.9939985	721.69477	1243.2354	0	270.21
28	Optimize d	236.5984	-9.986975	714.67181	1211.6321	0	269.72
29	Optimize d	238.33555	-9.9799515	707.64886	1180.0288	0	269.23
30	Optimize d	240.21525	-9.9068	695.93024	1151.1684	0	268.7
31	Optimize d	242.23755	-9.76752	679.50259	1101.9348	0	268.14
32	Optimize d	244.27435	-9.335614	644.6349	1074.0084	0	267.56
33	Optimize d	246.2467	-8.6389735	593.17788	971.71412	0	267.01
34	Optimize d	248.14005	-7.9702245	543.52644	873.65625	0	266.48
35	Optimize d	250.153	-6.805674	461.71851	792.42129	0	265.91
36	Optimize d	251.278	-5.929792	401.61908	685.48295	0	265.6
37	Optimize d	252.27195	-5.155943	337.95533	708.27445	0	650
38	Optimize d	253.3036	-4.3442615	268.52033	623.13307	0	650
39	Optimize d	254.72045	-3.1162575	168.31826	481.9435	0	650
40	Optimize d	256.60155	-1.485896	37.731818	296.94809	0	650

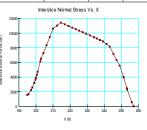
 Slip Surface: 12431

 Slip
 X (ft)
 Y (ft)
 PWP (psf)
 Base
 Frictiona
 Cohesiv

	Surfac				Normal	I	е
	e				Stress (psf)	Strength	Strength
						(psf)	(psf)
1	12431	195.7454	0.733371	309.20352	468.01968	0	540.55
2	12431	196.92415	-0.22116895	343.75752	700.21959	0	532.08
3	12431	197.7956	-0.92686745	369.02462	788.16131	0	525.83
4	12431	198.45	-1.4567785	387.22344	861.36003	0	521.13
5	12431	199.5	-2.307052	416.09158	964.74867	0	513.59
6	12431	200.1911	-2.866709	410.47184	982.15182	0	510.79
7	12431	200.4411	-3.069155	422.08469	1061.3656	0	279.88
8	12431	200.75	-3.319282	436.83373	1083.4347	0	279.79
9	12431	202.1831	-4.479775	505.69776	1165.8933	0	279.39
10	12431	203.8331	-5.8159185	581.67347	1255.9899	0	278.92
11	12431	205.475	-7.1455115	657.3332	1345.653	0	278.46
12	12431	207.825	-9.048504	766.00135	1473.9317	0	277.8
13	12431	210.06765	-10	816.28104	1684.8265	0	277.17
14	12431	212.20295	-10	808.13228	1646.799	0	276.57
15	12431	214.33825	-10	800.03035	1608.7246	0	275.97
16	12431	216.47355	-10	791.92842	1570.6971	0	275.37
17	12431	218.60885	-10	783.82649	1532.6227	0	274.77
18	12431	220.74415	-10	775.67773	1494.5951	0	274.17
19	12431	222.87945	-10	767.5758	1456.5207	0	273.57
20	12431	225.01475	-10	759.47387	1418.4932	0	272.97
21	12431	227.15	-10	751.37194	1380.4188	0	272.37
22	12431	229.28525	-10	743.27001	1342.3913	0	271.77
23	12431	231.42055	-10	735.16808	1304.3169	0	271.17
24	12431	233.55585	-10	727.01932	1266.2893	0	270.57
25	12431	235.69115	-10	718.91739	1228.2149	0	269.97
26	12431	237.82645	-10	710.81547	1190.1874	0	269.37
27	12431	239.96175	-10	702.71354	1152.113	0	268.77
28	12431	242.09705	-10	694.61161	1114.0855	0	268.17
29	12431	244.23235	-10	686.50968	1076.0579	0	267.58
30	12431	245.65	-10	681.11429	1050.8143	0	267.18
31	12431	246.9224	-9.3298395	634.04216	1089.9491	0	266.82
32	12431	248.7672	-7.989519	542.21174	924.39997	0	266.3
33	12431	250.612	-6.6491985	449.94277	758.80699	0	265,78

34	12431	251.58795	-5.940123	400.99779	671.22969	0	265.51
35	12431	252.52075	-5.2623965	344.72415	694.50898	0	650
36	12431	254.30585	-3.9654535	235.49129	531.4909	0	650
37	12431	256.11755	-2.6491905	128.66617	383.41741	0	650
38	12431	257.7054	-1.4955295	37.50986	253.62822	0	650





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R31 Slope Stability Global (Entry/Exit) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 689 Last Edited By: Goltz, Amanda MVS Date: 2/25/2013

Time: 11:33:51 AM File Name: 17thReach31.gsz

Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/25/2013

Last Solved Time: 11:36:28 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global (Entry/Exit)

Kind: SLOPE/W

Parent: Seepage Analysis (Global) Method: Spencer

PWP Conditions Source: Parent Analysis

Direction of movement: Left to Right Use Passive Mode: No

Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1

Optimize Critical Slip Surface Location: Yes Tension Crack

Tension Crack Option: Tension Crack Line

Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf

FOS Distribution FOS Calculation Option: Constant Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +8.5 TO -3.0

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: Emb. 8.1 TO -3

Phi-B: 0°

MARSH 1, EL. -3.0/-6.0 TO -10.0

Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf

Cohesion Fn: Marsh -3.0/-6.0 to -10.0

Phi-B: 0 °

BEACH SAND, EL. -10 TO -45

Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi-B: 0 °

BAY SOUND CLAY, EL. -45 TO -70

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: -45.0 to -70.0

Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0)

Unit Weight: 0.1 pcf

EMBANKMENT FILL, EL. -1.0 TO -6.0 (protected)

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 650 psf Phi-B: 0°

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (80, -10.30386) ft Left-Zone Right Coordinate: (200, 12.9) ft Left-Zone Increment: 20

Right Projection: Range

Right-Zone Left Coordinate: (209.99468, 6.53702) ft

Right-Zone Right Coordinate: (275, -1) ft

Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (44, -6) ft Right Coordinate: (310, -1) ft

Tension Crack Line

	X (ft)	Y (ft)
Г	190	-0.5
	200	1.5

Cohesion Functions

Marsh -3.0/-6.0 to -10.0

Model: Spline Data Point Function Function: Cohesion vs. X

Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 265

Data Points: X (ft), Cohesion (psf) Data Point: (140.6, 265) Data Point: (161.1, 265)

Data Point: (200, 280) Data Point: (253.4, 265) Data Point: (310, 265)

-45.0 to -70.0

Model: Spline Data Point Function Function: Cohesion vs. Y Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 740
Data Points: Y (ft), Cohesion (psf)

Data Point: (-70, 985) Data Point: (-45, 740)

Emb. 8.1 TO -3

Model: Spline Data Point Function Function: Cohesion vs. X

Curve Fit to Data: 100 %

Segment Curvature: 0 % Y-Intercept: 650

Data Points: X (ft), Cohesion (psf) Data Point: (180.5, 650) Data Point: (200, 510) Data Point: (234, 650)

Regions

	Material	Points	Area (ft²)
Region 1	MARSH 1, EL3.0/-6.0 TO -10.0	22,12,13,18,23	101.82934
Region 2	Sheet Pile	15,6,14,20,16	3.6
Region 3	BEACH SAND, EL10 TO -45	26,25,1,24,10,11	9199.9976
Region 4	BAY SOUND CLAY, EL45 TO -70	27,26,11,19	6650
Region 5	EMBANKMENT FILL, EL. +8.5 TO -3.0	29,4,21,5,6,14,30	119.15
Region 6	EMBANKMENT FILL, EL. +8.5 TO -3.0	14,20,28,31,30	178.26606
Region 7	MARSH 1, EL3.0/-6.0 TO -10.0	13,12,17	64.08
Region 8	MARSH 1, EL3.0/-6.0 TO -10.0	13,17,9,10,24,23,18	698.18104
Region 9	EMBANKMENT FILL, EL1.0 TO -6.0 (protected)	7,34,35,8	83.485
Region 10	EMBANKMENT FILL, EL1.0 TO -6.0 (protected)	35,9,17,34	199.515
Region 11	EMBANKMENT FILL, EL. +8.5 TO -3.0	12,17,34,33	165.006

Region 12	EMBANKMENT FILL, EL. +8.5 TO -3.0	30,33,34,7,31	90.984
Region 13	EMBANKMENT FILL, EL. +8.5 TO -3.0	29,32,33,30	24.6205
Region 14	EMBANKMENT FILL, EL. +8.5 TO -3.0	32,3,2,22,12,33	76.831502

Points

	X (ft)	Y (ft)
Point 1	124.3	-15.6
Point 2	163.7	-2.1
Point 3	173.2	-1.5
Point 4	178	2.6
Point 5	199	8.5
Point 6	200	8.5
Point 7	253.4	-1
Point 8	310	-1
Point 9	310	-6
Point 10	310	-10
Point 11	310	-45
Point 12	200	-3
Point 13	200	-5.4
Point 14	200	8.1
Point 15	200	12.9
Point 16	200.5	12.9
Point 17	253.4	-6
Point 18	161.1	-5.4
Point 19	310	-70
Point 20	201	8.1
Point 21	197.9	8.2
Point 22	161.07333	-3
Point 23	154.06889	-5.4
Point 24	140.6437	-10
Point 25	44	-6
Point 26	44	-45

Point 27	44	-70
Point 28	204.3	7.52691
Point 29	175.45	0.4
Point 30	200	0.4
Point 31	245.3	0.4
Point 32	174.775	-0.27
Point 33	200	-0.9
Point 34	253.4	-1.92
Point 35	310	-3.03

Critical Slip Surfaces

		Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
ſ	1	Optimized	2.65	(229.574, 42.169)	23.56695	(198.061, 8.244)	(256.414, - 1)
	2	8262	2.86	(229.574, 42.169)	52.013	(197.728, 8.15152)	(258.586, - 1)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	198.41995	0.756133	303.16341	443.57583	0	521.34
2	Optimize d	198.8893	0.2900422	320.77111	649.71289	0	517.97
3	Optimize d	199.3057	-0.1234978	335.71507	695.05914	0	514.98
4	Optimize d	199.8057	-0.6232073	318.63912	742.46501	0	511.4
5	Optimize d	200.04075	-0.86044525	297.34853	727.06317	0	510.17
6	Optimize d	200.29075	-1.11279	311.5401	751.9371	0	511.2
7	Optimize d	200.75	-1.5763685	336.83811	797.38998	0	513.09

5

8	Optimize d	201.64385	-2.4786185	385.44213	874.90183	0	516.77
9	Optimize d	202.58735	-3.430952	438.52087	1028.4105	0	279.27
10	Optimize d	203.5935	-4.2103645	483.66833	1137.2461	0	278.99
11	Optimize d	204.8731	-5.0742715	531.75897	1192.2675	0	278.63
12	Optimize d	206.51145	-6.180372	593.75405	1262.7437	0	278.17
13	Optimize d	208.70225	-7.388765	660.09962	1379.1935	0	277.56
14	Optimize d	210.9533	-8.367195	711.92327	1428.6541	0	276.92
15	Optimize d	213.0931	-9.082905	748.01894	1499.3575	0	276.32
16	Optimize d	215.1217	-9.535895	768.32148	1505.2751	0	275.75
17	Optimize d	217.0079	-9.8199425	778.7407	1531.0446	0	275.22
18	Optimize d	218.75165	-9.9350475	779.25571	1510.7306	0	274.73
19	Optimize d	220.5574	-9.993015	775.98899	1497.7433	0	274.23
20	Optimize d	222.51775	-9.9935455	768.57354	1462.9104	0	273.67
21	Optimize d	224.57065	-9.993777	760.77966	1426.3766	0	273.1
22	Optimize d	226.62355	-9.9940085	752.98578	1389.7941	0	272.52
23	Optimize d	228.67645	-9.99424	745.19191	1353.2116	0	271.94
24	Optimize d	230.72935	-9.9944715	737.44675	1316.6778	0	271.37
25	Optimize d	232.78225	-9.994703	729.65287	1280.0953	0	270.79
26	Optimize d	234.83515	-9.9949345	721.859	1243.5615	0	270.21

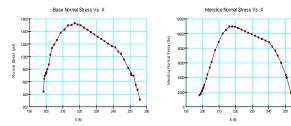
27	Optimize d	236.95745	-9.99262	713.6388	1205.9451	0	269.62
28	Optimize d	239.14915	-9.98776	705.01546	1166.4328	0	269
29	Optimize d	241.1724	-9.814675	686.51681	1147.3585	0	268.43
30	Optimize d	243.0272	-9.473365	658.09533	1081.6603	0	267.91
31	Optimize d	244.6273	-9.0508535	625.41329	1046.6015	0	267.46
32	Optimize d	246.37405	-8.3968985	577.46034	952.23189	0	266.97
33	Optimize d	248.9019	-7.160315	489.25915	820.43297	0	266.26
34	Optimize d	250.5682	-6.1481995	418.37423	732.94934	0	265.8
35	Optimize d	250.84665	-5.9154135	402.4773	704.68562	0	265.72
36	Optimize d	252.1563	-4.8204145	312.89806	694.94521	0	650
37	Optimize d	253.4304	-3.7551455	221.69067	549.38921	0	650
38	Optimize d	254.41885	-2.8442445	147.96452	471.91813	0	650
39	Optimize d	255.89555	-1.4793845	37.970938	315.69767	0	650

Slices of Slip Surface: 8262

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	al Strengt h (psf)	e Strengt h (psf)
1	8262	197.81385	0.9791225	295.40956	12.294521	0	525.7
2	8262	198.23965	0.656351	307.46312	657.48648	0	522.64
3	8262	198.78965	0.24552646	322.61074	719.93537	0	518.69
4	8262	199.5	-0.26331639	340.65766	784.42475	0	513.59
5	8262	200.21235	-0.7628986	292.18129	801.16608	0	510.87
6	8262	200.46235	-0.93355295	301.32529	820.30128	0	511.9

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7	8262	200.75	-1.1254327	311.40118	841.64056	0	513.09
8	8262	201.80075	-1.797671	346.62181	903.02117	0	517.41
9	8262	203.4022	-2.7697945	397.39159	984.81844	0	524.01
10	8262	204.25145	-3.263177	423.03367	1066.5803	0	278.81
11	8262	205.4156	-3.8755385	455.98562	1106.9627	0	278.48
12	8262	207.64675	-4.979647	515.27496	1178.0732	0	277.85
13	8262	209.77725	-5.9162925	564.87858	1235.2164	0	277.25
14	8262	211.80715	-6.70309	605.64728	1279.9108	0	276.68
15	8262	213.837	-7.394294	640.59763	1315.8006	0	276.11
16	8262	215.86685	-7.9938645	669.91876	1343.2116	0	275.54
17	8262	217.89675	-8.5050605	693.83303	1362.4148	0	274.97
18	8262	219.9266	-8.930539	712.43649	1373.6078	0	274.4
19	8262	221.95645	-9.2724305	725.92451	1376.9466	0	273.83
20	8262	223.98635	-9.5323965	734.34263	1372.6374	0	273.26
21	8262	226.01625	-9.7116705	737.77252	1360.7335	0	272.69
22	8262	228.0461	-9.811088	736.23118	1341.2299	0	272.12
23	8262	230.07595	-9.8311085	729.76592	1314.2092	0	271.55
24	8262	232.10585	-9.7718235	718.35503	1279.6452	0	270.98
25	8262	234.1357	-9.63296	702.00733	1237.5057	0	270.41
26	8262	236.16555	-9.4138755	680.6165	1187.6093	0	269.84
27	8262	238.19545	-9.1135395	654.16188	1129.9292	0	269.27
28	8262	240.22535	-8.730511	622.46756	1064.2078	0	268.7
29	8262	242.2552	-8.2629025	585.31416	990.27072	0	268.13
30	8262	244.28505	-7.7083315	542.49676	907.8469	0	267.56
31	8262	246.30215	-7.0684945	494.13767	817.31126	0	266.99
32	8262	248.30645	-6.3410215	439.93391	718.39147	0	266.43
33	8262	249.5038	-5.8730535	405.32538	655.93575	0	266.09
34	8262	250.62425	-5.3824785	364.31827	656.66037	0	650
35	8262	252.47475	-4.5190315	287.66647	539.11991	0	650
36	8262	254.31335	-3.571188	204.79252	429.8765	0	650
37	8262	256.14	-2.5344195	119.77147	328.54561	0	650
38	8262	257.8198	-1.4958235	37.496536	226.02865	0	650



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R32 Slope Stability Global (Block) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 931 Last Edited By: Redell, Chris MVS Date: 2/22/2013 Time: 9:48:20 AM File Name: 17thReach32.gsz

Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/22/2013

Last Solved Time: 9:48:50 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global (Block)

Kind: SLOPE/W Parent: Seepage Analysis (Global) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack

Tension Crack Option: Tension Crack Line

Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf

Cohesion Spatial Fn: Bay Sound Cohesion

FOS Distribution

Materials

Phi-B·∩°

Phi-B: 0 °

FOS Calculation Option: Constant Restrict Block Crossing: Yes Advanced

> Starting Optimization Points: 8 **Ending Optimization Points: 16**

Complete Passes per Insertion:

EMBANKMENT FILL, EL. +8.5 TO -4

Model: Spatial Mohr-Coulomb

Unit Weight: 110 pcf Cohesion: 400 psf

MARSH 1, EL. +-3.8/-4 TO -8

BEACH SAND, EL. -8 TO -46

Unit Weight: 122 pcf

Unit Weight: 107 pcf

Cohesion: 0 psf

Phi-B: 0 °

Phi-B: 0 °

Model: Spatial Mohr-Coulomb

BAY SOUND CLAY, EL. -46 TO -70

Model: Spatial Mohr-Coulomb

Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Marsh 1

Driving Side Maximum Convex Angle: 5

Resisting Side Maximum Convex Angle: 1 °

Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft

Slip Surface Limits

Left Coordinate: (55.165782, -13.247588) ft Right Coordinate: (310, -4.5) ft

Slip Surface Block

Left Grid

Upper Left: (203, -2) ft Lower Left: (203, -32) ft Lower Right: (233, -32) ft X Increments: 7 Y Increments: 7 Starting Angle: 135 ° Ending Angle: 180 ° Angle Increments: 5 Right Grid Upper Left: (235, -2) ft Lower Left: (235, -32) ft Lower Right: (285, -32) ft X Increments: 9

Tension Crack Line

Y Increments: 7 Starting Angle: 15 ° Ending Angle: 45 Angle Increments: 5

	X (ft)	Y (ft)
Г	193	3.8
Г	200	5.2

Spatial Functions

Bay Sound Cohesion Model: Linear Interpolation Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (158.6, -46, 535) Data Point: (158.6, -70, 770) Data Point: (200, -46, 835) Data Point: (200, -70, 1070) Data Point: (267.1, -46, 535) Data Point: (267.1, -70, 770) Data Point: (55, -46, 535)

Data Point: (55, -70, 770) Data Point: (310, -46, 535) Data Point: (310, -70, 770)

Marsh 1

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (158.6, -3.8, 315)
Data Point: (158.6, -8, 315) Data Point: (200, -4, 300) Data Point: (200, -8, 335) Data Point: (267.1, -3.8, 315) Data Point: (267.1, -8, 315) Data Point: (310, -3.8, 315) Data Point: (310, -8, 315) Data Point: (145.4, -3.8, 315) Data Point: (145.4, -8, 315)

Regions

.6.0			
	Points	Area (ft²)	Material
Region 1	5,15,16,13	3.3	
Region 2	25,1,2,23,19,8,9,26	9161.454	BEACH SAND, EL8 TO -46
Region 3	26,27,28,9	6120	BAY SOUND CLAY, EL46 TO -70
Region 4	22,12,21,10,24	62.131052	MARSH 1, EL. +-3.8/-4 TO -8
Region 5	23,22,24,10,6,17,7,8,19	563.85892	MARSH 1, EL. +-3.8/-4 TO -8
Region 6	29,4,20,18,5,30	109.6	EMBANKMENT FILL, EL. +8.5 TO -4
Region 7	21,3,29,30,10	139.459	EMBANKMENT FILL, EL. +8.5 TO -4
Region 8	5,13,14,31,30	192.205	EMBANKMENT FILL, EL. +8.5 TO -4
Region 9	30,31,11,6,10	235.96	EMBANKMENT FILL, EL. +8.5 TO -4

Points

	X (ft)	Y (ft)
Point 1	115.3	-16
Point 2	135.6	-11.2
Point 3	172.5	-1.1
Point 4	178.2	2.6
Point 5	200	8.5
Point 6	267.1	-3.8

Point 7	310	-4.5
Point 8	310	-8
Point 9	310	-46
Point 10	200	-4
Point 11	257.6	-2.4
Point 12	155.7	-4.6
Point 13	201	8.5
Point 14	206.3	8
Point 15	200	12.9
Point 16	200.5	12.9
Point 17	286.7	-4.5
Point 18	199	8.5
Point 19	200	-8
Point 20	199	7.6
Point 21	158.58	-4
Point 22	153.26237	-5.4
Point 23	145.4	-8
Point 24	200	-5.4
Point 25	55	-13.24
Point 26	55	-46
Point 27	55	-70
Point 28	310	-70
Point 29	174.8	0.4
Point 30	200	0.4
Point 31	243.8	0.4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.23	(236.052, 6.353)	31.2943	(198.032, 7.36741)	(272.601, - 3.99645)
2	7713	2.43	(236.052, 6.353)	32.838	(195.315, 6.71407)	(275.48, - 4.09929)

Slices of Slip Surface: Optimized

	Slip	X (ft)	Y (ft)	PWP (psf)	Base	Frictional	Cohesiv

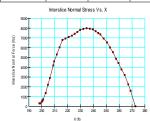
	ed						
19	Optimiz ed	228.60115	-9.170415	581.0727	1330.9596	432.94738	0
20	Optimiz ed	230.92645	-9.61601	597.01481	1350.9416	435.27982	0
21	Optimiz ed	233.47915	-10.04631	610.88271	1346.8082	424.88681	0
22	Optimiz ed	235.97485	-10.40852	620.75162	1352.0319	422.20485	0
23	Optimiz ed	238.41355	-10.70264	626.69533	1333.7936	408.24339	0
24	Optimiz ed	240.6747	-10.91702	628.57567	1328.5151	404.11021	0
25	Optimiz ed	242.75825	-11.051655	626.3246	1298.2933	387.96129	0
26	Optimiz ed	244.58095	-11.169435	624.40662	1271.8519	373.80269	0
27	Optimiz ed	246.6591	-11.218605	616.88826	1251.8931	366.62021	0
28	Optimiz ed	249.25345	-11.21601	603.51284	1192.1855	339.87033	0
29	Optimiz ed	251.6987	-11.133225	585.90976	1146.2337	323.50321	0
30	Optimiz ed	253.99495	-10.97025	564.01633	1071.8656	293.20691	0
31	Optimiz ed	256.37155	-10.7069	535.50283	1002.5177	269.63114	0
32	Optimiz ed	258.5126	-10.38994	504.80141	916.27364	237.5636	0
33	Optimiz ed	260.637	-10.000018	469.63939	842.49213	215.26663	0
34	Optimiz ed	263.06055	-9.4903725	425.50597	732.70367	177.36068	0
35	Optimiz ed	265.68615	-8.5881715	355.82074	606.36792	144.65349	0
36	Optimiz ed	267.98705	-7.5346265	273.15274	497.03364	0	315
37	Optimiz	270.73735	-5.562455	117.86621	340.59918	0	315

	Surface				Normal Stress (psf)	Strength (psf)	e Strengt h (psf)
1	Optimiz ed	198.5162	4.359748	161.57824	177.92589	0	400
2	Optimiz ed	199.5	3.451315	190.16622	369.71623	0	400
3	Optimiz ed	200.1827	2.820893	69.19849	433.06353	0	400
4	Optimiz ed	200.4327	2.5933765	78.344294	466.10378	0	400
5	Optimiz ed	200.75	2.316117	88.34808	493.74264	0	400
6	Optimiz ed	201.97135	1.2488255	129.03401	591.0215	0	400
7	Optimiz ed	203.84205	-0.38591	201.5981	736.42166	0	400
8	Optimiz ed	205.5207	-1.704615	258.82314	901.35516	0	400
9	Optimiz ed	207.56975	-3.1055315	320.59	1010.2954	0	400
10	Optimiz ed	209.17425	-4.2025065	372.88219	1110.348	0	303.78
11	Optimiz ed	210.5818	-4.8413085	404.86808	1221.0694	0	308.75
12	Optimiz ed	212.7274	-5.661205	444.29042	1256.9435	0	314.78
13	Optimiz ed	214.873	-6.4811015	483.90868	1292.9047	0	320.34
14	Optimiz ed	217.161	-7.075875	509.01381	1370.9976	0	323.94
15	Optimiz ed	219.59135	-7.445525	519.50894	1355.865	0	325.77
16	Optimiz ed	222.08145	-7.82427	530.34756	1340.3111	0	327.4
17	Optimiz ed	224.40535	-8.248635	544.94479	1312.1042	442.91966	0
18	Optimiz	226.50325	-8.709525	563.00875	1321.5551	437.94696	0

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	7713	197.15725	3.3239925	199.60433	378.69749	0	400
2	7713	199.5	2.130313	234.78027	599.18419	0	400
3	7713	200.25	1.748169	115.43881	639.68925	0	400
4	7713	200.75	1.4934065	124.38273	666.09868	0	400
5	7713	201.94795	0.8830125	145.85131	720.11587	0	400
6	7713	204.59795	-0.46723	200.68175	834.2152	0	400
7	7713	207.5911	-1.9923025	260.61026	948.57083	0	400
8	7713	210.1733	-3.307987	316.39616	1030.7297	0	400
9	7713	212.78395	-4.638191	380.72146	1124.575	0	307.6
10	7713	215.4231	-5.9829145	450.16759	1200.7395	0	316.96
11	7713	218.0623	-7.327638	520.01885	1277.0729	0	325.37
12	7713	220.64355	-8.642857	588.69454	1346.3492	437.43213	0
13	7713	223.1669	-9.928572	656.06673	1438.9683	452.00844	0
14	7713	225.81225	-10.57143	682.71164	1645.5833	555.91421	0
15	7713	228.5796	-10.57143	668.61872	1582.4904	527.62405	0
16	7713	231.34695	-10.57143	654.48966	1519.3613	499.33389	0
17	7713	234.1143	-10.57143	640.39674	1456.2323	471.02286	0
18	7713	236.88165	-10.57143	626.30382	1393.1032	442.71184	0
19	7713	239.649	-10.57143	612.2109	1329.9742	414.40081	0
20	7713	242.41635	-10.57143	598.11798	1266.8451	386.08978	0
21	7713	245.18	-10.57143	584.05797	1203.7681	357.78982	0
22	7713	247.94	-10.57143	570	1140.7609	329.52894	0
23	7713	250.7	-10.57143	555.94203	1077.7174	301.24715	0
24	7713	253.46	-10.57143	541.84783	1014.7101	273.00719	0
25	7713	256.22	-10.57143	527.78986	951.66667	244.72539	0
26	7713	258.89445	-10.57143	514.1974	898.72528	222.00728	0
27	7713	261.48335	-10.57143	500.9871	855.88838	204.90235	0
28	7713	263.85835	-10.020858	454.5507	851.05085	228.91947	0
29	7713	266.01945	-8.9197165	374.81364	651.66697	159.84134	0

30	7713	267.46225	-8.184573	321.59055	524.28028	117.02297	0
31	7713	269.1004	-7.3498815	254.31745	475.52059	0	315
32	7713	271.65225	-6.049644	149.44733	319.97693	0	315
33	7713	274.20415	-4.7494065	48.725235	164.4193	0	315





R32 Slope Stability Global (Entry & Exit) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 932 Last Edited By: Redell, Chris MVS Date: 2/22/2013

Time: 9:54:28 AM File Name: 17thReach32.gsz

Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/22/2013

Last Solved Time: 9:54:44 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global (Entry & Exit)

Kind: SLOPE/W

Parent: Seepage Analysis (Global)

Method: Spencer

PWP Conditions Source: Parent Analysis

Direction of movement: Left to Right Use Passive Mode: No

Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1

Optimize Critical Slip Surface Location: Yes

Tension Crack Tension Crack Option: Tension Crack Line

Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf

FOS Distribution FOS Calculation Option: Constant Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +8.5 TO -4

Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 400 psf Phi: 0° Phi-B: 0°

MARSH 1, EL. +-3.8/-4 TO -8

Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0

Phi-B: 0 °

BEACH SAND, EL. -8 TO -46

Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Phi-B: 0 °

BAY SOUND CLAY, EL. -46 TO -70

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf

Cohesion Spatial Fn: Bay Sound Cohesion

Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range

Left-Zone Left Coordinate: (166.42711, -2.36519) ft Left-Zone Right Coordinate: (207.41908, 7.7732) ft

Left-Zone Increment: 20

Right Projection: Range

Right-Zone Left Coordinate: (221.81015, 4.85661) ft Right-Zone Right Coordinate: (290, -4.5) ft

Right-Zone Increment: 20

Radius Increments: 20

Slip Surface Limits

Left Coordinate: (55.165782, -13.247588) ft Right Coordinate: (310, -4.5) ft

Tension Crack Line

	X (ft)	Y (ft)
Г	190.25	3.4375
Г	200	5.625

Spatial Functions

Bay Sound Cohesion

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (158.6, -46, 535)

Data Point: (158.6, -70, 770) Data Point: (200, -46, 835) Data Point: (200, -70, 1070)

Data Point: (267.1, -46, 535) Data Point: (267.1, -70, 770) Data Point: (55, -46, 535) Data Point: (55, -70, 770) Data Point: (310, -46, 535)

Data Point: (310, -70, 770)

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf) Data Point; (158.6, -3.8, 315)

Data Point: (158.6, -8, 315) Data Point: (200, -4, 300) Data Point: (200, -8, 335) Data Point: (267.1, -3.8, 315) Data Point: (267.1, -8, 315) Data Point: (310, -3.8, 315) Data Point: (310, -8, 315) Data Point: (145.4, -3.8, 315) Data Point: (145.4, -8, 315)

Regions

	Points	Area (ft²)	Material
Region 1	5,15,16,13	3.3	
Region 2	25,1,2,23,19,8,9,26	9161.454	BEACH SAND, EL8 TO -46
Region 3	26,27,28,9	6120	BAY SOUND CLAY, EL46 TO -70
Region 4	22,12,21,10,24	62.131052	MARSH 1, EL. +-3.8/-4 TO -8
Region 5	23,22,24,10,6,17,7,8,19	563.85892	MARSH 1, EL. +-3.8/-4 TO -8
Region 6	29,4,20,18,5,30	109.6	EMBANKMENT FILL, EL. +8.5 TO -4
Region 7	21,3,29,30,10	139.459	EMBANKMENT FILL, EL. +8.5 TO -4
Region 8	5,13,14,31,30	192.205	EMBANKMENT FILL, EL. +8.5 TO -4
Region 9	30,31,11,6,10	235.96	EMBANKMENT FILL, EL. +8.5 TO -4

Points

	X (ft)	Y (ft)
Point 1	115.3	-16
Point 2	135.6	-11.2
Point 3	172.5	-1.1
Point 4	178.2	2.6
Point 5	200	8.5
Point 6	267.1	-3.8
Point 7	310	-4.5
Point 8	310	-8
Point 9	310	-46
Point 10	200	-4
Point 11	257.6	-2.4
Point 12	155.7	-4.6
Point 13	201	8.5

Point 14	206.3	8
Point 15	200	12.9
Point 16	200.5	12.9
Point 17	286.7	-4.5
Point 18	199	8.5
Point 19	200	-8
Point 20	199	7.6
Point 21	158.58	-4
Point 22	153.26237	-5.4
Point 23	145.4	-8
Point 24	200	-5.4
Point 25	55	-13.24
Point 26	55	-46
Point 27	55	-70
Point 28	310	-70
Point 29	174.8	0.4
Point 30	200	0.4
Point 31	243.8	0.4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.21	(246.686, 59.665)	32.56394	(199.004, 8.5)	(276.353, - 4.13048)
2	6980	2.30	(246.686, 59.665)	71.913	(199.395, 8.5)	(279.649, - 4.2482)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	199.50185	4.884986	139.04383	175.34643	0	400
2	Optimize d	200.25	4.109323	13.324327	282.81774	0	400

5

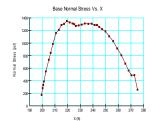
22	Optimize d	238.9702	-10.55372	614.55965	1306.2548	399.35037	0
23	Optimize d	241.29295	-10.815555	619.09452	1286.618	385.39484	0
24	Optimize d	243.12715	-10.98068	620.03595	1285.8477	384.40657	0
25	Optimize d	244.92375	-11.07202	616.59519	1256.6526	369.53734	0
26	Optimize d	247.17125	-11.186285	612.28489	1220.0373	350.88602	0
27	Optimize d	249.78995	-11.208535	600.30649	1185.6998	337.97697	0
28	Optimize d	252.7798	-11.13876	580.74545	1108.0575	304.44376	0
29	Optimize d	255.93735	-10.896645	549.53122	1031.0537	278.00711	0
30	Optimize d	259.152	-10.495985	508.17667	913.31777	233.90832	0
31	Optimize d	262.3246	-10.004885	461.34817	807.56413	199.88788	0
32	Optimize d	265.5226	-9.3470915	404.01431	673.14087	155.38029	0
33	Optimize d	268.1768	-8.74113	352.68058	561.11464	120.33946	0
34	Optimize d	270.3304	-8.2494635	311.0327	488.32139	102.35767	0
35	Optimize d	272.6449	-7.0344345	215.38075	491.81631	0	315
36	Optimize d	275.118	-5.0978585	70.216037	257.76152	0	315

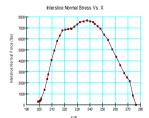
Slices of Slip Surface: 6980

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	6980	199.69755	5.2281925	90.520885	159.34819	0	400
2	6980	200.25	4.755686	-3.2463581	259.58037	0	400
3	6980	200.75	4.336702	-	304.46211	0	400

3	Optimize d	200.75	3.590949	32.570762	333.66356	0	400
4	Optimize d	201.31365	3.006591	54.020212	388.08317	0	400
5	Optimize d	202.916	1.54071	110.5485	550.1569	0	400
6	Optimize d	205.25235	-0.527307	199.00556	734.30318	0	400
7	Optimize d	206.67555	-1.787022	255.57153	842.43395	0	400
8	Optimize d	208.38485	-3.03144	311.77211	985.91161	0	400
9	Optimize d	210.8252	-4.4425905	378.96417	1158.1863	0	305.88
10	Optimize d	213.00805	-5.4271705	428.36754	1209.1696	0	313.15
11	Optimize d	215.1277	-6.2154875	466.12999	1287.0231	0	318.53
12	Optimize d	217.21455	-6.8212425	492.91325	1303.268	0	322.3
13	Optimize d	219.3921	-7.2701	509.63652	1349.2359	0	324.74
14	Optimize d	221.6603	-7.56206	516.19555	1329.5588	0	325.99
15	Optimize d	223.9285	-7.85402	522.75458	1309.9255	0	327.06
16	Optimize d	225.24575	-8.02357	526.61098	1298.2877	445.52775	0
17	Optimize d	226.55635	-8.29235	536.68852	1272.149	424.61828	0
18	Optimize d	228.8113	-8.78277	555.79871	1281.6824	419.08914	0
19	Optimize d	231.06625	-9.27319	574.90889	1291.2158	413.56	0
20	Optimize d	233.5975	-9.7445	591.44069	1310.8821	415.36969	0
21	Optimize d	236.40505	-10.1967	605.36604	1303.7788	403.22877	0

				0.02961988 9			
4	6980	202.2385	3.1550225	40.420977	420.07607	0	400
5	6980	204.71545	1.2904525	110.64922	599.43187	0	400
6	6980	206.12695	0.2818055	149.85321	696.71588	0	400
7	6980	207.44525	-0.5823405	185.89644	767.16669	0	400
8	6980	209.7358	-2.014393	247.40836	879.51103	0	400
9	6980	212.02635	-3.330617	306.95201	980.24366	0	400
10	6980	214.6991	-4.7196085	375.67546	1093.5483	0	308.45
11	6980	217.75405	-6.1499525	448.50386	1184.5632	0	317.96
12	6980	220.809	-7.410714	511.11592	1259.4353	0	325.29
13	6980	223.67795	-8.4531095	561.3988	1313.8738	434.44163	0
14	6980	226.3609	-9.301569	600.67286	1369.6314	443.9584	0
15	6980	229.04385	-10.036465	632.87	1412.5124	450.12673	0
16	6980	231.72675	-10.66136	658.19215	1442.5979	452.8769	0
17	6980	234.4097	-11.179175	676.8087	1460.0103	452.18165	0
18	6980	237.09265	-11.59225	688.9169	1464.7149	447.90718	0
19	6980	239.7756	-11.902395	694.62273	1456.6932	439.98159	0
20	6980	242.45855	-12.110945	693.9672	1435.7467	428.26661	0
21	6980	245.18	-12.218875	686.84195	1401.033	412.33837	0
22	6980	247.94	-12.223725	673.08598	1351.8595	391.89007	0
23	6980	250.7	-12.122505	652.71261	1288.2419	366.92301	0
24	6980	253.46	-11.91476	625.68309	1209.6684	337.16408	0
25	6980	256.22	-11.599555	591.97267	1115.569	302.29847	0
26	6980	258.7875	-11.212195	554.71001	1021.9697	269.77249	0
27	6980	261.1625	-10.76537	514.71389	930.81552	240.23639	0
28	6980	263.5375	-10.235015	469.53814	826.96183	206.35866	0
29	6980	265.9125	-9.619213	419.02881	709.68744	167.81184	0
30	6980	269.0681	-8.644843	342.12362	557.78874	124.51431	0
31	6980	272.47175	-7.4484515	245.49936	451.89257	0	315
32	6980	275.34285	-6.2730145	150.77939	320.58428	0	315
33	6980	278.21395	-4.9486615	50.596823	171.53588	0	315





R33 Slope Stability Global (Block) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

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File Information
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Created By: USACE St. Louis District Revision Number: 957 Last Edited By: Goltz, Amanda MVS Date: 12/4/2012 Time: 8:55:17 AM File Name: 17thReach33.gsz Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 12/4/2012 Last Solved Time: 8:58:28 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global (Block) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: Search for Tension Crack Percentage Wet: 1 Tension Crack Fluid Unit Weight: 62.4 pcf

FOS Distribution FOS Calculation Option: Constant Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 **Ending Optimization Points: 16** Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL, EL. +9.3 TO +6 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 750 psf Phi-R: 0 ° MARSH 1, EL. -2.8/-4 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH -2.8 TO -9 Cohesion Fn: MARSH -2.8 to -9 Phi-B: 0 ° BEACH SAND, EL. -9 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi-B: 0 ° Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf Bay Sound, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf

```
Cohesion Spatial Fn: Bay Sound Cohesion
    Phi-B: 0°
EMBANKMENT FILL 2, EL. +6 TO +1
    Model: Spatial Mohr-Coulomb
    Unit Weight: 105 pcf
     Cohesion: 325 psf
    Phi-B: 0 °
EMBANKMENT FILL 3, EL. +1 TO -2.8/-4
    Model: Spatial Mohr-Coulomb
     Unit Weight: 105 pcf
    Cohesion: 300 psf
    Phi-B: 0 °
```

Slip Surface Limits

Left Coordinate: (57, -9) ft Right Coordinate: (310, -3.3) ft

Slip Surface Block Left Grid

Upper Left: (160, -1) ft Lower Left: (160, -51) ft Lower Right: (210, -51) ft X Increments: 8 Y Increments: 8 Starting Angle: 135 ° Ending Angle: 180 ° Angle Increments: 6 Right Grid Upper Left: (215, -1) ft Lower Left: (215, -51) ft Lower Right: (265, -51) ft X Increments: 8 Y Increments: 8 Starting Angle: 0 ° Ending Angle: 45 Angle Increments: 6

Cohesion Functions

MARSH -2.8 to -9 Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 285 Data Points: X (ft), Cohesion (psf) Data Point: (57, 285)
Data Point: (160, 285) Data Point: (200, 300) Data Point: (257, 285) Data Point: (310, 285)

Unit Weight Functions

MARSH -2.8 TO -9 Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 105 Data Points: X (ft), Unit Weight (pcf)
Data Point: (57, 105) Data Point: (160, 105) Data Point: (200, 106) Data Point: (257, 105) Data Point: (310, 105)

Spatial Functions

Bay Sound Cohesion Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf) Data Point: (160.5, -46, 750) Data Point: (160.5, -70, 985) Data Point: (200, -46, 825) Data Point: (200, -70, 1060) Data Point: (257.4, -46, 750) Data Point: (257.4, -70, 985) Data Point: (57, -46, 750) Data Point: (57, -70, 985)

Data Point: (310, -46, 750) Data Point: (310, -70, 985)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	11,33,15,17,14,34,13	2.775001
Region 2	BEACH SAND, EL9 TO -46	30,32,27,18,10,28	9361
Region 3	Bay Sound, EL46 TO -70	30,28,29,31	6072
Region 4	EMBANKMENT FILL, EL. +9.3 TO +6	14,17,36,22,5	60.543036
Region 5	EMBANKMENT FILL, EL. +9.3 TO +6	17,15,4,3,2,36	43.89
Region 6	EMBANKMENT FILL 2, EL. +6 TO +1	36,22,23,37	170.85955
Region 7	EMBANKMENT FILL 2, EL. +6 TO +1	36,37,24,2	120.85715
Region 8	MARSH 1, EL2.8/-4 TO -9	21,35,19	17.22
Region 9	EMBANKMENT FILL 3, EL. +1 TO -2.8/-	37,23,6,7,8,9,20,19,21	292.55241
Region 10	EMBANKMENT FILL 3, EL. +1 TO -2.8/-	21,25,38	63.212443
Region 11	EMBANKMENT FILL 3, EL. +1 TO -2.8/-	21,37,24,38	69.298993
Region 12	MARSH 1, EL2.8/-4 TO -9	26,25,21,35	24.15
Region 13	MARSH 1, EL2.8/-4 TO -9	27,16,1,12,26,35,19,20,10,18	858.59091

Points

	X (ft)	Y (ft)
Point 1	151.1	-5.5
Point 2	181.9	6
Point 3	195	9.8
Point 4	199	9.8
Point 5	213.3	8.9
Point 6	247.7	0
Point 7	257.4	-1.9
Point 8	284.2	-3.1
Point 9	310	-3.3
Point 10	310	-9

Point 11	200	13.4
Point 12	158.1	-3.8
Point 13	200.5	13.4
Point 14	201	9.7
Point 15	200	9.8
Point 16	140.1	-8.4
Point 17	200	9.7
Point 18	257.4	-9
Point 19	257.4	-4
Point 20	310	-4
Point 21	200	-2.8
Point 22	224.50899	6
Point 23	243.83483	1
Point 24	169.75714	1
Point 25	160.5	-2.8
Point 26	159	-3.4
Point 27	127.06364	-9
Point 28	310	-46
Point 29	310	-70
Point 30	57	-46
Point 31	57	-70
Point 32	57	-9
Point 33	200	10
Point 34	200.95946	10
Point 35	200	-3.4
Point 36	200	6
Point 37	200	1
Point 38	168.29702	0.40063

Critical Slip Surfaces

		Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
	1	Optimized	1.75	(225.443, 7.993)	27.48204	(193.294, 9.30505)	(257.86, - 1.92059)
Г	2	7095	2.13	(225.443,	29.019	(190.5,	(258.994, -

6

5

		7.993)	8.49466)	1.97136)

Slices of Slip Surface: Optimized

ces of Slip Surface: Optimized Friction Cohesiv									
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	al Strengt h (psf)	e Strengt h (psf)		
1	Optimize d	194.14685	5.2267365	237.41732	321.87031	0	325		
2	Optimize d	196.12595	3.7792515	325.97331	506.54309	0	325		
3	Optimize d	198.12595	2.306323	434.33282	646.23486	0	325		
4	Optimize d	199.4039	1.356813	519.24525	737.98153	0	325		
5	Optimize d	199.85415	1.028365	553.50727	803.4139	0	325		
6	Optimize d	199.95025	0.96956555	561.32689	815.75141	0	300		
7	Optimize d	200.25	0.78619085	561.89417	811.88462	0	300		
8	Optimize d	200.72975	0.4927107	554.4746	840.76284	0	300		
9	Optimize d	200.97975	0.3397704	549.46477	855.58101	0	300		
10	Optimize d	201.85865	-0.1979325	525.17935	902.53559	0	300		
11	Optimize d	203.576	-1.2485375	469.2142	993.98127	0	300		
12	Optimize d	205.5773	-2.3571625	434.41641	1117.7668	0	300		
13	Optimize d	207.24955	-3.2109005	433.18519	1191.6712	0	298.09		
14	Optimize d	208.4364	-3.816843	446.22802	1244.2616	0	297.78		
15	Optimize d	210.1452	-4.591937	467.81553	1338.6087	0	297.33		
16	Optimize d	212.2484	-5.471071	498.5236	1412.9222	0	296.78		

17	Optimize d	213.91325	-6.166969	528.0393	1459.2698	0	296.34
18	Optimize d	215.3112	-6.67265	548.8688	1505.2341	0	295.97
19	Optimize d	217.35465	-7.29546	574.73234	1519.5448	0	295.43
20	Optimize d	219.92205	-7.903635	598.32634	1550.4587	0	294.76
21	Optimize d	222.05025	-8.174219	604.25338	1565.5332	0	294.2
22	Optimize d	223.6894	-8.2459565	600.59645	1526.4649	0	293.77
23	Optimize d	225.3542	-8.3188165	596.96535	1487.8923	0	293.33
24	Optimize d	227.04465	-8.392799	593.30118	1449.773	0	292.88
25	Optimize d	228.80115	-8.4805535	590.19077	1407.4075	0	292.42
26	Optimize d	230.62365	-8.58208	587.67069	1368.6202	0	291.94
27	Optimize d	232.44615	-8.6836065	585.15062	1329.8878	0	291.46
28	Optimize d	234.42355	-8.767574	580.78134	1292.8596	0	290.94
29	Optimize d	236.55585	-8.8339815	574.64071	1241.8596	0	290.38
30	Optimize d	238.68815	-8.9003885	568.45321	1190.8596	0	289.82
31	Optimize d	240.8402	-8.967411	562.25798	1139.4273	0	289.25
32	Optimize d	242.88045	-8.8140065	542.90212	1135.159	0	288.72
33	Optimize d	244.71765	-8.45359	511.57618	1044.9937	0	288.23
34	Optimize d	246.48335	-8.1072035	481.43737	958.40644	0	287.77
35	Optimize d	247.5331	-7.857842	460.78428	976.24019	0	287.49

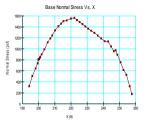
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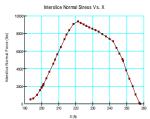
36	Optimize d	248.6483	-7.3489015	423.55077	894.10943	0	287.2
37	Optimize d	250.5449	-6.483357	359.951	756.49141	0	286.7
38	Optimize d	252.4415	-5.6178125	295.99147	618.96932	0	286.2
39	Optimize d	254.23435	-4.568258	220.3874	528.29485	0	285.73
40	Optimize d	256.23945	-3.1039525	106.96817	322.6059	0	300
41	Optimize d	257.62995	-2.08851	14.134573	178.75215	0	300

Slices of Slip Surface: 7095

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	7095	191.625	4.875	241.94676	308.22937	0	325
2	7095	193.875	2.625	342.5539	568.98517	0	325
3	7095	195.25	1.25	420.98308	713.71114	0	325
4	7095	196.375	0.125	479.94363	829.29474	0	300
5	7095	198.125	-1.625	611.58669	994.47487	0	300
6	7095	199.1107	- 2.610697 5	723.15762	1087.547	0	300
7	7095	199.2607	- 2.760697 5	740.59348	1101.6967	0	300
8	7095	199.6	-3.1	785.52496	1134.0461	0	299.85
9	7095	199.95	-3.45	830.07239	1167.3622	0	299.98
10	7095	200.25	-3.75	799.87917	1174.9286	0	299.93
11	7095	200.72975	-4.22973	749.2906	1220.7618	0	299.81
12	7095	200.97975	-4.47973	728.22926	1244.4311	0	299.74
13	7095	202.375	-5.875	677.99975	1368.5731	0	299.38
14	7095	204.94375	-7.25	672.33508	1789.822	0	298.7
15	7095	207.33125	-7.25	642.17801	1772.4817	0	298.07
16	7095	209.71875	-7.25	620.1466	1755.1414	0	297.44

17	7095	212.10625	-7.25	602.63874	1737.8429	0	296.81
18	7095	214.4209	-7.25	588.50084	1697.1645	0	296.21
19	7095	216.6627	-7.25	575.78783	1633.1088	0	295.62
20	7095	218.9045	-7.25	563.74392	1569.0977	0	295.03
21	7095	221.1463	-7.25	552.10148	1505.0865	0	294.44
22	7095	223.3881	-7.25	540.8159	1441.0754	0	293.85
23	7095	225.71685	-7.25	529.23961	1376.1058	0	293.23
24	7095	228.1326	-7.25	517.31775	1310.2872	0	292.6
25	7095	230.54835	-7.25	505.47868	1244.4272	0	291.96
26	7095	232.96405	-7.25	493.681	1178.6085	0	291.33
27	7095	235.37975	-7.25	481.96611	1112.7485	0	290.69
28	7095	237.7955	-7.25	470.25123	1046.9299	0	290.05
29	7095	240.21125	-7.25	458.53634	981.0699	0	289.42
30	7095	242.62695	-7.25	446.82146	915.25129	0	288.78
31	7095	245.0424	-7.25	435.08324	849.46401	0	288.15
32	7095	246.975	-6.949695	406.87647	861.18299	0	287.64
33	7095	248.7796	-6.202211	351.32009	734.59471	0	287.16
34	7095	250.93875	-5.307853	284.47146	589.19904	0	286.6
35	7095	253.1366	- 4.397461 5	215.63789	441.24742	0	286.02
36	7095	255.82745	-3.282884	123.7883	264.07681	0	300
37	7095	258.1969	2.301440 5	28.853288	118.15159	0	300





R33 Slope Stability Global (Entry & Exit) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 957 Last Edited By: Goltz, Amanda MVS Date: 12/4/2012

Time: 8:55:17 AM File Name: 17thReach33.gsz

Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\

Last Solved Date: 12/4/2012 Last Solved Time: 8:59:24 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global (Entry & Exit)

Kind: SLOPE/W

Parent: Seepage Analysis (Gap) Method: Spencer

PWP Conditions Source: Parent Analysis

Direction of movement: Left to Right

Use Passive Mode: No

Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1

Optimize Critical Slip Surface Location: Yes

Tension Crack

Tension Crack Option: Search for Tension Crack Percentage Wet: 1

Tension Crack Fluid Unit Weight: 62.4 pcf

FOS Distribution FOS Calculation Option: Constant Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +9.3 TO +6

Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 750 psf Phi: 0° Phi-B: 0°

MARSH 1, EL. -2.8/-4 TO -9

Model: Spatial Mohr-Coulomb Weight Fn: MARSH -2.8 TO -9 Cohesion Fn: MARSH -2.8 to -9

Phi: 0 Phi-B: 0 °

BEACH SAND, EL. -9 TO -46

Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Bay Sound, EL. -46 TO -70 Model: Spatial Mohr-Coulomb

Unit Weight: 107 pcf

Cohesion Spatial Fn: Bay Sound Cohesion

Phi: 0° Phi-B: 0 °

EMBANKMENT FILL 2, EL. +6 TO +1

Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 325 psf Phi-B: 0 °

EMBANKMENT FILL 3, EL. +1 TO -2.8/-4

Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 300 psf Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (120, -9) ft Left-Zone Right Coordinate: (204.74509, 9.45642) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (214.79075, 8.51431) ft Right-Zone Right Coordinate: (275.28206, -2.70069) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (57, -9) ft Right Coordinate: (310, -3.3) ft

Cohesion Functions

MARSH -2.8 to -9

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 285 Data Points: X (ft), Cohesion (psf)
Data Point: (57, 285) Data Point: (160, 285)

Data Point: (200, 300) Data Point: (257, 285) Data Point: (310, 285)

Unit Weight Functions

MARSH -2.8 TO -9 Model: Spline Data Point Function

Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 105 Data Points: X (ft), Unit Weight (pcf) Data Point: (57, 105)
Data Point: (160, 105)

Data Point: (200, 106) Data Point: (257, 105) Data Point: (310, 105)

Spatial Functions

Bay Sound Cohesion Model: Linear Interpolation

Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf) Data Point: (160.5, -46, 750) Data Point: (160.5, -70, 985)

Data Point: (200, -46, 825) Data Point: (200, -70, 1060) Data Point: (257.4, -46, 750) Data Point: (257.4, -70, 985)
Data Point: (57, -46, 750)
Data Point: (57, -70, 985)
Data Point: (310, -46, 750) Data Point: (310, -70, 985)

Regions

0.0			
	Material	Points	Area (ft²)
Region 1	Sheet Pile	11,33,15,17,14,34,13	2.775001
Region 2	BEACH SAND, EL9 TO -46	30,32,27,18,10,28	9361
Region 3	Bay Sound, EL46 TO -70	30,28,29,31	6072
Region 4	EMBANKMENT FILL, EL. +9.3 TO +6	14,17,36,22,5	60.543036

Region 5	EMBANKMENT FILL, EL. +9.3 TO +6	17,15,4,3,2,36	43.89
Region 6	EMBANKMENT FILL 2, EL. +6 TO +1	36,22,23,37	170.85955
Region 7	EMBANKMENT FILL 2, EL. +6 TO +1	36,37,24,2	120.85715
Region 8	MARSH 1, EL2.8/-4 TO -9	21,35,19	17.22
Region 9	EMBANKMENT FILL 3, EL. +1 TO -2.8/-	37,23,6,7,8,9,20,19,21	292.55241
Region 10	EMBANKMENT FILL 3, EL. +1 TO -2.8/-	21,25,38	63.212443
Region 11	EMBANKMENT FILL 3, EL. +1 TO -2.8/-	21,37,24,38	69.298993
Region 12	MARSH 1, EL2.8/-4 TO -9	26,25,21,35	24.15
Region 13	MARSH 1, EL2.8/-4 TO -9	27,16,1,12,26,35,19,20,10,18	858.59091

Points

	X (ft)	Y (ft)
Point 1	151.1	-5.5
Point 2	181.9	6
Point 3	195	9.8
Point 4	199	9.8
Point 5	213.3	8.9
Point 6	247.7	0
Point 7	257.4	-1.9
Point 8	284.2	-3.1
Point 9	310	-3.3
Point 10	310	-9
Point 11	200	13.4
Point 12	158.1	-3.8
Point 13	200.5	13.4
Point 14	201	9.7
Point 15	200	9.8
Point 16	140.1	-8.4
Point 17	200	9.7
Point 18	257.4	-9
Point 19	257.4	-4

Point 20	310	-4
Point 21	200	-2.8
Point 22	224.50899	6
Point 23	243.83483	1
Point 24	169.75714	1
Point 25	160.5	-2.8
Point 26	159	-3.4
Point 27	127.06364	-9
Point 28	310	-46
Point 29	310	-70
Point 30	57	-46
Point 31	57	-70
Point 32	57	-9
Point 33	200	10
Point 34	200.95946	10
Point 35	200	-3.4
Point 36	200	6
Point 37	200	1
Point 38	168.29702	0.40063

Critical Slip Surfaces

		Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
	1	Optimized	1.71	(233.358, 46.022)	27.13501	(195.362, 9.8)	(257.781, - 1.91705)
ſ	2	7380	1.77	(233.358, 46.022)	54.854	(195.845, 9.8)	(259.853, - 2.00985)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	196.2715	5.0355205	265.47779	329.22249	0	325
2	Optimize	198.0905	3.5345415	369.26804	505.61545	0	325

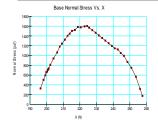
d Optimize 199.23445 2.590586 444.02284 595.89596 0 325 4								
3		d						
1	3		199.23445	2.590586	444.02284	595.89596	0	325
5 d 200.25 1.832561 498.12694 672.21445 0 325 6 Optimize d Optimize d Optimize d Standard 200.72975 1.48582 497.96238 705.86123 0 325 7 Optimize d Standard 200.97975 1.305124 497.55322 723.15945 0 325 8 Optimize d Standard 201.20095 1.1452365 496.96844 737.29522 0 325 9 Optimize d Standard 202.20955 0.41623 481.24409 809.29003 0 300 10 Optimize d Standard 204.1016 -0.864095 438.33633 941.88581 0 300 11 Optimize d Standard 207.8909 -3.2424025 423.55411 1184.2743 0 297.92 13 Optimize d Standard 209.23 -3.9433315 440.69022 1245.1448 0 297.57 14 Optimize d Standard 210.9722 -4.85244 474.56365 1324.3235 0 297.11 15	4		199.73445	2.2051885	478.22963	657.73741	0	325
6 d 200.72975 1.48582 497.96238 705.86123 0 325 7 Optimize d optimize	5		200.25	1.832561	498.12694	672.21445	0	325
7 d 200,97975 1.305124 497.55322 723.15945 0 325 8 Optimize d 201,20095 1.1452365 496.96844 737.29522 0 325 9 Optimize d 202,20955 0.41623 481,24409 809,29003 0 300 10 Optimize d 204,1016 -0.864095 438,33633 941,88581 0 300 11 Optimize d 206,30445 -2.27904 411,39663 1065,2604 0 300 12 Optimize d 207,8909 -3.2424025 423,55411 1184,2743 0 297,92 13 Optimize d 209,23 -3.9433315 440,69022 1245,1448 0 297,57 14 Optimize d 210,9722 -4.855244 474,56365 1324,3235 0 297,11 15 Optimize d 213,85205 -6.6930365 535,95957 1448,3107 0 296,35 17 Optimize d 215,26755 -6.8956575	6		200.72975	1.48582	497.96238	705.86123	0	325
8 d 201.20095 1.1452365 496.96844 737.29522 0 325 9 Optimize d 202.20955 0.41623 481.24409 809.29003 0 300 10 Optimize d 204.1016 -0.864095 438.33633 941.88581 0 300 11 Optimize d 206.30445 -2.27904 411.39663 1065.2604 0 300 12 Optimize d 207.8909 -3.2424025 423.55411 1184.2743 0 297.92 13 Optimize d 209.23 -3.9433315 440.69022 1245.1448 0 297.57 14 Optimize d 210.9722 -4.855244 474.56365 1324.3235 0 297.11 15 Optimize d 212.57165 -5.6672065 507.76771 1405.5216 0 296.69 16 Optimize d 213.85205 -6.2930365 535.95957 1448.3107 0 296.35 17 Optimize d 215.26755 -6.8956575 562.41274 1504.7742 0 295.98 18 Optimize d 216.99445 -7.5612525 592.72435 1524.982 0 295.53 19 Optimize d 218.7472 -8.09943 616.15176 1584.8363 0 295.07 20 Optimize d 220.52575 -8.51019 632.31293 1577.6597 0 294.6	7		200.97975	1.305124	497.55322	723.15945	0	325
9 d 202.20955	8		201.20095	1.1452365	496.96844	737.29522	0	325
10 d 204.1016 -0.864095 438.33633 941.88581 0 300 11 Optimize d 206.30445 -2.27904 411.39663 1065.2604 0 300 12 Optimize d 207.8909 -3.2424025 423.55411 1184.2743 0 297.92 13 Optimize d 209.23 -3.9433315 440.69022 1245.1448 0 297.57 14 Optimize d 210.9722 -4.855244 474.56365 1324.3235 0 297.11 15 Optimize d 212.57165 -5.6672065 507.76771 1405.5216 0 296.69 16 Optimize d 213.85205 -6.2930365 535.95957 1448.3107 0 296.35 17 Optimize d 215.26755 -6.8956575 562.41274 1504.7742 0 295.98 18 Optimize d 216.99445 -7.5612525 592.72435 1524.982 0 295.53 19 Optimize d 218.7472 -8.09943 616.15176 1584.8363 0 295.07 20 Optimize d 220.52575 -8.51019 632.31293 1577.6597 0 294.6	9		202.20955	0.41623	481.24409	809.29003	0	300
11 d 206.30445 -2.27904 411.39663 1065.2604 0 300 12 Optimize d 207.8909 -3.2424025 423.55411 1184.2743 0 297.92 13 Optimize d 209.23 -3.9433315 440.69022 1245.1448 0 297.57 14 Optimize d 210.9722 -4.855244 474.56365 1324.3235 0 297.11 15 Optimize d 213.85205 -5.6672065 507.76771 1405.5216 0 296.69 16 Optimize d 213.85205 -6.2930365 535.95957 1448.3107 0 296.35 17 Optimize d 215.26755 -6.8956575 562.41274 1504.7742 0 295.98 18 Optimize d 216.99445 -7.5612525 592.72435 1524.982 0 295.53 19 Optimize d 2218.7472 -8.09943 616.15176 1584.8363 0 295.07 20 Optimize d 220.52575	10		204.1016	-0.864095	438.33633	941.88581	0	300
12 d 207.8909 -3.2424025 423.55411 1184.2743 0 297.92 13 Optimize d 210.9722 -4.855244 474.56365 1324.3235 0 297.11 15 Optimize d 212.57165 -5.6672065 507.76771 1405.5216 0 296.69 16 Optimize d 213.85205 -6.2930365 535.95957 1448.3107 0 296.35 17 Optimize d 215.26755 -6.8956575 562.41274 1504.7742 0 295.98 18 Optimize d 216.99445 -7.5612525 592.72435 1524.982 0 295.53 19 Optimize d 218.7472 -8.09943 616.15176 1584.8363 0 295.07 20 Optimize d 220.52575 -8.51019 632.31293 1577.6597 0 294.6	11		206.30445	-2.27904	411.39663	1065.2604	0	300
13 d 209.23 -3.9433315 440.69022 1245.1448 0 297.57 14 Optimize d 210.9722 -4.855244 474.56365 1324.3235 0 297.11 15 Optimize d 212.57165 -5.6672065 507.76771 1405.5216 0 296.69 16 Optimize d 213.85205 -6.2930365 535.95957 1448.3107 0 296.35 17 Optimize d 215.26755 -6.8956575 562.41274 1504.7742 0 295.98 18 Optimize d 216.99445 -7.5612525 592.72435 1524.982 0 295.53 19 Optimize d 218.7472 -8.09943 616.15176 1584.8363 0 295.07 20 Optimize d 220.52575 -8.51019 632.31293 1577.6597 0 294.6	12		207.8909	-3.2424025	423.55411	1184.2743	0	297.92
15 Optimize d 215.26755 -6.8956575 562.41274 1504.7742 0 295.98 18 Optimize d 216.99445 -7.5612525 592.72435 1524.982 0 295.53 19 Optimize d 218.7472 -8.09943 616.15176 1584.8363 0 295.07	13		209.23	-3.9433315	440.69022	1245.1448	0	297.57
15 d 212.57165 -5.6672065 507.76771 1405.5216 0 296.69 16 Optimize d 213.85205 -6.2930365 535.95957 1448.3107 0 296.35 17 Optimize d 215.26755 -6.8956575 562.41274 1504.7742 0 295.98 18 Optimize d 216.99445 -7.5612525 592.72435 1524.982 0 295.53 19 Optimize d 218.7472 -8.09943 616.15176 1584.8363 0 295.07 20 Optimize d 220.52575 -8.51019 632.31293 1577.6597 0 294.6	14		210.9722	-4.855244	474.56365	1324.3235	0	297.11
16 d 213.85205 -6.2930365 535.95957 1448.3107 0 296.35 17 Optimize d 215.26755 -6.8956575 562.41274 1504.7742 0 295.98 18 Optimize d 216.99445 -7.5612525 592.72435 1524.982 0 295.53 19 Optimize d 218.7472 -8.09943 616.15176 1584.8363 0 295.07 20 Optimize d 220.52575 -8.51019 632.31293 1577.6597 0 294.6	15		212.57165	-5.6672065	507.76771	1405.5216	0	296.69
17 d 215.26755 -6.8956575 562.41274 1504.7742 0 295.98 18 Optimize d 216.99445 -7.5612525 592.72435 1524.982 0 295.53 19 Optimize d 218.7472 -8.09943 616.15176 1584.8363 0 295.07 20 Optimize d 220.52575 -8.51019 632.31293 1577.6597 0 294.6	16		213.85205	-6.2930365	535.95957	1448.3107	0	296.35
18 d 216.99445 -7.5612525 592.72435 1524.982 0 295.53 19 Optimize d 218.7472 -8.09943 616.15176 1584.8363 0 295.07 20 Optimize d 220.52575 -8.51019 632.31293 1577.6597 0 294.6	17		215.26755	-6.8956575	562.41274	1504.7742	0	295.98
19 d 218.7472 -8.09943 616.15176 1584.8363 0 295.07 20 Optimize d 220.52575 -8.51019 632.31293 1577.6597 0 294.6	18		216.99445	-7.5612525	592.72435	1524.982	0	295.53
20 d 220.52575 -8.51019 632.31293 1577.6597 0 294.6	19		218.7472	-8.09943	616.15176	1584.8363	0	295.07
21 Optimize 222,81395 -8.85688 642,41435 1595,3853 0 294	20		220.52575	-8.51019	632.31293	1577.6597	0	294.6
	21	Optimize	222.81395	-8.85688	642.41435	1595.3853	0	294

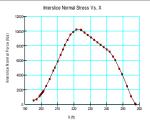
	d						
22	Optimize d	224.36095	-8.998147	643.64827	1602.6542	0	293.59
23	Optimize d	225.49035	-8.9978195	638.19272	1571.5865	0	293.29
24	Optimize d	227.4531	-8.9972505	628.66518	1517.9877	0	292.78
25	Optimize d	229.41585	-8.9966815	619.18858	1464.3379	0	292.26
26	Optimize d	231.37855	-8.996112	609.66103	1410.6882	0	291.74
27	Optimize d	233.34125	-8.9955425	600.18444	1357.0894	0	291.23
28	Optimize d	235.304	-8.9949735	590.65689	1303.4396	0	290.71
29	Optimize d	237.26675	-8.9944045	581.18029	1249.8408	0	290.19
30	Optimize d	239.15015	-8.9928875	571.9759	1198.6052	0	289.7
31	Optimize d	240.95425	-8.9904225	563.16262	1149.1622	0	289.22
32	Optimize d	242.84555	-8.840085	544.65844	1126.8502	0	288.72
33	Optimize d	244.55845	-8.581915	520.33512	1051.6024	0	288.27
34	Optimize d	246.49105	-8.0849605	480.00586	994.19378	0	287.77
35	Optimize d	248.53675	-7.4286105	429.08255	870.10254	0	287.23
36	Optimize d	250.9266	-6.414365	353.70637	750.33461	0	286.6
37	Optimize d	253.69535	-4.808272	238.43146	567.09601	0	285.87
38	Optimize d	256.1555	-3.06721	105.01761	319.6539	0	300
39	Optimize d	257.59035	-2.0517505	11.363768	174.32578	0	300

Slices of Slip Surface: 7380

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strength (psf)	Cohesiv e Strengt h (psf)
1	7380	197.42245	4.630369	299.04514	377.95285	0	325
2	7380	199.5	2.8684325	433.70614	581.93582	0	325
3	7380	200.25	2.28687	470.28072	622.85247	0	325
4	7380	200.72975	1.9276175	471.55683	661.64568	0	325
5	7380	200.97975	1.7427995	471.72075	681.42751	0	325
6	7380	201.5104	1.3639885	470.38208	719.09636	0	325
7	7380	203.13535	0.263827	440.12974	835.52781	0	300
8	7380	205.36445	-1.134009	401.14352	974.48675	0	300
9	7380	207.5936	-2.388862	391.11683	1099.8824	0	300
10	7380	209.2393	-3.242091	400.53367	1186.2216	0	297.57
11	7380	210.6528	-3.903436	423.03685	1253.3011	0	297.2
12	7380	212.4176	-4.6692645	450.03271	1331.124	0	296.73
13	7380	214.4209	-5.446221	481.3841	1387.4277	0	296.21
14	7380	216.6627	-6.216901	513.74287	1420.048	0	295.62
15	7380	218.9045	-6.8813945	541.3595	1441.3734	0	295.03
16	7380	221.1463	-7.4436695	563.98383	1451.8594	0	294.44
17	7380	223.3881	-7.90693	581.238	1451.7572	0	293.85
18	7380	225.58265	-8.267941	592.69906	1443.0012	0	293.27
19	7380	227.72995	-8.532491	598.59713	1426.2195	0	292.7
20	7380	229.87725	-8.71155	599.30639	1400.1322	0	292.14
21	7380	232.0246	-8.805957	594.75286	1364.789	0	291.57
22	7380	234.17195	-8.8161505	585.03822	1320.1543	0	291.01
23	7380	236.31925	-8.742177	570.0662	1266.1059	0	290.44
24	7380	238.46655	-8.583694	549.8704	1202.63	0	289.88
25	7380	240.61385	-8.3399615	524.33672	1129.5466	0	289.31
26	7380	242.76115	-8.0098235	493.44188	1046.6198	0	288.75
27	7380	244.8011	-7.616843	459.07763	958.72061	0	288.21
28	7380	246.7337	-7.167715	421.65307	866.54034	0	287.7
29	7380	248.72575	-6.6253135	377.98409	769.25704	0	287.18
30	7380	250.77725	-5.982321	327.46317	666.03776	0	286.64
31	7380	252.8288	-5.249204	270.80405	552.20749	0	286.1

32	7380	254.88035	-4.4220255	207.62318	427.12296	0	285.56
33	7380	256.65305	-3.6339645	143.4351	315.37663	0	300
34	7380	258.6266	-2.6466955	54.341672	193.25463	0	300





R34 Slope Stability Global Block

Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

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File Information
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Created By: USACE St. Louis District Revision Number: 785 Last Edited By: Goltz, Amanda MVS Date: 5/30/2013 Time: 7:33:45 AM File Name: 17thReach34.gsz Directory: Z-\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_Hlgh_water_analyses\High water cases\
Last Solved Date: 5/30/2013 Last Solved Time: 7:40:50 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global Block Kind: SLOPE/W Parent: Seepage Analysis (Full Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: Search for Tension Crack Percentage Wet: 1 Tension Crack Fluid Unit Weight: 62.4 pcf

EMBANKMENT FILL 2, EL. +6 TO -2.8

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: FILL 2 Phi: 0 ° Phi-B: 0 °

Bay Sound, El. -46 to -70 Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi-B: 0 °

EMBANKMENT FILL EL. +2.0 TO -2.3

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 650 psf Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (42, -8.4) ft Right Coordinate: (310, -2.3) ft

Slip Surface Block

Left Grid Upper Left: (175, 0) ft Lower Left: (175, -50) ft Lower Right: (225, -50) ft X Increments: 10 Y Increments: 10 Starting Angle: 125 Ending Angle: 155 Angle Increments: 5 Upper Left: (230, 0) ft Lower Left: (230, -50) ft Lower Right: (280, -50) ft X Increments: 10 Y Increments: 10 Starting Angle: 15 Ending Angle: 45 ° Angle Increments: 5

```
FOS Distribution
     FOS Calculation Option: Constant
Restrict Block Crossing: Yes
Advanced
     Number of Slices: 30
     Optimization Tolerance: 0.01
     Minimum Slip Surface Depth: 0.1 ft
     Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
     Starting Optimization Points: 8
     Ending Optimization Points: 16
     Complete Passes per Insertion:
     Driving Side Maximum Convex Angle: 5
     Resisting Side Maximum Convex Angle: 1 °
```

```
Materials
EMBANKMENT FILL, EL. +9.9 TO +6.0
    Model: Spatial Mohr-Coulomb
     Unit Weight: 107 pcf
    Cohesion Fn: FILL 1
    Phi-B·∩°
MARSH 1, EL. -2.8 TO -7
    Model: Spatial Mohr-Coulomb
    Unit Weight: 93 pcf
Cohesion Fn: MARSH 1
    Phi-B: 0 °
BEACH SAND, EL. -13/-15 TO -46
    Model: Mohr-Coulomb
    Unit Weight: 122 pcf
    Cohesion: 0 psf
    Phi: 30 <sup>1</sup>
    Phi-B: 0 °
MARSH 2, EL. -7 TO -13/-15
    Model: Spatial Mohr-Coulomb
    Unit Weight: 108 pcf
    Cohesion Fn: MARSH 2
    Phi-B: 0 °
```

Cohesion Functions

```
FILL 2
     Model: Spline Data Point Function
     Function: Cohesion vs. X
           Curve Fit to Data: 100 %
           Segment Curvature: 0 %
      Y-Intercept: 650
     Data Points: X (ft), Cohesion (psf)
           Data Point: (180.5, 650)
           Data Point: (200, 300)
           Data Point: (234, 650)
MARSH 2
     Model: Spline Data Point Function
     Function: Cohesion vs. X
Curve Fit to Data: 100 %
           Segment Curvature: 0 %
      Y-Intercept: 330
     Data Points: X (ft), Cohesion (psf)
           Data Point: (42, 330)
           Data Point: (156.8, 330)
           Data Point: (200, 350)
           Data Point: (248, 330)
           Data Point: (310, 330)
MARSH 1
     Model: Spline Data Point Function
     Function: Cohesion vs. X
Curve Fit to Data: 100 %
           Segment Curvature: 0 %
     Y-Intercept: 215
     Data Points: X (ft), Cohesion (psf)
           Data Point: (42, 215)
Data Point: (156.8, 215)
           Data Point: (200, 230)
           Data Point: (248, 215)
           Data Point: (310, 215)
FILL 1
     Model: Spline Data Point Function
     Function: Cohesion vs. X
Curve Fit to Data: 100 %
           Segment Curvature: 0 %
     Y-Intercept: 650
Data Points: X (ft), Cohesion (psf)
```

Data Point: (156.8, 650)

Data Point: (200, 700) Data Point: (248, 650)

Spatial Functions

Bay Sound Cohesion

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (156.8, -46, 780)
Data Point: (200, -46, 800)
Data Point: (200, -70, 1015)
Data Point: (200, -70, 1035)
Data Point: (248, -70, 1015)
Data Point: (248, -70, 1015)
Data Point: (42, -70, 1015)
Data Point: (42, -70, 1015)
Data Point: (310, -46, 780)
Data Point: (310, -46, 780)
Data Point: (310, -70, 1015)

Regions

	Points	Area (ft²)	Material
Region 1	17,18,47,19,20,21,46,8	2.7706535	
Region 2	24,16,36,31,15,14,27,25,35	8752.8	BEACH SAND, EL13/-15 TO -46
Region 3	12,43,26,28,13	285.275	MARSH 1, EL2.8 TO -7
Region 4	30,37,38,34,29,26,43	363.12	MARSH 1, EL2.8 TO -7
Region 5	20,21,7,6,39,32	46.120367	EMBANKMENT FILL, EL. +9.9 TO +6.0
Region 6	42,41,38,34	31.90707	MARSH 1, EL2.8 TO -7
Region 7	41,38,40	0.731952	MARSH 1, EL2.8 TO -7
Region 8	40,38,37,30	25.92	MARSH 1, EL2.8 TO -7
Region 9	10,11,12,43	107.85	EMBANKMENT FILL EL. +2.0 TO -2.3

Point 24	42	-13
Point 25	200	-15
Point 26	248	-7
Point 27	248	-13
Point 28	310	-7
Point 29	200	-7
Point 30	200	-2.8
Point 31	248	-46
Point 32	200	6
Point 33	227.5	6
Point 34	156.8	-7
Point 35	156.8	-13
Point 36	156.8	-46
Point 37	200	-3.4
Point 38	156.8	-3.4
Point 39	181.14853	6
Point 40	156.8	-2.8
Point 41	154.36016	-3.4
Point 42	141.51369	-7
Point 43	248	-2.55
Point 44	310	-70
Point 45	42	-70
Point 46	200	10
Point 47	200.95711	10

Critical Slip Surfaces

		Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
:	1	Optimized	2.28	(236.953, 10.699)	35.22445	(193.482, 9.4233)	(279.785, - 0.93401)
	2	12578	2.58	(236.953, 10.699)	38.572	(189.509, 8.32058)	(282.944, - 1.19257)

Slices of Slip Surface: Optimized

	Slip	X (ft)	Y (ft)	PWP (psf)	Base	Friction	Cohesiv
	Surface	X (IL)	Y (IL)	PWP (psi)	Normal	al	e

Region 10	16,36,31,15,44,45	6432	Bay Sound, El46 to -70
Region 11	24,1,22,23,2,3,42,34,29,26,28,14,27,25,35	1596.2586	MARSH 2, EL7 TO -13/- 15
Region 12	40,4,5,39,32,30	274.51963	EMBANKMENT FILL 2, EL. +6 TO -2.8
Region 13	32,33,10,43,30	375.4	EMBANKMENT FILL 2, EL. +6 TO -2.8
Region 14	32,20,19,9,33	67.345	EMBANKMENT FILL, EL. +9.9 TO +6.0

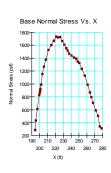
Points

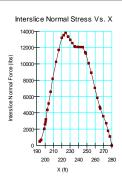
	X (ft)	Y (ft)
Point 1	42	-8.4
Point 2	132.9	-7.9
Point 3	140.8	-7.2
Point 4	165.8	-0.3
Point 5	170.7	3.1
Point 6	195.2	9.9
Point 7	199	9.9
Point 8	200	10.4
Point 9	213.2	9.1
Point 10	248	2
Point 11	280.5	-1
Point 12	297	-2.3
Point 13	310	-2.3
Point 14	310	-13
Point 15	310	-46
Point 16	42	-46
Point 17	200	13.4
Point 18	200.5	13.4
Point 19	201	9.7
Point 20	200	9.7
Point 21	200	9.9
Point 22	61.3	-8.2
Point 23	97.4	-8

						-	
					Stress (psf)	Strengt h (psf)	Strengt h (psf)
1	Optimize d	194.25475	5.249795	186.31593	286.43306	0	403.12
2	Optimize d	195.1135	4.427224	227.98561	433.08888	0	387.71
3	Optimize d	197.1	2.765679	337.20335	611.87117	0	352.05
4	Optimize d	199.5	0.7582951	546.16931	826.65992	0	308.97
5	Optimize d	200.25	0.13098772	316.9336	865.4271	0	302.57
6	Optimize d	200.72855	-0.26928043	291.11036	904.02285	0	307.5
7	Optimize d	200.97855	-0.4783829	311.02661	924.19131	0	310.07
8	Optimize d	201.84435	-1.2025299	345.6803	989.83186	0	318.99
9	Optimize d	203.46905	-2.343304	325.45306	1153.8836	0	335.71
10	Optimize d	205.4449	-3.4436085	279.674	1268.9999	0	228.3
11	Optimize d	207.8359	-4.7750895	268.19312	1375.4777	0	227.55
12	Optimize d	211.1157	-6.2528195	281.77401	1526.0188	0	226.53
13	Optimize d	214.74005	-7.6647745	315.22113	1602.0917	0	343.86
14	Optimize d	218.1452	-8.88085	359.25238	1669.1375	0	342.44
15	Optimize d	221.13245	-9.6803825	393.10781	1732.6346	0	341.19
16	Optimize d	223.3768	-10.047228	408.5776	1720.2342	0	340.26
17	Optimize d	225.9995	-10.226505	413.88971	1726.3343	0	339.17
18	Optimize d	228.79535	-10.21878	409.0405	1663.3748	0	338

19	Optimize d	231.38605	-10.21162	405.41213	1608.2931	0	336.92
20	Optimize d	233.97675	-10.20446	402.40136	1553.1728	0	335.84
21	Optimize d	235.584	-10.205015	401.02923	1515.2326	0	335.17
22	Optimize d	237.4202	-10.35985	409.19941	1470.846	0	334.41
23	Optimize d	240.46885	-10.661255	425.87945	1439.7709	0	333.14
24	Optimize d	243.51755	-10.96266	442.8859	1408.6957	0	331.87
25	Optimize d	246.52095	-11.04071	446.30135	1392.3873	0	330.62
26	Optimize d	248.3442	-10.951155	439.8985	1348.0742	0	330
27	Optimize d	250.33105	-10.66076	420.96059	1326.3862	0	330
28	Optimize d	253.6163	-10.113785	385.47019	1233.3665	0	330
29	Optimize d	257.35805	-9.283585	332.1095	1128.3204	0	330
30	Optimize d	260.95985	-8.3293275	271.09525	986.23663	0	330
31	Optimize d	263.96515	-7.5342425	220.26026	867.95514	0	330
32	Optimize d	265.74525	-7.06835	190.46306	794.55554	0	330
33	Optimize d	267.78975	-6.5647	158.21002	708.18654	0	215
34	Optimize d	271.32385	-5.6941	102.45571	589.71585	0	215
35	Optimize d	274.1974	-4.543951	29.53483	506.4426	0	215
36	Optimize d	276.4104	-3.114253	-60.562078	342.94852	0	215
37	Optimize d	278.651	-1.6667069	-151.76085	312.69059	0	650

32	12578	272.32115	-5.270349	75.614308	548.94185	0	215
33	12578	275.3251	-4.1172485	2.4562685	408.31105	0	215
34	12578	278.32905	-2.9641475	-70.700776	267.67714	0	215
35	12578	280.1655	-2.259192	-115.41857	257.40672	0	650
36	12578	281.72205	-1.661678	-153.30605	177.88941	0	650





Slices of Slip Surface: 12578

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	12578	191.44045	7.160289	117.83221	104.16269	0	690.09
2	12578	194.28575	5.4506715	180.29155	372.45752	0	402.56
3	12578	197.1	3.759708	298.76791	567.96355	0	352.05
4	12578	199.5	2.3176425	457.4532	725.24093	0	308.97
5	12578	200.25	1.866997	175.06785	746.18128	0	302.57
6	12578	200.72855	1.5794525	124.86691	774.80902	0	307.5
7	12578	200.97855	1.4292375	133.93913	789.757	0	310.07
8	12578	202.73705	0.3726133	176.33863	886.14659	0	328.18
9	12578	206.2112	-1.7148642	163.90357	1076.3735	0	363.94
10	12578	209.2612	-3.547489	165.7075	1266.3013	0	227.11
11	12578	211.88705	-5.1252615	205.31369	1394.198	0	226.29
12	12578	214.1036	-6.457074	255.28211	1486.5567	0	225.59
13	12578	216.2554	-7.75	308.34987	1541.406	0	343.23
14	12578	218.7518	-9.25	377.66026	1641.6324	0	342.19
15	12578	221.875	-10	409.76	1793.6267	0	340.89
16	12578	225.625	-10	401.01333	1706.3467	0	339.32
17	12578	228.9643	-10	395.51713	1631.9905	0	337.93
18	12578	231.89285	-10	391.89762	1570.5954	0	336.71
19	12578	234.8214	-10	389.06347	1509.2344	0	335.49
20	12578	237.75	-10	386.74152	1447.8392	0	334.27
21	12578	240.6786	-10	384.79518	1386.4441	0	333.05
22	12578	243.60715	-10	383.08786	1325.049	0	331.83
23	12578	246.5357	-10	381.58542	1263.6538	0	330.61
24	12578	249.5	-10	380.2	1218.0667	0	330
25	12578	252.5	-10	378.86667	1188.2	0	330
26	12578	255.5	-10	377.56667	1158.3667	0	330
27	12578	258.5	-10	376.33333	1128.5333	0	330
28	12578	261.30255	-9.5	343.97949	1123.6986	0	330
29	12578	263.90765	-8.5	280.53044	986.37198	0	330
30	12578	266.51275	-7.5	217.08139	849.04538	0	330
31	12578	269.31725	-6.4234495	148.77651	689.57265	0	215

R34 Slope Stability Global Entry & Exit

File Information

Created By: USACE St. Louis District Revision Number: 785 Last Edited By: Goltz, Amanda MVS Date: 5/30/2013 Time: 7:33:45 AM File Name: 17thReach34.gsz Directory: Z-\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_Hlgh_water_analyses\High water cases\ Last Solved Date: 5/30/2013

Last Solved Time: 7:41:22 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global Entry & Exit Kind: SLOPE/W Parent: Seepage Analysis (Full Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: Search for Tension Crack Percentage Wet: 1 Tension Crack Fluid Unit Weight: 62.4 pcf

Cohesion Fn: FILL 2 Phi-R·∩° Bay Sound, El. -46 to -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi-B: 0 ° EMBANKMENT FILL EL. +2.0 TO -2.3 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 650 psf

Unit Weight: 107 pcf

Slip Surface Entry and Exit

Phi-B: 0 °

Left Projection: Range Left-Zone Left Coordinate: (60.64524, -8.20679) ft Left-Zone Right Coordinate: (200, 9.7) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (215.60647, 8.57832) ft Right-Zone Right Coordinate: (288.4128, -1.62343) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (42, -8.4) ft Right Coordinate: (310, -2.3) ft

Cohesion Functions

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 650 Data Points: X (ft), Cohesion (psf)

FOS Distribution FOS Calculation Option: Constant Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL, EL. +9.9 TO +6.0 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: FILL 1 Phi: 0° Phi-B: 0 ° MARSH 1, EL. -2.8 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: MARSH 1 Phi: 0 Phi-B: 0 ° BEACH SAND, EL. -13/-15 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi-B: 0 ° MARSH 2, EL. -7 TO -13/-15 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion En: MARSH 2 Phi-B: 0 ° EMBANKMENT FILL 2. EL. +6 TO -2.8 Model: Spatial Mohr-Coulomb

Data Point: (180.5, 650) Data Point: (200, 300) Data Point: (234, 650) Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 330 Data Points: X (ft), Cohesion (psf) Data Point: (42, 330) Data Point: (156.8, 330) Data Point: (200, 350) Data Point: (248, 330) Data Point: (310, 330) MARSH 1 Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 215
Data Points: X (ft), Cohesion (psf) Data Point: (42, 215) Data Point: (156.8, 215) Data Point: (200, 230) Data Point: (248, 215) Data Point: (310, 215) Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 650 Data Points: X (ft), Cohesion (psf) Data Point: (156.8, 650) Data Point: (200, 700)

Spatial Functions

Bay Sound Cohesion Model: Linear Interpolation Limit Range By: Data Values

Data Point: (248, 650)

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (156.8, -46, 780)
Data Point: (156.8, -70, 1015)
Data Point: (200, -46, 800)
Data Point: (200, -70, 1035)
Data Point: (248, -70, 1015)
Data Point: (248, -70, 1015)
Data Point: (42, -46, 780)
Data Point: (42, -46, 780)
Data Point: (42, -70, 1015)
Data Point: (310, -46, 780)
Data Point: (310, -46, 780)
Data Point: (310, -70, 1015)

Regions

	Points	Area (ft²)	Material
Region 1	17,18,47,19,20,21,46,8	2.7706535	
Region 2	24,16,36,31,15,14,27,25,35	8752.8	BEACH SAND, EL13/-15 TO -46
Region 3	12,43,26,28,13	285.275	MARSH 1, EL2.8 TO -7
Region 4	30,37,38,34,29,26,43	363.12	MARSH 1, EL2.8 TO -7
Region 5	20,21,7,6,39,32	46.120367	EMBANKMENT FILL, EL. +9.9 TO +6.0
Region 6	42,41,38,34	31.90707	MARSH 1, EL2.8 TO -7
Region 7	41,38,40	0.731952	MARSH 1, EL2.8 TO -7
Region 8	40,38,37,30	25.92	MARSH 1, EL2.8 TO -7
Region 9	10,11,12,43	107.85	EMBANKMENT FILL EL. +2.0 TO -2.3
Region 10	16,36,31,15,44,45	6432	Bay Sound, El46 to -70
Region 11	24,1,22,23,2,3,42,34,29,26,28,14,27,25,35	1596.2586	MARSH 2, EL7 TO -13/- 15
Region 12	40,4,5,39,32,30	274.51963	EMBANKMENT FILL 2, EL. +6 TO -2.8
Region 13	32,33,10,43,30	375.4	EMBANKMENT FILL 2, EL. +6 TO -2.8
	A		

Point 31	248	-46
Point 32	200	6
Point 33	227.5	6
Point 34	156.8	-7
Point 35	156.8	-13
Point 36	156.8	-46
Point 37	200	-3.4
Point 38	156.8	-3.4
Point 39	181.14853	6
Point 40	156.8	-2.8
Point 41	154.36016	-3.4
Point 42	141.51369	-7
Point 43	248	-2.55
Point 44	310	-70
Point 45	42	-70
Point 46	200	10
Point 47	200.95711	10

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.11	(235.865, 39.562)	34.19602	(195.2, 9.9)	(275.264, - 0.516674)
2	8705	2.18	(235.865, 39.562)	52.329	(195.717, 9.9)	(270.074, - 0.0375702)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	196.011	5.100121	218.15282	321.09643	0	371.6
2	Optimize d	197.911	3.2365785	347.12786	528.03363	0	337.5
3	Optimize d	199.5	1.6215815	497.86018	700.59937	0	308.97

Region 14	32,20,19,9,33	67.345	EMBANKMENT FILL, EL. +9.9 TO +6.0
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Points

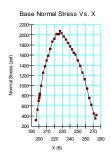
	X (ft)	Y (ft)
Point 1	42	-8.4
Point 2	132.9	-7.9
Point 3	140.8	-7.2
Point 4	165.8	-0.3
Point 5	170.7	3.1
Point 6	195.2	9.9
Point 7	199	9.9
Point 8	200	10.4
Point 9	213.2	9.1
Point 10	248	2
Point 11	280.5	-1
Point 12	297	-2.3
Point 13	310	-2.3
Point 14	310	-13
Point 15	310	-46
Point 16	42	-46
Point 17	200	13.4
Point 18	200.5	13.4
Point 19	201	9.7
Point 20	200	9.7
Point 21	200	9.9
Point 22	61.3	-8.2
Point 23	97.4	-8
Point 24	42	-13
Point 25	200	-15
Point 26	248	-7
Point 27	248	-13
Point 28	310	-7
Point 29	200	-7
Point 30	200	-2.8

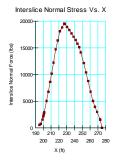
4	Optimize d	200.25	0.85931805	252.94875	753.17936	0	302.57
5	Optimize d	200.72855	0.37293795	226.71002	799.48423	0	307.5
6	Optimize d	200.97855	0.11885015	246.69062	823.68112	0	310.07
7	Optimize d	201.12885	-0.03392775	258.9783	837.59245	0	311.62
8	Optimize d	202.75715	-1.452205	306.37112	997.5215	0	328.38
9	Optimize d	205.42945	-3.523946	284.16375	1253.5125	0	228.3
10	Optimize d	207.7468	-5.073821	286.07433	1379.4393	0	227.58
11	Optimize d	209.81215	-6.419625	312.4667	1496.3492	0	226.93
12	Optimize d	211.9665	-7.7773875	349.24063	1587.3577	0	345.01
13	Optimize d	214.56095	-9.4125025	410.26865	1719.7405	0	343.93
14	Optimize d	217.25115	-10.827665	473.02121	1867.178	0	342.81
15	Optimize d	219.9096	-11.94254	526.37312	1924.1376	0	341.7
16	Optimize d	222.68365	-12.79683	570.53038	2016.1271	0	340.55
17	Optimize d	225.57335	-13.390525	602.5975	2013.1441	0	339.34
18	Optimize d	227.2591	-13.684225	618.99297	2073.9222	0	338.64
19	Optimize d	229.00535	-13.66143	616.67712	2034.2573	0	337.91
20	Optimize d	232.01605	-13.62213	612.79133	1966.8041	0	336.66
21	Optimize d	234.8449	-13.54726	606.91893	1908.0257	0	335.48
22	Optimize d	237.4919	-13.436815	598.95451	1840.347	0	334.38

23	Optimize d	240.1389	-13.32637	590.99009	1772.706	0	333.28
24	Optimize d	242.6272	-13.182145	581.03029	1714.7135	0	332.24
25	Optimize d	244.95675	-13.00413	569.00307	1646.1883	0	331.27
26	Optimize d	247.06075	-12.698445	549.12107	1611.7269	0	330.39
27	Optimize d	249.991	-12.02245	505.89497	1497.2034	0	330
28	Optimize d	253.36245	-11.09413	446.66405	1390.0292	0	330
29	Optimize d	256.1233	-10.15613	387.05854	1257.8888	0	330
30	Optimize d	259.0587	-9.0153475	314.68549	1124.349	0	330
31	Optimize d	262.16875	-7.6717825	229.58079	942.40349	0	330
32	Optimize d	265.006	-6.4460725	151.9431	756.3326	0	215
33	Optimize d	267.5704	-5.3382175	81.772556	623.48755	0	215
34	Optimize d	270.809	-3.705045	-21.443801	450.01862	0	215
35	Optimize d	272.88585	-2.5241085	-95.96834	353.1536	0	215
36	Optimize d	274.13515	-1.4695452	-162.2404	423.90393	0	650

Slices of Slip Surface: 8705

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strength (psf)	Cohesiv e Strengt h (psf)
1	8705	197.3583	4.211662	286.37013	409.04134	0	347.42
2	8705	199.5	1.940019	479.4493	682.89996	0	308.97
3	8705	200.25	1.2244628	224.14238	737.60235	0	302.57
4	8705	200.72855	0.7851092	190.91883	784.03655	0	307.5





5	8705	200.97855	0.558825	207.02343	808.02221	0	310.07
6	8705	202.02685	-0.33135745	257.4021	897.73987	0	320.86
7	8705	204.08055	-1.9878785	275.2692	1065.7516	0	342.01
8	8705	206.25345	-3.5604195	250.84586	1252.3952	0	228.05
9	8705	208.5456	-5.049306	263.7422	1387.3532	0	227.33
10	8705	210.8378	-6.375586	293.19258	1507.7589	0	226.61
11	8705	212.59195	-7.301971	318.54949	1574.1513	0	344.75
12	8705	214.39165	-8.140387	344.0922	1644.266	0	344
13	8705	216.775	-9.1439115	381.90626	1711.6501	0	343.01
14	8705	219.15835	-10.012596	419.59588	1764.3862	0	342.02
15	8705	221.54165	-10.753445	454.55499	1803.2484	0	341.02
16	8705	223.925	-11.37205	485.30443	1828.797	0	340.03
17	8705	226.30835	-11.872835	511.60686	1841.4877	0	339.04
18	8705	228.78125	-12.269375	532.84121	1844.0845	0	338.01
19	8705	231.34375	-12.55565	548.18465	1835.9132	0	336.94
20	8705	233.90625	-12.714825	556.33138	1813.751	0	335.87
21	8705	236.46875	-12.74806	556.95817	1777.7162	0	334.8
22	8705	239.03125	-12.6556	550.0143	1727.7538	0	333.74
23	8705	241.59375	-12.43677	535.25927	1663.7296	0	332.67
24	8705	244.15625	-12.089955	512.58004	1585.4417	0	331.6
25	8705	246.71875	-11.612555	481.7717	1492.4997	0	330.53
26	8705	249.1747	-11.031805	444.57489	1402.7573	0	330
27	8705	251.52405	-10.354289	401.34966	1317.1329	0	330
28	8705	253.8734	-9.555106	350.52804	1217.9283	0	330
29	8705	256.22275	-8.6281895	291.7285	1104.3823	0	330
30	8705	258.5721	-7.5659775	224.4814	975.56094	0	330
31	8705	260.96565	-6.333402	146.59247	803.46927	0	215
32	8705	263.40335	-4.912095	56.895626	651.47636	0	215
33	8705	265.84105	-3.305071	-44.375983	480.7062	0	215
34	8705	268.5668	-1.2451631	-173.976	430.53829	0	650

R35 Slope Stability Global Block Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 717 Last Edited By: Goltz, Amanda MVS Date: 2/25/2013 Time: 12:46:54 PM File Name: 17thReach35.gsz Directory: Y\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_High_water_analyses\High water cases\ Last Solved Date: 2/25/2013 Last Solved Time: 1:02:54 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Global Block Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant

Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL, EL. +8.5 TO +5.5 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 700 psf Phi-B: 0 ° EMBANKMENT FILL 3, EL. -1 TO -4 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Embankment Fill 3 Phi-B: 0 ° BEACH SAND, EL. -20 TO -44 Model: Shear/Normal Fn Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 ° BAY SOUND CLAY, EL. -44 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi-B: 0 ° Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf

Restrict Block Crossing: Yes

MARSH1. EL. -4 TO -20 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Spatial Fn: Marsh 1 Phi-B: 0° EMBANKMENT FILL2, EL. +5.5 TO -1 Weight Fn: FILL 2 Cohesion Fn: FILL 2 Phi · ∩ ° Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (42, -9.2) ft Right Coordinate: (310, -2.1) ft

Slip Surface Block

Left Grid Upper Left: (163, 0) ft Lower Left: (163, -50) ft Lower Right: (213, -50) ft X Increments: 15 Y Increments: 10 Starting Angle: 125 ° Ending Angle: 155 ° Angle Increments: 6 Right Grid Upper Left: (230, 0) ft Lower Left: (230, -50) ft Lower Right: (280, -50) ft X Increments: 10 Y Increments: 10 Starting Angle: 15

Ending Angle: 45

Angle Increments: 6

Cohesion Functions

Model: Spline Data Point Function Function: Cohesion vs. X

Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 425 Data Points: X (ft), Cohesion (psf)
Data Point: (180.5, 425) Data Point: (200, 400)

Cohesion: 0.01 psf

Shear/Normal Strength Functions

Data Point: (234, 425)

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (0, 0) Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Unit Weight Functions

FILL 2

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 105 Data Points: X (ft), Unit Weight (pcf) Data Point: (160, 105) Data Point: (200, 106) Data Point: (291.3, 105)

Spatial Functions

Bay Sound Cohesion Model: Linear Interpolation

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), V (ft), Cohesion (psf)
Data Point: (154.7, -44, 700)
Data Point: (154.7, -70, 970)
Data Point: (200, -44, 735)
Data Point: (200, -70, 1010)
Data Point: (291.3, -44, 700)
Data Point: (291.3, -70, 970)
Data Point: (42, -44, 700)
Data Point: (42, -70, 970)
Data Point: (310, -44, 700)
Data Point: (310, -44, 700)
Data Point: (310, -70, 970)

Marsh 1

Model: Linear Interpolation

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (154.7, -4, 400)
Data Point: (154.7, -20, 400)
Data Point: (200, -4, 450)
Data Point: (200, -20, 450)
Data Point: (291.3, -4, 400)
Data Point: (291.3, -20, 400)
Data Point: (310, -4, 400)
Data Point: (310, -4, 400)
Data Point: (310, -20, 400)

Embankment Fill 3

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (154.7, -1, 425)
Data Point: (154.7, -4, 425)
Data Point: (200, -1, 400)
Data Point: (200, -4, 400)
Data Point: (201, -4, 405)
Data Point: (291.3, -2.1, 425)
Data Point: (291.3, -4, 425)
Data Point: (310, -2.1, 425)
Data Point: (310, -2.1, 425)
Data Point: (310, -4, 425)
Data Point: (310, -4, 425)
Data Point: (142.99231, -4, 425)

Regions

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	Material	Points	Area (ft²)
Regio n 1	Sheet Pile	21,22,58,23,25,9,57	3.900006
Regio n 2	EMBANKMEN T FILL, EL. +8.5 TO +5.5	25,23,10,40,36	44.558481
Regio n 3	EMBANKMEN T FILL2, EL. +5.5 TO -1	36,35,39,13,12,11,40	296.83653
Regio n 4	EMBANKMEN T FILL, EL. +8.5 TO +5.5	25,9,8,24,7,46,36	39.338512
Regio n 5	EMBANKMEN T FILL2, EL. +5.5 TO -1	46,6,5,47,48,35,36	229.03649
Regio n 6	EMBANKMEN T FILL 3, EL1 TO -4	48,41,37,35	135.9
Regio n 7	MARSH1, EL 4 TO -20	41,42,34,37	22.65
Regio n 8	EMBANKMEN T FILL 3, EL1 TO -4	48,51,49,41	17.026922
Regio n 9	MARSH1, EL 4 TO -20	49,50,42,41	6.4307675
Regio n 10	BAY SOUND CLAY, EL44 TO -70	55,27,45,28,29,18,30,44,19,54	6968
Regio n 11	BEACH SAND, EL20 TO -44	54,19,44,30,18,17,32,38,43,20,53	6432
Regio n 12	MARSH1, EL 4 TO -20	53,20,43,38,32,17,56,33,31,59,37,34,42,50,4,3,2,26,1, 52	3821.1173
Regio n 13	EMBANKMEN T FILL 3, EL1 TO -4	59,31,33,16,15,14,39,35,37	301.54

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Points

	X (ft)	Y (ft)
Point 1	90.9	-9.2
Point 2	124	-7.3
Point 3	130	-6.7
Point 4	133.3	-6.1
Point 5	161.6	1.5
Point 6	166.4	3.3
Point 7	187	7
Point 8	199	8.5
Point 9	200	8.5
Point 10	214	7.6
Point 11	237.8	3
Point 12	261.9	0.3
Point 13	263.5	-0.6
Point 14	281.7	-1.3
Point 15	291.3	-2.1
Point 16	310	-2.1
Point 17	310	-20
Point 18	310	-44
Point 19	90.9	-44
Point 20	90.9	-20
Point 21	200	13.3
Point 22	200.5	13.3
Point 23	201	8.1
Point 24	194.9	8.5
Point 25	200	8.1
Point 26	110.2	-8.5
Point 27	90.9	-70
Point 28	291.3	-70
Point 29	310	-70
Point 30	291.3	-44
Point 31	291.3	-4
Point 32	291.3	-20
Point 33	310	-4

Point 34	200	-4.5
Point 35	200	-1
Point 36	200	5.5
Point 37	200	-4
Point 38	200	-20
Point 39	273.9	-1
Point 40	224.86522	5.5
Point 41	154.7	-4
Point 42	154.7	-4.5
Point 43	154.7	-20
Point 44	154.7	-44
Point 45	154.7	-70
Point 46	178.64865	5.5
Point 47	157.3	-0.3
Point 48	154.7	-1
Point 49	142.99231	-4
Point 50	140.68462	-4.5
Point 51	145.3	-3.5
Point 52	42	-9.2
Point 53	42	-20
Point 54	42	-44
Point 55	42	-70
Point 56	310	-4.1
Point 57	200	10
Point 58	200.81731	10
Point 59	250	-4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
:	Optimized	2.62	(234.371, 7.025)	46.87183	(179.341, 5.62441)	(290.207, - 2.0089)
:	42935	2.73	(234.371, 7.025)	47.438	(177.004, 5.20462)	(291.041, - 2.07842)

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	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	181.3013	4.279528	235.08239	316.10756	0	423.97
2	Optimize d	185.13065	1.651975	203.67461	617.72845	0	419.06
3	Optimize d	187.017	0.35762505	210.66792	766.21056	0	416.64
4	Optimize d	187.86185	-0.327025	217.55962	818.71329	0	415.56
5	Optimize d	190.53485	-2.5	344.77502	1064.4984	0	405.22
6	Optimize d	192.6875	-4.25	479.77493	1250.7152	0	441.93
7	Optimize d	193.9475	-5.274332	548.78161	1368.5529	0	443.32
8	Optimize d	196.02345	-6.961957	657.22518	1553.4978	0	445.61
9	Optimize d	198.07345	-8.456103	722.12499	1757.2592	0	447.87
10	Optimize d	199.5	-9.3504	725.61745	1851.1332	0	449.45
11	Optimize d	200.25	-9.8205665	721.59313	1759.6278	0	449.86
12	Optimize d	200.65865	-10.07675	722.87419	1794.3953	0	449.64
13	Optimize d	200.90865	-10.23347	723.77398	1810.6408	0	449.5
14	Optimize d	202.3878	-11.16074	733.77367	1902.3231	0	448.69
15	Optimize d	205.16345	-12.900755	757.49204	2073.8157	0	447.17
16	Optimize d	208.41345	-14.64369	796.7401	2290.1051	0	445.39
17	Optimize	212.1378	-16.38955	851.5871	2459.8488	0	443.35

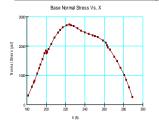
	d						
18	Optimize d	214.3429	-17.42323	892.79255	2554.4381	0	442.15
19	Optimize d	216.9757	-18.329775	931.8121	2640.0755	0	440.7
20	Optimize d	221.0703	-19.411795	983.89339	2713.4965	0	438.46
21	Optimize d	223.8701	-19.817385	1004.7523	2734.9113	0	436.93
22	Optimize d	225.61765	-19.9392	1010.9829	2711.2451	0	435.97
23	Optimize d	228.2751	-19.992305	1013.2896	2685.0626	0	434.52
24	Optimize d	232.08505	-19.993615	1012.371	2607.1879	0	432.43
25	Optimize d	235.895	-19.994925	1011.4261	2529.287	0	430.34
26	Optimize d	239.83335	-19.996275	1010.4589	2466.3932	0	428.19
27	Optimize d	243.9	-19.99767	1009.4753	2418.1473	0	425.96
28	Optimize d	247.96665	-19.99907	1008.4917	2370.049	0	423.73
29	Optimize d	250.33895	-19.999885	1007.9065	2342.0168	0	422.43
30	Optimize d	253.2897	-19.754435	991.96086	2308.1712	0	420.82
31	Optimize d	258.54305	-19.025645	945.35106	2191.4762	0	417.94
32	Optimize d	261.5423	-18.44422	908.39304	2117.6203	0	416.3
33	Optimize d	262.7	-18.12639	888.3186	2029.8915	0	415.66
34	Optimize d	263.5516	-17.89259	873.51173	1955.5466	0	415.2
35	Optimize d	265.8162	-16.86868	809.17484	1882.1753	0	413.96
36	Optimize	270.2422	-14.849205	682.08222	1637.0754	0	411.53

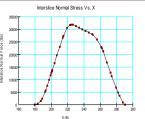
	d						
37	Optimize d	273.1776	-13.44782	593.85759	1489.0554	0	409.92
38	Optimize d	276.62365	-11.579515	476.32735	1263.9015	0	408.04
39	Optimize d	280.52365	-9.341724	335.59926	1018.3992	0	405.9
40	Optimize d	282.618	-7.986599	250.4455	851.2193	0	404.75
41	Optimize d	285.63785	-5.696305	106.67858	595.15788	0	403.1
42	Optimize d	288.9733	-3.0044525	-62.248687	268.00843	0	424.36

Slices	of	gil2	Surface:	42935

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strength (psf)	Cohesiv e Strengt h (psf)
1	42935	177.8264	4.628845	277.29919	252.98222	0	425
2	42935	180.4528	2.7898055	223.30673	461.21543	0	425
3	42935	184.06105	0.2632685	190.9154	749.98587	0	420.43
4	42935	186.4326	-1.397302	219.73508	942.00022	0	407.49
5	42935	188.5748	-2.897302	329.72769	1113.1105	0	406.31
6	42935	190.50665	-4.25	428.4616	1260.9504	0	439.52
7	42935	192.88185	-5.913122	547.8543	1456.6491	0	442.14
8	42935	196.95	-8.761667	708.56649	1773.9636	0	446.63
9	42935	199.5	-10.547195	742.06959	1960.6398	0	449.45
10	42935	200.25	-11.072355	749.42582	1875.2028	0	449.86
11	42935	200.65865	-11.3585	753.60643	1912.9553	0	449.64
12	42935	200.90865	-11.53355	756.28869	1931.0538	0	449.5
13	42935	203	-12.997925	782.31074	2076.141	0	448.36
14	42935	207	-15.798755	852.92165	2353.0144	0	446.17
15	42935	211	-18.599585	955.86859	2629.683	0	443.98
16	42935	213.5	-20	1017.6	2994	0	442.61
17	42935	215.81085	-20	1017.0526	2952.4483	0	441.34
18	42935	219.4326	-20	1016.0862	2873.7568	0	439.36

20 42935 227.021 -20 1014.0799 2711.5268 0 435.2 21 42935 231.3326 -20 1012.9435 2623.1604 0 432.8 22 42935 235.6442 -20 1011.807 2534.794 0 430.4 23 42935 239.83335 -20 1010.6802 2466.3932 0 428.1 24 42935 243.9 -20 1009.6229 2418.1719 0 425.9 25 42935 247.96665 -20 1008.5409 2369.926 0 423.7 26 42935 251.66665 -20 1007.5501 2326.0502 0 421.7 27 42935 255 -20 1006.6801 2286.5702 0 419.8 28 42935 258.3335 -20 1005.8101 2247.0902 0 418.0 29 42935 260.95 -19.451515 971.08797 2323.5918 0 416.6 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>								
21 42935 231.3326 -20 1012.9435 2623.1604 0 432.8 22 42935 235.6442 -20 1011.807 2534.794 0 430.44 23 42935 239.83335 -20 1010.6802 2466.3932 0 428.19 24 42935 243.9 -20 1009.6229 2418.1719 0 425.91 25 42935 247.96665 -20 1008.5409 2369.926 0 423.77 26 42935 251.66665 -20 1007.5501 2326.0502 0 421.77 27 42935 255 -20 1006.6801 2286.5702 0 419.81 28 42935 258.3335 -20 1005.8101 2247.0902 0 418.01 29 42935 260.95 -19.451515 971.08797 2323.5918 0 416.66 30 42935 265.23335 16.97853 816.19561 1926.9481 0 412.	19	42935	223.05435	-20	1015.1198	2795.0654	0	437.37
22 42935 235.6442 -20 1011.807 2534.794 0 430.44 23 42935 239.83335 -20 1010.6802 2466.3932 0 428.15 24 42935 243.9 -20 1009.6229 2418.1719 0 425.90 25 42935 247.96665 -20 1008.5409 2369.926 0 423.73 26 42935 251.66665 -20 1007.5501 2326.0502 0 421.73 27 42935 255 -20 1006.6801 2286.5702 0 419.81 28 42935 258.33335 -20 1005.8101 2247.0902 0 418.01 29 42935 260.95 -19.451515 971.08797 2323.5918 0 416.66 30 42935 262.7 -18.44115 907.86519 2148.663 0 415.66 31 42935 265.23335 -16.97853 816.19561 1926.9481 0 <td< td=""><td>20</td><td>42935</td><td>227.021</td><td>-20</td><td>1014.0799</td><td>2711.5268</td><td>0</td><td>435.2</td></td<>	20	42935	227.021	-20	1014.0799	2711.5268	0	435.2
23 42935 239.83335 -20 1010.6802 2466.3932 0 428.15 24 42935 243.9 -20 1009.6229 2418.1719 0 425.91 25 42935 247.96665 -20 1008.5409 2369.926 0 423.73 26 42935 251.66665 -20 1007.5501 2326.0502 0 421.73 27 42935 255 -20 1006.6801 2286.5702 0 419.81 28 42935 258.33335 -20 1005.8101 2247.0902 0 418.01 29 42935 260.95 -19.451515 971.08797 2323.5918 0 416.66 30 42935 262.7 -18.44115 907.86519 2148.663 0 415.66 31 42935 265.23335 -16.97853 816.19561 1926.9481 0 414.28 32 42935 272.16665 12.97557 564.78178 1445.2298 0	21	42935	231.3326	-20	1012.9435	2623.1604	0	432.84
24 42935 243.9 -20 1009.6229 2418.1719 0 425.91 25 42935 247.96665 -20 1008.5409 2369.926 0 423.77 26 42935 251.66665 -20 1007.5501 2326.0502 0 421.77 27 42935 255 -20 1006.6801 2286.5702 0 419.81 28 42935 258.33335 -20 1005.8101 2247.0902 0 418.01 29 42935 260.95 -19.451515 971.08797 2323.5918 0 416.61 30 42935 262.7 -18.44115 907.86519 2148.663 0 415.61 31 42935 265.23335 -16.97853 816.19561 1926.9481 0 414.21 32 42935 272.16665 -12.97557 564.78178 1445.2298 0 410.41 34 42935 275.85 -10.848997 431.0586 1189.3638 0	22	42935	235.6442	-20	1011.807	2534.794	0	430.48
25 42935 247.96665 -20 1008.5409 2369.926 0 423.7: 26 42935 251.66665 -20 1007.5501 2326.0502 0 421.7: 27 42935 255 -20 1006.6801 2286.5702 0 419.8i 28 42935 258.33335 -20 1005.8101 2247.0902 0 418.0i 29 42935 260.95 -19.451515 971.08797 2323.5918 0 416.6i 30 42935 262.7 -18.44115 907.86519 2148.663 0 415.6i 31 42935 265.23335 -16.97853 816.19561 1926.9481 0 414.2i 32 42935 268.7 -14.97705 690.56364 1686.0765 0 412.3i 33 42935 275.85 -10.848997 431.0586 1189.3638 0 408.4i 34 42935 279.75 -8.597332 289.43014 918.45327 0 </td <td>23</td> <td>42935</td> <td>239.83335</td> <td>-20</td> <td>1010.6802</td> <td>2466.3932</td> <td>0</td> <td>428.19</td>	23	42935	239.83335	-20	1010.6802	2466.3932	0	428.19
26 42935 251.66665 -20 1007.5501 2326.0502 0 421.7: 27 42935 255 -20 1006.6801 2286.5702 0 419.8t 28 42935 258.33335 -20 1005.8101 2247.0902 0 418.0t 29 42935 260.95 -19.451515 971.08797 2323.5918 0 416.6t 30 42935 262.7 -18.44115 907.86519 2148.663 0 415.6t 31 42935 265.23335 -16.97853 816.19561 1926.9481 0 414.2t 32 42935 268.7 -14.97705 690.56364 1686.0765 0 412.3t 33 42935 272.16665 -12.97557 564.78178 1445.2298 0 410.4t 34 42935 279.75 -8.597332 289.43014 918.45327 0 406.3t 36 42935 283.2032 -6.6036245 164.02424 671.26622	24	42935	243.9	-20	1009.6229	2418.1719	0	425.96
27 42935 255 -20 1006.6801 2286.5702 0 419.81 28 42935 258.33335 -20 1005.8101 2247.0902 0 418.01 29 42935 260.95 -19.451515 971.08797 2323.5918 0 416.61 30 42935 262.7 -18.44115 907.86519 2148.663 0 415.61 31 42935 265.23335 -16.97853 816.19561 1926.9481 0 414.21 32 42935 268.7 -14.97705 690.56364 1686.0765 0 412.31 33 42935 272.16665 -12.97557 564.78178 1445.2298 0 410.41 34 42935 275.85 -10.848997 431.0586 1189.3638 0 408.41 35 42935 279.75 -8.597332 289.43014 918.45327 0 406.33 36 42935 283.2032 -6.6036245 164.02424 671.26622	25	42935	247.96665	-20	1008.5409	2369.926	0	423.73
28 42935 258.33335 -20 1005.8101 2247.0902 0 418.01 29 42935 260.95 -19.451515 971.08797 2323.5918 0 416.62 30 42935 262.7 -18.44115 907.86519 2148.663 0 415.66 31 42935 265.23335 -16.97853 816.19561 1926.9481 0 414.21 32 42935 268.7 -14.97705 690.56364 1686.0765 0 412.31 33 42935 272.16665 -12.97557 564.78178 1445.2298 0 410.41 34 42935 275.85 -10.848997 431.0586 1189.3638 0 408.41 35 42935 279.75 -8.597332 289.43014 918.45327 0 406.33 36 42935 283.2032 -6.6036245 164.02424 671.26622 0 404.43 37 42935 286.2096 -4.867875 54.835101 447.76	26	42935	251.66665	-20	1007.5501	2326.0502	0	421.71
29 42935 260.95 -19.451515 971.08797 2323.5918 0 416.62 30 42935 262.7 -18.44115 907.86519 2148.663 0 415.61 31 42935 265.23335 -16.97853 816.19561 1926.9481 0 414.21 32 42935 268.7 -14.97705 690.56364 1686.0765 0 412.31 33 42935 272.16665 -12.97557 564.78178 1445.2298 0 410.41 34 42935 275.85 -10.848997 431.0586 1189.3638 0 408.41 35 42935 279.75 -8.597332 289.43014 918.45327 0 406.33 36 42935 283.2032 -6.6036245 164.02424 671.26622 0 404.43 37 42935 286.2096 -4.867875 54.835101 447.76046 0 402.75	27	42935	255	-20	1006.6801	2286.5702	0	419.88
30 42935 262.7 -18.44115 907.86519 2148.663 0 415.61 31 42935 265.23335 -16.97853 816.19561 1926.9481 0 414.21 32 42935 268.7 -14.97705 690.56364 1686.0765 0 412.31 33 42935 272.16665 -12.97557 564.78178 1445.2298 0 410.41 34 42935 275.85 -10.848997 431.0586 1189.3638 0 408.41 35 42935 279.75 -8.597332 289.43014 918.45327 0 406.33 36 42935 283.2032 -6.6036245 164.02424 671.26622 0 404.43 37 42935 286.2096 -4.867875 54.835101 447.76046 0 402.79	28	42935	258.33335	-20	1005.8101	2247.0902	0	418.05
31 42935 265,23335 -16,97853 816,19561 1926,9481 0 414,21 32 42935 268.7 -14,97705 690,56364 1686,0765 0 412,31 33 42935 272,16665 -12,97557 564,78178 1445,2298 0 410,41 34 42935 275,85 -10,848997 431,0586 1189,3638 0 408,41 35 42935 279,75 -8,597332 289,43014 918,45327 0 406,33 36 42935 283,2032 -6,6036245 164,02424 671,26622 0 404,43 37 42935 286,2096 -4,867875 54,835101 447,76046 0 402,73	29	42935	260.95	-19.451515	971.08797	2323.5918	0	416.62
32 42935 268.7 -14.97705 690.56364 1686.0765 0 412.31 33 42935 272.16665 -12.97557 564.78178 1445.2298 0 410.41 34 42935 275.85 -10.848997 431.0586 1189.3638 0 408.41 35 42935 279.75 -8.597332 289.43014 918.45327 0 406.33 36 42935 283.2032 -6.6036245 164.02424 671.26622 0 404.43 37 42935 286.2096 -4.867875 54.835101 447.76046 0 402.79	30	42935	262.7	-18.44115	907.86519	2148.663	0	415.66
33 42935 272.16665 -12.97557 564.78178 1445.2298 0 410.44 34 42935 275.85 -10.848997 431.0586 1189.3638 0 408.44 35 42935 279.75 -8.597332 289.43014 918.45327 0 406.33 36 42935 283.2032 -6.6036245 164.02424 671.26622 0 404.43 37 42935 286.2096 -4.867875 54.835101 447.76046 0 402.79	31	42935	265.23335	-16.97853	816.19561	1926.9481	0	414.28
34 42935 275.85 -10.848997 431.0586 1189.3638 0 408.44 35 42935 279.75 -8.597332 289.43014 918.45327 0 406.33 36 42935 283.2032 -6.6036245 164.02424 671.26622 0 404.43 37 42935 286.2096 -4.867875 54.835101 447.76046 0 402.73	32	42935	268.7	-14.97705	690.56364	1686.0765	0	412.38
35 42935 279.75 -8.597332 289.43014 918.45327 0 406.33 36 42935 283.2032 -6.6036245 164.02424 671.26622 0 404.43 37 42935 286.2096 -4.867875 54.835101 447.76046 0 402.79	33	42935	272.16665	-12.97557	564.78178	1445.2298	0	410.48
36 42935 283.2032 -6.6036245 164.02424 671.26622 0 404.43 37 42935 286.2096 -4.867875 54.835101 447.76046 0 402.79	34	42935	275.85	-10.848997	431.0586	1189.3638	0	408.46
37 42935 286.2096 -4.867875 54.835101 447.76046 0 402.75	35	42935	279.75	-8.597332	289.43014	918.45327	0	406.33
	36	42935	283.2032	-6.6036245	164.02424	671.26622	0	404.43
38 42935 289 37695 -3 0392115 -60 205774 221 91935 0 424 4	37	42935	286.2096	-4.867875	54.835101	447.76046	0	402.79
36 4233 265.57633 3.6332113 66.263774 221.51333 6 424.4.	38	42935	289.37695	-3.0392115	-60.205774	221.91935	0	424.47





R35 Slope Stability Global Entry/Exit

File Information

Created By: USACE St. Louis District Revision Number: 717 Last Edited By: Goltz, Amanda MVS Date: 2/25/2013 Time: 12:46:54 PM File Name: 17thReach35.gsz Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/25/2013

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Last Solved Time: 1:06:44 PM

Analysis Settings

Slope Stability Global Entry/Exit Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: Search for Tension Crack Percentage Wet: 1 Tension Crack Fluid Unit Weight: 62.4 pcf

FOS Distribution FOS Calculation Option: Constant Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 ° Materials

EMBANKMENT FILL, EL. +8.5 TO +5.5

Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 700 psf Phi-B: 0°

EMBANKMENT FILL 3, EL. -1 TO -4 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Embankment Fill 3 Phi-B: 0 °

BEACH SAND, EL. -20 TO -44 Model: Shear/Normal En Unit Weight: 122 pcf

Strength Function: Sand Phi-B: 0 °

BAY SOUND CLAY, EL. -44 TO -70

Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf

Cohesion Spatial Fn: Bay Sound Cohesion

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf

Cohesion: 0.01 psf

MARSH1, EL. -4 TO -20 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Spatial Fn: Marsh 1

Phi-B: 0°

EMBANKMENT FILL2, EL. +5.5 TO -1

Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Fn: FILL 2 Phi-B: 0°

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (124, -7.3) ft Left-Zone Right Coordinate: (200, 8.5) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (225, 5,47395) ft Right-Zone Right Coordinate: (300, -2.1) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (42, -9.2) ft Right Coordinate: (310, -2.1) ft

Cohesion Functions

FILL 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 425 Data Points: X (ft), Cohesion (psf) Data Point: (180.5, 425) Data Point: (200, 400) Data Point: (234, 425)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (0, 0) Data Point: (10000, 5773) Estimation Properties Intact Rock Param : 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Unit Weight Functions

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 105
Data Points: X (ft), Unit Weight (pcf) Data Point: (160, 105) Data Point: (200, 106) Data Point: (291.3, 105)

Spatial Functions

Bay Sound Cohesion Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (154.7, -44, 700)
Data Point: (154.7, -70, 970) Data Point: (200, -44, 735) Data Point: (200, -70, 1010) Data Point: (291.3, -44, 700)

Data Point: (291.3, -70, 970)
Data Point: (42, -44, 700)
Data Point: (42, -70, 970)
Data Point: (310, -44, 700)
Data Point: (310, -70, 970)

Marsh 1

Irish 1
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), V (ft), Cohesion (psf)
Data Point: (154.7, -4, 400)
Data Point: (154.7, -20, 400)
Data Point: (200, -4, 450)
Data Point: (200, -20, 450)
Data Point: (291.3, -4, 400)
Data Point: (310, -4, 400)
Data Point: (310, -4, 400)
Data Point: (310, -20, 400)

Embankment Fill 3

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (154.7, -1, 425)
Data Point: (2164.7, -4, 425)
Data Point: (200, -1, 400)
Data Point: (200, -4, 400)
Data Point: (291.3, -2.1, 425)
Data Point: (291.3, -2.1, 425)
Data Point: (310, -2.1, 425)
Data Point: (310, -2.1, 425)
Data Point: (310, -4, 425)
Data Point: (142.99231, -4, 425)

Regions

	Material	Points	Area (ft²)
Regio n 1	Sheet Pile	21,22,58,23,25,9,57	3.900006
Regio n 2	EMBANKMEN T FILL, EL. +8.5 TO +5.5	25,23,10,40,36	44.558481
Regio n 3	EMBANKMEN T FILL2, EL. +5.5 TO -1	36,35,39,13,12,11,40	296.83653
Regio	EMBANKMEN	25,9,8,24,7,46,36	39.338512

Point 10 214 7.6 Point 12 261.9 0.3 Point 13 263.5 Point 14 281.7 -2.1 Point 16 Point 17 -20 -44 Point 18 Point 19 90.9 -44 90.9 -20 Point 21 200 Point 22 200.5 13.3 8.1 Point 24 194.9 8.5 200 8.1 Point 26 -8.5 Point 27 90.9 -70 Point 28 -70 -44 Point 30 291.3 Point 31 291.3 -4 Point 32 291.3 -20 -4 Point 33 Point 34 200 -4.5 200 Point 35 -1 Point 36 5.5 Point 37 200 -4 200 -20 Point 38 Point 39 273.9 Point 40 224.86522 -4 154.7 Point 41 Point 42 -4.5 -20 Point 43 Point 44 154.7 -44 -70 Point 45

n 4	T FILL, EL. +8.5 TO +5.5		
Regio n 5	EMBANKMEN T FILL2, EL. +5.5 TO -1	46,6,5,47,48,35,36	229.03649
Regio n 6	EMBANKMEN T FILL 3, EL1 TO -4	48,41,37,35	135.9
Regio n 7	MARSH1, EL 4 TO -20	41,42,34,37	22.65
Regio n 8	EMBANKMEN T FILL 3, EL1 TO -4	48,51,49,41	17.026922
Regio n 9	MARSH1, EL 4 TO -20	49,50,42,41	6.4307675
Regio n 10	BAY SOUND CLAY, EL44 TO -70	55,27,45,28,29,18,30,44,19,54	6968
Regio n 11	BEACH SAND, EL20 TO -44	54,19,44,30,18,17,32,38,43,20,53	6432
Regio n 12	MARSH1, EL 4 TO -20	53,20,43,38,32,17,56,33,31,59,37,34,42,50,4,3,2,26,1, 52	3821.1173
Regio n 13	EMBANKMEN T FILL 3, EL1 TO -4	59,31,33,16,15,14,39,35,37	301.54

Points

5

	X (ft)	Y (ft)
Point 1	90.9	-9.2
Point 2	124	-7.3
Point 3	130	-6.7
Point 4	133.3	-6.1
Point 5	161.6	1.5
Point 6	166.4	3.3
Point 7	187	7
Point 8	199	8.5
Point 9	200	8.5

6

178.64865	5.5
157.3	-0.3
154.7	-1
142.99231	-4
140.68462	-4.5
145.3	-3.5
42	-9.2
42	-20
42	-44
42	-70
310	-4.1
200	10
200.81731	10
250	-4
	157.3 154.7 142.99231 140.68462 145.3 42 42 42 42 310 200 200.81731

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.58	(240.772, 53.437)	44.73457	(187.22, 7.04179)	(290.387, - 2.02388)
2	7423	2.64	(240.772, 53.437)	73.165	(185.5, 6.7305)	(288.659, - 1.87989)

Slices of Slip Surface: Optimized

		Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
	1	Optimize d	188.7047	3.944825	209.12955	345.34771	0	414.48
	2	Optimize d	191.67385	0.834475	274.97585	689.09078	0	410.67
	3	Optimize d	193.2952	-0.86035	334.57827	878.02178	0	408.6
	4	Optimize d	194.166	-1.7493345	407.37568	975.60999	0	403.22
ľ	5	Optimize	195.6353	-3.2493345	537.3067	1131.6178	0	402.41

8

7

	d						
6	Optimize d	196.6155	-4.25	615.06471	1216.1419	0	446.26
7	Optimize d	197.9302	-5.592156	703.28658	1353.1987	0	447.72
8	Optimize d	199.49495	-7.189606	716.43618	1516.3564	0	449.44
9	Optimize d	199.99495	-7.698161	717.31004	1666.7402	0	449.99
10	Optimize d	200.25	-7.863023	712.23511	1543.0193	0	449.86
11	Optimize d	200.65865	-8.1271795	702.35179	1579.1204	0	449.64
12	Optimize d	200.90865	-8.288781	697.54453	1595.7929	0	449.5
13	Optimize d	202.37705	-9.2379435	682.8197	1689.4543	0	448.7
14	Optimize d	205.1311	-11.01818	691.08355	1864.5503	0	447.19
15	Optimize d	208.3811	-12.926895	725.31812	2081.1152	0	445.41
16	Optimize d	212.12705	-14.964085	785.28445	2280.2446	0	443.36
17	Optimize d	214.8351	-16.43684	842.8299	2410.1969	0	441.88
18	Optimize d	217.001	-17.381795	883.50769	2520.4856	0	440.69
19	Optimize d	219.66265	-18.36339	929.29753	2568.7077	0	439.23
20	Optimize d	222.92935	-19.21161	971.73686	2650.6301	0	437.44
21	Optimize d	225.54005	-19.69363	997.20081	2647.4964	0	436.01
22	Optimize d	228.295	-19.90174	1008.0796	2662.4484	0	434.5
23	Optimize d	232.2313	-19.986465	1011.9136	2604.2762	0	432.35
24	Optimize	235.94375	-19.988895	1011.0517	2528.5315	0	430.32

	d						
25	Optimize d	239.32155	-19.991105	1010.2819	2472.6998	0	428.47
26	Optimize d	242.36465	-19.9931	1009.5918	2436.7498	0	426.8
27	Optimize d	245.40775	-19.995095	1008.9017	2400.8654	0	425.13
28	Optimize d	248.45085	-19.997085	1008.2445	2364.9811	0	423.47
29	Optimize d	251.89255	-19.893215	1000.9145	2330.0415	0	421.58
30	Optimize d	255.94835	-19.510575	976.13422	2263.1363	0	419.36
31	Optimize d	259.992	-18.77416	929.32465	2167.1077	0	417.15
32	Optimize d	262.3195	-18.21468	893.89658	2056.8301	0	415.87
33	Optimize d	263.1195	-17.94779	877.07782	2036.9037	0	415.43
34	Optimize d	264.9559	-17.146365	826.71812	1917.6461	0	414.43
35	Optimize d	267.8677	-15.87561	746.73751	1762.721	0	412.83
36	Optimize d	271.6118	-14.047115	631.70165	1564.2865	0	410.78
37	Optimize d	275.26295	-12.143325	511.90404	1333.9041	0	408.78
38	Optimize d	279.16295	-9.8629	368.52119	1082.7709	0	406.65
39	Optimize d	283.63565	-7.09552	194.56566	739.77258	0	404.2
40	Optimize d	286.7508	-4.948945	59.725243	503.64997	0	402.49
41	Optimize d	289.1584	-3.0119385	-61.83977	270.81347	0	424.41

Slices of Slip Surface: 7423 Frictiona Cohesiv Slip Surfac Base X (ft) Y (ft) PWP (psf) Normal

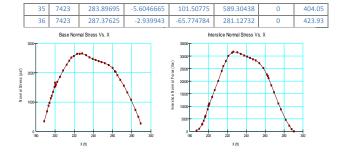
10

12

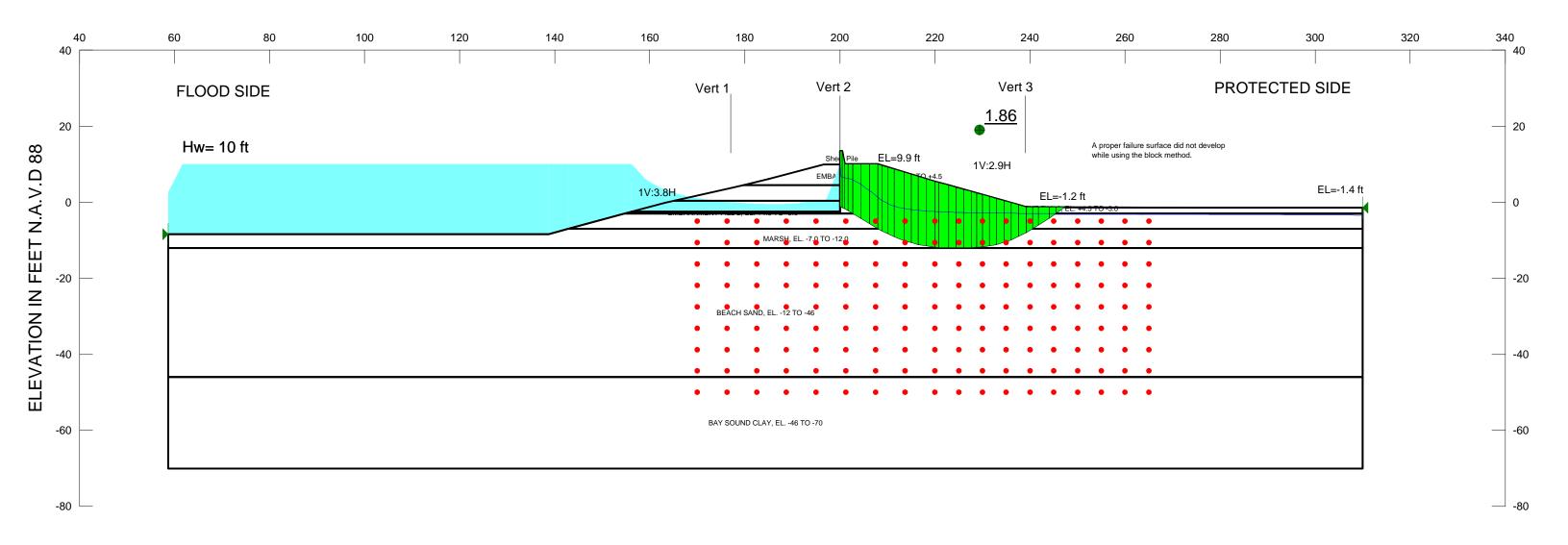
	е				Stress (psf)	Strength (psf)	Strength (psf)
1	7423	186.2498	4.66139	205.19753	237.66706	0	417.63
2	7423	189.44415	1.41139	233.4809	623.75645	0	413.53
3	7423	193.39415	-2.2804565	408.24246	1057.3224	0	403.65
4	7423	195.1755	-3.7804565	542.58855	1233.6409	0	402.66
5	7423	195.77145	-4.25	582.29035	1274.3099	0	445.33
6	7423	197.54595	-5.565251	679.06233	1422.3415	0	447.29
7	7423	199.5	-6.9721085	717.55014	1581.3632	0	449,45

	e				Stress (psr)	(psf)	(psf)
1	7423	186.2498	4.66139	205.19753	237.66706	0	417.63
2	7423	189.44415	1.41139	233.4809	623.75645	0	413.53
3	7423	193.39415	-2.2804565	408.24246	1057.3224	0	403.65
4	7423	195.1755	-3.7804565	542.58855	1233.6409	0	402.66
5	7423	195.77145	-4.25	582.29035	1274.3099	0	445.33
6	7423	197.54595	-5.565251	679.06233	1422.3415	0	447.29
7	7423	199.5	-6.9721085	717.55014	1581.3632	0	449.45
8	7423	200.25	-7.480016	710.15108	1498.2013	0	449.86
9	7423	200.65865	-7.7503295	698.46007	1537.6084	0	449.64
10	7423	200.90865	-7.913695	692.71111	1555.9837	0	449.5
11	7423	202.625	-8.966413	670.59633	1669.6126	0	448.56
12	7423	205.875	-10.841999	674.02672	1872.0561	0	446.78
13	7423	209.125	-12.50411	699.1007	2052.0306	0	445
14	7423	212.375	-13.968595	737.21709	2211.0558	0	443.22
15	7423	215.81085	-15.3107	782.46412	2326.5779	0	441.34
16	7423	219.4326	-16.520595	832.06303	2397.1264	0	439.36
17	7423	223.05435	-17.52512	878.58693	2445.24	0	437.37
18	7423	226.48205	-18.29935	917.46653	2473.3473	0	435.5
19	7423	229.71575	-18.86868	947.60985	2484.2241	0	433.73
20	7423	232.94945	-19.28984	970.5293	2478.8238	0	431.96
21	7423	236.18315	-19.5654	985.65528	2457.3482	0	430.18
22	7423	239.325	-19.697225	992.52704	2434.5071	0	428.46
23	7423	242.375	-19.69399	991.40141	2411.2901	0	426.79
24	7423	245.425	-19.563375	982.49846	2374.0359	0	425.12
25	7423	248.475	-19.3047	965.68332	2322.5894	0	423.45
26	7423	251.98335	-18.83557	935.65043	2244.3354	0	421.53
27	7423	255.95	-18.10717	889.30966	2133.7415	0	419.36
28	7423	259.91665	-17.148505	828.52146	1997.2885	0	417.19
29	7423	262.7	-16.359255	778.54537	1849.5595	0	415.66
30	7423	265.23335	-15.49282	723.83276	1708.5618	0	414.28
31	7423	268.7	-14.16162	639.82558	1560.7596	0	412.38
32	7423	272.16665	-12.62176	542.74876	1389.2044	0	410.48
33	7423	275.85	-10.732051	423.78954	1177.9081	0	408.46
34	7423	279.75	-8.4377175	279.47802	920.20341	0	406.33

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Appendix B – Gap Stability	Analyses	



Name: EMBANKMENT FILL, EL. +9.6 TO +4.5 Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -3.0 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -12 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Clay Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion Spatial Fn: Embankment Fill 2 Phi: 0 °

Name: MARSH, EL. -7.0 TO -12.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 2 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap Block File Name: 17thReach1.gsz Last Edited By: Goltz, Amanda MVS

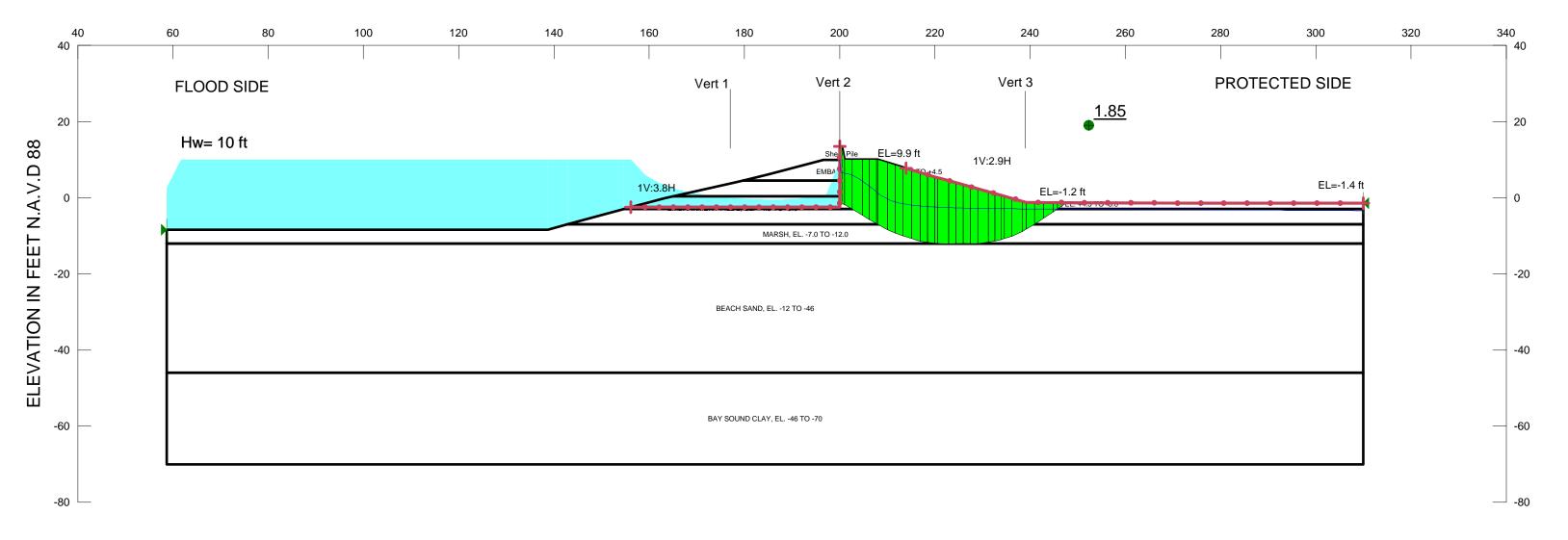




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17th STREET OUTFALL CANAL, REACH 1, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap Block STA. 658+00 - 663+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.6 TO +4.5 Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -3.0 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -12 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Clay

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion Spatial Fn: Embankment Fill 2 Phi: 0 °

Name: MARSH, EL. -7.0 TO -12.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 2 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap Entry & Exit File Name: 17thReach1.gsz Last Edited By: Goltz, Amanda MVS

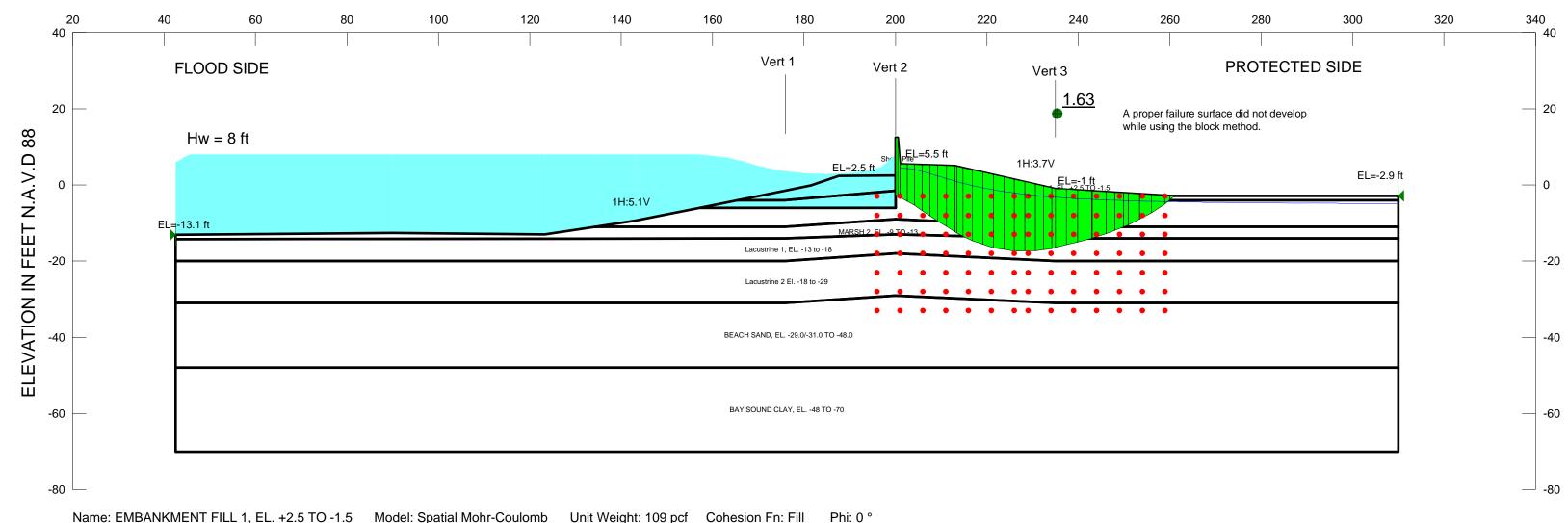




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17th STREET OUTFALL CANAL, REACH 1, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap Entry & Exit STA. 658+00 - 663+00 WEST ORLEANS PARISH, LOUISIANA



Cohesion Spatial Fn: Lacustrine 2 Cohesion Phi: 0 °

Phi: 0°

Name: MARSH 2, EL. -9 TO -13 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: Marsh 2 Phi: 0°

Name: BEACH SAND, EL. -29.0/-31.0 TO -48.0 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30°

Name: BAY SOUND CLAY, EL. -48 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Clay Phi: 0°

Name: Marsh 1, EL -1.5 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion Fn: Marsh 1 Phi: 0°

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Lacustrine 1, EL. -13 to -18 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1 Cohesion

Name: Lacustrine 2 El. -18 to -29 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2

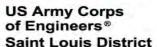
GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap Block File Name: 17thReach10.gsz Last Edited By: Goltz, Amanda MVS

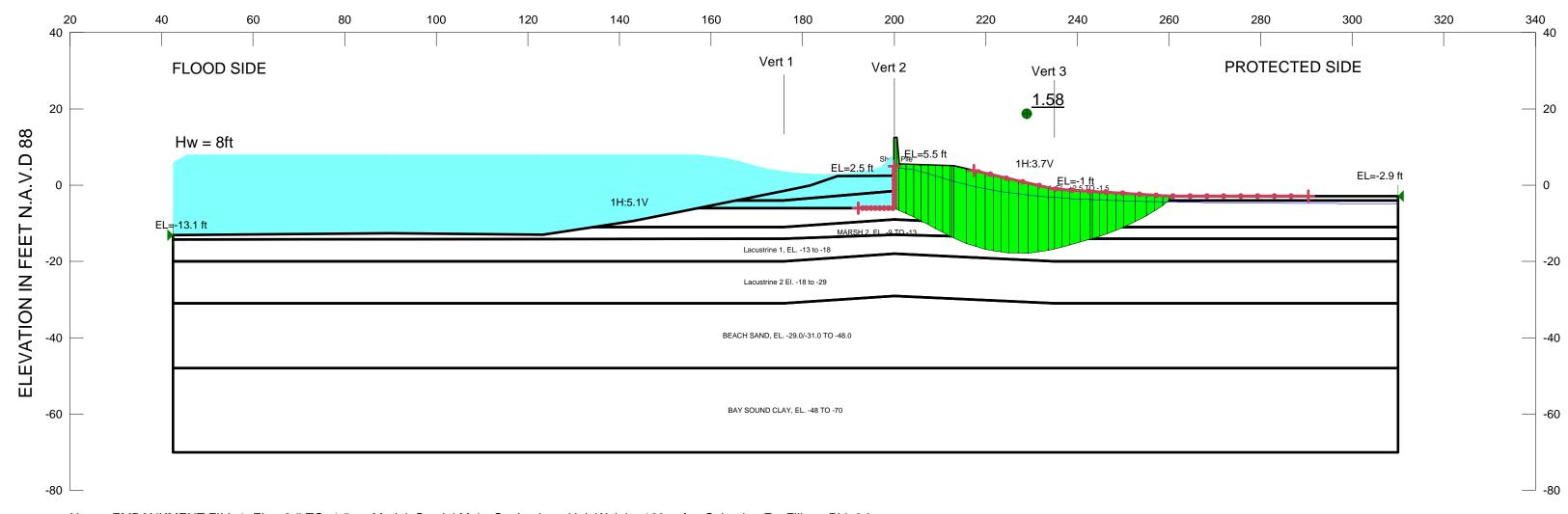






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17th STREET OUTFALL CANAL, REACH 10, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap Block STA. 593+00 - 596+05 WEST ORLEANS PARISH, LOUISIANA



Cohesion Spatial Fn: Lacustrine 2 Cohesion Phi: 0 °

Phi: 0°

Name: EMBANKMENT FILL 1, EL. +2.5 TO -1.5 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Fn: Fill Phi: 0 °
Name: MARSH 2, EL. -9 TO -13 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: Marsh 2 Phi: 0 °
Name: BEACH SAND, EL. -29.0/-31.0 TO -48.0 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °
Name: BAY SOUND CLAY, EL. -48 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Clay Phi: 0 °
Name: Marsh 1, EL -1.5 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion Fn: Marsh 1 Phi: 0 °
Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf
Name: Lacustrine 1, EL. -13 to -18 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1 Cohesion

Name: Lacustrine 2 El. -18 to -29 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

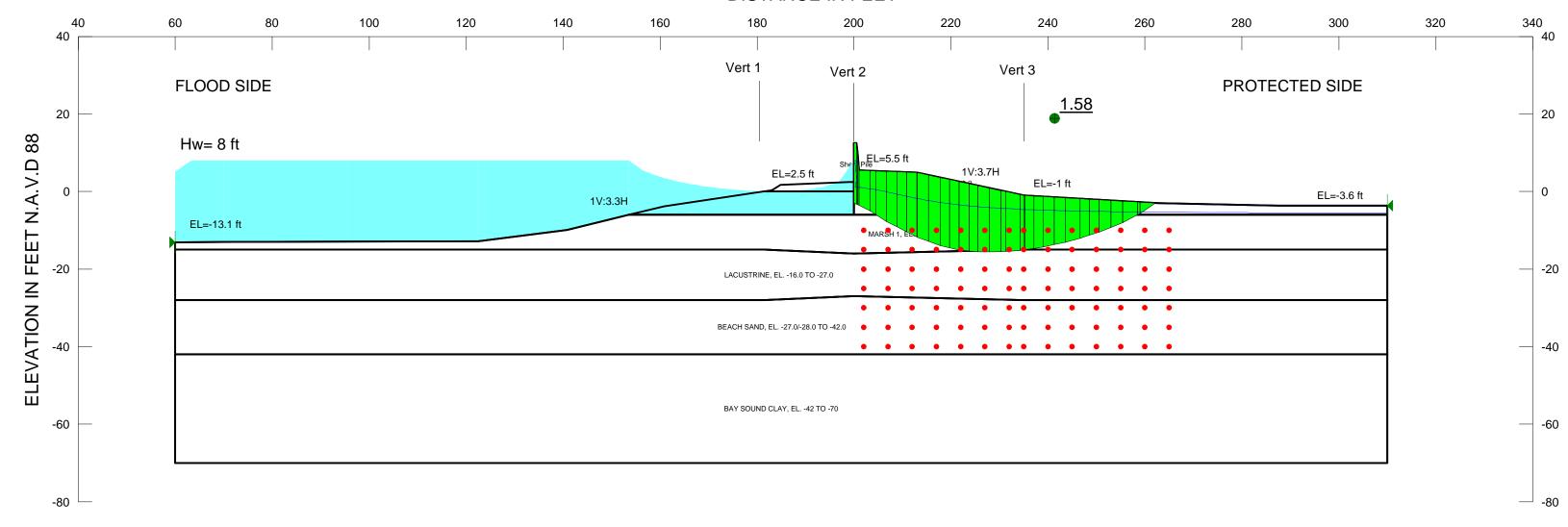
Name: Slope Stability Gap Entry & Exit File Name: 17thReach10.gsz Last Edited By: Goltz, Amanda MVS





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17th STREET OUTFALL CANAL, REACH 10, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap Entry & Exit STA. 593+00 - 596+05 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.5 TO 0.0 Model: Undrained (Phi=0) Unit Weight: 118 pcf Cohesion: 800 psf

Name: MARSH 1, EL. -6.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -27.0/-28.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi: 0 °

Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Spatial Fn: Fill 2 Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: LACUSTRINE, EL. -16.0 TO -27.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

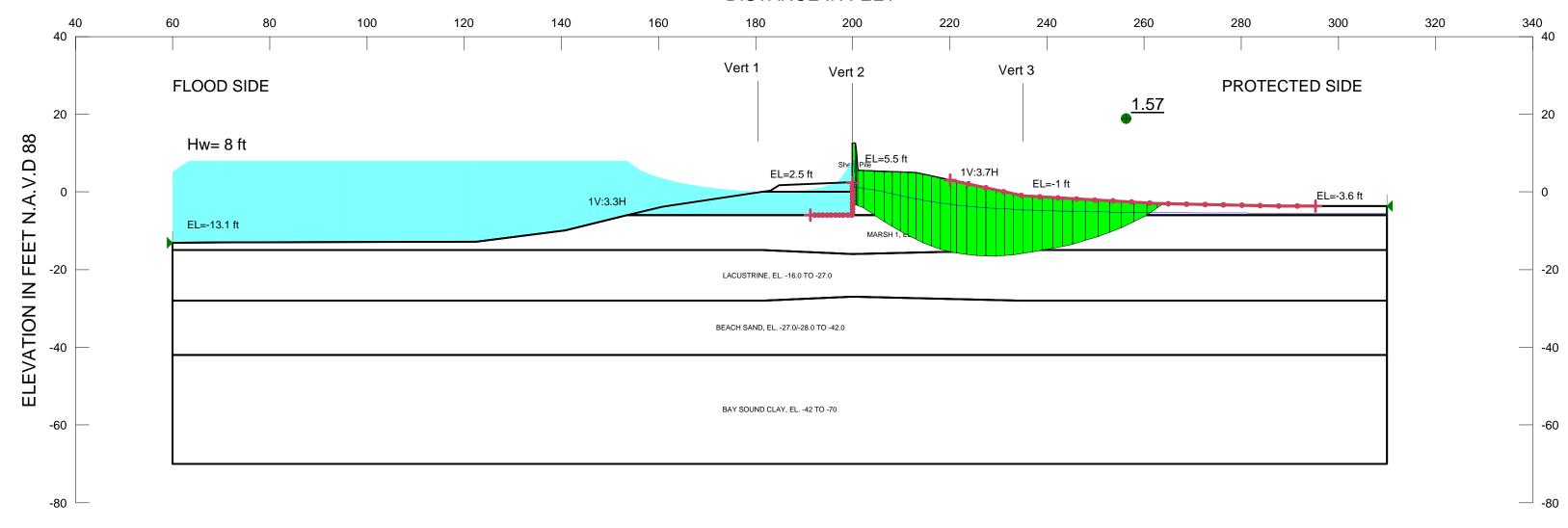
Name: Slope Stability Gap (Block) File Name: 17thReach11.gsz Last Edited By: Goltz, Amanda MVS





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17th STREET OUTFALL CANAL, REACH 11, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap (Block) STA. 596+05 to 609+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.5 TO 0.0 Model: Undrained (Phi=0) Unit Weight: 118 pcf Cohesion: 800 psf

Name: MARSH 1, EL. -6.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -27.0/-28.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi: 0 °

Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Spatial Fn: Fill 2 Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: LACUSTRINE, EL. -16.0 TO -27.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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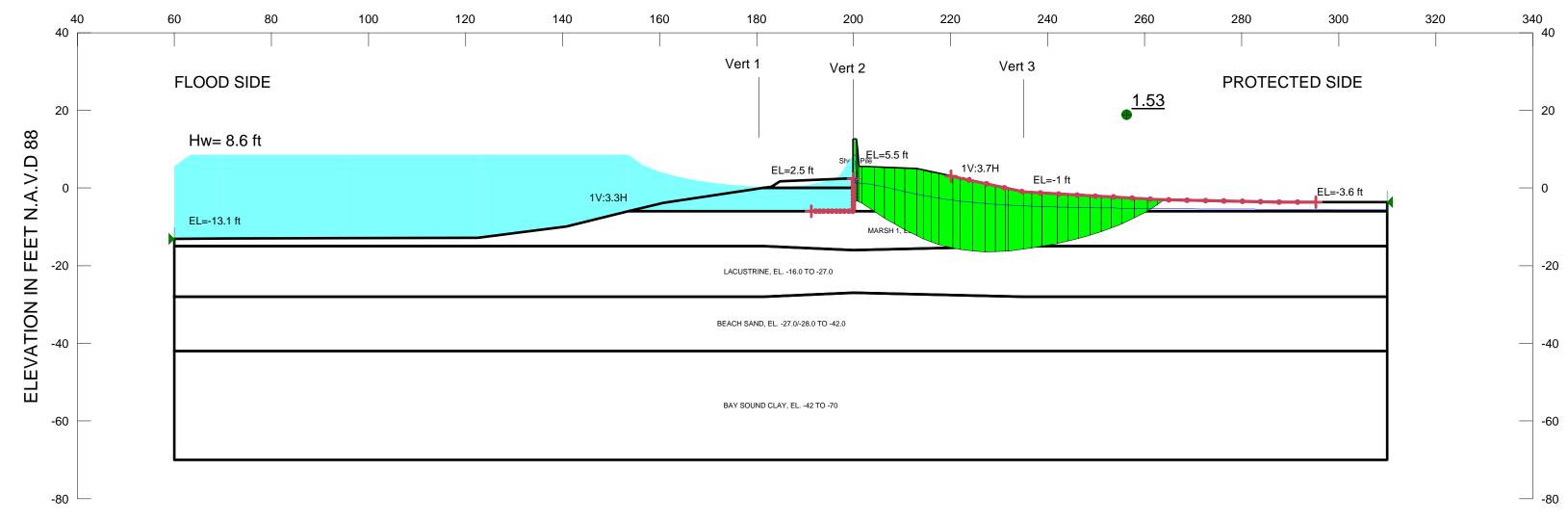
Name: Slope Stability Gap (Entry/Exit) File Name: 17thReach11.gsz Last Edited By: Goltz, Amanda MVS





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17th STREET OUTFALL CANAL, REACH 11, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap (Entry/Exit) STA. 596+05 to 609+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.5 TO 0.0 Model: Undrained (Phi=0) Unit Weight: 118 pcf Cohesion: 800 psf

Name: MARSH 1, EL. -6.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -27.0/-28.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi: 0 °

Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Spatial Fn: Fill 2 Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: LACUSTRINE, EL. -16.0 TO -27.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability Gap (Entry/Exit) File Name: 17thReach11.gsz Last Edited By: Goetz, Ryan MVS

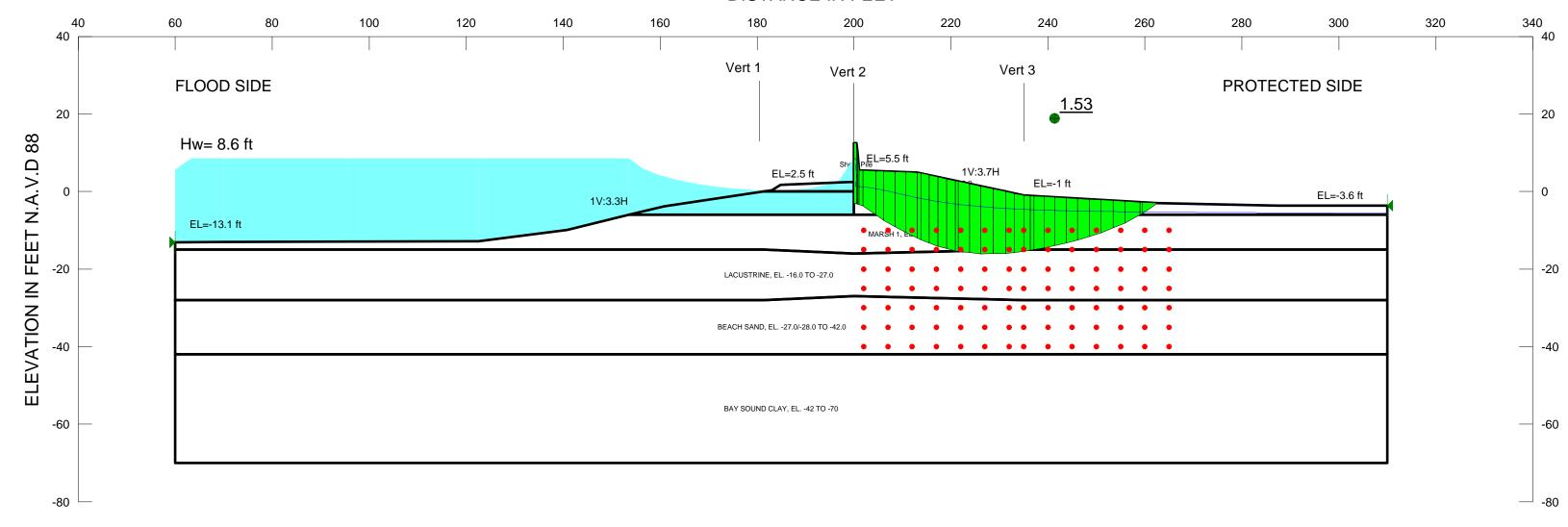






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17th STREET OUTFALL CANAL, REACH 11, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap (Entry/Exit) STA. 596+05 to 609+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.5 TO 0.0 Model: Undrained (Phi=0) Unit Weight: 118 pcf Cohesion: 800 psf

Name: MARSH 1, EL. -6.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -27.0/-28.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi: 0 °

Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Spatial Fn: Fill 2 Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: LACUSTRINE, EL. -16.0 TO -27.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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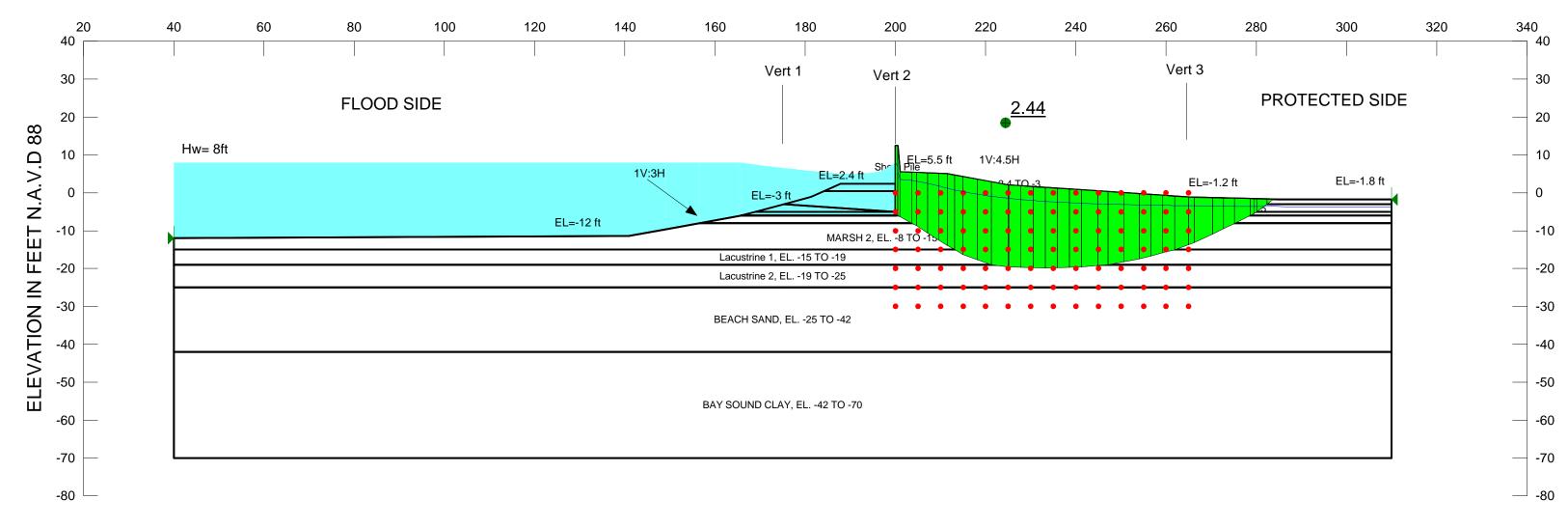
Name: Slope Stability Gap (Block) File Name: 17thReach11.gsz Last Edited By: Goetz, Ryan MVS





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17th STREET OUTFALL CANAL, REACH 11, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap (Block) STA. 596+05 to 609+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.4 TO -3 Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 500 psf Phi: 0 ° Name: MARSH 1b, EL. -5 TO -8 Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion Spatial Fn: Marsh 1b Phi: 0 °

Name: BEACH SAND, EL. -25 TO -42 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: MARSH 2, EL. -8 TO -15 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Marsh 2 Phi: 0 °

Name: Lacustrine 1, EL. -15 TO -19 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Lacustrine 1 Phi: 0 ° Name: Lacustrine 2, EL. -19 TO -25 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine 2 Phi: 0 °

Name: MARSH 1a, EL. -0.4 TO -5 Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh 1a unit wt Cohesion Spatial Fn: Marsh 1a Phi: 0°

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap (Block) File Name: 17thReach12.gsz Last Edited By: Redell, Chris MVS

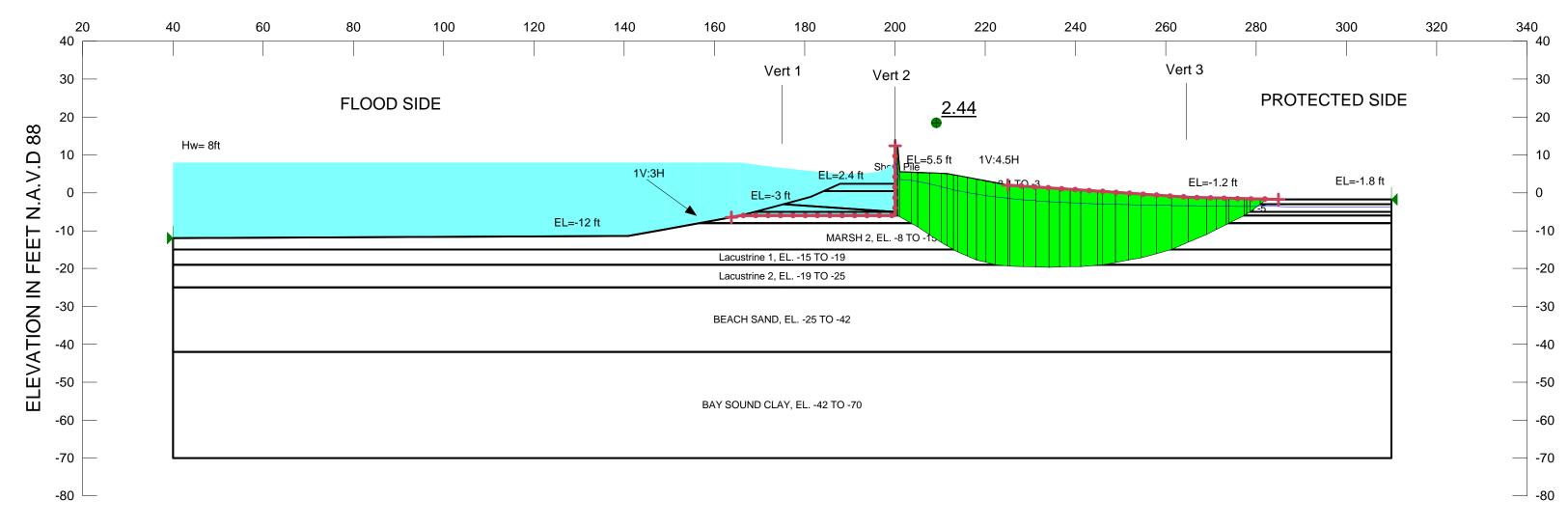




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17th STREET OUTFALL CANAL, REACH 12, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap (Block) STA. 609+00 to 614+00 WEST

ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.4 TO -3 Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 500 psf Phi: 0 ° Name: MARSH 1b, EL. -5 TO -8 Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion Spatial Fn: Marsh 1b Phi: 0 °

Name: BEACH SAND, EL. -25 TO -42 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: MARSH 2, EL. -8 TO -15 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Marsh 2 Phi: 0 °

Name: Lacustrine 1, EL. -15 TO -19 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Lacustrine 1 Phi: 0 ° Name: Lacustrine 2, EL. -19 TO -25 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine 2 Phi: 0 °

Name: MARSH 1a, EL. -0.4 TO -5 Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh 1a unit wt Cohesion Spatial Fn: Marsh 1a Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

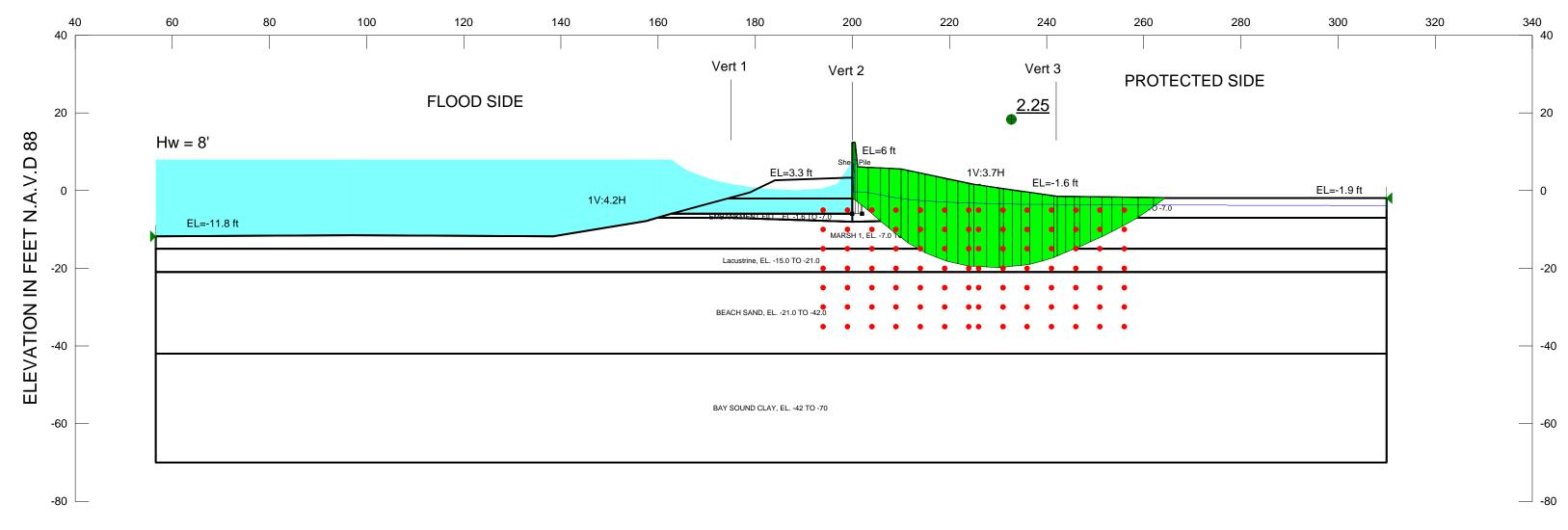
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Saint Louis District New Orleans District

17th STREET OUTFALL CANAL, REACH 12, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap (Entry/Exit) STA. 609+00 to 614+00 WEST ORLEANS PARISH, LOUISIANA



Phi: 0°

Name: EMBANKMENT FILL, EL. +3.0 TO 2.0 Model: Undrained (Phi=0) Unit Weight: 108 pcf Cohesion: 750 psf Name: BEACH SAND, EL. -21.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: EMBANKMENT FILL, EL -1.6 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: FILL 2 Phi: 0 °

Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: Clay

Name: MARSH 1, EL. -7.0 TO -15.0 Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: Lacustrine, EL. -15.0 TO -21.0 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine Phi: 0°

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

Name: BAY SOUND CLAY, EL. -42 TO -70

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap (Block) File Name: 17thReach13.gsz Last Edited By: Redell, Chris MVS

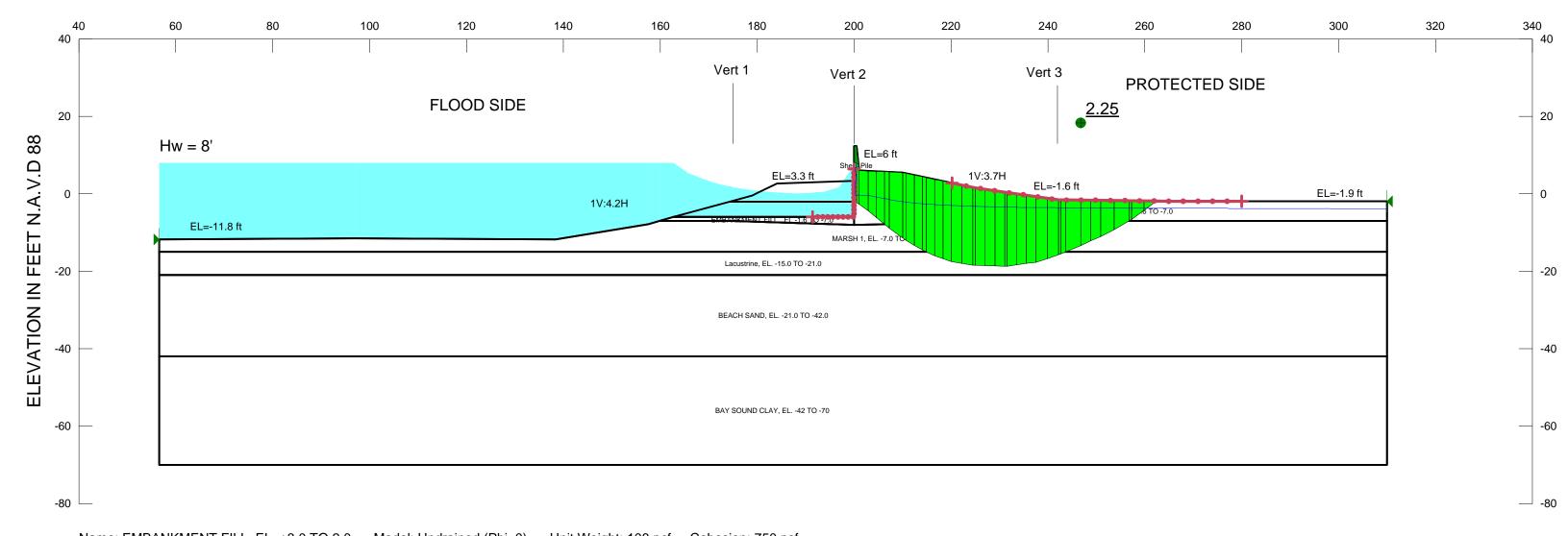




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17th STREET OUTFALL CANAL, REACH 13, PROTECTED SIDE STABILITY ANALYSIS. CASE: Slope Stability Gap (Block) STA. 614+00 to 617+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +3.0 TO 2.0 Model: Undrained (Phi=0) Unit Weight: 108 pcf Cohesion: 750 psf
Name: BEACH SAND, EL. -21.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand
Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf
Name: EMBANKMENT FILL, EL -1.6 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: FILL 2 Phi: 0 °

Name: MARSH 1, EL. -7.0 TO -15.0 Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion Fn: MARSH 1 Phi: 0 °
Name: Lacustrine, EL. -15.0 TO -21.0 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine Phi: 0 °
Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: Clay Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap (Entry & Exit) File Name: 17thReach13.gsz Last Edited By: Redell, Chris MVS

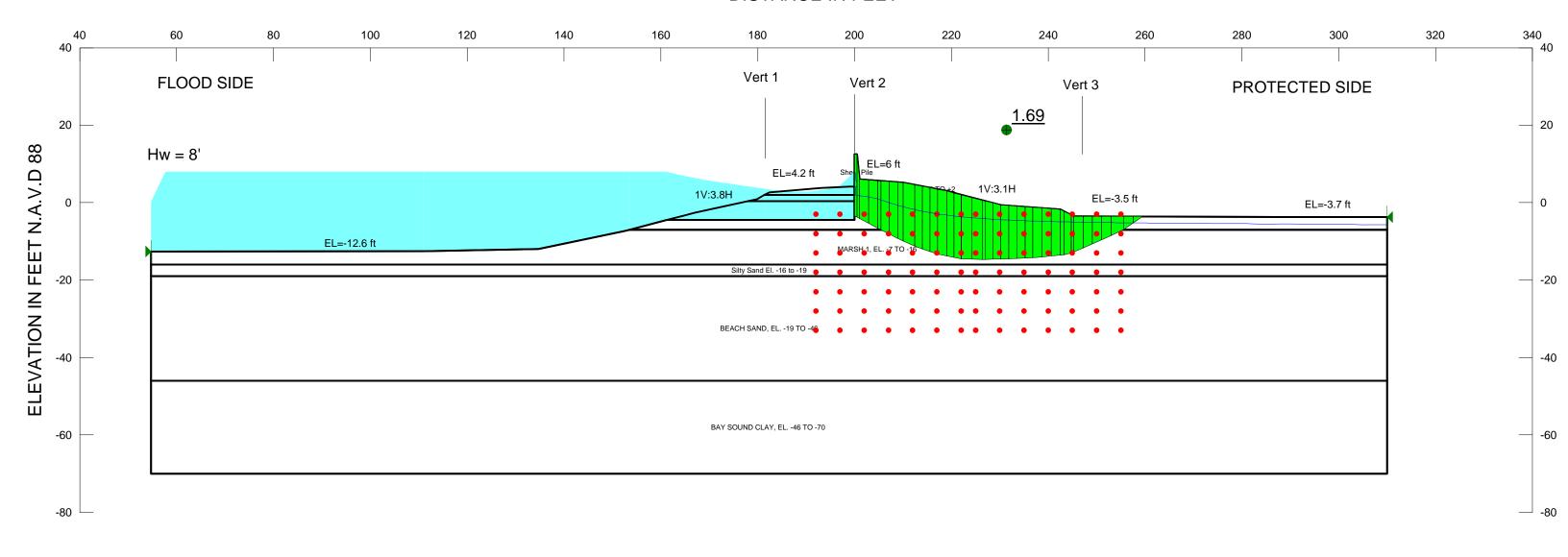




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17th STREET OUTFALL CANAL, REACH 13, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap (Entry & Exit) STA. 614+00 to 617+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +4.2 TO +2 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 860 psf Phi: 0 °

Name: BEACH SAND, EL. -19 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Fill 2, EL. -3.3 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Fill Phi: 0 °

Name: MARSH 1, EL. -7 TO -16 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Spatial Fn: Marsh 1 Cohesion Phi: 0 °

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0°

Name: Silty Sand El. -16 to -19 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap (Block) File Name: 17thReach14.gsz Last Edited By: Redell, Chris MVS

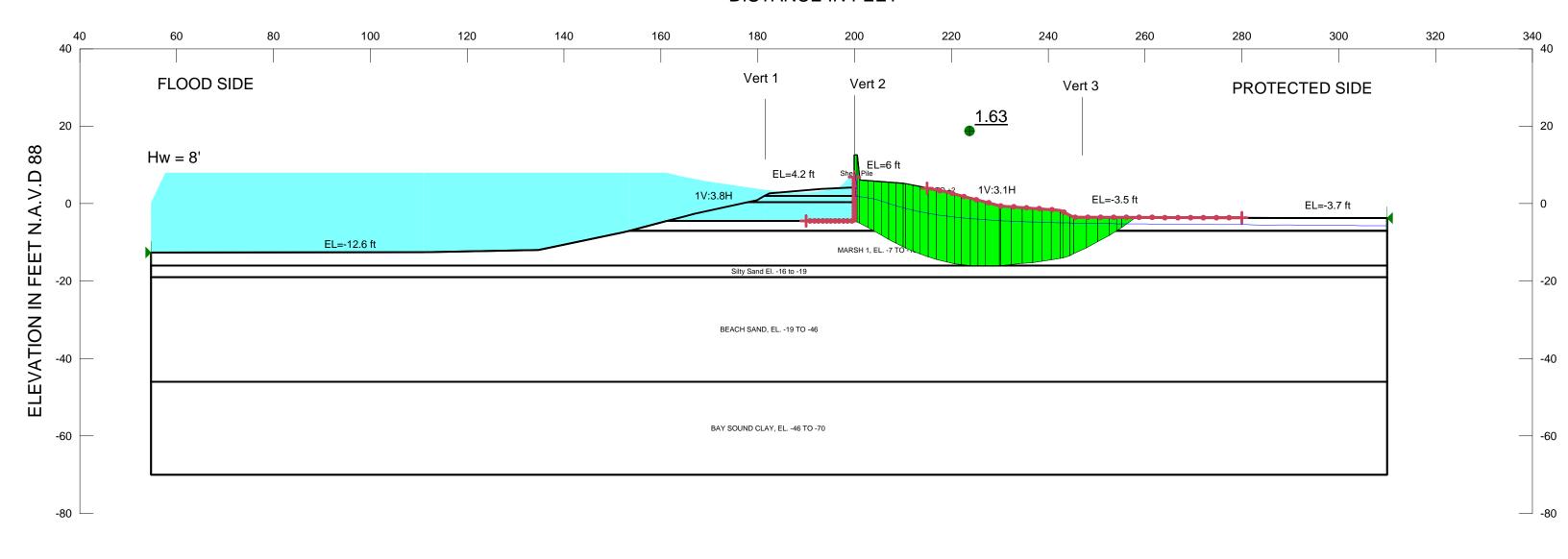




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17th STREET OUTFALL CANAL, REACH 14, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap (Block) STA. 617+00 to 625+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +4.2 TO +2 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 860 psf Phi: 0 °

Name: BEACH SAND, EL. -19 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Fill 2, EL. -3.3 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Fill Phi: 0 °

Name: MARSH 1, EL. -7 TO -16 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Spatial Fn: Marsh 1 Cohesion Phi: 0 °

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0°

Name: Silty Sand El. -16 to -19 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap (Entry & Exit) File Name: 17thReach14.gsz Last Edited By: Redell, Chris MVS

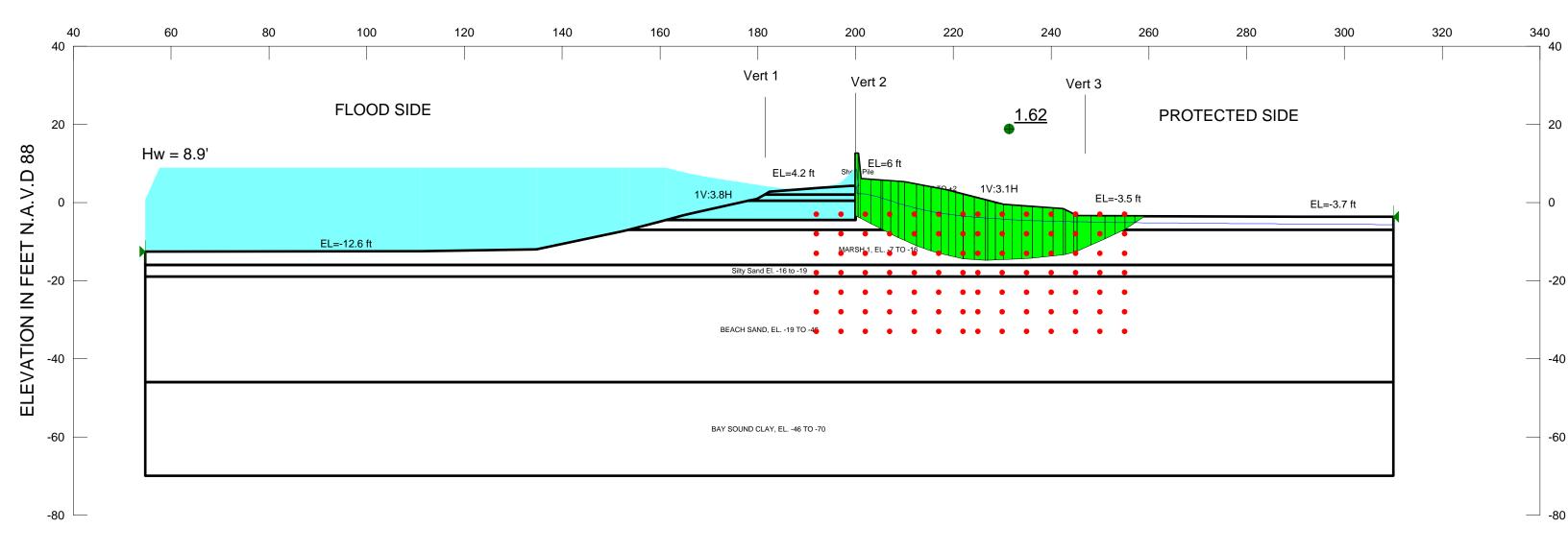




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17th STREET OUTFALL CANAL, REACH 14, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap (Entry & Exit) STA. 617+00 to 625+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +4.2 TO +2 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 860 psf Phi: 0 °

Name: BEACH SAND, EL. -19 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Fill 2, EL. -3.3 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Fill Phi: 0 °

Name: MARSH 1, EL. -7 TO -16 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Spatial Fn: Marsh 1 Cohesion

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

Name: Silty Sand El. -16 to -19 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap (Block) File Name: 17thReach14.gsz Last Edited By: Goltz, Amanda MVS

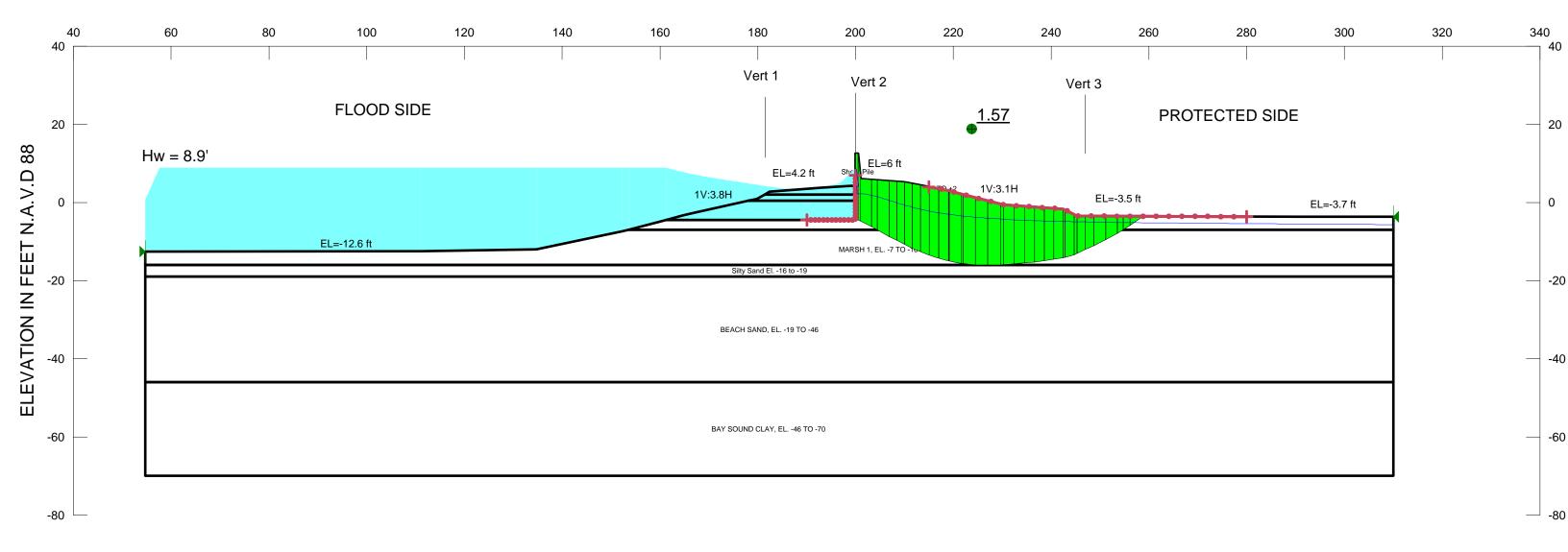




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17th STREET OUTFALL CANAL, REACH 14, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap (Block) STA. 617+00 to 625+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +4.2 TO +2 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 860 psf Phi: 0 °

Name: BEACH SAND, EL. -19 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Fill 2, EL. -3.3 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Fill Phi: 0 °

Name: MARSH 1, EL. -7 TO -16 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Spatial Fn: Marsh 1 Cohesion

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

Name: Silty Sand El. -16 to -19 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap (Entry & Exit) File Name: 17thReach14.gsz Last Edited By: Goltz, Amanda MVS

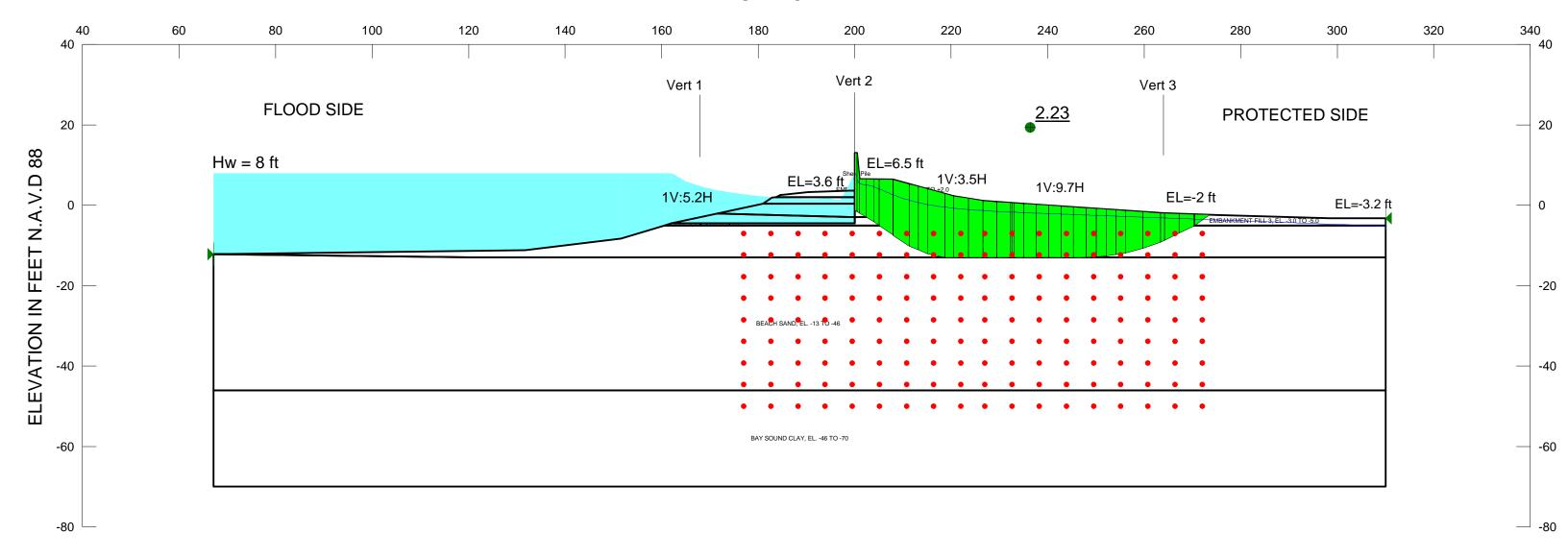




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17th STREET OUTFALL CANAL, REACH 14, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap (Entry & Exit) STA. 617+00 to 625+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 1, EL. +5.9 TO +2.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0 °

Name: BEACH SAND, EL. -13 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: EMBANKMENT FILL 2, EL. +2.0 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi: 0 ° Name: EMBANKMENT FILL 3, EL. -3.0 TO -5.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap (Block) File Name: 17thReach15A.gsz Last Edited By: Redell, Chris MVS

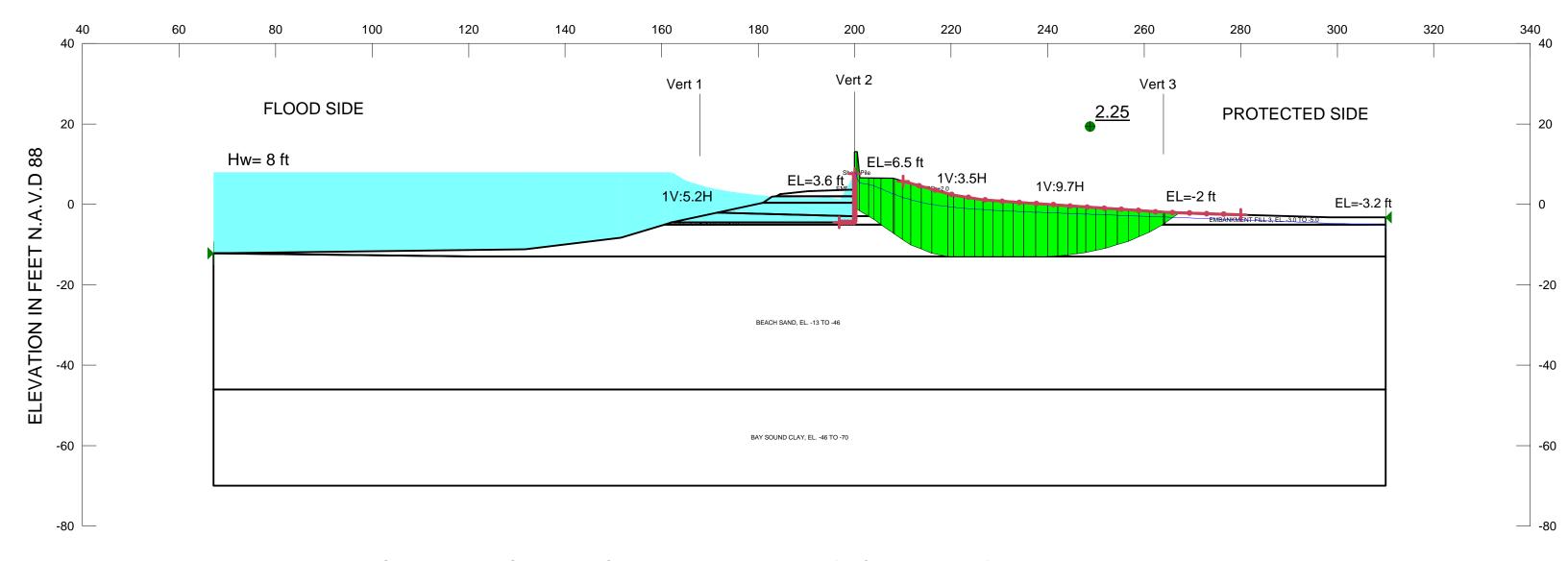




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17th STREET OUTFALL CANAL, REACH 15A, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap (Block) STA. 626+56 to 635+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 1, EL. +5.9 TO +2.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0 °

Name: BEACH SAND, EL. -13 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: EMBANKMENT FILL 2, EL. +2.0 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi: 0 ° Name: EMBANKMENT FILL 3, EL. -3.0 TO -5.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap (Entry & Exit) File Name: 17thReach15A.gsz Last Edited By: Redell, Chris MVS

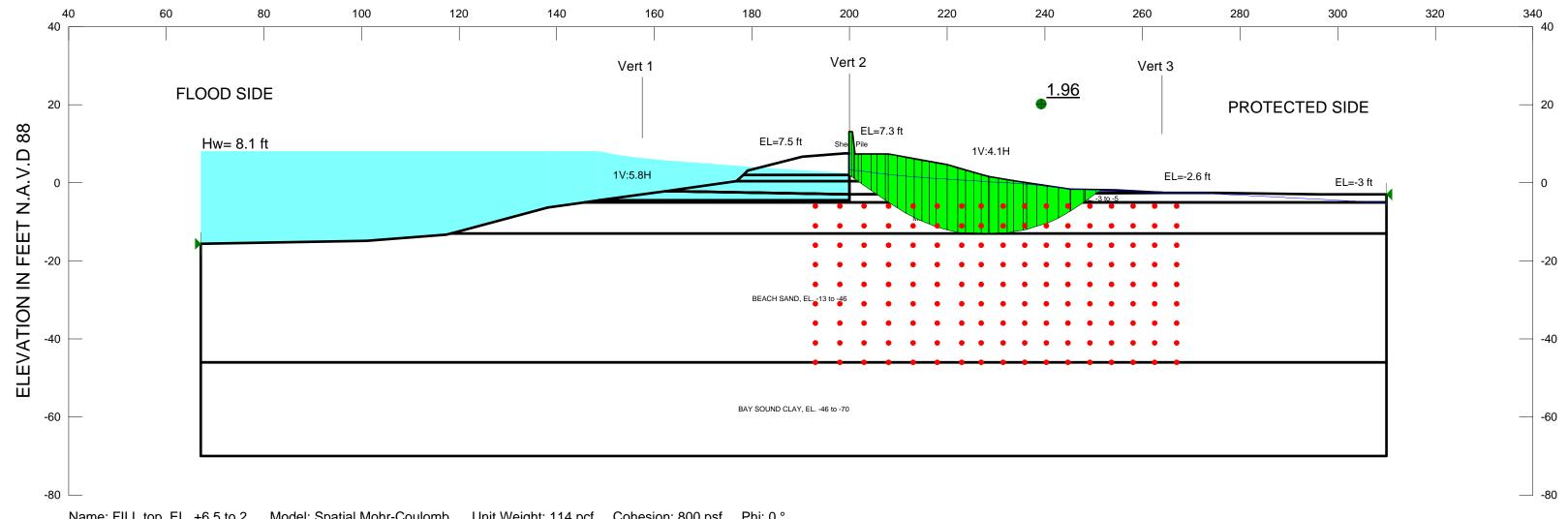




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17th STREET OUTFALL CANAL, REACH 15A, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap (Entry & Exit) STA. 626+56 to 635+00 WEST ORLEANS PARISH, LOUISIANA



Name: FILL top, EL. +6.5 to 2 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -5 to -13 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: BEACH SAND, EL. -13 to -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi: 0°

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: FILL middle, EL. 2 to -3 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi: 0 ° Name: FILL bottom, EL. -3 to -5 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap Block File Name: 17thReach15B.gsz Last Edited By: Redell, Chris MVS

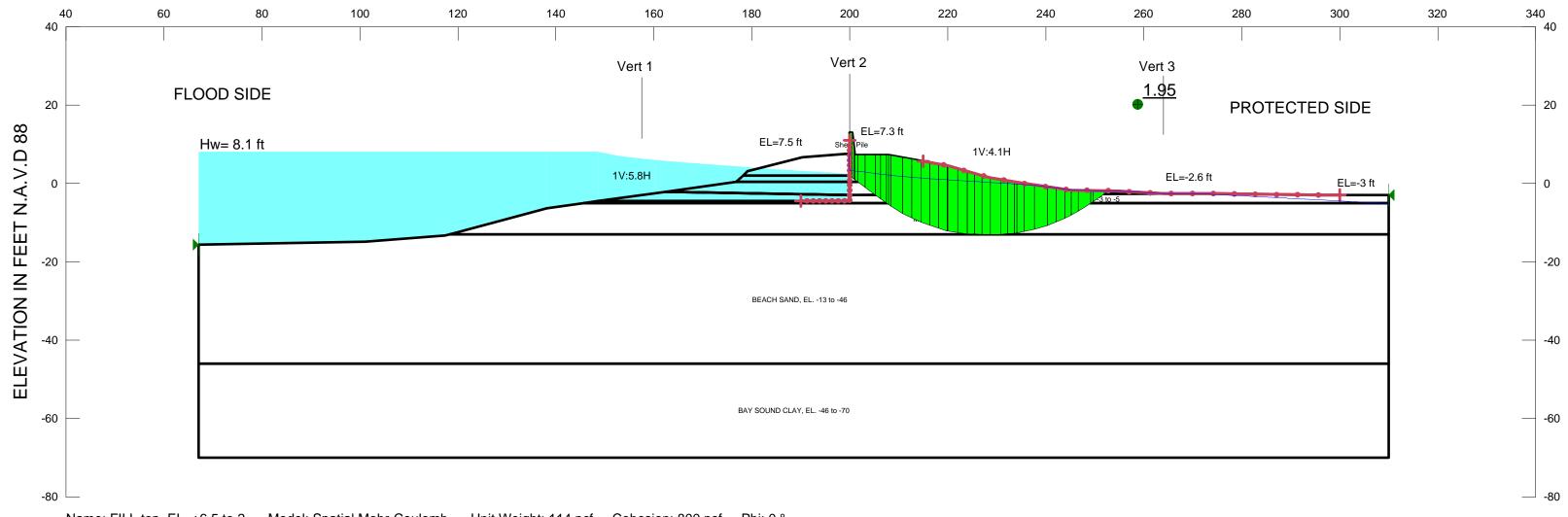




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17th STREET OUTFALL CANAL, REACH 15B, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap Block STA. 635+00 to 639+06 WEST ORLEANS PARISH, LOUISIANA



Name: FILL top, EL. +6.5 to 2 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -5 to -13 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: BEACH SAND, EL. -13 to -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi: 0°

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: FILL middle, EL. 2 to -3 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi: 0 ° Name: FILL bottom, EL. -3 to -5 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap Entry & Exit File Name: 17thReach15B.gsz Last Edited By: Redell, Chris MVS

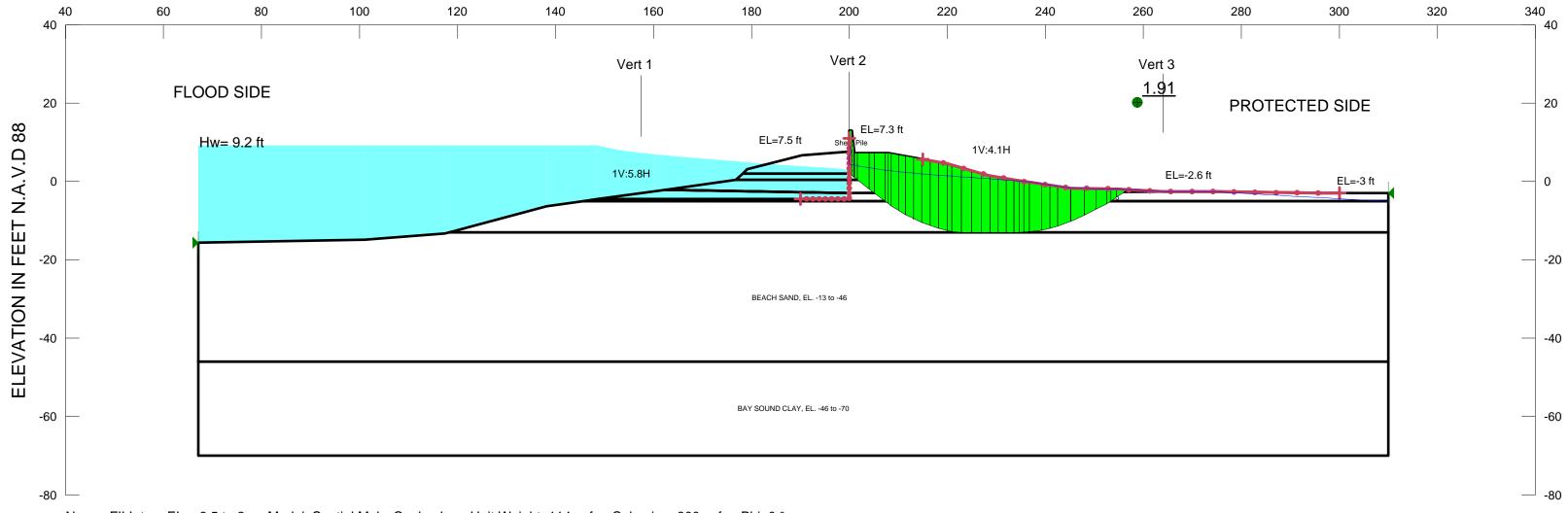




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17th STREET OUTFALL CANAL, REACH 15B, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap Entry & Exit STA. 635+00 to 639+06 WEST ORLEANS PARISH, LOUISIANA



Name: FILL top, EL. +6.5 to 2 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -5 to -13 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: BEACH SAND, EL. -13 to -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi: 0°

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: FILL middle, EL. 2 to -3 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi: 0 ° Name: FILL bottom, EL. -3 to -5 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability Gap Entry & Exit File Name: 17thReach15B.gsz Last Edited By: Goetz, Ryan MVS

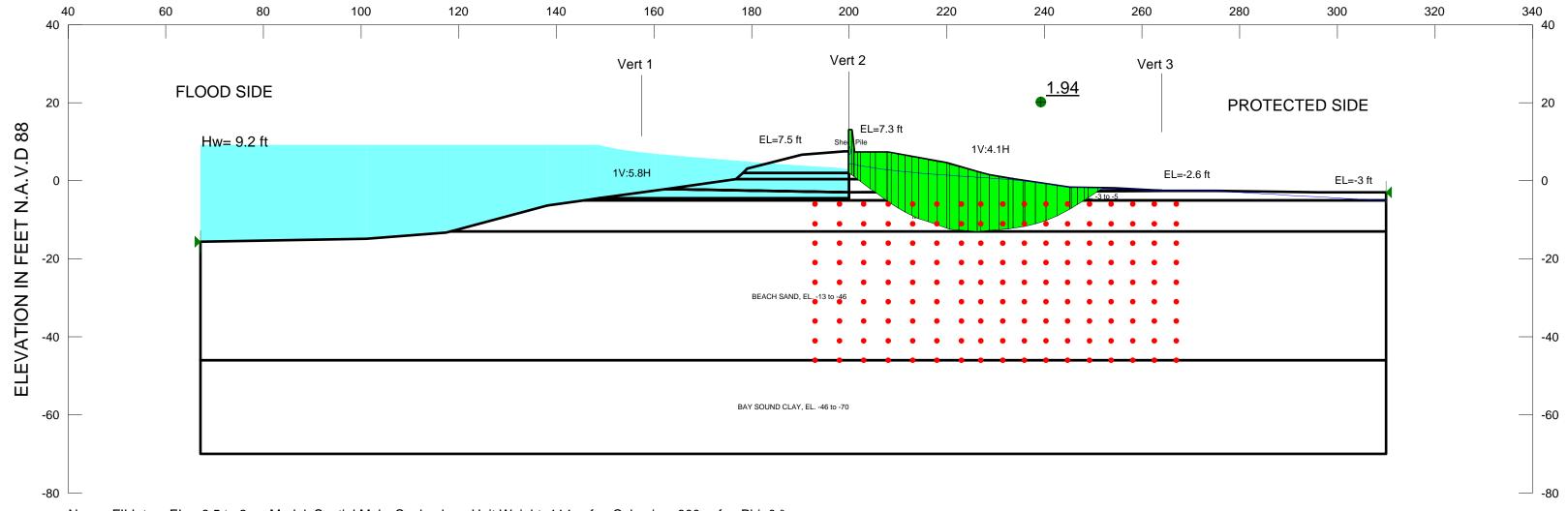




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17th STREET OUTFALL CANAL, REACH 15B, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap Entry & Exit STA. 635+00 to 639+06 WEST ORLEANS PARISH, LOUISIANA



Name: FILL top, EL. +6.5 to 2 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -5 to -13 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: BEACH SAND, EL. -13 to -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi: 0°

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: FILL middle, EL. 2 to -3 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi: 0 ° Name: FILL bottom, EL. -3 to -5 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability Gap Block File Name: 17thReach15B.gsz Last Edited By: Goetz, Ryan MVS

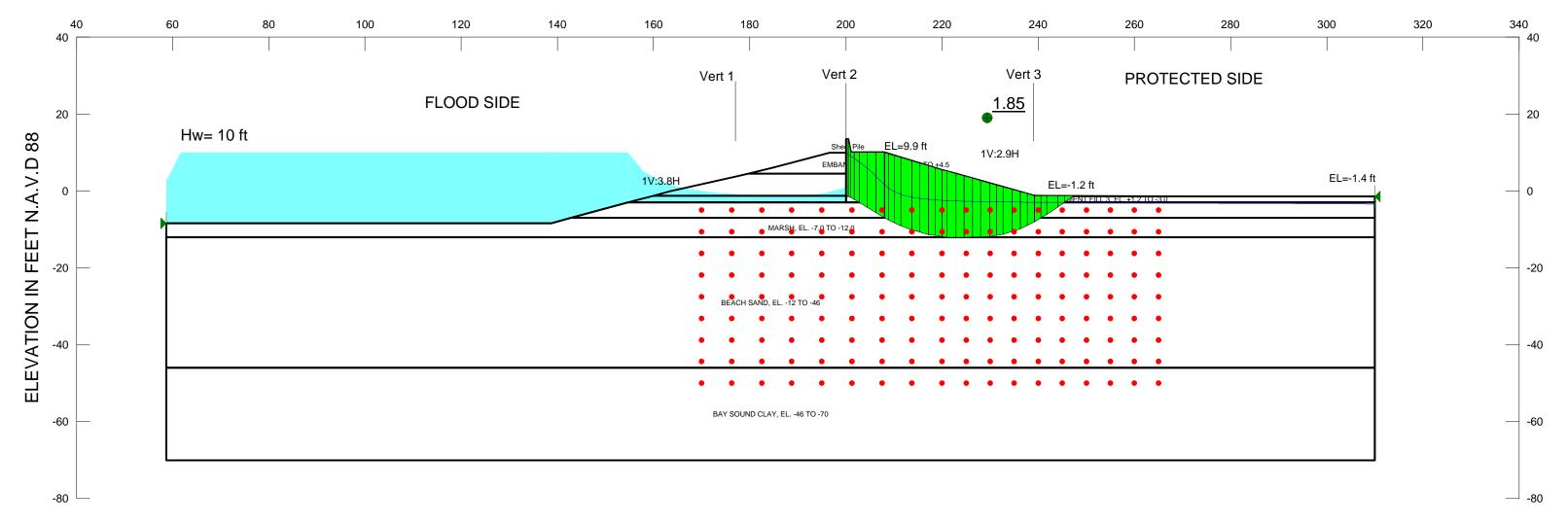




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17th STREET OUTFALL CANAL, REACH 15B, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap Block STA. 635+00 to 639+06 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.6 TO +4.5 Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -3.0 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -12 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Clay Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 650 psf Phi: 0 ° Name: EMBANKMENT FILL 3, EL. +1.2 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion Fn: Fill Phi: 0 ° Name: MARSH, EL. -7.0 TO -12.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 2 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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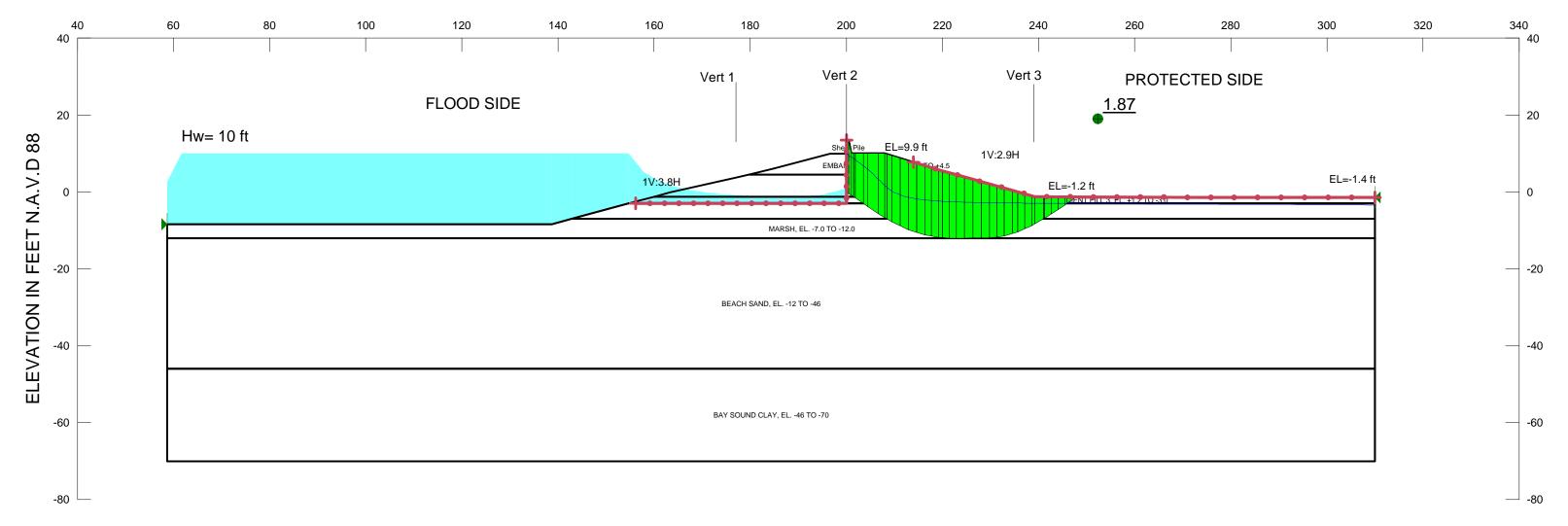




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17th STREET OUTFALL CANAL, REACH 17, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap Block STA. 658+00 - 663+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.6 TO +4.5 Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -3.0 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -12 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Clay Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 650 psf Phi: 0 ° Name: EMBANKMENT FILL 3, EL. +1.2 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion Fn: Fill Phi: 0 ° Name: MARSH, EL. -7.0 TO -12.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 2 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

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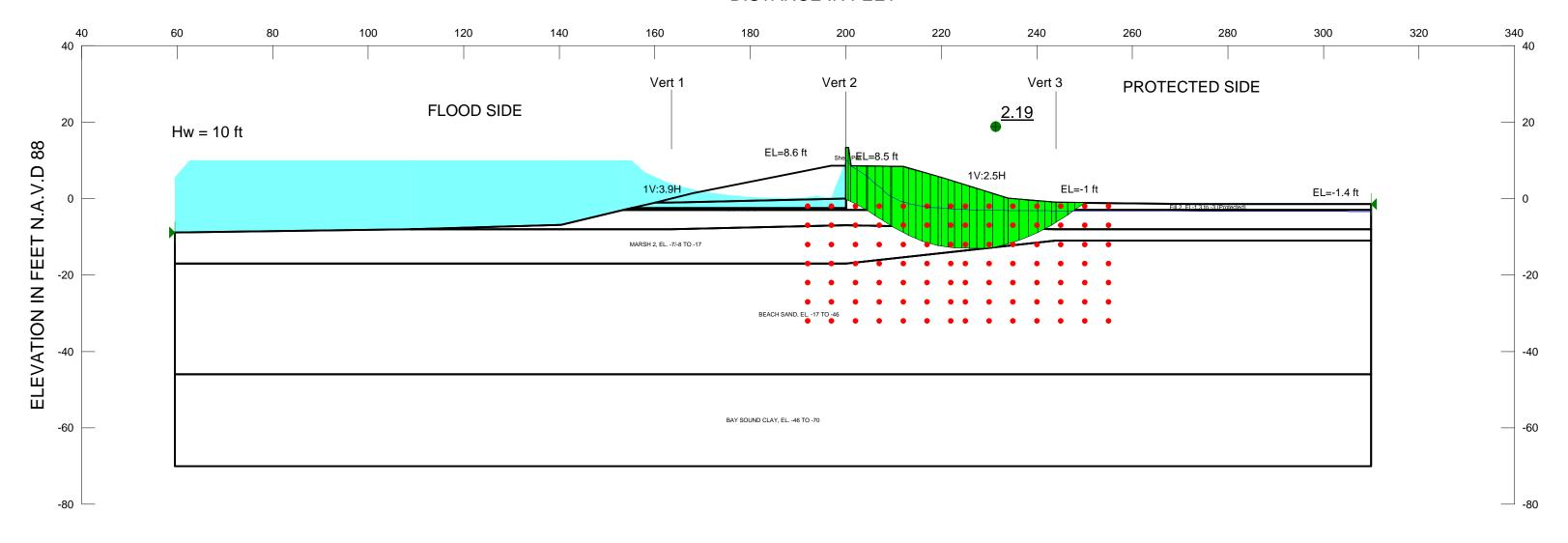




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17th STREET OUTFALL CANAL, REACH 17, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap Entry & Exit STA. 658+00 - 663+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.6 TO 0 Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH 1, EL. -3 TO -7/-8 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -17 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0°

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: MARSH 2, EL. -7/-8 TO -17 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: MARSH 2 Phi: 0 °

Name: Fill 2, El. 0 to -3 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion Fn: Fill Phi: 0 °

Name: Fill 2, El -1.3 to -3 (Protected) Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 800 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap Block File Name: 17thReach18.gsz Last Edited By: Redell, Chris MVS

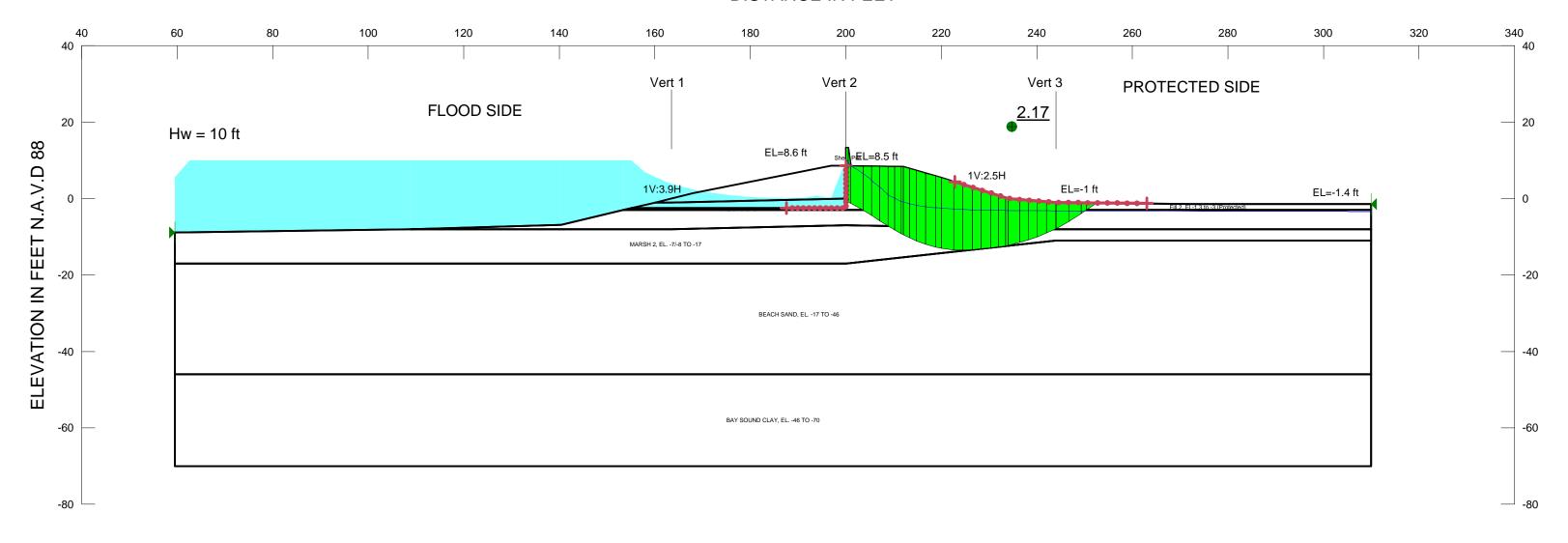




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17th STREET OUTFALL CANAL, REACH 18, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap Block STA. 663+00 to 669+36 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.6 TO 0 Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH 1, EL. -3 TO -7/-8 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -17 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0°

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: MARSH 2, EL. -7/-8 TO -17 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: MARSH 2 Phi: 0 °

Name: Fill 2, El. 0 to -3 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion Fn: Fill Phi: 0 °

Name: Fill 2, El -1.3 to -3 (Protected) Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 800 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability Gap Entry & Exit File Name: 17thReach18.gsz Last Edited By: Redell, Chris MVS

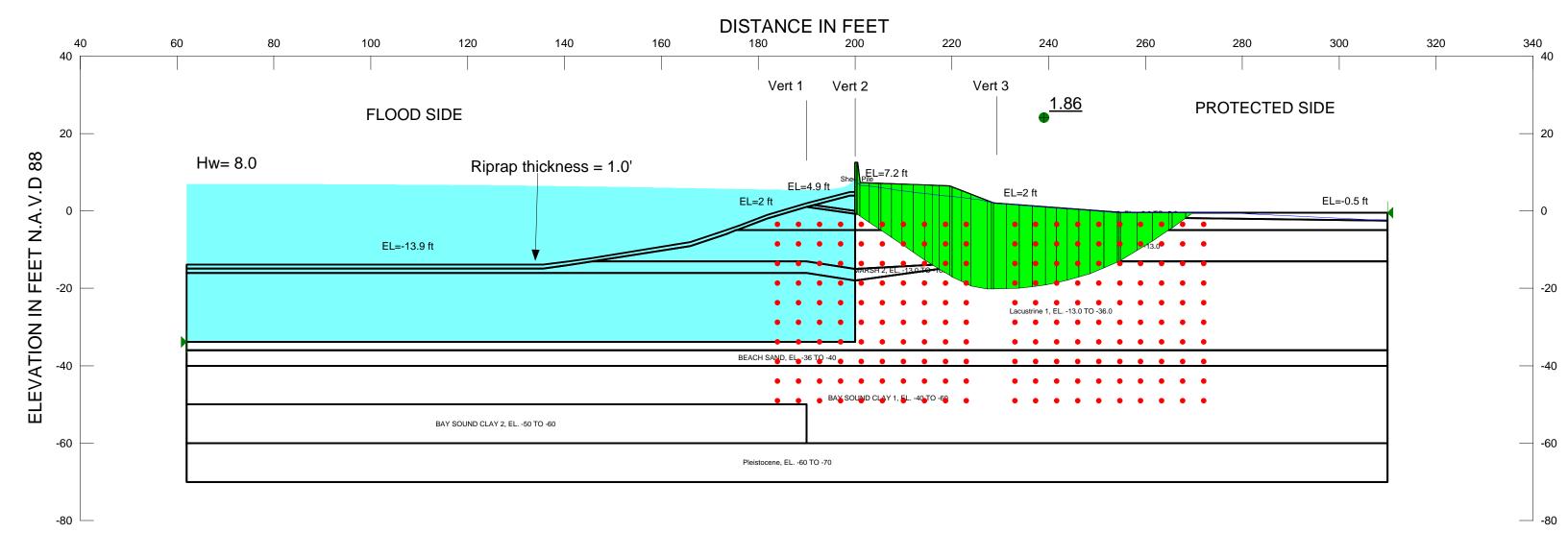




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17th STREET OUTFALL CANAL, REACH 18, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap Entry & Exit STA. 663+00 to 669+36 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL. +2.0 TO -5.0 Model: Spatial Mohr-Coulomb Weight Fn: Fill (2) Cohesion: 500 psf Phi: 0 ° Name: MARSH 1, EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -36 TO -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY 1, EL. -40 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Bay Sound 1 Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Lacustrine 1, EL. -13.0 TO -36.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1 Phi: 0 °

Name: Pleistocene, EL. -60 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 124 pcf Cohesion: 1000 psf Phi: 0 °

Name: EMBANKMENT FILL, EL. +7.2 TO 0.0 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion Spatial Fn: Embankment Fill Phi: 0°

Name: MARSH 2, EL. -13.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion Fn: MARSH 2 Phi: 0 °

Name: BAY SOUND CLAY 2, EL. -50 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Bay Sound 2 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap Block File Name: 17thReach19.gsz Last Edited By: Redell, Chris MVS

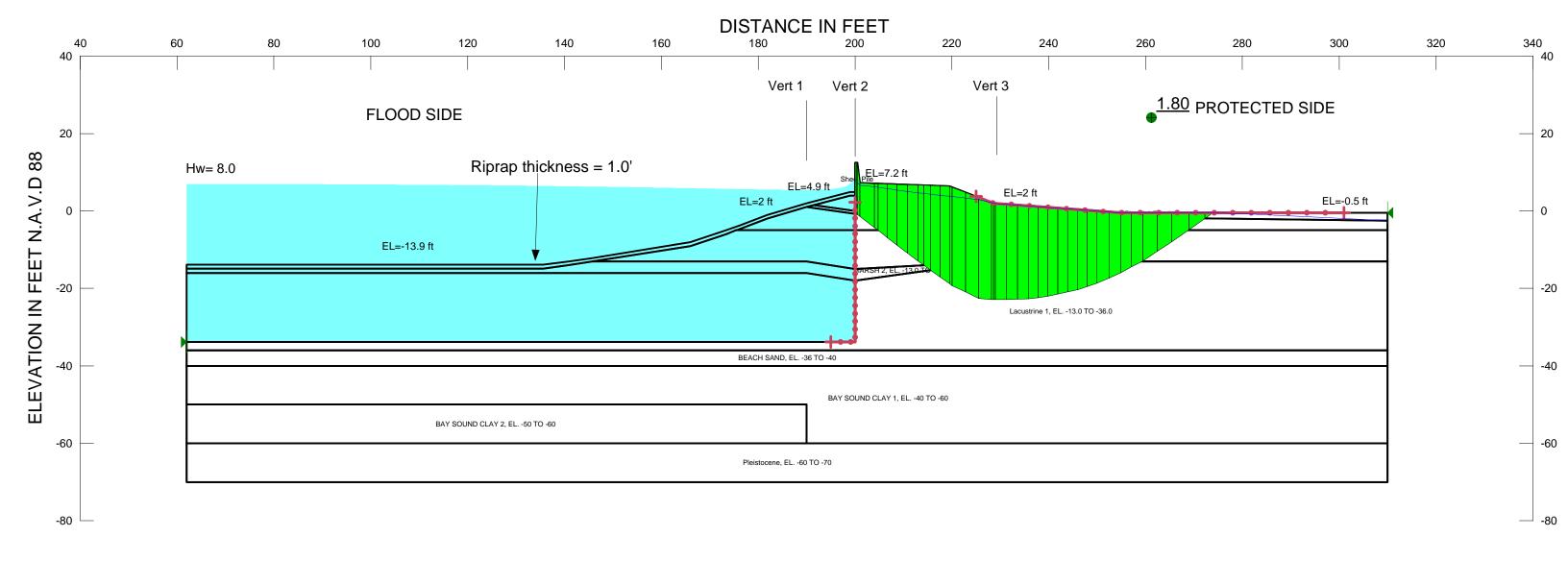




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17th STREET OUTFALL CANAL, REACH 19, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap Block STA. Closure to 552+17 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL. +2.0 TO -5.0 Model: Spatial Mohr-Coulomb Weight Fn: Fill (2) Cohesion: 500 psf Phi: 0 ° Name: MARSH 1, EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -36 TO -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY 1, EL. -40 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Bay Sound 1 Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Lacustrine 1, EL. -13.0 TO -36.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1 Phi: 0 °

Name: Pleistocene, EL. -60 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 124 pcf Cohesion: 1000 psf Phi: 0 °

Name: EMBANKMENT FILL, EL. +7.2 TO 0.0 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion Spatial Fn: Embankment Fill Phi: 0°

Name: MARSH 2, EL. -13.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion Fn: MARSH 2 Phi: 0 °

Name: BAY SOUND CLAY 2, EL. -50 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Bay Sound 2 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap Entry & Exit File Name: 17thReach19.gsz Last Edited By: Redell, Chris MVS

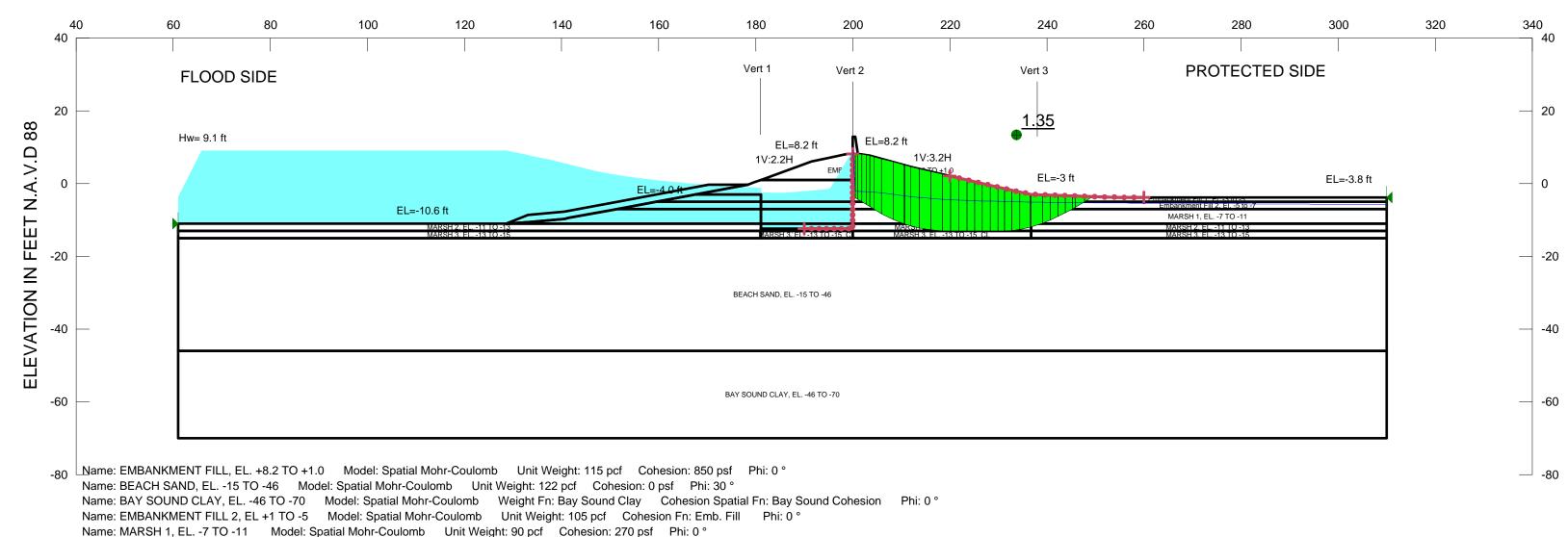




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17th STREET OUTFALL CANAL, REACH 19, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap Entry & Exit STA. Closure to 552+17 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 2, EL. -11 TO -13 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 180 psf Phi: 0 ° Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 800 psf Phi: 0 ° Name: Embankment Fill 1, El. -3 to -5 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 500 psf Phi: 0 ° Name: Embankment Fill 2, El. -5 to -7 Name: MARSH 3, EL. -13 TO -15 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 285 psf Phi: 0 ° Name: MARSH 1, EL. -7 TO -11 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: MARSH 2, EL. -11 TO -13 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Phi: 0 ° Name: MARSH 3, EL. -13 TO -15 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi: 0 ° Name: EMBANKMENT FILL 3, EL -5 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Emb. Fill 2 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap (Entry/Exit) File Name: 17thReach30 Modified.gsz Last Edited By: Goltz, Amanda MVS

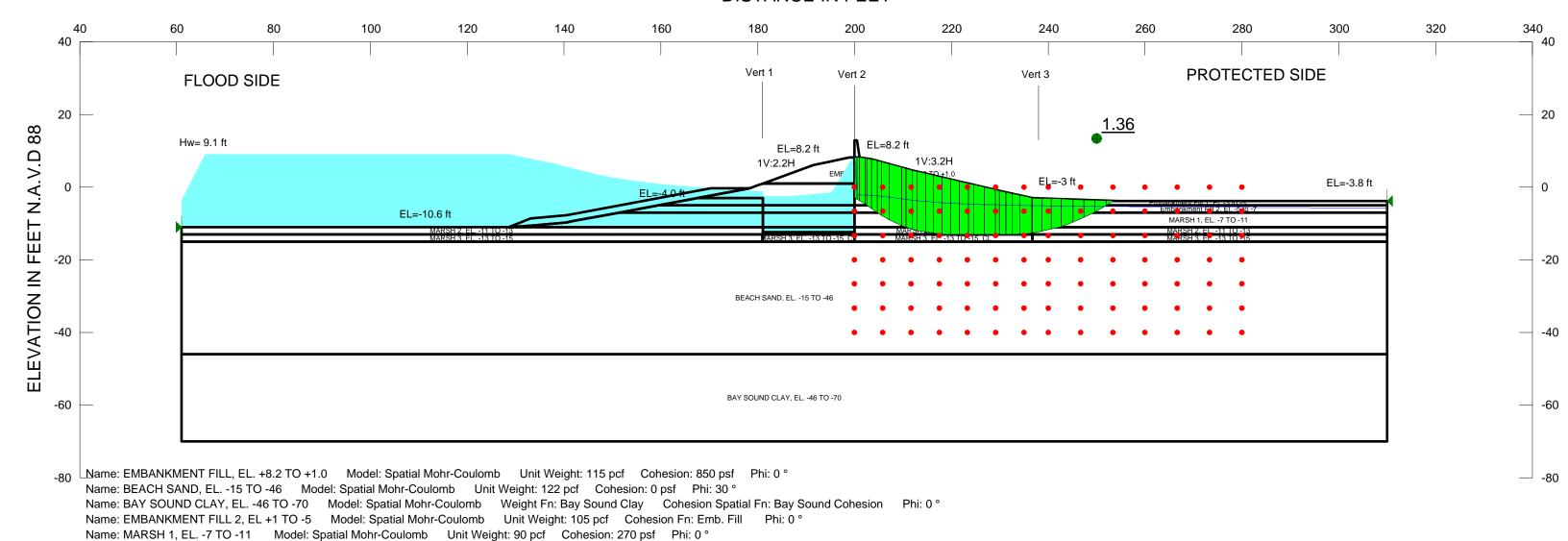


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17th STREET OUTFALL CANAL, REACH 30, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap (Entry/Exit) STA, 626+73 to 634+09 EAST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

Name: Embankment Fill 1, El. -3 to -5

Name: Embankment Fill 2, El. -5 to -7

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: MARSH 2, EL. -11 TO -13 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 180 psf Phi: 0 °

Name: MARSH 3, EL. -13 TO -15 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 285 psf Phi: 0 °

Name: MARSH 1, EL. -7 TO -11 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: MARSH 2, EL. -11 TO -13 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Phi: 0 ° Name: MARSH 3, EL. -13 TO -15 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi: 0 °

Name: EMBANKMENT FILL 3, EL -5 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Emb. Fill 2 Phi: 0 °

Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 800 psf Phi: 0 °

Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 500 psf Phi: 0 °

Name: Slope Stability Gap (Block) File Name: 17thReach30 Modified.gsz Last Edited By: Goltz, Amanda MVS

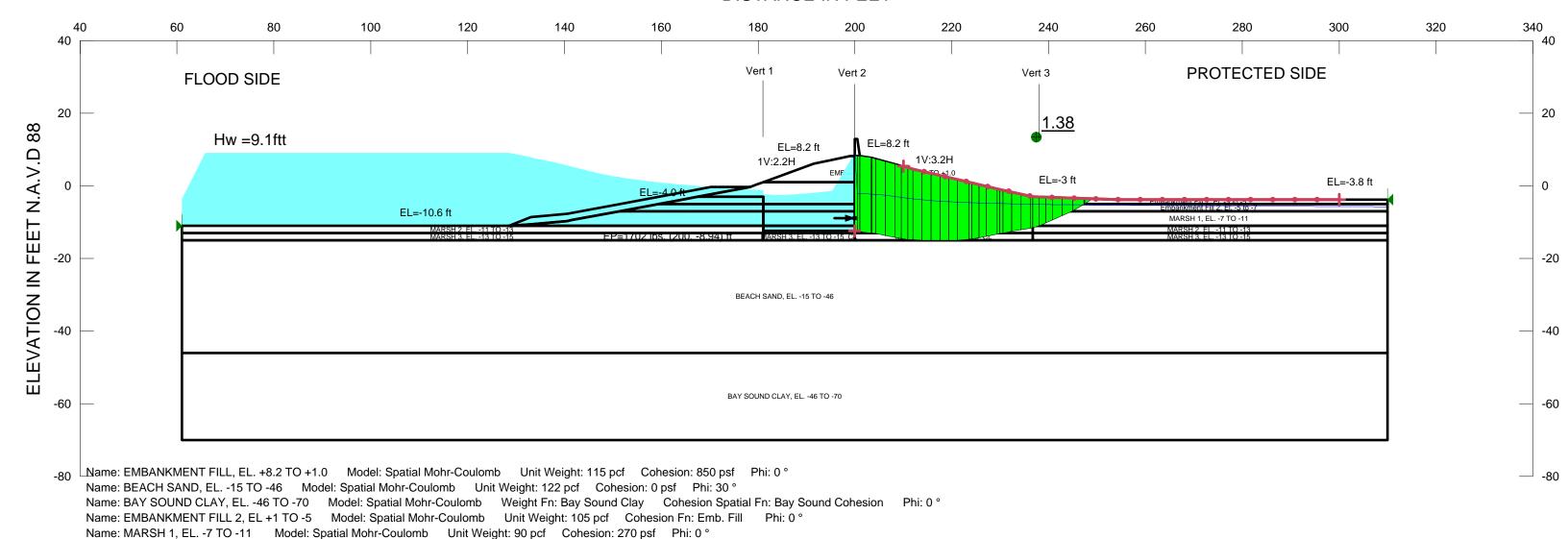




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17th STREET OUTFALL CANAL, REACH 30, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap (Block) STA. 626+73 to 634+09 EAST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

Name: Embankment Fill 1, El. -3 to -5 Name: Embankment Fill 2, El. -5 to -7

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: MARSH 2, EL. -11 TO -13 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 180 psf Phi: 0 °

Name: MARSH 3, EL. -13 TO -15 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 285 psf Phi: 0 ° Name: MARSH 1, EL. -7 TO -11 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1

Name: MARSH 2, EL. -11 TO -13 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Phi: 0 ° Name: MARSH 3, EL. -13 TO -15 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi: 0 °

Name: EMBANKMENT FILL 3, EL -5 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Emb. Fill 2 Phi: 0 °

Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 800 psf Phi: 0 °

Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 500 psf Phi: 0 °

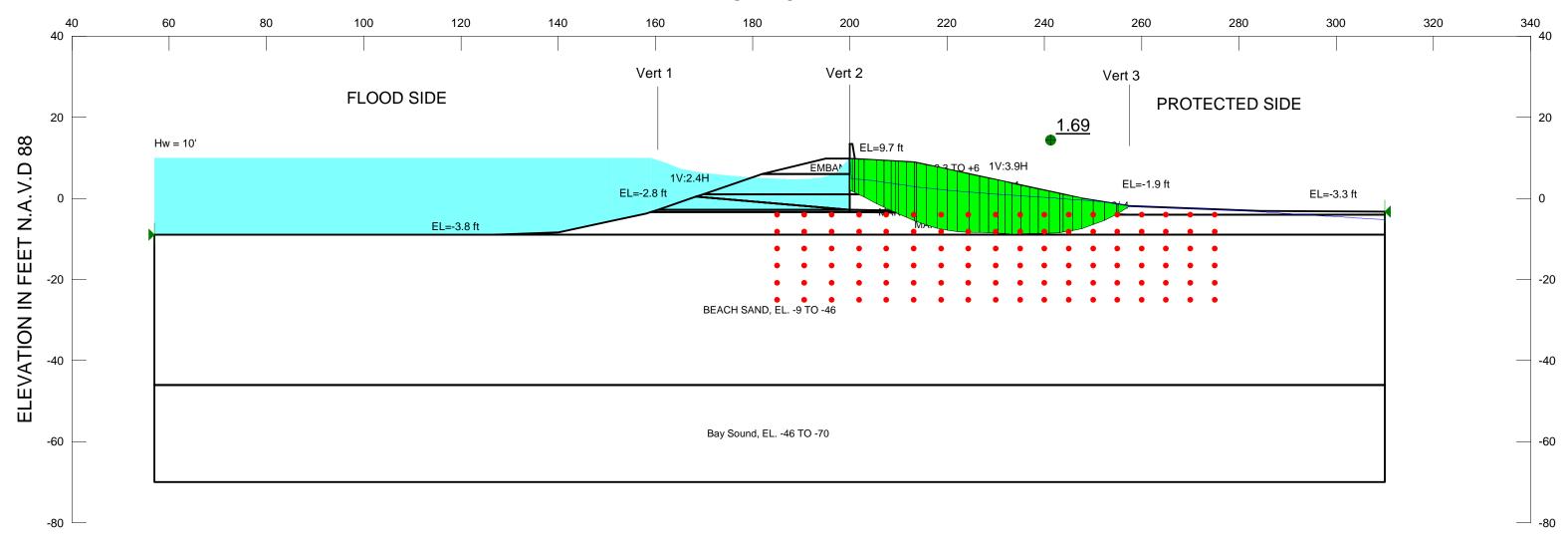
Name: Slope Stability Gap (Entry/Exit) File Name: 17thReach30_Partial Gap.gsz Last Edited By: Goltz, Amanda MVS





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17th STREET OUTFALL CANAL, REACH 30, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap (Entry/Exit) STA. 626+73 to 634+09 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.3 TO +6 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 750 psf Phi: 0 °
Name: MARSH 1, EL. -2.8/-4 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH -2.8 TO -9 Cohesion Fn: MARSH -2.8 to -9 Phi: 0 °
Name: BEACH SAND, EL. -9 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: Bay Sound, EL. -46 TO -70 Model: Montr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

Name: EMBANKMENT FILL 2, EL. +6 TO +1 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 325 psf Phi: 0 ° Name: EMBANKMENT FILL 3, EL. +1 TO -2.8/-4 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 300 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

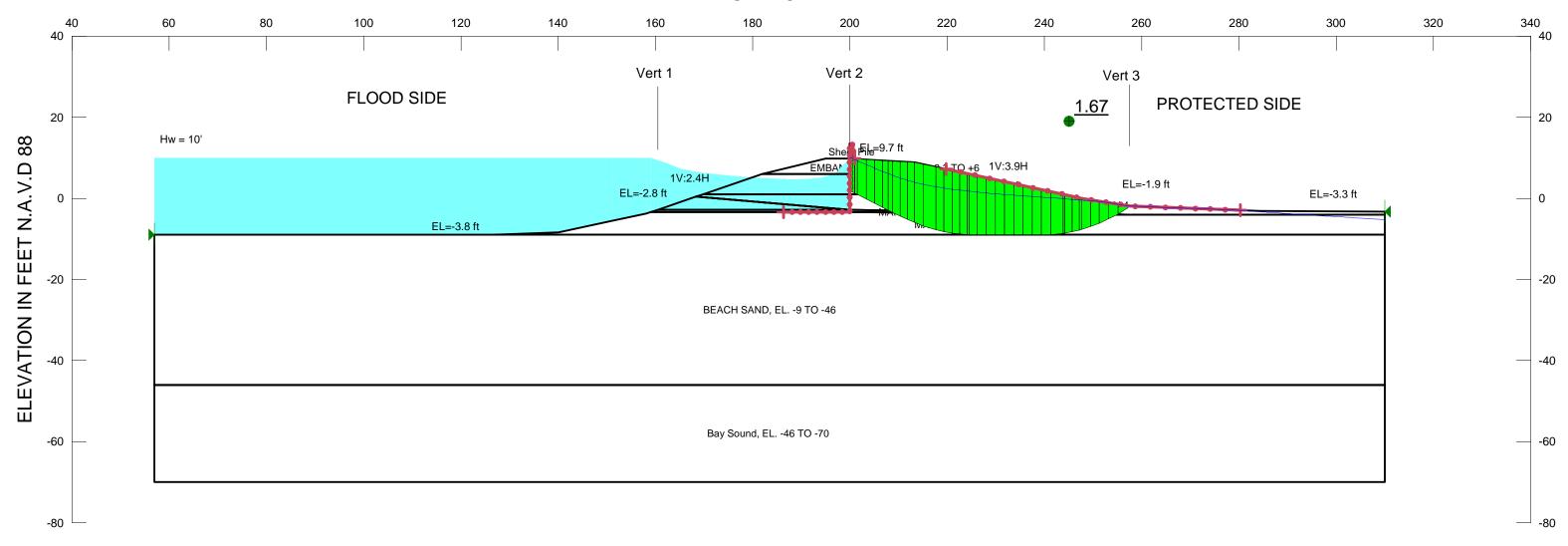
Name: Slope Stability Full Gap (Block) File Name: 17thReach33.gsz Last Edited By: Goltz, Amanda MVS Slip surface on the left block could not be located inside the block grid, therefore the 0.7H criteria was used to find the critical failure.





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17th STREET OUTFALL CANAL, REACH 33, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Full Gap (Block) STA. 643+40 to 658+00 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.3 TO +6 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 750 psf Phi: 0 °

Name: MARSH 1, EL. -2.8/-4 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH -2.8 TO -9 Cohesion Fn: MARSH -2.8 to -9 Phi: 0 °

Name: BEACH SAND, EL. -9 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Bay Sound, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

Name: EMBANKMENT FILL 2, EL. +6 TO +1 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 325 psf Phi: 0 °

Name: EMBANKMENT FILL 3, EL. +1 TO -2.8/-4 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 300 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Full Gap (Entry & Exit) File Name: 17thReach33.gsz Last Edited By: Goltz, Amanda MVS

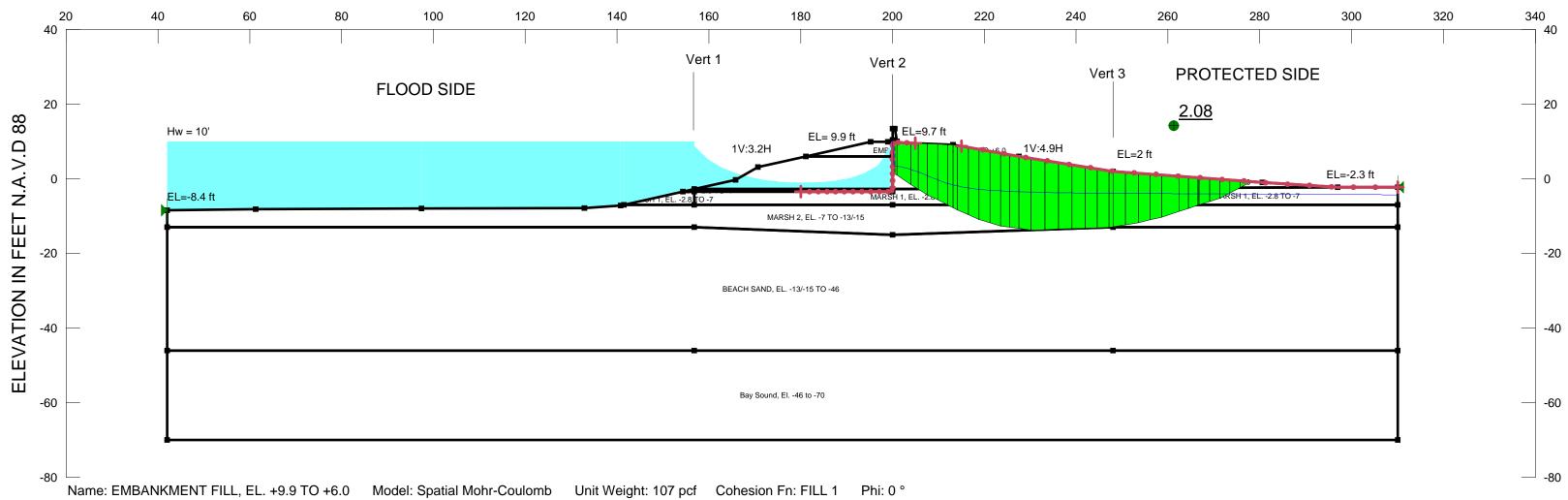




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17th STREET OUTFALL CANAL, REACH 33, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Full Gap (Entry & Exit) STA. 643+40 to 658+00 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.9 TO +6.0 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: FILL 1 Phi: 0 °
Name: MARSH 1, EL. -2.8 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: MARSH 1 Phi: 0 °
Name: BEACH SAND, EL. -13/-15 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °
Name: MARSH 2, EL. -7 TO -13/-15 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Fn: MARSH 2 Phi: 0 °
Name: EMBANKMENT FILL 2, EL. +6 TO -2.8 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: FILL 2 Phi: 0 °
Name: Bay Sound, El. -46 to -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °
Name: EMBANKMENT FILL EL. +2.0 TO -2.3 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 650 psf Phi: 0 °

GENERAL NOTES

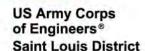
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Full Gap (Entry & Exit)

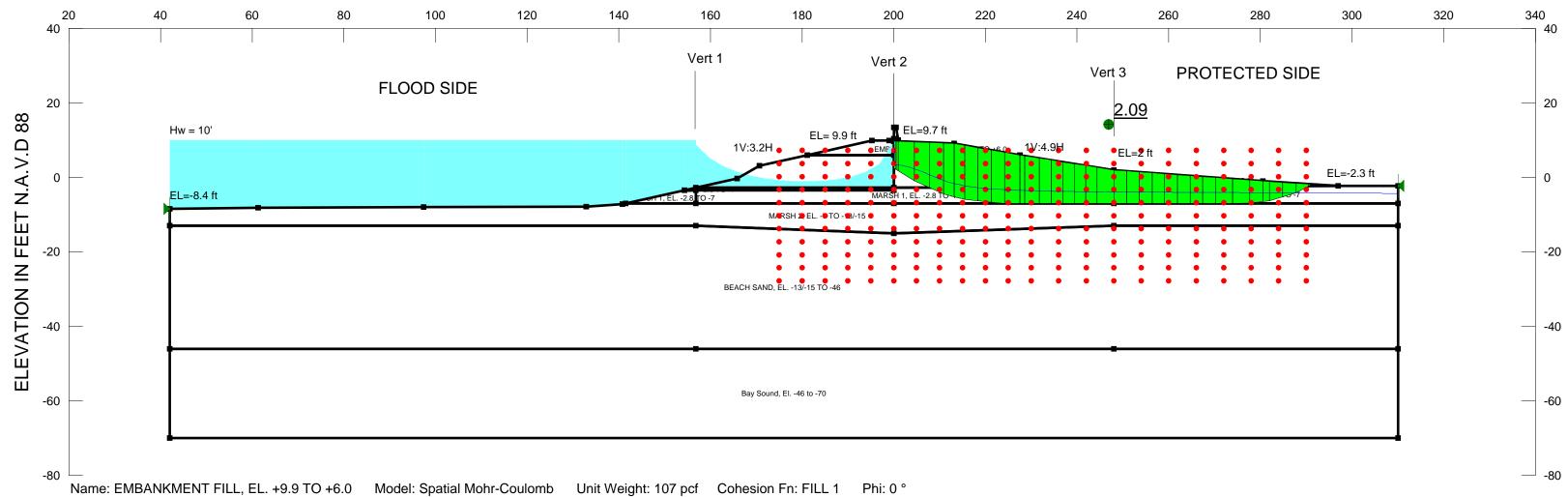
File Name: 17thReach34.gsz Last Edited By: Goltz, Amanda MVS





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17th STREET OUTFALL CANAL, REACH 34, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Full Gap (Entry & Exit) STA. 658+00- 662+87 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -2.8 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: BEACH SAND, EL. -13/-15 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: MARSH 2, EL. -7 TO -13/-15 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Fn: MARSH 2 Phi: 0 ° Name: EMBANKMENT FILL 2, EL. +6 TO -2.8 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: FILL 2 Phi: 0 ° Name: Bay Sound, El. -46 to -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 ° Name: EMBANKMENT FILL EL. +2.0 TO -2.3 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 650 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Full Gap (block) File Name: 17thReach34.gsz Last Edited By: Goltz, Amanda MVS

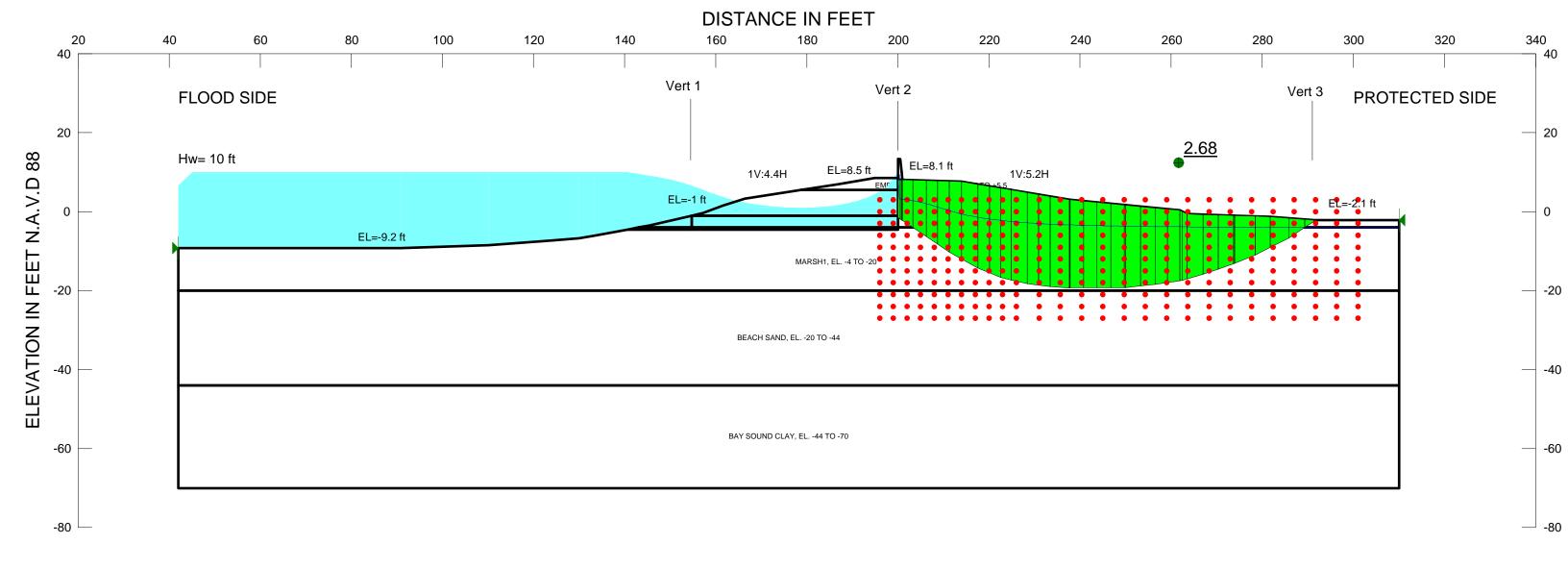




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17th STREET OUTFALL CANAL, REACH 34, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Full Gap (block) STA. 658+00-662+87 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.5 TO +5.5 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 700 psf Phi: 0 °

Name: EMBANKMENT FILL 3, EL. -1 TO -4 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Embankment Fill 3 Phi: 0 °

Name: BEACH SAND, EL. -20 TO -44 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -44 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0°

Name: MARSH1, EL. -4 TO -20 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 ° Name: EMBANKMENT FILL2, EL. +5.5 TO -1 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Fn: FILL 2 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap Block File Name: 17thReach35.gsz Last Edited By: Goltz, Amanda MVS

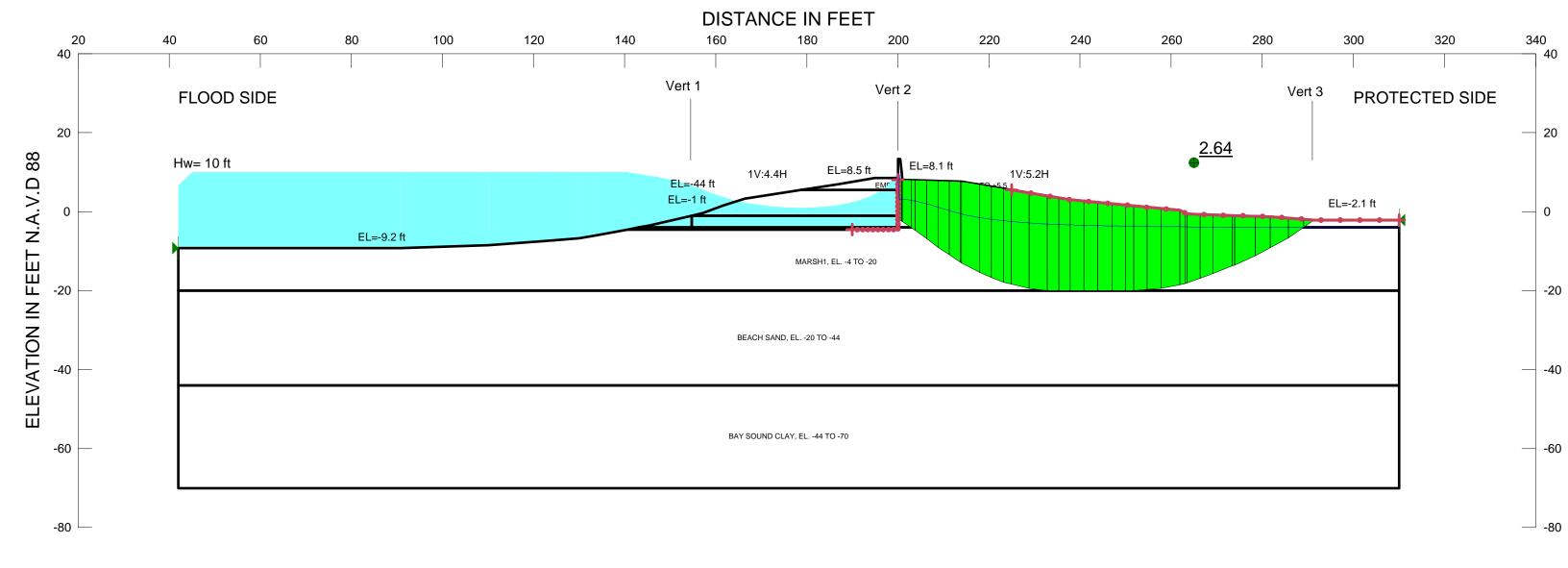




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17th STREET OUTFALL CANAL, REACH 35, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap Block STA. 662+87 to 670+63 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.5 TO +5.5 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 700 psf Phi: 0 °

Name: EMBANKMENT FILL 3, EL. -1 TO -4 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Embankment Fill 3 Phi: 0°

Name: BEACH SAND, EL. -20 TO -44 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -44 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0°

Name: MARSH1, EL. -4 TO -20 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 ° Name: EMBANKMENT FILL2, EL. +5.5 TO -1 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Fn: FILL 2 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability Gap Entry/Exit File Name: 17thReach35.gsz Last Edited By: Goltz, Amanda MVS

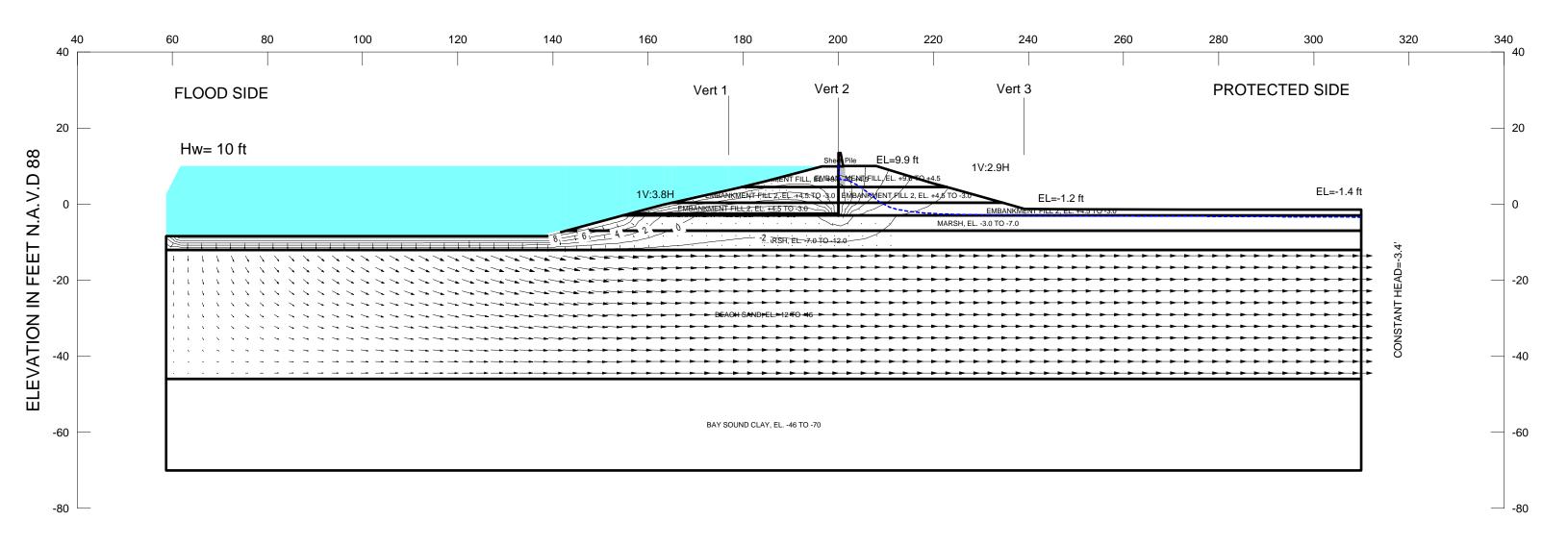




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17th STREET OUTFALL CANAL, REACH 35, PROTECTED SIDE STABILITY ANALYSIS, CASE: Slope Stability Gap Entry/Exit STA. 662+87 to 670+63 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.6 TO +4.5 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH, EL. -3.0 TO -7.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -12 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH, EL. -7.0 TO -12.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (Gap) File Name: 17thReach1.gsz Last Edited By: Goltz, Amanda MVS

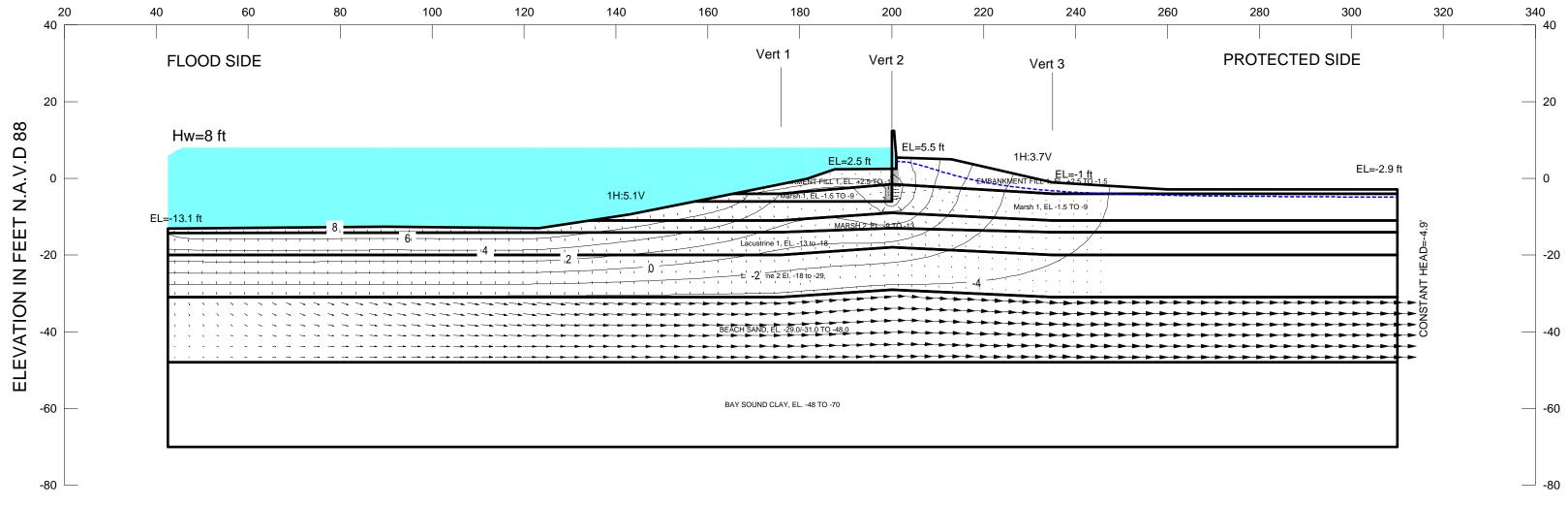




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17th STREET OUTFALL CANAL, REACH 1, PROTECTED SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (Gap) STA. 658+00 - 663+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 1, EL. +2.5 TO -1.5 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH 2, EL. -9 TO -13 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -29.0/-31.0 TO -48.0 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -48 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Marsh 1, EL -1.5 TO -9 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: Lacustrine 1, EL. -13 to -18 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: Lacustrine 2 El. -18 to -29 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

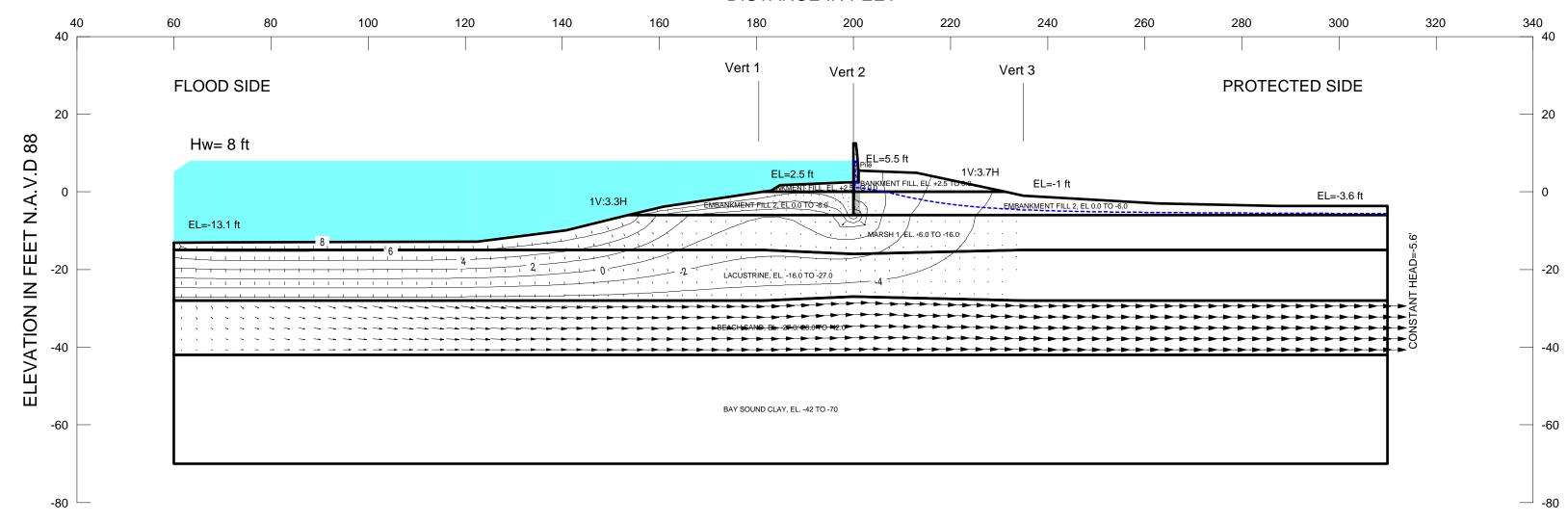
Name: Seepage Analysis (Gap) File Name: 17thReach10.gsz Last Edited By: Goltz, Amanda MVS





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17th STREET OUTFALL CANAL, REACH 10, PROTECTED SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (Gap) STA. 593+00 - 596+05 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.5 TO 0.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: MARSH 1, EL. -6.0 TO -16.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: BEACH SAND, EL. -27.0/-28.0 TO -42.0 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1
Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: LACUSTRINE, EL. -16.0 TO -27.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

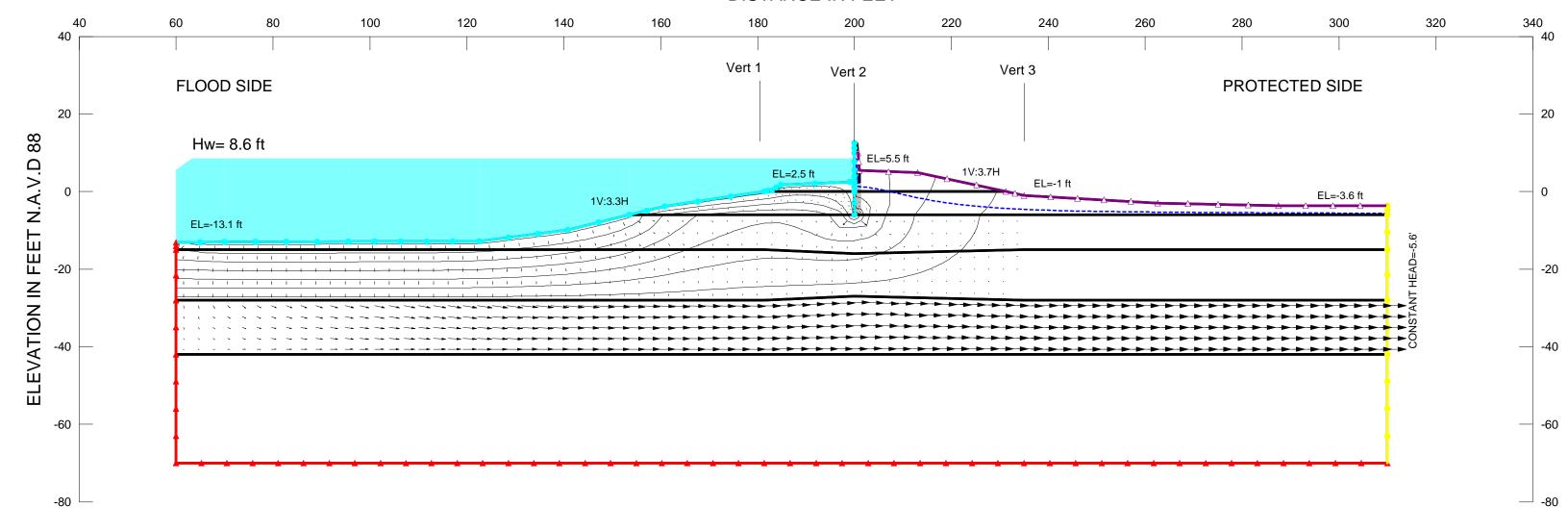
Name: Seepage Analysis (Gap) File Name: 17thReach11.gsz Last Edited By: Goltz, Amanda MVS





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17th STREET OUTFALL CANAL, REACH 11, PROTECTED SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (Gap) STA. 596+05 to 609+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.5 TO 0.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: MARSH 1, EL. -6.0 TO -16.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: BEACH SAND, EL. -27.0/-28.0 TO -42.0 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1
Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: LACUSTRINE, EL. -16.0 TO -27.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (Gap) File Name: 17thReach11.gsz Last Edited By: Goetz, Ryan MVS

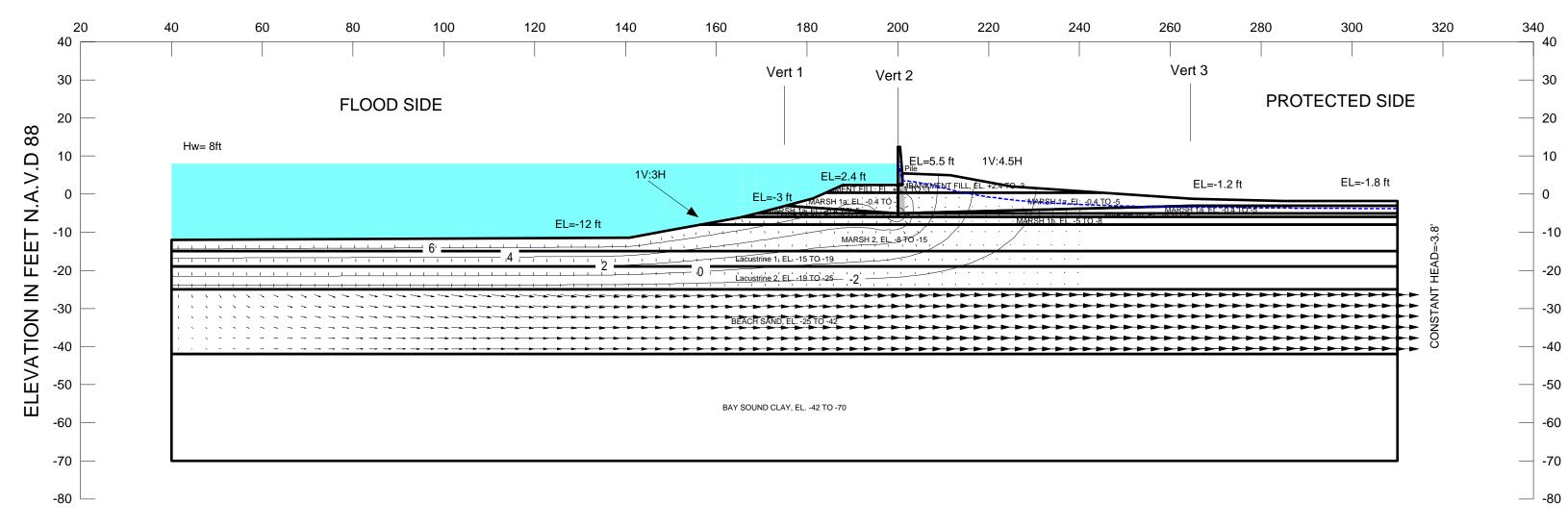






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17th STREET OUTFALL CANAL, REACH 11, PROTECTED SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (Gap) STA. 596+05 to 609+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.4 TO -3 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH 1b, EL. -5 TO -8 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: BEACH SAND, EL. -25 TO -42 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: MARSH 2, EL. -8 TO -15 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: Lacustrine 1, EL. -15 TO -19 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: Lacustrine 2, EL. -19 TO -25 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: MARSH 1a, EL. -0.4 TO -5 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

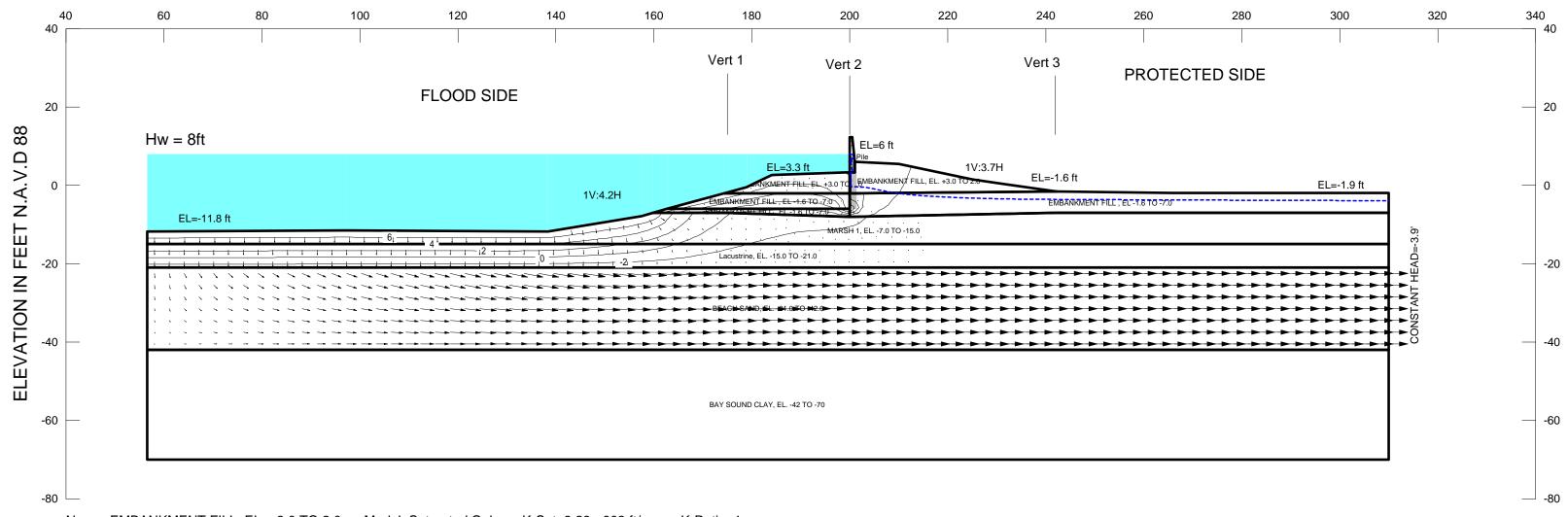
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17th STREET OUTFALL CANAL, REACH 12, PROTECTED SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (Gap) STA. 609+00 to 614+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +3.0 TO 2.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -21.0 TO -42.0 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL, EL -1.6 TO -7.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH 1, EL. -7.0 TO -15.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Lacustrine, EL. -15.0 TO -21.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (Gap) File Name: 17thReach13.gsz Last Edited By: Redell, Chris MVS

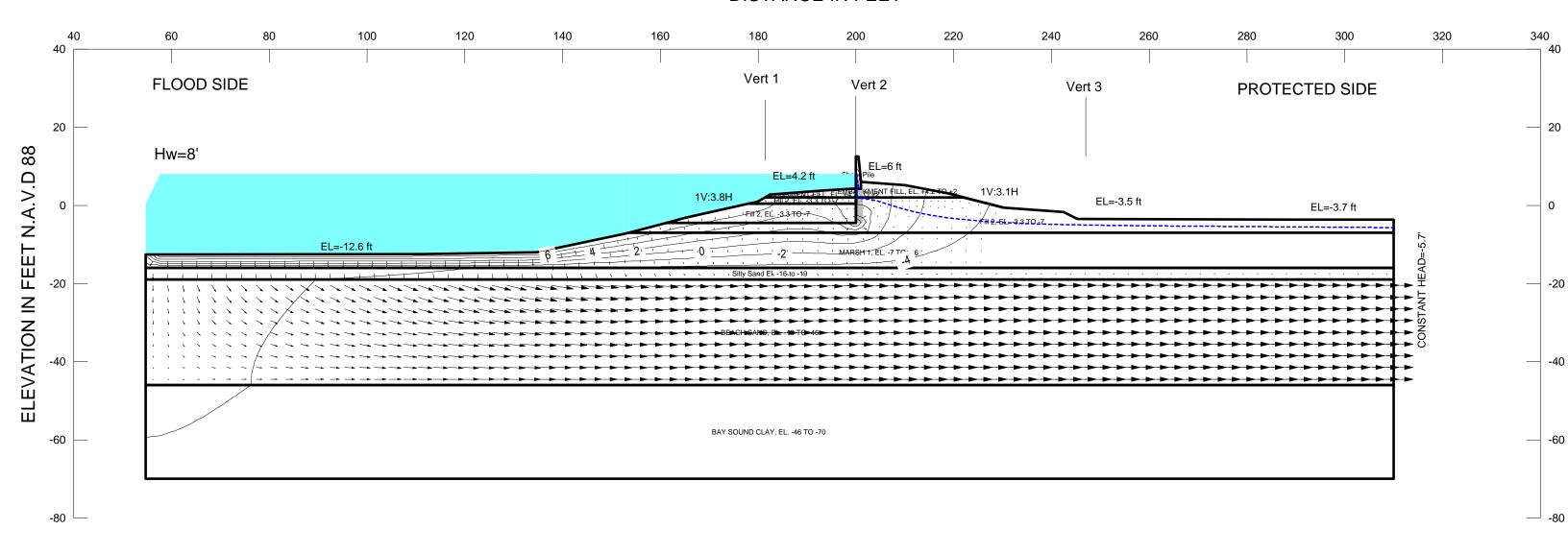




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17th STREET OUTFALL CANAL, REACH 13, PROTECTED SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (Gap) STA. 614+00 to 617+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +4.2 TO +2 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -19 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: Fill 2, EL. -3.3 TO -7 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: MARSH 1, EL. -7 TO -16 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Silty Sand El. -16 to -19 Model: Saturated Only K-Sat: 2.3e-005 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (Gap) File Name: 17thReach14.gsz Last Edited By: Redell, Chris MVS

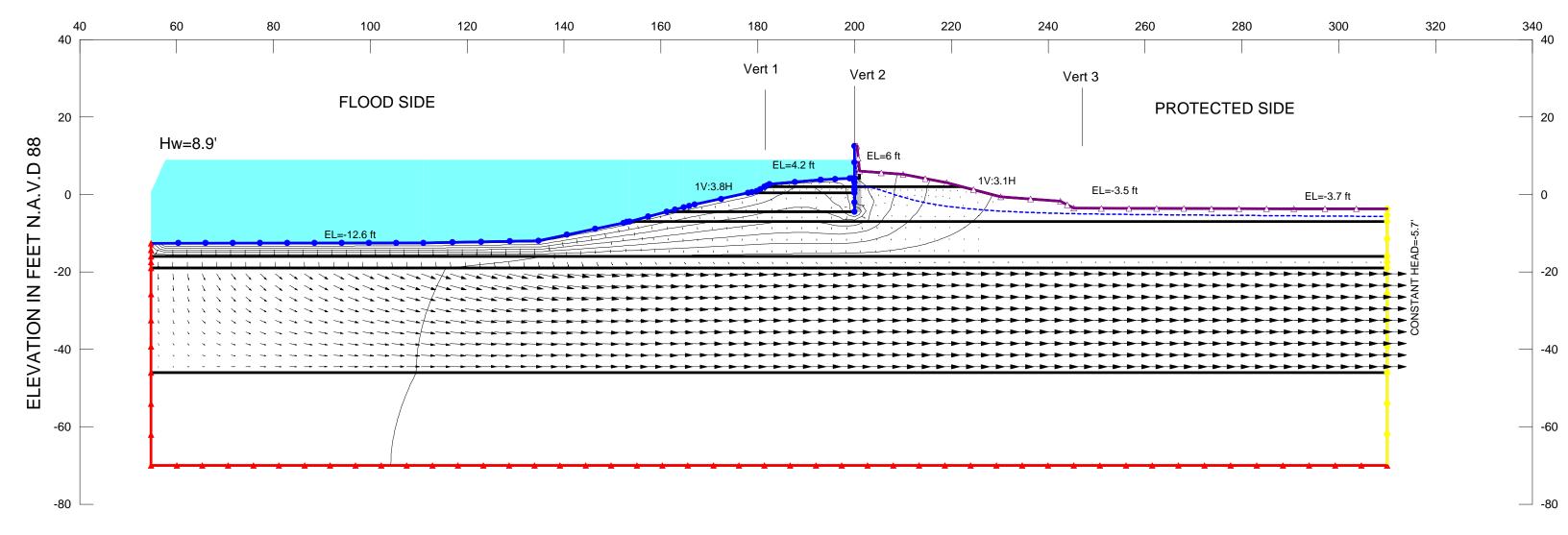




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17th STREET OUTFALL CANAL, REACH 14, PROTECTED SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (Gap) STA. 617+00 to 625+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +4.2 TO +2 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -19 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: Fill 2, EL. -3.3 TO -7 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: MARSH 1, EL. -7 TO -16 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Silty Sand El. -16 to -19 Model: Saturated Only K-Sat: 2.3e-005 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (Gap) File Name: 17thReach14.gsz Last Edited By: Goltz, Amanda MVS

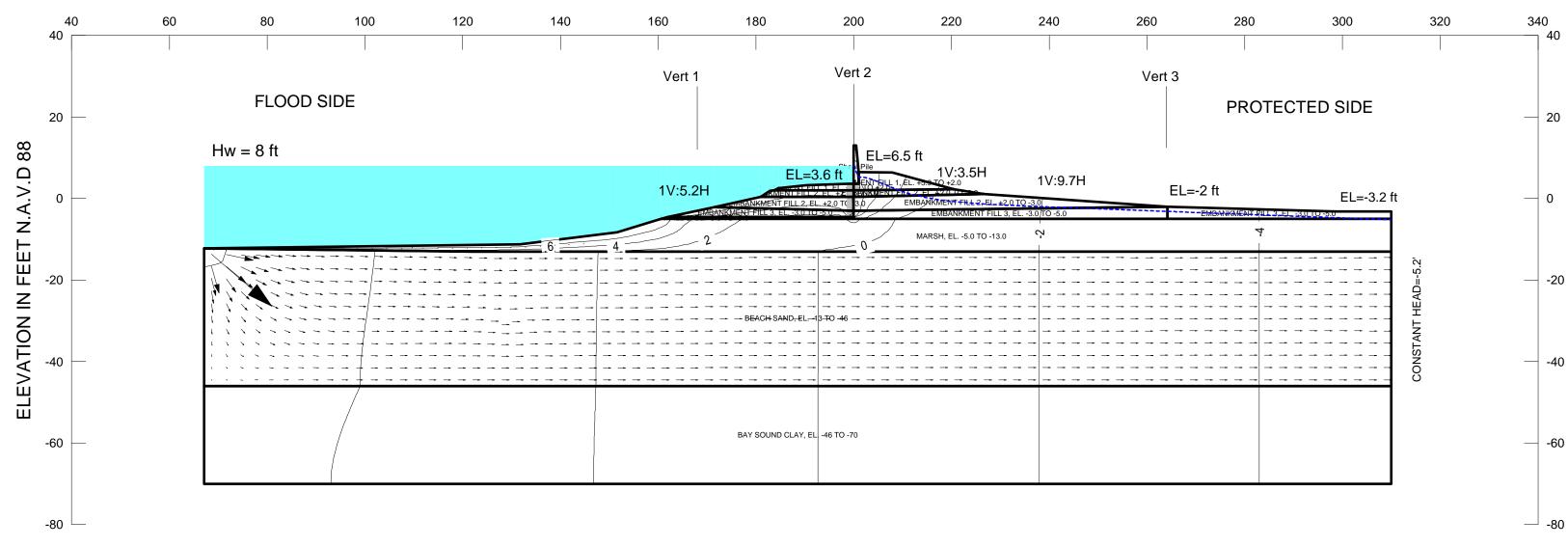




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17th STREET OUTFALL CANAL, REACH 14, PROTECTED SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (Gap) STA. 617+00 to 625+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 1, EL. +5.9 TO +2.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH, EL. -5.0 TO -13.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -13 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 2, EL. +2.0 TO -3.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: EMBANKMENT FILL 3, EL. -3.0 TO -5.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (Gap) File Name: 17thReach15A.gsz Last Edited By: Redell, Chris MVS

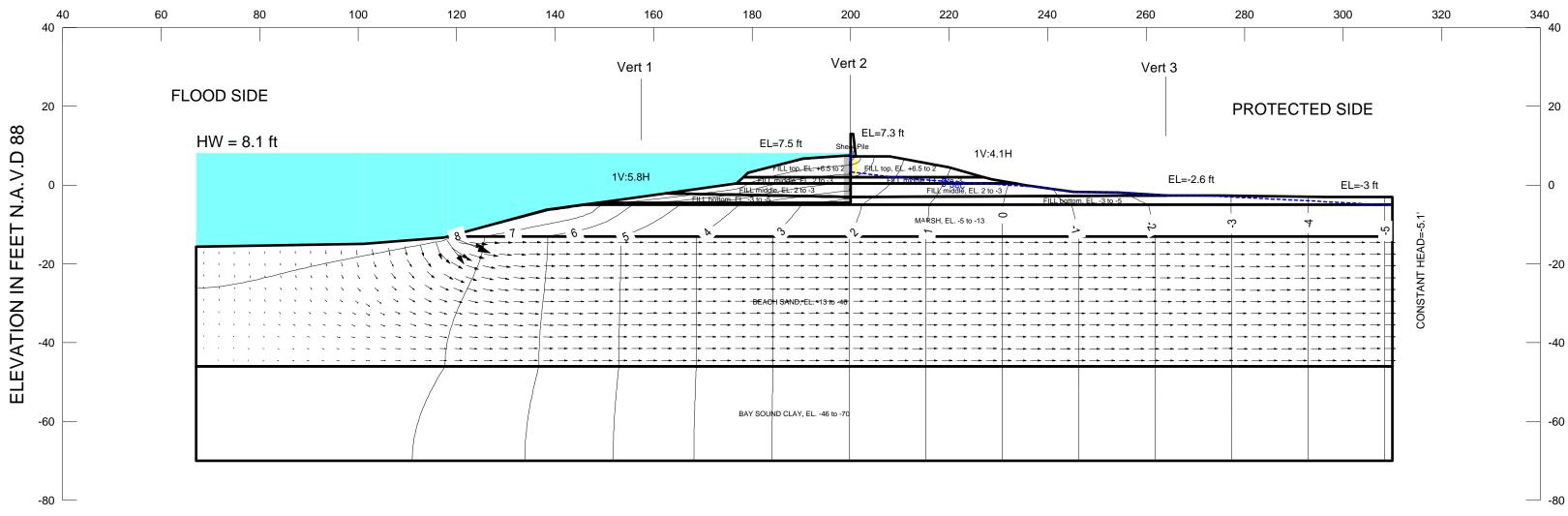




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17th STREET OUTFALL CANAL, REACH 15A, PROTECTED SIDE STABILITY ANALYSIS. CASE: Seepage Analysis (Gap) STA. 626+56 to 635+00 WEST ORLEANS PARISH, LOUISIANA



Name: FILL top, EL. +6.5 to 2 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH, EL. -5 to -13 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -13 to -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY, EL. -46 to -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: FILL middle, EL. 2 to -3 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: FILL bottom, EL. -3 to -5 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (Gap) File Name: 17thReach15B.gsz Last Edited By: Redell, Chris MVS

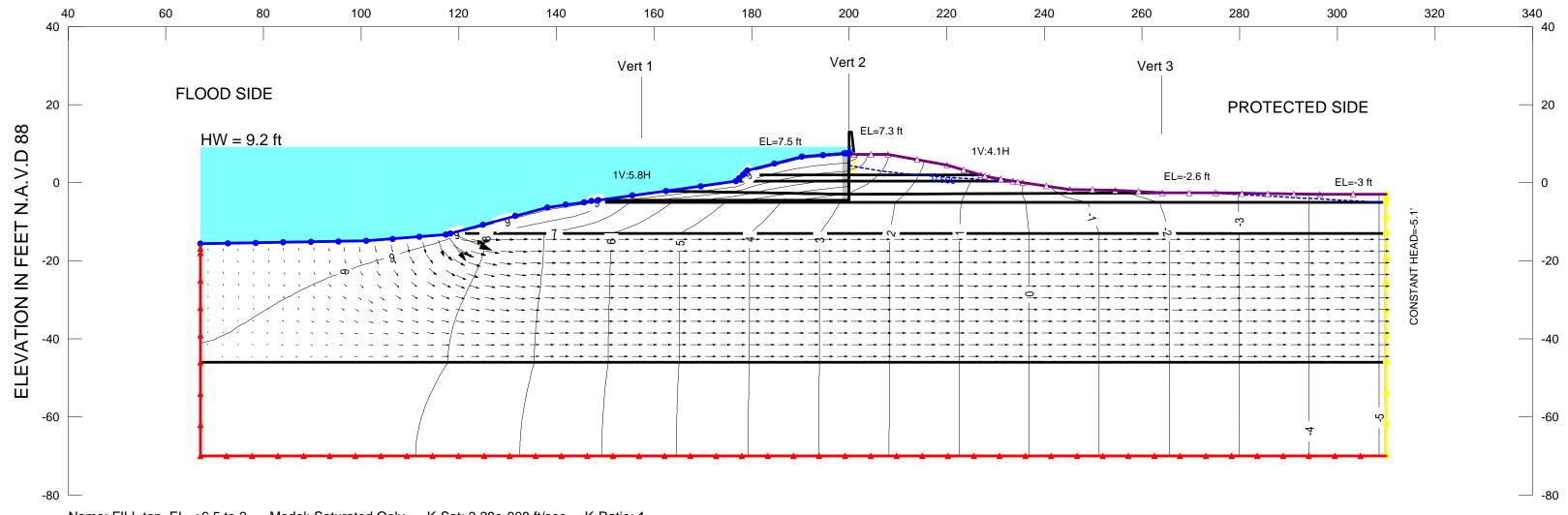




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17th STREET OUTFALL CANAL, REACH 15B, PROTECTED SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (Gap) STA. 635+00 to 639+06 WEST ORLEANS PARISH, LOUISIANA



Name: FILL top, EL. +6.5 to 2 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: MARSH, EL. -5 to -13 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -13 to -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -46 to -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: FILL middle, EL. 2 to -3 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: FILL bottom, EL. -3 to -5 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (Gap) File Name: 17thReach15B.gsz Last Edited By: Goetz, Ryan MVS

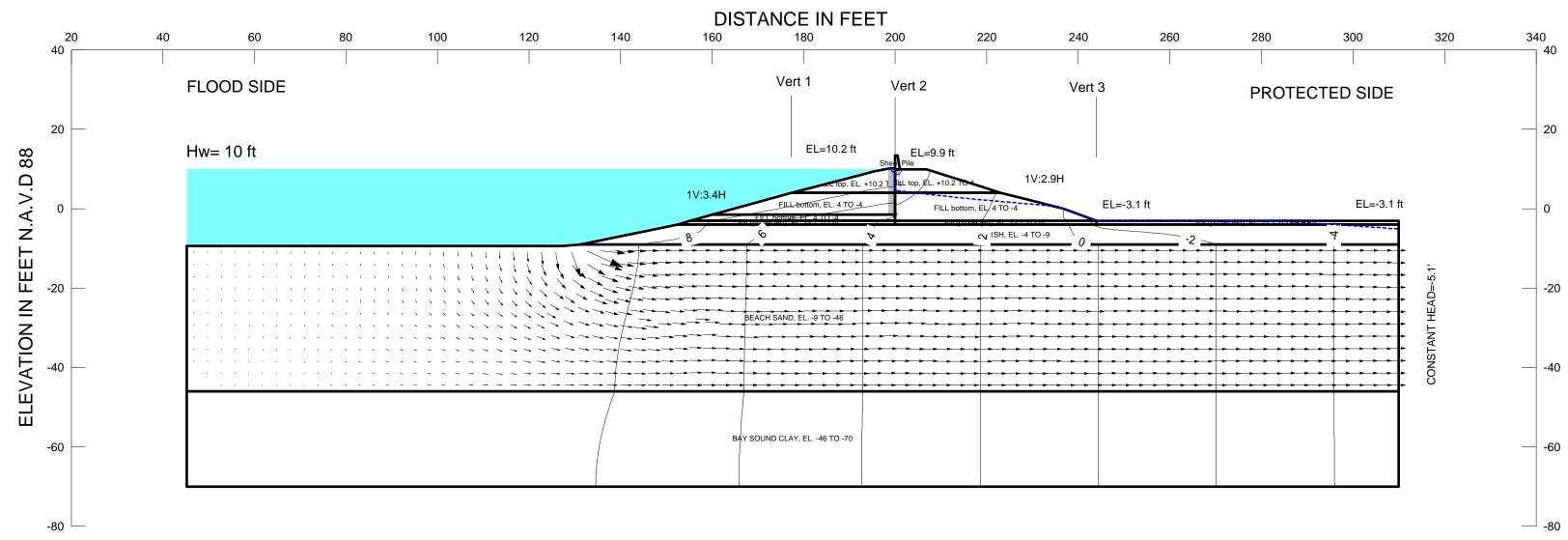




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17th STREET OUTFALL CANAL, REACH 15B, PROTECTED SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (Gap) STA. 635+00 to 639+06 WEST ORLEANS PARISH, LOUISIANA



Name: FILL top, EL. +10.2 TO 4 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: MARSH, EL. -4 TO -9 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: BEACH SAND, EL. -9 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1
Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: Fill (protected), EL. -3.1 TO -4 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: FILL bottom, EL. 4 TO -4 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (Global) File Name: 17thReach16.gsz Last Edited By: Redell, Chris MVS

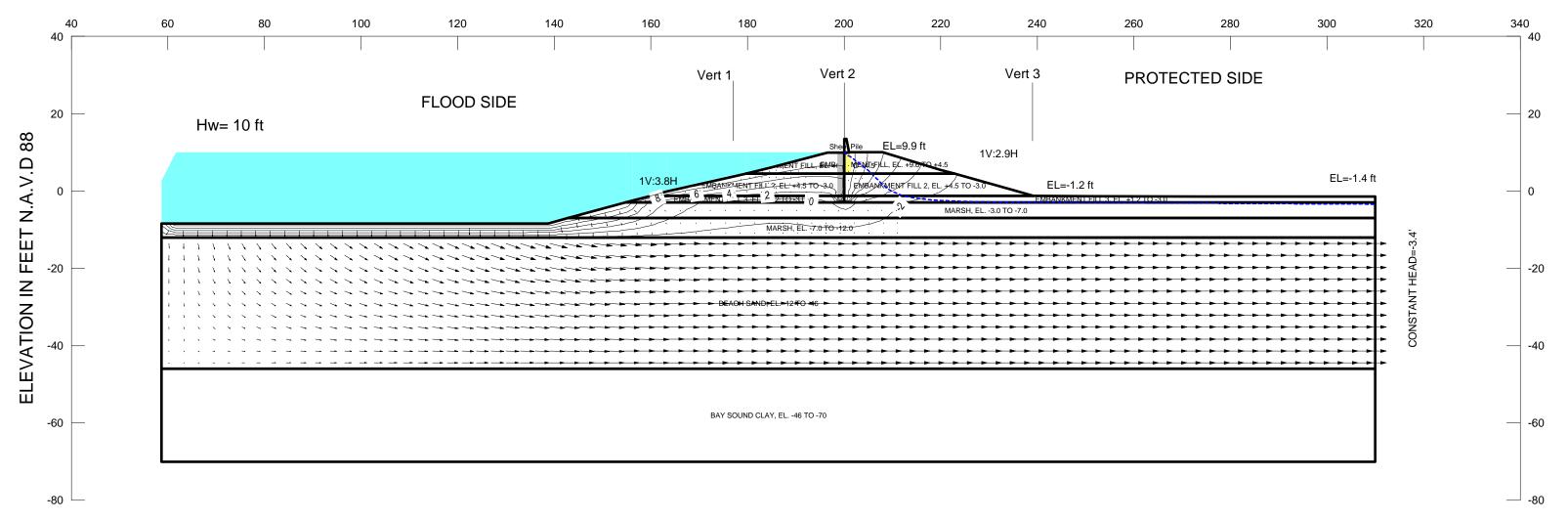


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17th STREET OUTFALL CANAL, REACH 16, PROTECTED SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (Global) STA. 641+85 - 658+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.6 TO +4.5 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH, EL. -3.0 TO -7.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -12 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: EMBANKMENT FILL 3, EL. +1.2 TO -3.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH, EL. -7.0 TO -12.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (Gap) File Name: 17thReach17.gsz Last Edited By: Redell, Chris MVS

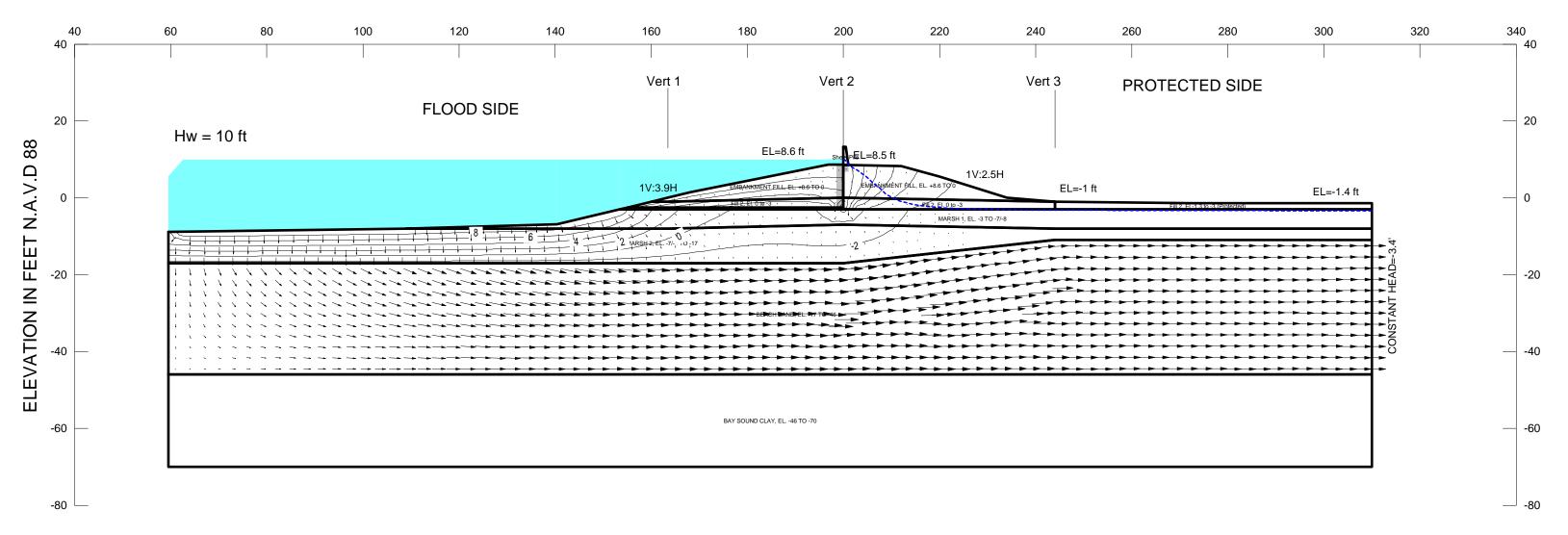




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17th STREET OUTFALL CANAL, REACH 17, PROTECTED SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (Gap) STA. 658+00 - 663+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.6 TO 0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: MARSH 1, EL. -3 TO -7/-8 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -17 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: MARSH 2, EL. -7/-8 TO -17 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Fill 2, El. 0 to -3 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Fill 2, El -1.3 to -3 (Protected) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (Gap) File Name: 17thReach18.gsz Last Edited By: Redell, Chris MVS

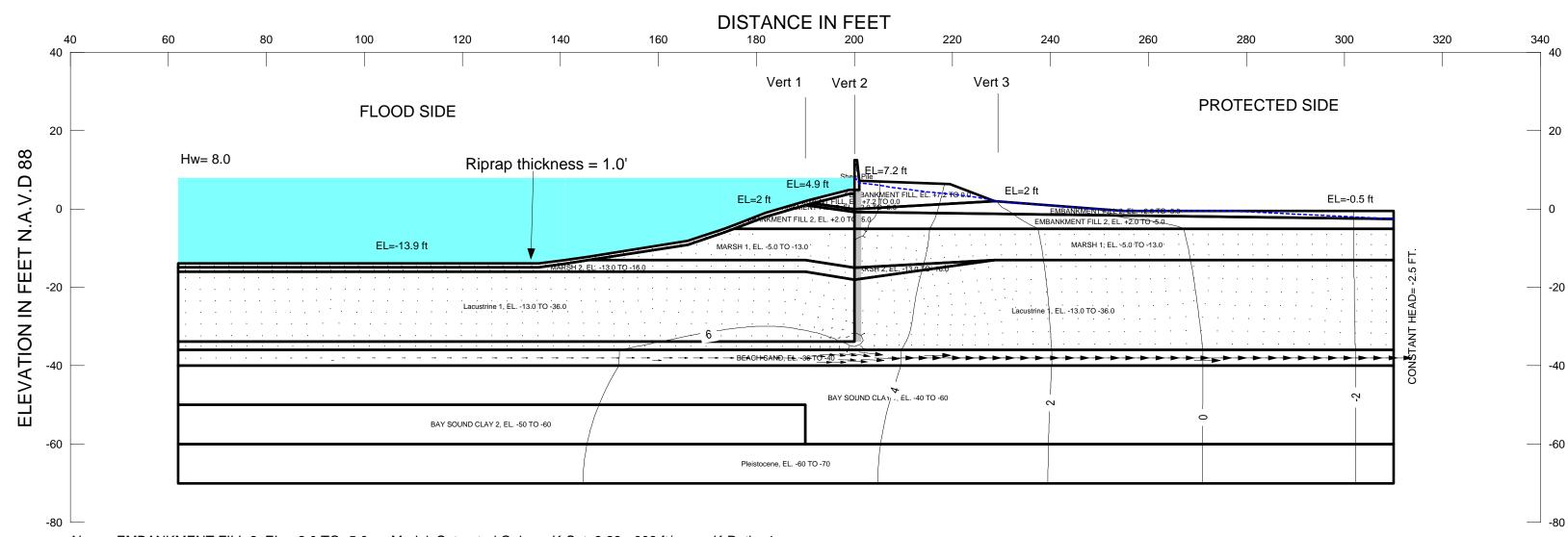




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17th STREET OUTFALL CANAL, REACH 18, PROTECTED SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (Gap) STA. 663+00 to 669+36 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL. +2.0 TO -5.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: MARSH 1, EL. -5.0 TO -13.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -36 TO -40 Model: Saturated Only K-Sat: 2.3e-005 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY 1, EL. -40 TO -60 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: Lacustrine 1, EL. -13.0 TO -36.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Pleistocene, EL. -60 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL, EL. +7.2 TO 0.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH 2, EL. -13.0 TO -16.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY 2, EL. -50 TO -60 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Rip Rap Model: Saturated Only K-Sat: 0.00023 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

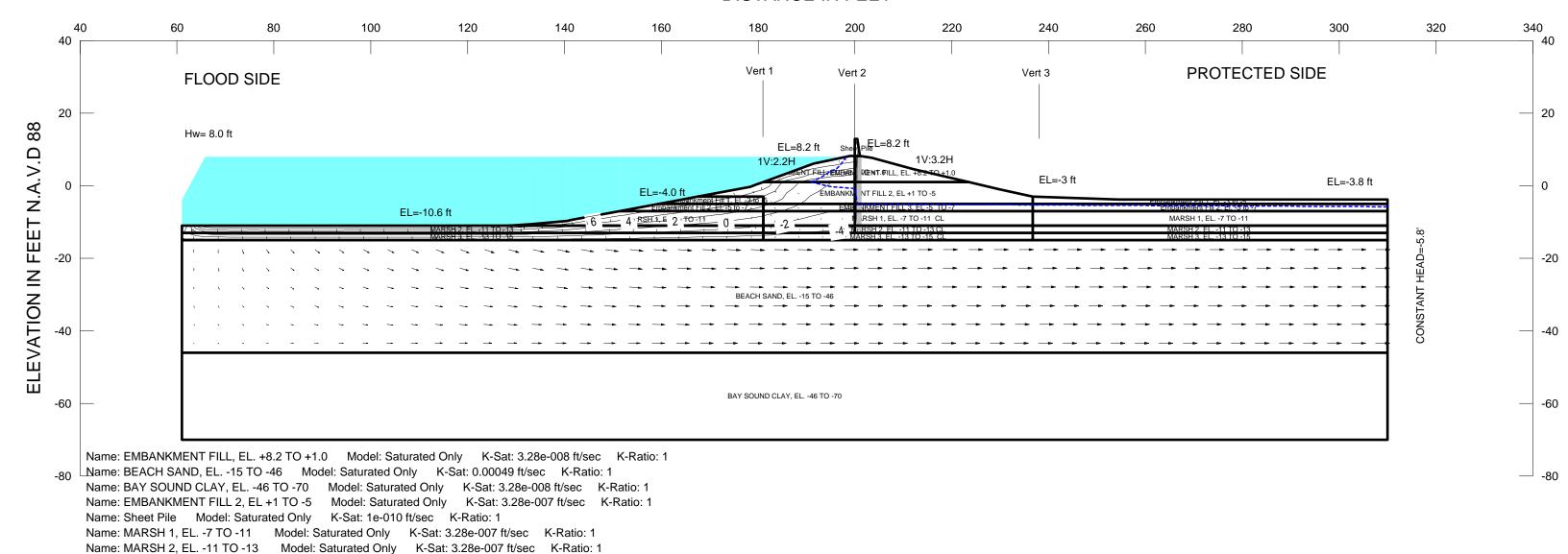
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17th STREET OUTFALL CANAL, REACH 19, PROTECTED SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (Gap) STA. Closure to 552+17 EAST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

Name: Embankment Fill 1, El. -3 to -5 Name: Embankment Fill 2, El. -5 to -7

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: MARSH 1, EL. -7 TO -11 CL Model: Saturated Only

Name: MARSH 2, EL. -11 TO -13 CL Model: Saturated Only

Name: MARSH 3, EL. -13 TO -15 CL Model: Saturated Only

Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: MARSH 3, EL. -13 TO -15 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 3, EL -5 TO -7 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Steady-State Seepage Global File Name: 17thReach30.gsz Last Edited By: Goltz, Amanda MVS



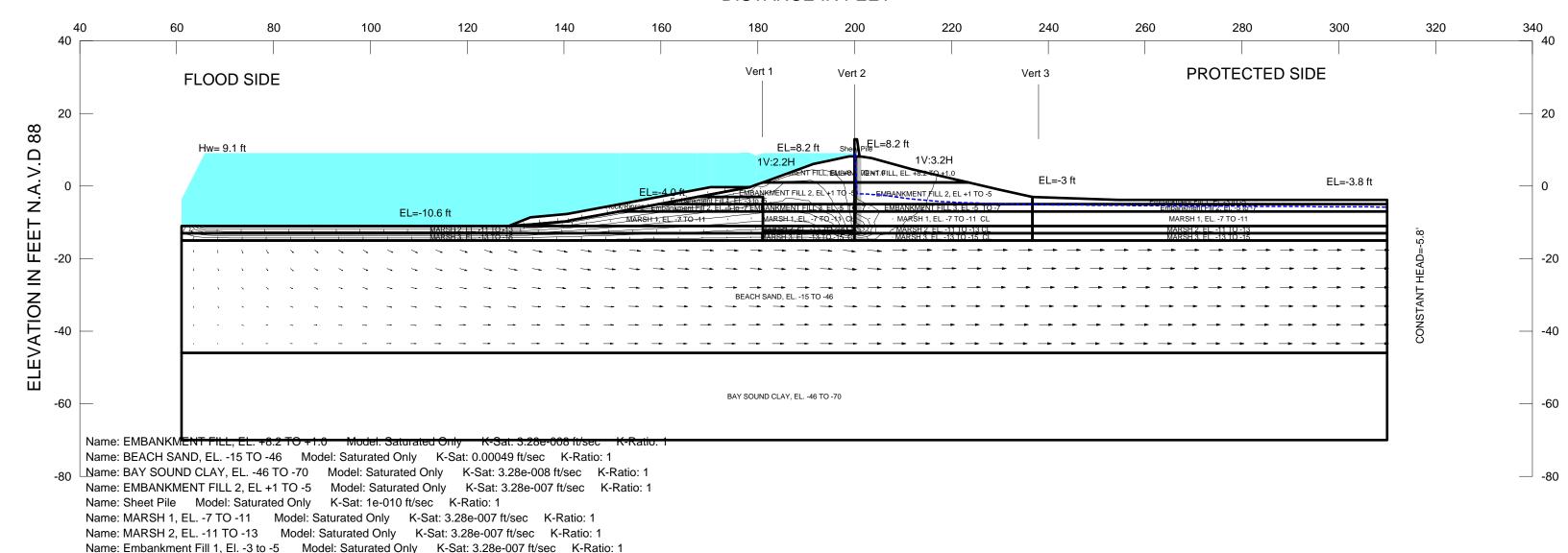




Saint Louis District New Orleans District

17th STREET OUTEAU CANAL REACH 30

17th STREET OUTFALL CANAL, REACH 30, PROTECTED SIDE STABILITY ANALYSIS, CASE: Steady-State Seepage Global STA. 626+73 to 634+09 EAST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

Name: Embankment Fill 2, El. -5 to -7

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: MARSH 3, EL. -13 TO -15 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: MARSH 1, EL. -7 TO -11 CL Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: MARSH 3, EL. -13 TO -15 CL Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: EMBANKMENT FILL 3, EL -5 TO -7 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Rock/Riprap Model: Saturated Only K-Sat: 0.00023 ft/sec K-Ratio: 1

Name: MARSH 2, EL. -11 TO -13 CL Model: Saturated Only

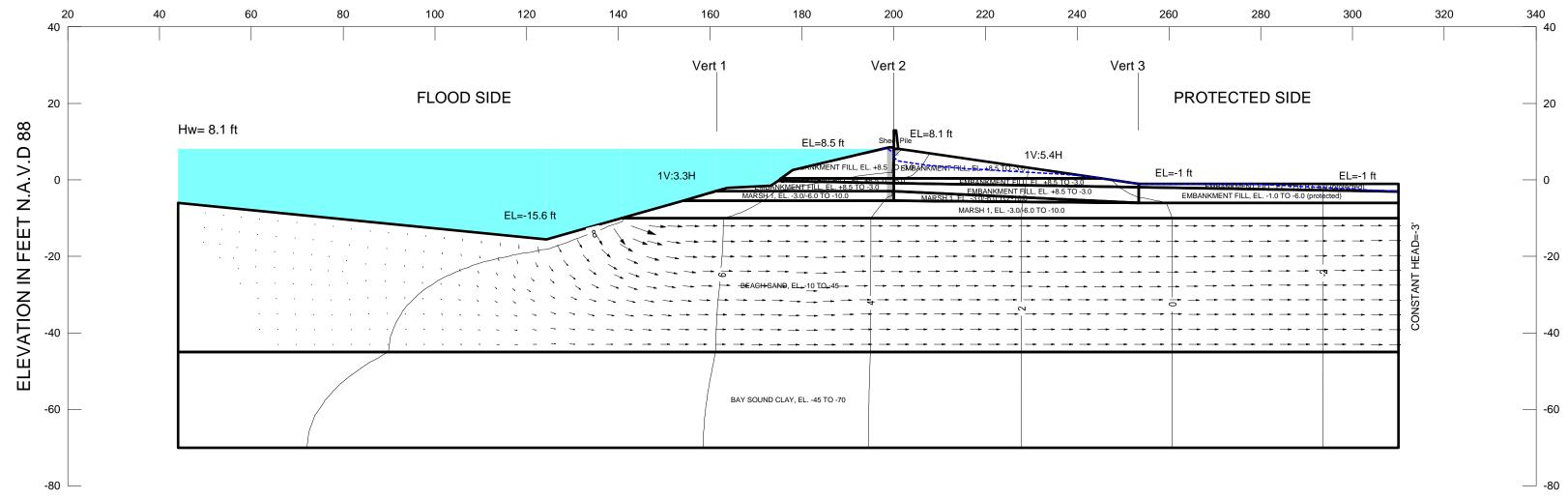
Name: Steady-State Seepage Global File Name: 17thReach30 Modified.gsz Last Edited By: Goltz, Amanda MVS



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17th STREET OUTFALL CANAL, REACH 30, PROTECTED SIDE STABILITY ANALYSIS, CASE: Steady-State Seepage Global STA, 626+73 to 634+09 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.5 TO -3.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: MARSH 1, EL. -3.0/-6.0 TO -10.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -10 TO -45 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL, EL. -1.0 TO -6.0 (protected) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (Global) File Name: 17thReach31.gsz Last Edited By: Goltz, Amanda MVS

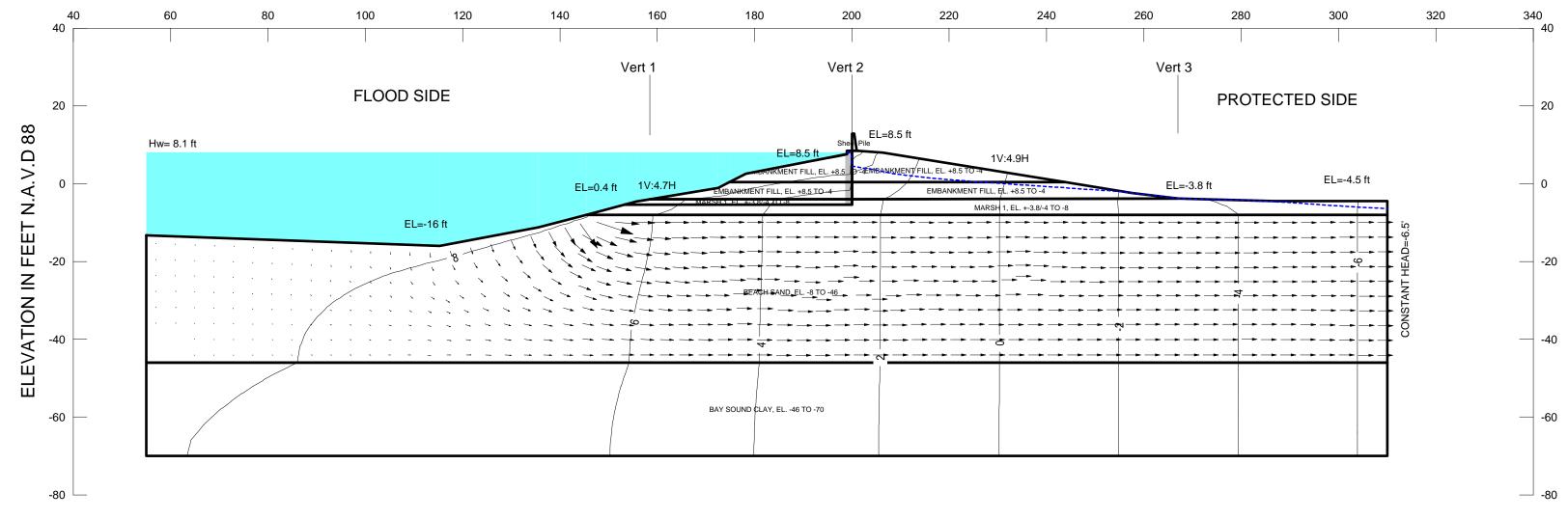




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17th STREET OUTFALL CANAL, REACH 31, PROTECTED SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (Global) STA. 634+09 to 637+00 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.5 TO -4 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: MARSH 1, EL. +-3.8/-4 TO -8 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: BEACH SAND, EL. -8 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1
Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (Global) File Name: 17thReach32.gsz Last Edited By: Redell, Chris MVS

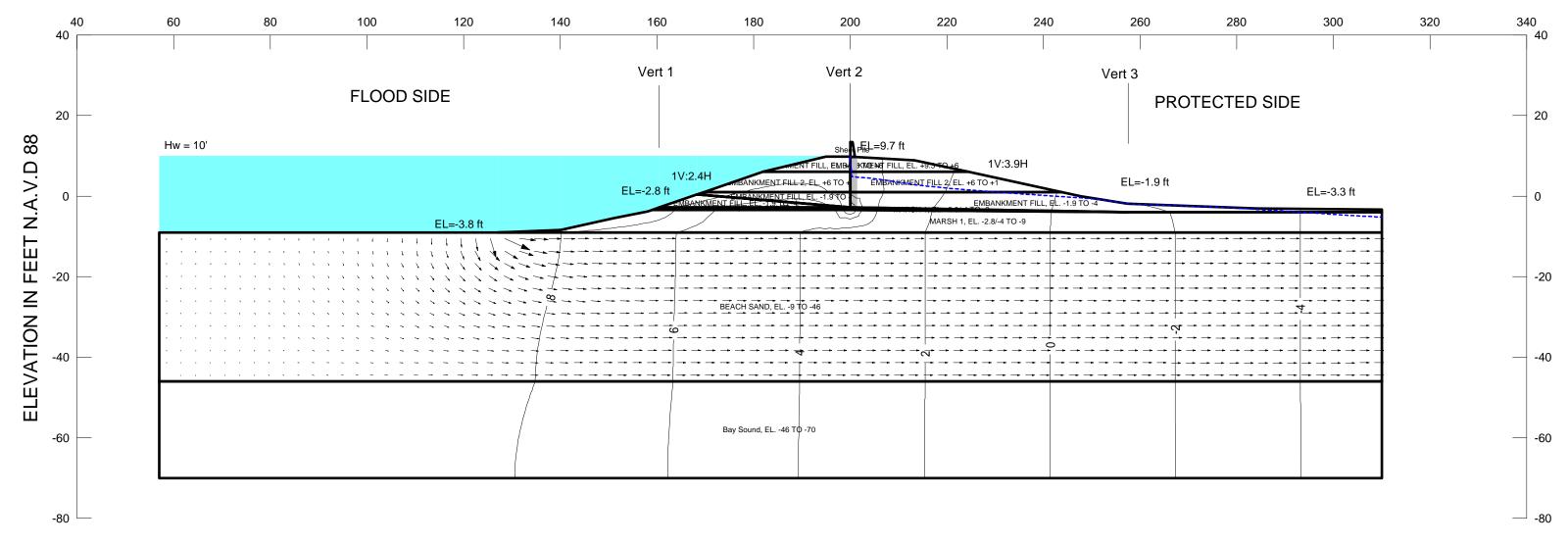




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17th STREET OUTFALL CANAL, REACH 32, PROTECTED SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (Global) STA. 637+00 to 638+44 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.3 TO +6 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH 1, EL. -2.8/-4 TO -9 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: BEACH SAND, EL. -9 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: Bay Sound, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 2, EL. +6 TO +1 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: EMBANKMENT FILL, EL. -1.9 TO -4 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

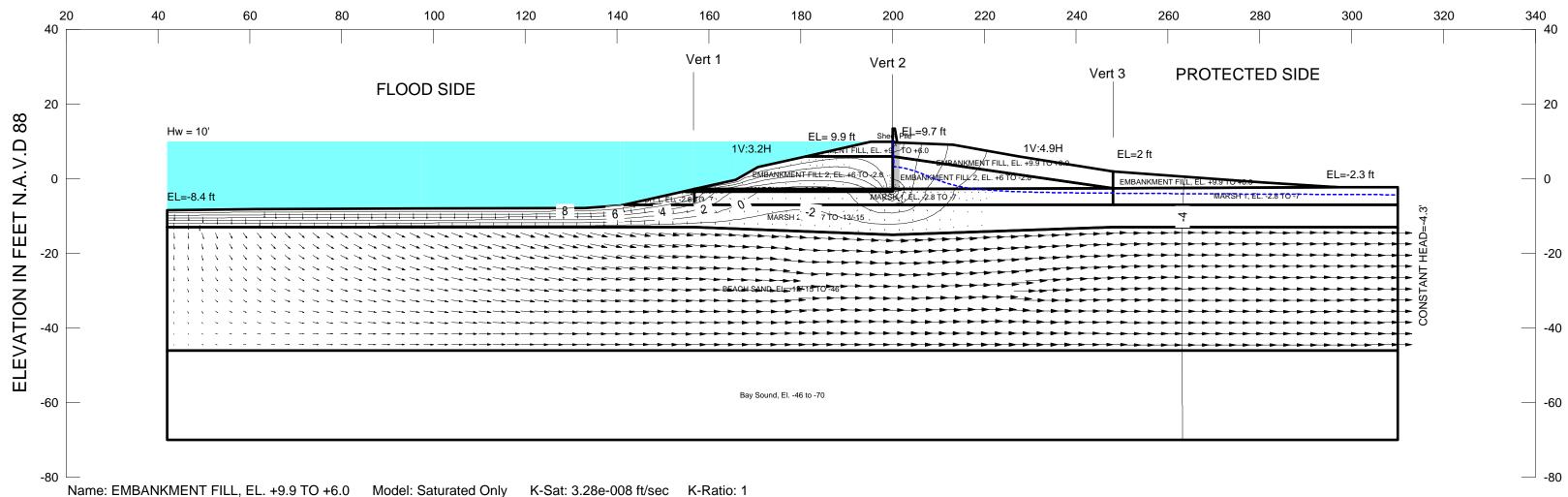
Name: Seepage Analysis (Gap) File Name: 17thReach33.gsz Last Edited By: Goltz, Amanda MVS





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17th STREET OUTFALL CANAL, REACH 33, PROTECTED SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (Gap) STA. 643+40 to 658+00 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -2.8 TO -7 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -13/-15 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: MARSH 2, EL. -7 TO -13/-15 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 2, EL. +6 TO -2.8 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Bay Sound, El. -46 to -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (Full Gap) File Name: 17thReach34.gsz Last Edited By: Goltz, Amanda MVS

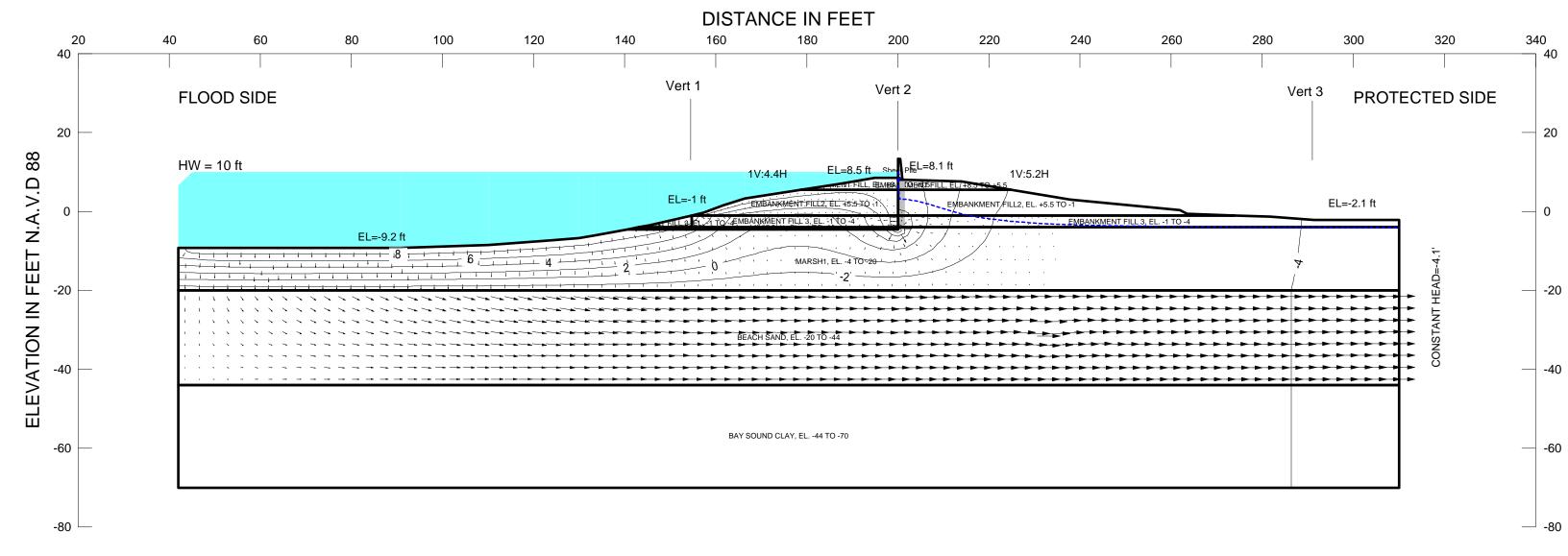




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17th STREET OUTFALL CANAL, REACH 34, PROTECTED SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (Full Gap) STA. 658+00-662+87 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.5 TO +5.5 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: EMBANKMENT FILL 3, EL. -1 TO -4 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -20 TO -44 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -44 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: MARSH1, EL. -4 TO -20 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL2, EL. +5.5 TO -1 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (Gap) File Name: 17thReach35.gsz Last Edited By: Guerrero, Mario MVS





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17th STREET OUTFALL CANAL, REACH 35, PROTECTED SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (Gap) STA. 662+87 to 670+63 EAST ORLEANS PARISH, LOUISIANA

R1 Slope Stability Gap Block Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

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File Information
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Created By: USACE St. Louis District Revision Number: 554 Last Edited By: Goltz, Amanda MVS Date: 11/26/2012 Time: 1:36:33 PM File Name: 17thReach1.gsz Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_Hlgh_water_ analyses\High water cases\ Last Solved Date: 11/26/2012

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Last Solved Time: 1:37:42 PM

Analysis Settings

Slope Stability Gap Block Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant

Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL, EL. +9.6 TO +4.5 Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 800 psf Phi: 0° Phi-B: 0 ° MARSH, EL. -3.0 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 1 Phi-B: 0 ° BEACH SAND, EL. -12 TO -46 Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 ° BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Clay Phi-B: 0 ° Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

```
EMBANKMENT FILL 2, EL. +4.5 TO -3.0
    Model: Spatial Mohr-Coulomb
    Unit Weight: 113 pcf
Cohesion Spatial Fn: Embankment Fill 2
    Phi-B: 0 °
MARSH, EL. -7.0 TO -12.0
    Unit Weight: 108 pcf
    Cohesion Spatial Fn: Marsh 2
    Phi-B: 0 °
Slip Surface Limits
```

Left Coordinate: (58.7, -8.4) ft Right Coordinate: (310, -1.4) ft

Slip Surface Block

Left Grid Upper Left: (170, -5) ft Lower Left: (170, -50) ft Lower Right: (220, -50) ft X Increments: 8 Y Increments: 8 Starting Angle: 115 ° Ending Angle: 180 ° Angle Increments: 5 Right Grid Upper Left: (225, -5) ft Lower Left: (225, -50) ft Lower Right: (265, -50) ft X Increments: 8 Starting Angle: 0 Ending Angle: 45 ° Angle Increments: 5

Shear/Normal Strength Functions

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress

```
Curve Fit to Data: 100 %
      Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
      Data Point: (-10000, 0)
     Data Point: (0, 0)
Data Point: (10000, 5773)
Estimation Properties
Intact Rock Param.: 10
      Geological Strength: 100
      Disturbance Factor: 0
      SigmaC: 600000 psf
      Sigma3: 300000 psf
      Num. Points: 20
```

Spatial Functions Bay Sound Clay Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (116.5, -46, 555) Data Point: (116.5, -70, 790) Data Point: (177, -46, 555) Data Point: (177, -70, 790) Data Point: (200, -46, 835) Data Point: (200, -70, 1070) Data Point: (239.2, -46, 555) Data Point: (239.2, -70, 790) Data Point: (310, -46, 555) Data Point: (310, -70, 790) Embankment Fill 2 Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (200, 4.5, 650) Data Point: (239.2, -1.2, 800) Data Point: (200, -3, 650) Data Point: (239.2, -3, 800) Data Point: (310, -1.2, 800) Data Point: (310, -3, 800) Data Point: (154.7. -3, 800) Data Point: (160, -1.2, 800)

Marsh 1

Model: Linear Interpolation Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (177, -3, 425)
Data Point: (200, -3, 450)
Data Point: (239, 2, -3, 425)
Data Point: (200, -7, 425)
Data Point: (200, -7, 450)
Data Point: (310, -3, 425)
Data Point: (310, -3, 425)
Data Point: (310, -7, 425)
Data Point: (143, -7, 425)
Data Point: (143, -7, 425)
Data Point: (143, -7, 425)
Data Point: (154, -7, -3, 425)

Marsh 2

Arsh 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (177, -7, 320)
Data Point: (200, -7, 450)
Data Point: (239.2, -7, 320)
Data Point: (177, -12, 320)
Data Point: (200, -12, 450)
Data Point: (239.2, -12, 320)
Data Point: (310, -7, 320)
Data Point: (310, -7, 320)
Data Point: (310, -12, 320)
Data Point: (116.5, -8.4, 320)
Data Point: (116.5, -12, 320)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	12,47,13,14,15,25	2.725
Region 2		4,5,38,12,43,45	63.226664
Region 3	BEACH SAND, EL12 TO -46	22,21,30,27,18,19,34,36	8544.2
Region 4	EMBANKMENT FILL, EL. +9.6 TO +4.5	44,7,6,15,25,12,43	84.332835
Region 5	MARSH, EL7.0 TO -12.0	21,1,2,40,33,32,17,18,27,30	1141.5954
Region 6	BAY SOUND CLAY, EL46 TO -70	22,23,37,35,20,19,34,36	6031.2
Region 7	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	41,42,31,16,28,29	22.277108
Region 8	MARSH, EL3.0 TO -7.0	40,41,29,28,26,24,46,17,32,33	644.89156
Region 9		42,3,48,49,16,31	114.63223

Point 27	239.2	-12
Point 28	200	-3
Point 29	177	-3
Point 30	177	-12
Point 31	177	-2.5
Point 32	239.2	-7
Point 33	177	-7
Point 34	239.2	-46
Point 35	239.2	-70
Point 36	177	-46
Point 37	177	-70
Point 38	199	9.9
Point 39	177	3.7
Point 40	142.8494	-7
Point 41	154.70482	-3
Point 42	156.18675	-2.5
Point 43	200	4.5
Point 44	222.86567	4.5
Point 45	179.66667	4.5
Point 46	310	-3.4
Point 47	200	10
Point 48	165.10004	0.40634
Point 49	200	0.4
Point 50	234.61639	0.40305

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.86	(223.984, 0.956)	19.44174	(200, 13.5)	(247.379, - 1.27174)
2	5309	2.02	(223.984, 0.956)	19.87	(200, 13.5)	(247.868, - 1.27603)

Slices of Slip Surface: Optimized

,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	6	C. Optilize	-				
	Slip	X (ft)	Y (ft)	PWP (psf)	Base	Frictiona	Cohesiv
	Surface	A (IL)	1 (11)	PWP (psi)	Normal	I	e

Region 10		48,39,45,43,49	112.79536
Region 11	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	43,49,50,44	117.80335
Region 12	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	49,16,28,26,24,11,10,9,8,50	245.83789

Points

	X (ft)	Y (ft)
Point 1	58.7	-8.4
Point 2	138.7	-8.4
Point 3	163.3	-0.1
Point 4	185	6.1
Point 5	196.6	9.9
Point 6	208	10
Point 7	220	5.5
Point 8	239.2	-1.2
Point 9	250.6	-1.3
Point 10	274.1	-1.4
Point 11	310	-1.4
Point 12	200	9.9
Point 13	200	13.5
Point 14	200.5	13.5
Point 15	201	10
Point 16	200	-2.5
Point 17	310	-7
Point 18	310	-12
Point 19	310	-46
Point 20	310	-70
Point 21	58.7	-12
Point 22	58.7	-46
Point 23	58.7	-70
Point 24	310	-3
Point 25	201	9.9
Point 26	239.2	-3

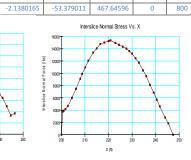
6

					Stress (psf)	Strength (psf)	Strengt h (psf)
1	Optimize d	200.25	-1.262544	662.84022	257.13499	0	650.96
2	Optimize d	200.75	- 1.584460 5	595.86169	1053.5119	0	652.87
3	Optimize d	201.36805	- 1.982394 5	500.93773	1105.654	0	655.23
4	Optimize d	202.24005	-2.609685	346.20468	1113.3555	0	658.57
5	Optimize d	203.60745	-3.66883	212.06312	1290.9006	0	447.7
6	Optimize d	205.3344	-5.00649	246.53871	1424.7561	0	446.6
7	Optimize d	207.09895	- 6.324730 5	293.08767	1576.9247	0	445.47
8	Optimize d	208.40815	- 7.268310 5	332.84802	1662.2525	0	422.12
9	Optimize d	209.4728	- 7.951432 5	361.83784	1737.6341	0	418.59
10	Optimize d	210.78575	- 8.729337 5	398.51962	1763.9758	0	414.23
11	Optimize d	212.4765	-9.60637	441.72944	1832.2766	0	408.62
12	Optimize d	214.2575	- 10.36688 5	481.38451	1880.1694	0	402.72
13	Optimize d	215.75085	-10.91176	510.80619	1874.9481	0	397.77
14	Optimize d	217.37315	-11.34379	534.74172	1925.6297	0	392.39
15	Optimize d	219.1244	- 11.66296	552.58349	1884.9577	0	386.58

			5				
16	Optimize d	220.4165	-11.89846	566.05525	1856.1434	0	382.29
17	Optimize d	221.84935	- 11.97545 5	570.08173	1879.0854	0	377.54
18	Optimize d	223.65745	-11.97739	569.483	1806.6035	0	371.54
19	Optimize d	225.24095	- 11.97908 5	568.95254	1744.1479	0	366.29
20	Optimize d	226.82445	- 11.98077 5	568.42208	1681.6291	0	361.04
21	Optimize d	228.21165	-11.92421	564.38388	1656.3831	0	356.44
22	Optimize d	229.40255	- 11.80939 5	556.81953	1596.0354	0	352.49
23	Optimize d	230.7225	-11.59886	543.25499	1561.0124	0	348.11
24	Optimize d	232.17145	- 11.29260 5	523.67313	1467.9647	0	343.31
25	Optimize d	233.75615	-10.80625	492.80755	1409.0591	0	338.05
26	Optimize d	235.3161	- 10.20198 5	454.5709	1275.3946	0	332.88
27	Optimize d	236.80705	- 9.455597 5	407.4635	1195.9781	0	327.94
28	Optimize d	238.3895	- 8.504892 5	347.53188	1017.3858	0	322.69
29	Optimize d	239.19035	-8.022208	317.07194	974.16282	0	320.03
30	Optimize d	239.8661	-7.507438	284.69052	912.54539	0	320

23	5309	232.09835	-10.625	482.37478	1326.1062	0	343.55
24	5309	233.77705	-10.625	481.5527	1259.6847	0	337.98
25	5309	234.8082	-10.625	481.08756	1218.8421	0	334.56
26	5309	235.7	-10.11642	449.06804	1356.895	0	331.61
27	5309	237.1	-9.0992605	385.15569	1175.1551	0	326.96
28	5309	238.5	-8.082101	321.16244	993.41518	0	322.32
29	5309	239.5947	-7.2867605	271.07828	868.46513	0	320
30	5309	240.907	-6.3333335	211.01198	802.37101	0	425
31	5309	242.74215	-5	126.96162	643.75715	0	425
32	5309	244.5773	-3.6666665	42.937275	485.18737	0	425
33	5309	246.6813	-2.1380165	-53.379011	467.64596	0	800

		rmal Stress Vs. X	
	1800	haya a	
	1600	No.	
s (psf)	1400		
Normal Stress (psf)	1000		1
Norm	800		1
	600		\ <u></u>
	400		
	200 210	220 230	240 250



31	Optimize d	241.156	-6.52481	222.82243	848.99007	0	425
32	Optimize d	242.91275	-5.122885	134.54827	700.94088	0	425
33	Optimize d	244.7273	-3.598075	38.587549	537.22841	0	425
34	Optimize d	246.3938	- 2.135871 5	-53.384144	575.17036	0	800

Slices of Slip Surface: 5309

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	5309	200.0676	0.4547712	589.44978	-1324.1646	0	650.26
2	5309	200.3176	0.25232515	575.19595	809.17757	0	651.22
3	5309	200.75	-0.0978076	542.61884	844.78872	0	652.87
4	5309	201.8335	-0.9751903	418.56996	944.95494	0	657.02
5	5309	203.50045	-2.3250635	201.48534	1082.9056	0	663.39
6	5309	205.25045	-3.7421855	183.76734	1295.1262	0	446.65
7	5309	207.0835	-5.2265565	234.84656	1442.6234	0	445.48
8	5309	208.63675	-6.484371	288.81695	1542.1512	0	444.49
9	5309	210.0196	-7.6041665	340.41627	1606.7198	0	416.77
10	5309	211.51175	-8.8125	400.45603	1668.4887	0	411.82
11	5309	213.0039	-10.020834	463.8811	1730.2575	0	406.87
12	5309	214.53125	-10.625	495.744	2046.976	0	401.81
13	5309	216.09375	-10.625	493.792	1978.688	0	396.63
14	5309	217.65625	-10.625	492.1408	1910.464	0	391.45
15	5309	219.21875	-10.625	490.6432	1842.176	0	386.26
16	5309	220.7164	-10.625	489.37945	1778.9208	0	381.3
17	5309	222.14925	-10.625	488.26278	1720.7145	0	376.55
18	5309	223.705	-10.625	487.16427	1658.3327	0	371.39
19	5309	225.38365	-10.625	486.07413	1591.9112	0	365.82
20	5309	227.06235	-10.625	485.04951	1525.4302	0	360.25
21	5309	228.74105	-10.625	484.11425	1459.0087	0	354.69
22	5309	230.4197	-10.625	483.20877	1392.5872	0	349.12

Slope Stability Gap Entry & Exit Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 554 Last Edited By: Goltz, Amanda MVS Date: 11/26/2012 Time: 1:36:33 PM File Name: 17thReach1.gsz Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case LWL and HIgh water analyses\High water cases\

Last Solved Date: 11/26/2012 Last Solved Time: 1:38:24 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Gap Entry & Exit Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +9.6 TO +4.5 Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 800 psf Phi: 0 Phi-B: 0° MARSH, EL. -3.0 TO -7.0 Model: Snatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 1 Phi-B: 0° BEACH SAND, EL. -12 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Clay Phi-B: 0° Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf

EMBANKMENT FILL 2, EL. +4.5 TO -3.0

Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion Spatial Fn: Embankment Fill 2

Phi-B: 0°

MARSH, EL. -7.0 TO -12.0 Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 2

Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (156.15, -2.5124) ft Left-Zone Right Coordinate: (200, 13.5) ft Left-Zone Increment: 20

Right Projection: Range

Right-Zone Left Coordinate: (213.93507, 7.77435) ft Right-Zone Right Coordinate: (310, -1.4) ft

Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (58.7, -8.4) ft Right Coordinate: (310, -1.4) ft

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (0, 0) Data Point: (10000, 5773) **Estimation Properties** Intact Rock Param.: 10

Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Spatial Functions

Cohesion: 0.01 psf

Bay Sound Clay

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (116.5, -46, 555)
Data Point: (116.5, -70, 790)
Data Point: (177, -46, 555) Data Point: (177, -70, 790) Data Point: (200, -46, 835) Data Point: (200, -70, 1070) Data Point: (239.2, -46, 555) Data Point: (239.2, -70, 790) Data Point: (310, -46, 555)

Data Point: (310, -70, 790)

Embankment Fill 2

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (200, 4.5, 650) Data Point: (239.2, -1.2, 800) Data Point: (200, -3, 650) Data Point: (239.2, -3, 800) Data Point: (310, -1.2, 800) Data Point: (310, -3, 800) Data Point: (154.7, -3, 800) Data Point: (160, -1.2, 800)

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (177, -3, 425) Data Point: (200, -3, 450) Data Point: (239.2. -3, 425) Data Point: (177, -7, 425) Data Point: (200 -7 450) Data Point: (239.2, -7, 425)

Data Point: (310, -3, 425) Data Point: (310, -7, 425) Data Point: (143, -7, 425) Data Point: (154.7, -3, 425)

Marsh 2

Arsh 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (177, -7, 320)
Data Point: (209, -7, 450)
Data Point: (239, 2, -7, 320)
Data Point: (177, -12, 320)
Data Point: (201, -12, 450)
Data Point: (239, 2, -12, 320)
Data Point: (310, -7, 320)
Data Point: (310, -7, 320)
Data Point: (310, -12, 320)
Data Point: (116, 5, -8, 4, 320)
Data Point: (116, 5, -12, 320)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	12,47,13,14,15,25	2.725
Region 2		4,5,38,12,43,45	63.226664
Region 3	BEACH SAND, EL12 TO -46	22,21,30,27,18,19,34,36	8544.2
Region 4	EMBANKMENT FILL, EL. +9.6 TO +4.5	44,7,6,15,25,12,43	84.332835
Region 5	MARSH, EL7.0 TO -12.0	21,1,2,40,33,32,17,18,27,30	1141.5954
Region 6	BAY SOUND CLAY, EL46 TO -70	22,23,37,35,20,19,34,36	6031.2
Region 7	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	41,42,31,16,28,29	22.277108
Region 8	MARSH, EL3.0 TO -7.0	40,41,29,28,26,24,46,17,32,33	644.89156
Region 9		42,3,48,49,16,31	114.63223
Region 10		48,39,45,43,49	112.79536
Region 11	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	43,49,50,44	117.80335
Region 12	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	49,16,28,26,24,11,10,9,8,50	245.83789

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Point 34	239.2	-46
Point 35	239.2	-70
Point 36	177	-46
Point 37	177	-70
Point 38	199	9.9
Point 39	177	3.7
Point 40	142.8494	-7
Point 41	154.70482	-3
Point 42	156.18675	-2.5
Point 43	200	4.5
Point 44	222.86567	4.5
Point 45	179.66667	4.5
Point 46	310	-3.4
Point 47	200	10
Point 48	165.10004	0.40634
Point 49	200	0.4
Point 50	234.61639	0.40305

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.85	(224.278, 16.833)	19.5327	(200, 13.5)	(247.721, - 1.27475)
2	7215	1.96	(224.278, 16.833)	28.699	(200, 13.5)	(246.552, - 1.26449)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	- 1.328872 5	666.38367	247.67949	0	650.96
2	Optimize d	200.75	-1.667729	598.88438	1047.373	0	652.87
3	Optimize	201.80855	-	426.30915	1132.5005	0	656.92

Points

	X (ft)	Y (ft)
Point 1	58.7	-8.4
Point 2	138.7	-8.4
Point 3	163.3	-0.1
Point 4	185	6.1
Point 5	196.6	9.9
Point 6	208	10
Point 7	220	5.5
Point 8	239.2	-1.2
Point 9	250.6	-1.3
Point 10	274.1	-1.4
Point 11	310	-1.4
Point 12	200	9.9
Point 13	200	13.5
Point 14	200.5	13.5
Point 15	201	10
Point 16	200	-2.5
Point 17	310	-7
Point 18	310	-12
Point 19	310	-46
Point 20	310	-70
Point 21	58.7	-12
Point 22	58.7	-46
Point 23	58.7	-70
Point 24	310	-3
Point 25	201	9.9
Point 26	239.2	-3
Point 27	239.2	-12
Point 28	200	-3
Point 29	177	-3
Point 30	177	-12
Point 31	177	-2.5
Point 32	239.2	-7
Point 33	177	-7

6

	d		2.385118				
			5				
4	Optimize d	203.68145	-3.751355	214.48632	1301.0253	0	447
5	Optimize d	205.4904	-5.129625	250.33918	1445.3296	0	44
6	Optimize d	206.97955	-6.249615	290.13391	1557.6565	0	445
7	Optimize d	207.86205	- 6.903291 5	317.79178	1651.2399	0	444
8	Optimize d	209.0086	- 7.681961 5	350.43889	1695.9697	0	420
9	Optimize d	210.8427	-8.7925	401.77687	1798.1893	0	41
10	Optimize d	212.49365	-9.6436	443.76513	1818.4324	0	40
11	Optimize d	214.2223	-10.40636	483.69087	1882.4664	0	402
12	Optimize d	216.02875	-11.08078	520.37765	1877.747	0	396
13	Optimize d	217.699	-11.53905	546.03641	1942.4215	0	39
14	Optimize d	219.233	-11.78117	559.57141	1902.6922	0	386
15	Optimize d	220.2909	- 11.94814 5	569.09082	1876.0863	0	382
16	Optimize d	221.72375	- 11.99391 5	571.26469	1886.614	0	377
17	Optimize d	223.63335	-11.99367	570.48696	1809.7443	0	373
18	Optimize d	225.1687	-11.99347	569.86169	1748.9766	0	366
19	Optimize d	226.70405	- 11.99327 5	569.23643	1688.1438	0	36:

20	Optimize d	228.2394	-11.99308	568.61117	1627.3761	0	356.35
21	Optimize d	230.1056	-11.8399	558.40838	1586.5073	0	350.16
22	Optimize d	231.89465	-11.51323	537.45598	1517.6913	0	344.23
23	Optimize d	233.2757	-11.16605	515.33527	1422.3265	0	339.65
24	Optimize d	234.2913	- 10.86228 5	496.04543	1397.1856	0	336.28
25	Optimize d	235.41565	-10.41206	467.57	1299.012	0	332.55
26	Optimize d	237.2602	-9.49184	409.50128	1171.7104	0	326.43
27	Optimize d	238.75275	- 8.560218 5	350.79147	1050.4164	0	321.48
28	Optimize d	240.06445	- 7.588148 5	289.62555	915.66359	0	320
29	Optimize d	241.9021	- 6.152292 5	199.22303	823.51514	0	425
30	Optimize d	243.84855	- 4.561817 5	99.116213	633.43034	0	425
31	Optimize d	245.2678	-3.38329	24.9384	505.69746	0	425
32	Optimize	246.71755	-2.137374	-53.434137	565.92433	0	800

Slices of Slip Surface: 7215

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	7215	200.25	1.1466513	529.61468	87.97829	0	650.96
2	7215	200.6249	0.5818878	528.32835	541.22491	0	652.39

3	7215	200.8749	0.2238286	518.23002	591.896	0	653.35
4	7215	201.6338	-0.76779295	445.29107	742.88608	0	656.25
5	7215	202.90135	-2.2915885	233.52002	958.03488	0	661.1
6	7215	204.27925	-3.723938	201.62966	1247.3626	0	447.27
7	7215	205.76755	-5.0765725	243.33473	1424.0291	0	446.32
8	7215	207.25585	-6.2539335	287.98984	1579.6393	0	445.37
9	7215	208.1452	-6.901299	315.50422	1659.9924	0	444.81
10	7215	209.02225	-7.4596025	338.58001	1706.0336	0	420.08
11	7215	210.48595	-8.320491	377.30367	1763.562	0	415.23
12	7215	211.94965	-9.0700965	413.29431	1807.3144	0	410.37
13	7215	213.41335	-9.717893	446.03112	1838.6928	0	405.52
14	7215	214.87705	-10.27121	474.92227	1858.6497	0	400.66
15	7215	216.34075	-10.73576	499.99475	1867.898	0	395.81
16	7215	217.80445	-11.115985	520.98274	1867.0184	0	390.95
17	7215	219.26815	-11.415295	537.73828	1856.5919	0	386.1
18	7215	220.7164	-11.634725	550.07389	1839.3275	0	381.3
19	7215	222.14925	-11.77767	558.00545	1815.7066	0	376.55
20	7215	223.6001	-11.848345	561.66071	1783.8353	0	371.73
21	7215	225.0689	-11.84546	560.85553	1743.7073	0	366.86
22	7215	226.53775	-11.76719	555.43	1694.768	0	361.99
23	7215	228.0066	-11.61291	545.30739	1637.0292	0	357.12
24	7215	229.47545	-11.381365	530.37993	1570.2835	0	352.25
25	7215	230.9443	-11.07063	510.49814	1494.3993	0	347.38
26	7215	232.41315	-10.67802	485.49692	1408.8838	0	342.51
27	7215	233.882	-10.19995	455.13916	1313.5306	0	337.64
28	7215	235.38035	-9.6184065	418.29512	1205.1385	0	332.67
29	7215	236.9082	-8.9231675	374.30157	1082.5798	0	327.6
30	7215	238.43605	-8.1150385	323.24518	946.74987	0	322.53
31	7215	239.733	-7.3407575	274.37461	843.47567	0	320
32	7215	241.05855	-6.4282735	216.85497	804.86634	0	425
33	7215	242.64365	-5.195806	139.22102	694.4818	0	425
34	7215	244.22875	-3.7675325	49.39338	564.90364	0	425
35	7215	245.78645	-2.132244	-53.335212	675.27971	0	800

10

R10 Slope Stability Gap Block

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File Information
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Created By: USACE St. Louis District Revision Number: 609 Last Edited By: Goltz, Amanda MVS Date: 11/26/2012 Time: 9:13:19 AM File Name: 17thReach10.gsz Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 11/26/2012 Last Solved Time: 9:14:08 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Gap Block Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant

Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 3000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL 1, EL. +2.5 TO -1.5 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Fn: Fill Phi-B: 0 ° MARSH 2, EL. -9 TO -13 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: Marsh 2 Phi-B: 0 ° BEACH SAND, EL. -29.0/-31.0 TO -48.0 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Phi-B: 0 ° BAY SOUND CLAY, EL. -48 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Phi: 0 Marsh 1, EL -1.5 TO -9

Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1

```
Cohesion Fn: Marsh 1
     Phi-B: 0 °
Sheet Pile
     Model: Undrained (Phi=0)
     Unit Weight: 0.1 pcf
     Cohesion: 0.01 psf
Lacustrine 1, EL. -13 to -18
     Model: Spatial Mohr-Coulomb
      Weight Fn: Lacustrine 1
      Cohesion Spatial Fn: Lacustrine 1 Cohesion
     Phi-B: 0°
Lacustrine 2 El. -18 to -29
     Model: Spatial Mohr-Coulomb
      Weight Fn: Lacustrine 2
     Cohesion Spatial Fn: Lacustrine 2 Cohesion
     Phi-B: 0 °
Slip Surface Limits
     Left Coordinate: (42.5, -13.1) ft
Right Coordinate: (310, -2.9) ft
```

Slip Surface Block

Left Grid Upper Left: (196, -3) ft Lower Left: (196, -33) ft Lower Right: (226, -33) ft X Increments: 6 Y Increments: 6 Starting Angle: 135 ° Ending Angle: 175 Angle Increments: 5 Right Grid Upper Left: (229, -3) ft Lower Left: (229, -33) ft Lower Right: (259, -33) ft X Increments: 6 Y Increments: 6 Starting Angle: 0 ° Ending Angle: 45 °

Angle Increments: 5

Cohesion Functions Marsh 2 Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 180 Data Points: X (ft), Cohesion (psf) Data Point: (175.8, 180) Data Point: (200, 350) Data Point: (235, 180) Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 800 Data Points: X (ft), Cohesion (psf) Data Point: (175.8, 800) Data Point: (200, 830) Data Point: (235, 800) Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 500 Data Points: X (ft), Cohesion (psf) Data Point: (175.8, 500) Data Point: (200, 700) Data Point: (235, 500) Marsh 1 Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 180 Data Points: X (ft), Cohesion (psf) Data Point: (175.8, 180) Data Point: (200, 375)

Data Point: (235, 180) Data Point: (235, 89)

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Unit Weight Functions

MARSH 1

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 98 Data Points: X (ft), Unit Weight (pcf)

Data Point: (175.8, 98) Data Point: (200, 109) Data Point: (235, 98)

Lacustrine 1

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102

Data Points: X (ft), Unit Weight (pcf) Data Point: (175.8, 102) Data Point: (200, 106) Data Point: (235, 102)

Lacustrine 2

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 99 Data Points: X (ft), Unit Weight (pcf) Data Point: (175.8, 99) Data Point: (200, 102)

MARSH 2

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Data Point: (235, 99)

Y-Intercept: 89 Data Points: X (ft), Unit Weight (pcf) Data Point: (175.8, 89) Data Point: (200, 82)

Spatial Functions

Lacustrine 2 Cohesion Model: Linear Interpolation

Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (175.8, -31, 400) Data Point: (200, -18, 300) Data Point: (200, -29, 500) Data Point: (235, -31, 400) Data Point: (175.8, -20, 258) Data Point: (235, -20, 258) Data Point: (42.5, -20, 258) Data Point: (42.5, -31, 400) Data Point: (310, -20, 258) Data Point: (310, -31, 400)

Lacustrine 1 Cohesion

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (200, -13, 300) Data Point: (200, -18, 300) Data Point: (235, -20, 258) Data Point: (235, -14, 180) Data Point: (175.8, -20, 258) Data Point: (175.8, -14, 180)
Data Point: (42.5, -14.22618, 180)

Data Point: (42.5, -20, 258) Data Point: (310, -14, 180) Data Point: (310, -20, 258)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL29.0/-31.0 TO -48.0	13,14,46,44,15,16,42,30,37	4606.7
Region 2	Sheet Pile	4,32,22,21,18	8.175
Region 3	MARSH 2, EL9 TO -13	19,34,10,11,35,20,40,43,1,29,23,53,39	688.3599
Region 4	Lacustrine 1, EL13 to -18	11,12,36,31,41,17,43,40,20,35	1560.3251
Region 5	Lacustrine 2 El18 to -29	31,36,12,13,37,30,42,16,17,41	2942.5

6

BAY SOUND CLAY, EL. -48 TO -Region 6 15,28,45,47,26,14,46,44 5885 53,2,50,49,48,25,33,9,10,34,19,39 Marsh 1, EL -1.5 TO -9 1022.162 48,49,50,51,38,25 107.61989 Region 8 Region 9 51.38.25.4.27.3.24.52 112,16306 EMBANKMENT FILL 1, EL. +2.5 25,4,32,22,5,6,7,8,9,33 312 10 TO -1.5

Points

	X (ft)	Y (ft)
Point 1	42.5	-13.1
Point 2	143.1	-9.4
Point 3	187.6	2.4
Point 4	200	2.5
Point 5	213	5
Point 6	235	-1
Point 7	260	-2.9
Point 8	310	-2.9
Point 9	310	-4
Point 10	310	-11
Point 11	310	-14
Point 12	310	-20
Point 13	310	-31
Point 14	310	-48
Point 15	42.5	-48
Point 16	42.5	-31
Point 17	42.5	-20
Point 18	200	12.4
Point 19	200	-9
Point 20	200	-13
Point 21	200.5	12.4
Point 22	201	5.5
Point 23	123.3	-13
Point 24	181.6	-0.1
Point 25	200	-1.5

Point 26 310 Point 28 Point 29 90 Point 30 200 Point 31 200 Point 32 201 Point 33 Point 34 235 Point 35 Point 36 Point 37 Point 38

Point 39

-29

-18

-11

-14

-31

Point 40 175.8 -14 Point 41 175.8 Point 42 175.8 -31 Point 43 42.5 -14.22618 Point 44 175.8 -48 Point 46 235 -48 Point 47 -70 Point 48 200 175.8 Point 50 Point 51 165.45484

175 8043

Critical Slip Surfaces

Point 53 134.3

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.63	(231.824, -1.994)	25.27155	(200, 12.4)	(261.045, -2.9)
2	6604	1.72	(231.824, -1.994)	26.552	(200, 12.4)	(263.635, -2.9)

-1.5

-11

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	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	- 2.779637 5	658.74674	77.638009	0	373.61
2	Optimize d	200.75	- 3.115434 5	650.6444	454.44493	0	370.82
3	Optimize d	201.78485	- 3.810424 5	631.36796	836.41181	0	365.00
4	Optimize d	203.35455	- 4.864608	606.88116	940.44103	0	356.31
5	Optimize d	204.988	- 6.072188 5	596.5941	1023.8031	0	347.2
6	Optimize d	206.6852	- 7.433165	602.93742	1156.4153	0	337.7
7	Optimize d	208.38245	- 8.794141 5	627.48332	1287.7864	0	328.3
8	Optimize d	210.1923	- 10.19886	661.60564	1429.1097	0	300.49
9	Optimize d	212.07675	- 11.61872	701.78125	1537.7768	0	291.34
10	Optimize d	213.20515	- 12.46893	730.33349	1598.0291	0	285.86
11	Optimize d	214.0716	- 13.02222 5	748.26919	1660.8131	0	281.65
12	Optimize d	215.7582	- 14.03915	782.9035	1716.1903	0	249.7
13	Optimize d	217.95645	-15.1193	819.30184	1815.6557	0	250.09
14	Optimize d	220.3024	- 16.04318	850.75396	1838.9771	0	250.30

31	Optimize d	254.6892	- 8.171005	243.04799	678.69638	0	180
32	Optimize d	257.40915	- 6.233265	118.1835	481.39261	0	180
33	Optimize d	259.4336	- 4.515325	8.1854377	315.09166	0	180
34	Optimize d	260.52255	- 3.423785	-61.292387	414.63054	0	500

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	6604	200.25	- 2.363753 5	633.14229	67.419216	0	373.61
2	6604	200.75	- 2.740530 5	627.88727	402.8158	0	370.82
3	6604	202.09995	-3.757802	610.1406	815.75947	0	363.3
4	6604	204.2999	- 5.415568 5	596.34555	979.48494	0	351.04
5	6604	206.49985	-7.073335	590.97274	1141.2138	0	338.79
6	6604	208.69975	-8.731101	617.21964	1300.9822	0	326.53
7	6604	210.5998	- 10.16288 2	653.07707	1432.5771	0	298.52
8	6604	212.19995	- 11.36867 5	687.71486	1524.3123	0	290.74
9	6604	213.96545	- 12.69908 5	732.87602	1603.2361	0	282.17
10	6604	215.9424	-14.18883	788.83052	1692.9735	0	250.12
11	6604	217.96545	- 15.71329 5	850.65159	1783.376	0	254.38

15	Optimize d	222.60185	- 16.71678	872.65608	1895.3354	0	249.91
16	Optimize d	224.8547	- 17.14010 5	883.21311	1870.1643	0	248.06
17	Optimize d	227.13155	- 17.34056	882.87356	1876.2638	0	244.31
18	Optimize d	229.43245	- 17.31813 5	871.0092	1802.7309	0	238.14
19	Optimize d	231.47815	-17.1485	852.85818	1766.1595	0	230.71
20	Optimize d	233.2686	- 16.83166	827.55897	1676.2373	0	221.83
21	Optimize d	234.5819	- 16.54892	805.99163	1634.9084	0	214.39
22	Optimize d	236.2053	- 16.06620 5	771.79117	1559.6067	0	206.86
23	Optimize d	238.6159	- 15.34942	721.05415	1462.427	0	197.54
24	Optimize d	241.347	- 14.49551 5	661.53129	1353.6691	0	186.44
25	Optimize d	242.9627	-13.9708	625.42874	1284.0198	0	180
26	Optimize d	244.5498	- 13.37887 5	585.11287	1226.902	0	180
27	Optimize d	247.01305	- 12.36211	516.88652	1131.2953	0	180
28	Optimize d	248.9452	- 11.45403 5	457.03354	1031.1968	0	180
29	Optimize d	250.4074	- 10.76683 5	411.62075	953.25485	0	180
30	Optimize d	252.1654	- 9.746115	345.07934	861.92524	0	180

12	6604	219.9885	- 17.23776 5	917.052	1872.3573	0	260.79
13	6604	222.08335	-18	945.69216	2097.3228	0	262.47
14	6604	224.25	-18	934.01524	2030.2151	0	257.75
15	6604	226.41665	-18	923.2614	1963.0612	0	252.86
16	6604	228.58335	-18	913.6614	1895.9536	0	247.81
17	6604	230.75	-18	904.93832	1828.8459	0	242.62
18	6604	232.91665	-18	896.90755	1761.7382	0	237.27
19	6604	234.5	- 17.74523 5	876.56349	1818.0101	0	230
20	6604	236.14175	- 16.90872 5	822.02738	1699.5798	0	217.81
21	6604	238.42525	- 15.74523 5	745.31471	1551.7732	0	202.69
22	6604	240.7087	- 14.58174 5	668.56302	1403.9277	0	187.56
23	6604	242.83175	-13.5	597.13378	1275.5319	0	180
24	6604	244.7944	-12.5	530.89655	1166.4833	0	180
25	6604	246.757	-11.5	464.79553	1057.4348	0	180
26	6604	248.7601	- 10.47936 2	397.48257	941.26726	0	180
27	6604	250.8037	- 9.438084 5	328.76121	818.01178	0	180
28	6604	252.8473	- 8.396807 5	260.28401	694.7563	0	180
29	6604	254.89095	- 7.355530 5	192.15996	571.50082	0	180
30	6604	256.9346	- 6.314253	123.95743	448.28894	0	180

			5				
31	6604	258.9782	- 5.272976 5	55.977259	325.01602	0	180
32	6604	260.73825	-4.376169	-2.2403281	225.19745	0	180
33	6604	262.55595	-3.45	-62.357664	236.54145	0	500

R10 Slope Stability Gap Entry & Exit

File Information

Created By: USACE St. Louis District Revision Number: 609 Last Edited By: Goltz, Amanda MVS Date: 11/26/2012

Time: 9:13:19 AM File Name: 17thReach10.gsz

Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\

Last Solved Date: 11/26/2012

Last Solved Time: 9:14:40 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Gap Entry & Exit Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer

PWP Conditions Source: Parent Analysis

Direction of movement: Left to Right Use Passive Mode: Yes

Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1

Optimize Critical Slip Surface Location: Yes Tension Crack

Tension Crack Option: (none)

FOS Distribution

FOS Calculation Option: Constant

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 3000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1, EL. +2.5 TO -1.5

Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Fn: Fill Phi: 0

Phi-B: 0°

MARSH 2, EL. -9 TO -13 Model: Snatial Mohr-Coulomb

Weight Fn: MARSH 2 Cohesion Fn: Marsh 2 Phi: 0 Phi-B: 0°

BEACH SAND, EL. -29.0/-31.0 TO -48.0

Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi-B: 0 °

BAY SOUND CLAY, EL. -48 TO -70

Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Clay Phi-B: 0 °

Marsh 1, EL -1.5 TO -9

Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion Fn: Marsh 1

Phi: 0° Phi-B: 0

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Lacustrine 1, EL. -13 to -18

Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1

Cohesion Spatial Fn: Lacustrine 1 Cohesion

Lacustrine 2 El. -18 to -29

Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2

Cohesion Spatial Fn: Lacustrine 2 Cohesion

Phi-B: 0°

Slip Surface Entry and Exit

Left Projection: Range

Left-Zone Left Coordinate: (192.1295, -6) ft Left-Zone Right Coordinate: (200, 5) ft

Left-Zone Increment: 20 Right Projection: Range

Right-Zone Left Coordinate: (217.4, 3.8) ft Right-Zone Right Coordinate: (290.4, -2.9) ft

Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (42.5, -13.1) ft Right Coordinate: (310, -2.9) ft

Cohesion Functions

Marsh 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 %

Segment Curvature: 0 %

Y-Intercept: 180

Data Points: X (ft), Cohesion (psf) Data Point: (175.8, 180) Data Point: (200, 350) Data Point: (235, 180)

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 800

Data Points: X (ft), Cohesion (psf) Data Point: (175.8, 800) Data Point: (200, 830) Data Point: (235, 800)

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 %

Segment Curvature: 0 %

Y-Intercept: 500

Data Points: X (ft), Cohesion (psf) Data Point: (175.8, 500) Data Point: (200, 700) Data Point: (235, 500)

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 180 Data Points: X (ft), Cohesion (psf)

Data Point: (175.8, 180) Data Point: (200, 375) Data Point: (235, 180)

Unit Weight Functions

MARSH 1

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 %

Segment Curvature: 0 %

Y-Intercept: 98

Data Points: X (ft), Unit Weight (pcf) Data Point: (175.8, 98) Data Point: (200, 109) Data Point: (235, 98)

Lacustrine 1

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (175.8, 102) Data Point: (200, 106) Data Point: (235, 102)

Lacustrine 2

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 99 Data Points: X (ft), Unit Weight (pcf)

Data Point: (175.8, 99)
Data Point: (200, 102) Data Point: (235, 99)

MARSH 2

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 89
Data Points: X (ft), Unit Weight (pcf)

Data Point: (175.8, 89) Data Point: (200, 82) Data Point: (235, 89)

Spatial Functions

Lacustrine 2 Cohesion

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)

Data Point: (175.8, -31, 400) Data Point: (200, -18, 300) Data Point: (200, -29, 500) Data Point: (235, -31, 400) Data Point: (175.8, -20, 258) Data Point: (235, -20, 258) Data Point: (42.5, -20, 258) Data Point: (42.5, -31, 400) Data Point: (310, -20, 258) Data Point: (310, -31, 400)

Lacustrine 1 Cohesion

Model: Linear Interpolation Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (200, -13, 300)

Data Point: (200, -18, 300)
Data Point: (235, -20, 258)
Data Point: (235, -14, 180)
Data Point: (175.8, -20, 258) Data Point: (175.8, -14, 180) Data Point: (42.5, -14.22618, 180) Data Point: (42.5, -20, 258)
Data Point: (310, -14, 180) Data Point: (310, -20, 258)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL29.0/-31.0 TO -48.0	13,14,46,44,15,16,42,30,37	4606.7
Region 2	Sheet Pile	4,32,22,21,18	8.175
Region 3	MARSH 2, EL9 TO -13	19,34,10,11,35,20,40,43,1,29,23,53,39	688.3599
Region 4	Lacustrine 1, EL13 to -18	11,12,36,31,41,17,43,40,20,35	1560.3251
Region 5	Lacustrine 2 El18 to -29	31,36,12,13,37,30,42,16,17,41	2942.5
Region 6	BAY SOUND CLAY, EL48 TO - 70	15,28,45,47,26,14,46,44	5885
Region 7	Marsh 1, EL -1.5 TO -9	53,2,50,49,48,25,33,9,10,34,19,39	1022.162
Region 8		48,49,50,51,38,25	107.61989
Region 9		51,38,25,4,27,3,24,52	112.16306
Region 10	EMBANKMENT FILL 1, EL. +2.5 TO -1.5	25,4,32,22,5,6,7,8,9,33	312

6

Points

	X (ft)	Y (ft)
Point 1	42.5	-13.1
Point 2	143.1	-9.4
Point 3	187.6	2.4
Point 4	200	2.5
Point 5	213	5
Point 6	235	-1
Point 7	260	-2.9
Point 8	310	-2.9
Point 9	310	-4
Point 10	310	-11
Point 11	310	-14
Point 12	310	-20
Point 13	310	-31
Point 14	310	-48
Point 15	42.5	-48
Point 16	42.5	-31
Point 17	42.5	-20
Point 18	200	12.4
Point 19	200	-9
Point 20	200	-13
Point 21	200.5	12.4
Point 22	201	5.5
Point 23	123.3	-13
Point 24	181.6	-0.1
Point 25	200	-1.5
Point 26	310	-70
Point 27	199	2.5
Point 28	42.5	-70
Point 29	90	-12.6
Point 30	200	-29
Point 31	200	-18
Point 32	201	2.5
Point 33	235	-4

Point 34	235	-11
Point 35	235	-14
Point 36	235	-20
Point 37	235	-31
Point 38	175.8	-4
Point 39	175.8	-11
Point 40	175.8	-14
Point 41	175.8	-20
Point 42	175.8	-31
Point 43	42.5	-14.22618
Point 44	175.8	-48
Point 45	175.8	-70
Point 46	235	-48
Point 47	235	-70
Point 48	200	-6
Point 49	175.8	-6
Point 50	157.17527	-6
Point 51	165.45484	-4
Point 52	175.8043	-1.5
Point 53	134.3	-11

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.58	(229.309, 24.067)	25.68868	(199.957, -6)	(261.034, - 2.9)
2	4231	1.63	(229.309, 24.067)	41.546	(200, 12.4)	(260.914, - 2.9)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	199.9785	- 6.011482	871.83901	735.64235	0	374.83

			5				
2	Optimize d	200.25	- 6.156389	847.16051	73.404227	0	373.61
3	Optimize d	200.75	- 6.423237	805.00804	831.75695	0	370.82
4	Optimize d	201.80615	- 6.986908 5	747.21641	1201.204	0	364.94
5	Optimize d	203.4185	- 7.847403	713.18238	1283.4985	0	355.95
6	Optimize d	205.0505	- 8.806720 5	704.64252	1342.5525	0	346.86
7	Optimize d	206.6544	9.834250 5	711.22809	1437.1201	0	317.68
8	Optimize d	208.21055	- 10.83117	724.16049	1511.4679	0	310.12
9	Optimize d	209.78205	-11.8341	745.16266	1588.2765	0	302.49
10	Optimize d	211.369	- 12.84303 5	771.5914	1664.638	0	294.78
11	Optimize d	212.37155	- 13.48039 5	790.97874	1726.326	0	258.24
12	Optimize d	212.7903	- 13.72342	798.16763	1779.6185	0	258.05
13	Optimize d	214.38035	- 14.55843	822.62282	1822.1427	0	257.49
14	Optimize d	216.7962	- 15.67391	858.17151	1906.0037	0	257.4
15	Optimize d	218.86715	- 16.45511 5	883.38129	1923.1716	0	257.45
16	Optimize d	220.75125	- 17.00597	899.70907	1978.8389	0	257.07
17	Optimize d	222.4485	- 17.32646	906.88822	1960.0805	0	255.71

20	Optimize d	228.1737	- 17.81399	904.93916	1890.4128	0	246.77
21	Optimize d	230.33555	- 17.64075 5	885.89508	1852.0369	0	239.48
22	Optimize d	232.53965	- 17.28976 5	856.9059	1745.4893	0	229.53
23	Optimize d	234.32085	- 16.90787	828.16595	1687.6074	0	219.77
24	Optimize d	235.83615	- 16.44736	795.63972	1609.1879	0	211.82
25	Optimize d	237.5084	- 15.93914	759.82277	1540.3576	0	205.21
26	Optimize d	239.4607	- 15.30544	715.86606	1464.2599	0	196.97
27	Optimize d	241.69315	- 14.54625 5	663.66043	1363.2414	0	187.1
28	Optimize d	243.02515	- 14.08333	632.07351	1311.8568	0	181.08
29	Optimize d	244.0727	- 13.67875	604.58773	1264.4082	0	180
30	Optimize d	245.7363	- 13.03624 5	561.29876	1191.4001	0	180
31	Optimize d	247.45245	- 12.28984	511.53436	1127.5259	0	180
32	Optimize d	249.2212	- 11.43953 5	455.53004	1033.8711	0	180
33	Optimize d	251.35415	- 10.25984	378.45487	923.0707	0	180

914.9937

914.28059

1941.2063

1955.6141

0

0

254.64

251.76

12

9			

18

19

Optimize d 224.1457

226.0541

17.64696

17.80947

34	Optimize d	253.83935	- 8.757972 5	280.86233	747.47824	0	180
35	Optimize d	255.9669	- 7.333307 5	188.87077	608.76477	0	180
36	Optimize d	257.7487	5.978662 5	101.81374	452.48566	0	180
37	Optimize d	259.3198	- 4.619321 5	14.814365	332.70679	0	180
38	Optimize d	260.51725	- 3.418651 5	-61.605073	427.74266	0	500

Slices	of Slip	Surface:	4231

	Slip Surface	X (ft)	Y (ft)	Y (ft) PWP (psf) Base Normal Stress (psf)		Frictional Strength (psf)	Cohesive Strength (psf)
1	4231	200.25	5.6234615	833.88017	36.88077	0	373.61
2	4231	200.75	6.1047885	806.59721	692.62026	0	370.82
3	4231	201.8745	-7.11095	746.21869	1118.1476	0	364.56
4	4231	203.6235	-8.568751	732.42563	1287.608	0	354.81
5	4231	205.61325	- 10.032041	739.96842	1447.2073	0	322.74
6	4231	207.8438	11.480505	759.16381	1581.652	0	311.9
7	4231	210.07435	-12.73683	783.66381	1699.2826	0	301.07
8	4231	212.0948	-13.73196	806.29149	1807.9729	0	260.48
9	4231	214	- 14.540755	825.70223	1872.5523	0	258.59
10	4231	216	-15.27558	844.39146	1904.2856	0	257.02
11	4231	218	-15.89686	860.12297	1923.4655	0	255.62
12	4231	220	-16.40984	872.81346	1930.6466	0	254.14
13	4231	222	- 16.818605	881.91764	1926.5062	0	252.36

14	4231	224	- 17.126265	887.01307	1911.2908	0	250.08
15	4231	226	-17.33508	887.96783	1885.3367	0	247.1
16	4231	228	- 17.446545	884.86022	1848.8311	0	243.23
17	4231	230	-17.46145	876.92855	1801.7505	0	238.28
18	4231	232	- 17.379895	864.131	1744.0787	0	232.07
19	4231	234	- 17.201305	846.49939	1675.6604	0	224.41
20	4231	236.09525	-16.90625	822.00678	1617.2604	0	217.78
21	4231	238.2857	- 16.482405	789.79661	1567.8258	0	212.27
22	4231	240.47615	-15.9342	750.58965	1504.785	0	205.14
23	4231	242.6666	-15.25642	703.9048	1427.3913	0	196.33
24	4231	244.85705	- 14.442195	649.08319	1334.5723	0	185.75
25	4231	246.89175	-13.56101	590.56618	1241.7416	0	180
26	4231	248.7707	- 12.623705	529.12963	1151.8702	0	180
27	4231	250.64965	11.562695	460.14441	1050.6889	0	180
28	4231	252.63315	-10.29126	377.88347	923.39111	0	180
29	4231	254.7212	-8.774671	280.36831	765.55676	0	180
30	4231	256.80925	- 7.0439595	169.56572	585.63614	0	180
31	4231	258.92665	-5.028478	40.83542	375.70937	0	180
32	4231	260.457	- 3.4179295	-61.570467	461.44191	0	500

R11 Slope Stability Gap (Block) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

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File Information
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Created By: USACE St. Louis District Revision Number: 571 Last Edited By: Goltz, Amanda MVS Date: 2/21/2013 Time: 11:42:50 AM File Name: 17thReach11.gsz Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_Hlgh_water_ analyses\High water cases\ Last Solved Date: 2/21/2013 Last Solved Time: 11:44:02 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Gap (Block) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant

Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 3000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: Driving Side Maximum Convex Angle: 30 ° Resisting Side Maximum Convex Angle: 10 ° Materials

EMBANKMENT FILL, EL. +2.5 TO 0.0 Model: Undrained (Phi=0) Unit Weight: 118 pcf Cohesion: 800 psf MARSH 1, EL. -6.0 TO -16.0

Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi-B: 0°

BEACH SAND, EL. -27.0/-28.0 TO -42.0

Model: Shear/Normal Fn Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 °

BAY SOUND CLAY, EL. -42 TO -70

Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi-B: 0 °

EMBANKMENT FILL 2, EL 0.0 TO -6.0

Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Spatial Fn: Fill 2 Phi: 0 ° Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

LACUSTRINE, EL. -16.0 TO -27.0

Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Phi-B: 0°

Slip Surface Limits

Left Coordinate: (60, -13.1) ft Right Coordinate: (310, -3.6) ft

Slip Surface Block

Left Grid Upper Left: (202, -10) ft Lower Left: (202, -40) ft Lower Right: (232, -40) ft X Increments: 6 Y Increments: 6 Starting Angle: 135 Ending Angle: 180 ° Angle Increments: 5 Upper Left: (235, -10) ft Lower Left: (235, -40) ft Lower Right: (265, -40) ft X Increments: 6 Y Increments: 6 Starting Angle: 0 Angle Increments: 5

Shear/Normal Strength Functions

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 %

Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (0, 0) Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Unit Weight Functions

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 102) Data Point: (200, 104) Data Point: (235, 102)

Lacustrine

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 102) Data Point: (200, 103) Data Point: (235, 102)

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 106 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 106) Data Point: (200, 108)

Data Point: (235, 106)

Marsh 1

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 105 Data Points: X (ft), Unit Weight (pcf)

Data Point: (181.4, 105) Data Point: (200, 99) Data Point: (235, 105)

Spatial Functions

Lacustrine Model: Linear Interpolation Model: Linear interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf) Data Point: (181.4, -15, 200) Data Point: (181.4, -28, 400) Data Point: (200, -16, 275) Data Point: (200, -27, 425)
Data Point: (235, -15, 200) Data Point: (235, -28, 400)
Data Point: (60, -15, 200)
Data Point: (60, -28, 400)
Data Point: (310, -15, 200)

Data Point: (310, -28, 400)

Fill 2

Model: Linear Interpolation Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, 0, 400)
Data Point: (181.4, -6, 400)
Data Point: (235, -1, 400)
Data Point: (235, -6, 400)
Data Point: (200, -0, 425)
Data Point: (200, -6, 425)
Data Point: (168.9, -2.2, 400)
Data Point: (168.9, -6, 400)
Data Point: (168.9, -6, 400)
Data Point: (310, -3.6, 400)
Data Point: (310, -6, 400)

Marsh 1

Model: Linear Interpolation Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -6, 200)
Data Point: (181.4, -15, 200)
Data Point: (235, -6, 200)
Data Point: (205, -5, 200)
Data Point: (200, -6, 275)
Data Point: (200, -6, 275)
Data Point: (200, -6, 275) Data Point: (200, -16, 275)
Data Point: (153.4, -6, 200)
Data Point: (153.4, -15, 200)
Data Point: (60, -13.1, 200) Data Point: (60, -15, 200) Data Point: (310, -3.6, 200)

Data Point: (310, -15, 200)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. +2.5 TO 0.0	46,22,8,26,19,6	109.66442
Region 2		6,42,31,5,43,19	34.363658
Region 3	BEACH SAND, EL27.0/- 28.0 TO -42.0	17,16,40,41,15,14,29,30,34	3526.8
Region 4	MARSH 1, EL6.0 TO -16.0	1,45,2,3,23,44,32,20,27,12,13,28,35,33,24	1721.2756
Region 5	LACUSTRINE, EL16.0 TO - 27.0	17,24,33,35,28,13,14,29,30,34	3196.4
Region 6	BAY SOUND CLAY, EL42 TO -70	36,37,38,39,15,41,40,16	7000
Region 7	EMBANKMENT FILL 2, EL 0.0 TO -6.0	20,19,26,9,10,25,11,12,27	439.7656
Region 8		43,19,20,32,44,4	204.04076
Region 9	Sheet Pile	18,21,48,22,46,6,7,47	8.325

5 6

Points

	X (ft)	Y (ft)
Point 1	60	-13.1
Point 2	95.6	-12.9
Point 3	122.5	-12.8
Point 4	160.8	-3.8
Point 5	183	0.3
Point 6	200	2.5
Point 7	200	5.5
Point 8	213	4.9
Point 9	235	-1
Point 10	262.6	-3
Point 11	310	-3.6
Point 12	310	-6
Point 13	310	-15
Point 14	310	-28
Point 15	310	-42
Point 16	60	-42
Point 17	60	-28
Point 18	200	12.5
Point 19	200	0
Point 20	200	-6
Point 21	200.5	12.5
Point 22	201	5.5
Point 23	140.8	-9.9
Point 24	60	-15
Point 25	287.5	-3.6
Point 26	231.27119	0
Point 27	235	-6
Point 28	235	-15
Point 29	235	-28
Point 30	200	-27
Point 31	184.8	1.7
Point 32	181.4	-6
Point 33	181.4	-15

Point 34	181.4	-28
Point 35	200	-16
Point 36	60	-70
Point 37	181.4	-70
Point 38	235	-70
Point 39	310	-70
Point 40	181.4	-42
Point 41	235	-42
Point 42	199	2.5
Point 43	181.37561	0
Point 44	153.58689	-6
Point 45	70	-13
Point 46	201	2.5
Point 47	200	10
Point 48	200.7	10

Critical Slip Surfaces

-	Titical Stip Surfaces										
		Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)				
	1	Optimized	1.58	(231.756, - 2.555)	24.90809	(200, 12.5)	(262.11, - 2.96452)				
	2	2572	1.68	(231.756, - 2.555)	25.403	(200, 12.5)	(263.508, - 3.02189)				

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona Strength (psf)	Cohesiv e Strength (psf)
1	Optimize d	200.25	-3.110481	414.82022	-116.28259	0	424.82
2	Optimize d	200.6	3.323451 5	376.54854	489.03129	0	424.57
3	Optimize d	200.85	-3.475573	388.55404	504.33717	0	424.39
4	Optimize	202.1361	-4.258148	423.94308	915.14709	0	423.47

	d						
5	Optimize d	203.92085	-5.474725	419.45851	963.76015	0	422.2
6	Optimize d	205.6356	-6.863365	431.31129	1156.493	0	262.92
7	Optimize d	207.7461	- 8.391351 5	464.16476	1334.4535	0	258.4
8	Optimize d	209.83485	9.720596 5	498.33491	1451.5852	0	253.93
9	Optimize d	211.9236	-11.04984	539.8157	1569.6055	0	249.45
10	Optimize d	212.984	-11.72205	565.27485	1674.8843	0	247.18
11	Optimize d	214.1813	-12.2895	584.27797	1695.5765	0	244.61
12	Optimize d	216.5439	-13.40922	625.8154	1736.2342	0	239.55
13	Optimize d	218.71025	-14.23598	657.12473	1812.5923	0	234.91
14	Optimize d	220.6804	-14.76978	675.74155	1807.6932	0	230.68
15	Optimize d	222.7129	- 15.17890 5	689.27513	1827.44	0	226.33
16	Optimize d	224.6385	- 15.44037 5	696.03199	1796.1315	0	224.36
17	Optimize d	226.71315	-15.55679	694.62902	1784.6307	0	222.56
18	Optimize d	229.1061	-15.55113	686.10391	1710.9136	0	218.42
19	Optimize d	230.7869	- 15.50358 5	678.35869	1679.1403	0	214.85
20	Optimize d	232.7485	- 15.32247 5	662.11551	1604.3309	0	208.77

21	Optimize d	234.6129	- 15.11339 5	644.90077	1555.3175	0	202.4
22	Optimize d	235.1084	- 15.02035 5	638.08801	1533.8227	0	200.31
23	Optimize d	236.14815	-14.82513	623.99681	1504.9055	0	200
24	Optimize d	238.0108	- 14.47539 5	598.66969	1453.0905	0	200
25	Optimize d	240.10205	-13.99186	565.1998	1404.3765	0	200
26	Optimize d	242.4219	-13.37452	523.3347	1319.8965	0	200
27	Optimize d	245.1057	- 12.54937 5	468.41522	1227.0962	0	200
28	Optimize d	247.6026	-11.64177	408.89802	1123.5291	0	200
29	Optimize d	249.54855	-10.85951	357.9902	1023.1152	0	200
30	Optimize d	251.7455	- 9.850487 5	292.92057	917.54427	0	200
31	Optimize d	254.1935	- 8.614702 5	213.59771	762.55985	0	200
32	Optimize d	256.9384	-6.998405	110.40035	591.1782	0	200
33	Optimize d	258.73245	-5.820675	35.52006	544.15434	0	400
34	Optimize d	260.55795	-4.302933	-60.400173	421.67908	0	400

Slip				Base	Frictiona	Cohesiv
Surfac	X (ft)	Y (ft)	PWP (psf)	Normal	1	e
e				Stress (psf)	Strength	Strength

25	2572	245.51985	-12.1875	445.51609	1219.4389	0	200
26	2572	247.72775	-11.0625	372.8211	1078.5202	0	200
27	2572	249.9357	-9.9375	300.27542	937.60152	0	200
28	2572	252.14365	-8.8125	227.97591	796.68284	0	200
29	2572	254.3516	-7.6875	155.68043	655.76417	0	200
30	2572	256.55955	-6.5625	83.550408	514.88585	0	200
31	2572	258.8976	-5.371181	7.3893982	438.12958	0	400
32	2572	261.36585	- 4.113543 5	-72.796582	279.30987	0	400
33	2572	263.0542	3.253306 5	-127.60364	173.0972	0	400

						(psf)	(psf)
1	2572	200.25	- 2.830412 5	387.72948	-127.66126	0	424.82
2	2572	200.6	- 3.084702 5	349.8149	440.38839	0	424.57
3	2572	200.85	- 3.266338 5	364.83969	458.57779	0	424.39
4	2572	201.90315	-4.03149	419.77223	865.36984	0	423.64
5	2572	203.70945	-5.34383	419.47214	988.98771	0	422.35
6	2572	205.661	- 6.761728 5	424.82988	1173.8284	0	262.87
7	2572	207.75785	-8.285186	457.85634	1307.709	0	258.38
8	2572	209.8547	- 9.808642 5	502.72758	1442.5928	0	253.88
9	2572	211.95155	-11.3321	555.16094	1578.5183	0	249.39
10	2572	214	-12.82037	615.50012	1688.0139	0	245
11	2572	216	- 14.27345 5	678.56299	1770.9786	0	240.71
12	2572	218.01935	-15	705.04297	1991.3761	0	236.39
13	2572	220.0581	-15	692.63335	1929.0827	0	232.02
14	2572	222.09685	-15	681.89142	1866.7894	0	227.65
15	2572	224.1356	-15	672.2286	1804.5451	0	223.28
16	2572	226.17435	-15	663.59582	1742.2517	0	218.91
17	2572	228.21305	-15	656.33644	1679.9584	0	214.54
18	2572	230.2518	-15	649.76375	1617.665	0	210.17
19	2572	232.2034	-15	644.01243	1561.0342	0	205.99
20	2572	234.0678	-15	639.3997	1510.0796	0	202
21	2572	236.25	-15	634.44	1475.04	0	200
22	2572	238.75	-15	629.48	1455.84	0	200
23	2572	241.10395	-14.4375	590.75272	1501.2359	0	200
24	2572	243.3119	-13.3125	518.07387	1360.3172	0	200

R11 Slope Stability Gap (Entry/Exit)

File Information

Created By: USACE St. Louis District Revision Number: 571 Last Edited By: Goltz, Amanda MVS Date: 2/21/2013 Time: 11:42:50 AM File Name: 17thReach11.gsz Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_Hlgh_water_ analyses\High water cases\ Last Solved Date: 2/21/2013 Last Solved Time: 11:44:56 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Gap (Entry/Exit) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 3000

Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1

Driving Side Maximum Convex Angle: 30 $^{\circ}$ Resisting Side Maximum Convex Angle: 10 °

Materials

EMBANKMENT FILL, EL. +2.5 TO 0.0 Model: Undrained (Phi=0) Unit Weight: 118 pcf Cohesion: 800 psf

MARSH 1, EL. -6.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi-B: 0°

BEACH SAND, EL. -27.0/-28.0 TO -42.0 Model: Shear/Normal Fn Unit Weight: 122 pcf

Strength Function: Sand

BAY SOUND CLAY, EL. -42 TO -70

Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi-B: 0 °

EMBANKMENT FILL 2, EL 0.0 TO -6.0

Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Spatial Fn: Fill 2 Phi-B: 0 °

Sheet Pile Model: Undrained (Phi=0)

Unit Weight: 0.1 pcf Cohesion: 0.01 psf LACUSTRINE, EL. -16.0 TO -27.0

Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (191.3, -6) ft Left-Zone Right Coordinate: (200, 2.4) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (220.08475, 3) ft Right-Zone Right Coordinate: (295.3, -3.6) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (60, -13.1) ft Right Coordinate: (310, -3.6) ft

Shear/Normal Strength Functions

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-10000, 0) Data Point: (0, 0) Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0

SigmaC: 600000 psf Sigma3: 300000 psf

Unit Weight Functions

Num. Points: 20

Clay

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 102) Data Point: (200, 104) Data Point: (235, 102)

Lacustrine

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 102) Data Point: (200, 103) Data Point: (235, 102)

FILL 2

Model: Spline Data Point Function Function: Unit Weight vs. > Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 106 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 106) Data Point: (200, 108) Data Point: (235, 106)

Marsh 1 Model: Spline Data Point Function

Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 105 Data Points: X (ft), Unit Weight (pcf)

Data Point: (181.4, 105) Data Point: (200, 99) Data Point: (235, 105)

Spatial Functions

Lacustrine

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Points: (181.4, -15, 200)
Data Point: (181.4, -28, 400)
Data Point: (200, -16, 275)
Data Point: (200, -27, 425)
Data Point: (235, -15, 200)
Data Point: (235, -28, 400)
Data Point: (60, -15, 200)
Data Point: (60, -28, 400)
Data Point: (310, -15, 200)
Data Point: (310, -28, 400)

Fill 2

2
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Points: (181.4, -0, 400)
Data Point: (181.4, -6, 400)
Data Point: (235, -6, 400)
Data Point: (235, -6, 400)
Data Point: (200, 0, 425)
Data Point: (200, -6, 425)
Data Point: (168.9, -6, 400)
Data Point: (168.9, -6, 400)
Data Point: (310, -3.6, 400)
Data Point: (310, -6, 400)

Marsh 1

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), V (ft), Cohesion (psf)
Data Point: (181.4, -6, 200)
Data Point: (181.4, -15, 200)
Data Point: (235, -6, 200)
Data Point: (235, -15, 200)
Data Point: (200, -6, 275)
Data Point: (200, -16, 275)

Point 8 213 4.9 262.6 Point 10 Point 11 Point 12 -6 Point 14 -28 Point 15 -42 -42 Point 16 60 -28 Point 18 200 Point 19 200 0 Point 20 200 Point 22 201 140.8 Point 24 60 Point 25 287.5 -3.6 0 Point 26 Point 28 235 Point 29 235 -28 -27 Point 30 200 184.8 Point 31 Point 32 181.4 -6 181.4 Point 33 -15 Point 35 200 -16 60 -70 181.4 -70 -70 Point 38 235 -70 Point 39 310 Point 40 -42 -42 Point 41 Point 42 199 2.5 Point 43 181.37561 0

Data Point: (153.4, -6, 200) Data Point: (153.4, -15, 200) Data Point: (60, -13.1, 200) Data Point: (60, -15, 200) Data Point: (310, -3.6, 200) Data Point: (310, -15, 200)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. +2.5 TO 0.0	46,22,8,26,19,6	109.66442
Region 2		6,42,31,5,43,19	34.363658
Region 3	BEACH SAND, EL27.0/- 28.0 TO -42.0	17,16,40,41,15,14,29,30,34	3526.8
Region 4	MARSH 1, EL6.0 TO -16.0	1,45,2,3,23,44,32,20,27,12,13,28,35,33,24	1721.2756
Region 5	LACUSTRINE, EL16.0 TO - 27.0	17,24,33,35,28,13,14,29,30,34	3196.4
Region 6	BAY SOUND CLAY, EL42 TO -70	36,37,38,39,15,41,40,16	7000
Region 7	EMBANKMENT FILL 2, EL 0.0 TO -6.0	20,19,26,9,10,25,11,12,27	439.7656
Region 8		43,19,20,32,44,4	204.04076
Region 9	Sheet Pile	18,21,48,22,46,6,7,47	8.325

Points

	X (ft)	Y (ft)
Point 1	60	-13.1
Point 2	95.6	-12.9
Point 3	122.5	-12.8
Point 4	160.8	-3.8
Point 5	183	0.3
Point 6	200	2.5
Point 7	200	5.5

6

Point 44	153.58689	-6
Point 45	70	-13
Point 46	201	2.5
Point 47	200	10
Point 48	200.7	10

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.57	(232.656, 30.3)	26.05938	(200, 12.5)	(263.964, - 3.03286)
2	6435	1.62	(232.656, 30.3)	46.448	(200, 12.5)	(264.978, -3.0573)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	3.127166 5	416.53542	-85.29514	0	424.82
2	Optimize d	200.6	-3.29467	373.32416	524.20981	0	424.57
3	Optimize d	200.85	- 3.414315 5	381.61512	536.2817	0	424.39
4	Optimize d	201.6017	3.774056 5	407.51985	910.44698	0	423.86
5	Optimize d	203.3417	-5.031005	413.80625	908.28666	0	422.61
6	Optimize d	205.47695	-6.84866	436.39238	1145.6112	0	263.26
7	Optimize d	207.3046	-8.299235	469.02843	1305.023	0	259.35
8	Optimize d	208.966	-9.503065	500.80714	1411.5207	0	255.79

9	Optimize d	210.59755	- 10.61904 5	534.82567	1532.652	0	252.29
10	Optimize d	212.1992	-11.64717	569.87122	1624.2854	0	248.86
11	Optimize d	213.7208	- 12.62391 5	607.70294	1694.2128	0	245.6
12	Optimize d	215.339	-13.50582	641.04926	1782.7116	0	242.13
13	Optimize d	217.13375	- 14.34425 5	673.81097	1812.8483	0	238.28
14	Optimize d	219.14475	-15.09233	703.47271	1878.2812	0	233.98
15	Optimize d	220.82255	-15.58779	722.32167	1878.1162	0	233.07
16	Optimize d	222.3996	- 15.91690 5	733.55056	1903.9658	0	235.25
17	Optimize d	224.42535	- 16.24193 5	743.63992	1875.891	0	236.68
18	Optimize d	226.4429	-16.43869	747.50988	1872.8283	0	236.26
19	Optimize d	228.4523	-16.50717	745.07272	1818.6638	0	233.96
20	Optimize d	230.3641	-16.45495	736.43351	1792.7144	0	230.02
21	Optimize d	232.1804	- 16.28183 5	721.17161	1721.2751	0	224.38
22	Optimize d	234.0448	-16.00127	699.90551	1669.9446	0	216.99
23	Optimize d	235.9943	-15.60552	671.70917	1593.2271	0	209.32
24	Optimize d	237.9829	-15.20184	643.1258	1534.6805	0	203.11
25	Optimize	240.1119	-14.76966	612.91355	1471.9339	0	200
							0

	d						
26	Optimize d	242.24475	- 14.26397 5	578.34171	1419.2719	0	200
27	Optimize d	244.2411	- 13.71328 5	541.40163	1344.426	0	200
28	Optimize d	246.56475	-12.9515	491.24805	1265.7641	0	200
29	Optimize d	249.2157	-11.97862	427.85892	1139.4816	0	200
30	Optimize d	251.7137	-10.93174	360.11704	1030.5272	0	200
31	Optimize d	254.05875	-9.81086	288.1321	889.32749	0	200
32	Optimize d	256.5415	-8.437815	200.43159	747.23625	0	200
33	Optimize d	259.22525	-6.773335	94.505537	541.43701	0	200
34	Optimize d	261.5994	-5.062503	-13.842074	499.72208	0	400
35	Optimize d	263.2819	-3.618204	-105.00634	324.98386	0	400

		Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
	1	6435	200.25	-2.973481	401.0469	-161.83147	0	424.82
	2	6435	200.6	-3.312331	375.29195	394.86705	0	424.57
	3	6435	200.85	- 3.548647 5	396.85586	422.19225	0	424.39
	4	6435	202.3392	- 4.844797 5	455.30814	898.65754	0	423.33
	5	6435	204.8436	-6.871819	461.1555	1181.784	0	264.62
ı	6	6435	207.174	-8.508717	483.77487	1348.3068	0	259.63

7	6435	209.5044	-9.944113	515.45146	1495.6573	0	254.63
8	6435	211.8348	- 11.19904 5	549.1159	1625.7927	0	249.64
9	6435	214.091	-12.25956	583.56679	1709.7852	0	244.81
10	6435	216.27295	- 13.14685 5	613.30699	1749.0956	0	240.13
11	6435	218.4549	- 13.90870 5	640.06849	1775.6894	0	235.45
12	6435	220.6369	- 14.55151 5	663.31409	1790.0715	0	230.78
13	6435	222.8189	- 15.08036 5	682.95523	1792.6231	0	226.1
14	6435	225.13675	- 15.51820 5	698.50454	1781.9527	0	224.67
15	6435	227.5905	- 15.85420 5	709.21354	1756.8095	0	225.55
16	6435	230.0443	-16.05798	713.60417	1717.6873	0	224.52
17	6435	232.2034	-16.13619	712.36486	1675.3071	0	222.12
18	6435	234.0678	-16.11693	706.86931	1632.7957	0	218.73
19	6435	235.98975	- 16.01734 5	696.71716	1599.9754	0	215.65
20	6435	237.9692	-15.83212	681.53634	1576.4166	0	212.8
21	6435	239.94865	- 15.56074 5	661.61364	1543.6487	0	208.63
22	6435	241.92815	-15.20168	636.48707	1501.2739	0	203.1
23	6435	243.95765	- 14.73909 5	604.98559	1447.4692	0	200
24	6435	246.0372	-	566.89092	1381.4714	0	200

			14.16528				
			5				
25	6435	248.11675	- 13.48523 5	522.35896	1303.993	0	200
26	6435	250.1963	- 12.69389 5	470.98131	1214.4087	0	200
27	6435	252.27585	-11.78497	412.53891	1111.9557	0	200
28	6435	254.3554	-10.75062	346.27993	995.70572	0	200
29	6435	256.43495	9.581042 5	271.69466	864.38727	0	200
30	6435	258.5145	- 8.263885 5	187.97638	716.5988	0	200
31	6435	260.59405	-6.783343	94.13686	550.2647	0	200
32	6435	262.1169	-5.603604	19.498257	535.32394	0	400
33	6435	263.7889	-4.132252	-73.296433	386.29117	0	400

Slope Stability Gap (Entry/Exit) Report generated using GeoStudio 2007, version 7.22. Copyright © 1991-2013 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 575 Last Edited By: Goetz, Ryan MVS Date: 7/25/2014 Time: 2:52:30 PM File Name: 17thReach11.gsz Directory: C:\Users\B3ECGANG\Desktop\
Last Solved Date: 7/25/2014 Last Solved Time: 2:54:00 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Slope Stability Gap (Entry/Exit) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer Settings PWP Conditions Source: Parent Analysis Slip Surface Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack
Tension Crack Option: (none) FOS Distribution
FOS Calculation Option: Constant Advanced

Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf LACUSTRINE, EL. -16.0 TO -27.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (191.3, -6) ft Left-Zone Right Coordinate: (200, 2.4) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (220.08475, 3) ft Right-Zone Right Coordinate: (295.3, -3.6) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (60, -13.1) ft Right Coordinate: (310, -3.6) ft

Shear/Normal Strength Functions

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-10000, 0) Data Point: (0, 0) Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0

Optimization Maximum Iterations: 3000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 30 ° Resisting Side Maximum Convex Angle: 10 ° Materials EMBANKMENT FILL, EL. +2.5 TO 0.0 Unit Weight: 118 pcf Cohesion: 800 psf MARSH 1, EL. -6.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi: ∩ ° BEACH SAND, EL. -27.0/-28.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi-B: 0 ° EMBANKMENT FILL 2, EL 0.0 TO -6.0 Model: Spatial Mohr-Coulomb

Number of Slices: 30

Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft

SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Weight En: FILL 2 Cohesion Spatial Fn: Fill 2

Phi-B: 0 °

Unit Weight Functions

Clay Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 102) Data Point: (200, 104) Data Point: (235, 102) Lacustrine Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 102) Data Point: (200, 103) Data Point: (235, 102) FILL 2 Model: Spline Data Point Function Function: Unit Weight vs. > Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 106 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 106)
Data Point: (200, 108) Data Point: (235, 106) Marsh 1 Model: Spline Data Point Function Function: Unit Weight vs. X

Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 105 Data Points: X (ft), Unit Weight (pcf)

Data Point: (181.4, 105) Data Point: (200, 99) Data Point: (235, 105)

Spatial Functions

Lacustrine

Model: Linear Interpolation Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -15, 200)
Data Point: (181.4, -28, 400)
Data Point: (200, -16, 275)
Data Point: (200, -27, 425)
Data Point: (255, -15, 200)
Data Point: (255, -15, 200) Data Point: (235, -13, 200)
Data Point: (235, -28, 400)
Data Point: (60, -15, 200)
Data Point: (60, -28, 400)
Data Point: (310, -15, 200) Data Point: (310, -28, 400)

Fill 2

| 2 | Model: Linear Interpolation | Limit Range By: Data Values | Data Points: X (ft), Y (ft), Cohesion (psf) | Data Point: (181.4, 0, 400) | Data Point: (181.4, 6, 400) | Data Point: (235, -1, 400) | Data Point: (235, -6, 400) | Data Point: (200, -6, 425) | Data Point: (200, -6, 425) | Data Point: (168.9, -2.2, 400) | Data Point: (168.9, -6, 400) | Data Point: (310, -3.6, 400) | Data Point: (310, -3.6, 400)

rrsh 1
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), V (ft), Cohesion (psf)
Data Point: (181.4, -6, 200)
Data Point: (181.4, -15, 200)
Data Point: (235, -6, 200)
Data Point: (235, -6, 200)
Data Point: (200, -6, 275)
Data Point: (200, -16, 275)

Point 8	213	4.9
Point 9	235	-1
Point 10	262.6	-3
Point 11	310	-3.6
Point 12	310	-6
Point 13	310	-15
Point 14	310	-28
Point 15	310	-42
Point 16	60	-42
Point 17	60	-28
Point 18	200	12.5
Point 19	200	0
Point 20	200	-6
Point 21	200.5	12.5
Point 22	201	5.5
Point 23	140.8	-9.9
Point 24	60	-15
Point 25	287.5	-3.6
Point 26	231.27119	0
Point 27	235	-6
Point 28	235	-15
Point 29	235	-28
Point 30	200	-27
Point 31	184.8	1.7
Point 32	181.4	-6
Point 33	181.4	-15
Point 34	181.4	-28
Point 35	200	-16
Point 36	60	-70
Point 37	181.4	-70
Point 38	235	-70
Point 39	310	-70
Point 40	181.4	-42
Point 41	235	-42
Point 42	199	2.5
Point 43	181.37561	0

Data Point: (153.4, -6, 200) Data Point: (153.4, -15, 200) Data Point: (60, -13.1, 200) Data Point: (60, -15, 200) Data Point: (310, -3.6, 200) Data Point: (310, -15, 200)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. +2.5 TO 0.0	46,22,8,26,19,6	109.66442
Region 2		6,42,31,5,43,19	34.363658
Region 3	BEACH SAND, EL27.0/- 28.0 TO -42.0	17,16,40,41,15,14,29,30,34	3526.8
Region 4	MARSH 1, EL6.0 TO -16.0	1,45,2,3,23,44,32,20,27,12,13,28,35,33,24	1721.2756
Region 5	LACUSTRINE, EL16.0 TO - 27.0	17,24,33,35,28,13,14,29,30,34	3196.4
Region 6	BAY SOUND CLAY, EL42 TO -70	36,37,38,39,15,41,40,16	7000
Region 7	EMBANKMENT FILL 2, EL 0.0 TO -6.0	20,19,26,9,10,25,11,12,27	439.7656
Region 8		43,19,20,32,44,4	204.04076
Region 9	Sheet Pile	18,21,48,22,46,6,7,47	8.325

Points

	X (ft)	Y (ft)
Point 1	60	-13.1
Point 2	95.6	-12.9
Point 3	122.5	-12.8
Point 4	160.8	-3.8
Point 5	183	0.3
Point 6	200	2.5
Point 7	200	5.5

Point 44	153.58689	-6
Point 45	70	-13
Point 46	201	2.5
Point 47	200	10
Point 48	200.7	10

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.53	(232.656, 30.3)	25.90096	(200, 12.5)	(264.016, - 3.03411)
2	6435	1.59	(232.656, 30.3)	46.448	(200, 12.5)	(264.978, -3.0573)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	Optimize d	200.25	3.131976 5	442.21652	-206.48946	0	424.82
2	Optimize d	200.6	-3.306209	397.46494	517.07414	0	424.57
3	Optimize d	200.85	3.430660 5	406.36627	529.60703	0	424.39
4	Optimize d	201.3536	- 3.681345 5	424.85704	892.22384	0	424.03
5	Optimize d	202.9774	-4.92868	444.43308	894.9143	0	422.87
6	Optimize d	205.29425	-6.882795	461.12617	1143.9785	0	263.66
7	Optimize d	207.389	-8.507895	491.97394	1321.6763	0	259.17
8	Optimize d	209.48515	-9.992505	529.0754	1452.5631	0	254.67

9	Optimize d	211.7666	-11.49541	575.06027	1611.5904	0	249.79
10	Optimize d	213.67175	- 12.67025 5	618.22967	1699.8924	0	245.7
11	Optimize d	215.1605	- 13.46325 5	646.73421	1779.3519	0	242.51
12	Optimize d	216.7945	- 14.22076 5	675.27313	1806.1141	0	239.01
13	Optimize d	219.04635	-15.00717	704.12928	1872.9182	0	234.19
14	Optimize d	221.2094	-15.62172	726.63053	1870.3372	0	232.91
15	Optimize d	223.22865	-15.99069	737.61786	1896.3254	0	234.95
16	Optimize d	225.8107	-16.31483	745.80294	1851.3651	0	235.45
17	Optimize d	228.14405	- 16.43556 5	744.73347	1844.4831	0	233.39
18	Optimize d	230.2288	-16.35289	733.32618	1771.7736	0	228.69
19	Optimize d	231.5544	-16.30032	726.42407	1726.4502	0	225.7
20	Optimize d	233.4188	-16.01907	704.75898	1683.9719	0	218.31
21	Optimize d	235.84425	- 15.60487 5	674.08292	1589.1474	0	209.31
22	Optimize d	237.74075	-15.23035	647.30312	1547.6788	0	203.54
23	Optimize d	240.3715	- 14.65444 5	607.16048	1465.4221	0	200
24	Optimize d	243.0523	-13.99103	561.92997	1391.2485	0	200
25	Optimize	245.2569	-13.35531	519.43546	1305.3878	0	200

10	6435	216.27295	- 13.14685 5	619.61073	1745.2362	0	240.13
11	6435	218.4549	- 13.90870 5	645.43548	1772.5041	0	235.45
12	6435	220.6369	- 14.55151 5	667.91798	1787.5483	0	230.78
13	6435	222.8189	- 15.08036 5	686.98632	1790.7867	0	226.1
14	6435	225.13675	- 15.51820 5	702.04351	1780.8267	0	224.67
15	6435	227.5905	- 15.85420 5	712.25181	1756.4449	0	225.55
16	6435	230.0443	-16.05798	716.28965	1718.0128	0	224.52
17	6435	232.2034	-16.13619	714.77838	1676.2725	0	222.12
18	6435	234.0678	-16.11693	709.06739	1634.2432	0	218.73
19	6435	235.98975	- 16.01734 5	698.78308	1601.9405	0	215.65
20	6435	237.9692	-15.83212	683.44343	1578.8758	0	212.8
21	6435	239.94865	- 15.56074 5	663.35985	1546.5923	0	208.63
22	6435	241.92815	-15.20168	638.12062	1504.6895	0	203.1
23	6435	243.95765	- 14.73909 5	606.52476	1451.3404	0	200
24	6435	246.0372	- 14.16528 5	568.31839	1385.7999	0	200
25	6435	248.11675	- 13.48523 5	523.67392	1308.7994	0	200
26	6435	250.1963	-	472.27252	1219.5736	0	200

	d						
26	Optimize d	247.5356	-12.59133	469.13747	1227.2684	0	200
27	Optimize d	249.88845	- 11.69909 5	410.95727	1111.6631	0	200
28	Optimize d	252.10635	-10.75007	349.61513	1014.4329	0	200
29	Optimize d	254.1893	-9.74425	284.98367	887.46128	0	200
30	Optimize d	256.54225	-8.431005	201.03666	752.2455	0	200
31	Optimize d	259.22985	-6.770325	95.25561	546.02213	0	200
32	Optimize d	261.603	-5.076122	-12.127492	508.32035	0	400
33	Optimize d	263.3078	-3.633187	-103.26978	332.89837	0	400

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	6435	200.25	-2.973481	425.97711	-267.29774	0	424.82
2	6435	200.6	-3.312331	398.15972	389.51194	0	424.57
3	6435	200.85	- 3.548647 5	420.03028	416.82375	0	424.39
4	6435	202.3392	- 4.844797 5	477.47278	891.58973	0	423.33
5	6435	204.8436	-6.871819	477.99101	1175.4621	0	264.62
6	6435	207.174	-8.508717	497.11841	1342.2807	0	259.63
7	6435	209.5044	-9.944113	526.23807	1490.078	0	254.63
8	6435	211.8348	- 11.19904 5	557.89899	1620.6916	0	249.64
9	6435	214.091	-12.25956	590.96009	1705.2484	0	244.81

12.69389 27 6435 252.27585 -11.78497 413.71132 1117.4908 0 200 28 6435 254.3554 -10.75062 347.37678 1001.445 0 200 29 6435 256.43495 9.581042 272.71897 870.33489 0 200 6435 258.5145 8.263885 188.93493 722.58976 0 200 30 5 31 6435 260.59405 -6.783343 95.035596 556.14106 200 32 6435 262.1169 -5.603604 20.348791 545.02146 0 400 33 6435 263.7889 -4.132252 -72.488476 400

Slope Stability Gap (Block) Report generated using GeoStudio 2007, version 7.22. Copyright © 1991-2013 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 582 Last Edited By: Goetz, Ryan MVS Date: 7/30/2014 Time: 9:09:06 AM File Name: 17thReach11.gsz Directory: C:\Users\B3ECGANG\Desktop\
Last Solved Date: 7/30/2014 Last Solved Time: 9:09:48 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Slope Stability Gap (Block) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer Settings PWP Conditions Source: Parent Analysis Slip Surface Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack
Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant Restrict Block Crossing: Yes

Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf LACUSTRINE, EL. -16.0 TO -27.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (60, -13.1) ft Right Coordinate: (310, -3.6) ft

Slip Surface Block

Upper Left: (202, -10) ft Lower Left: (202, -40) ft Lower Right: (232, -40) ft X Increments: 6 Y Increments: 6 Starting Angle: 135 Ending Angle: 180 ° Angle Increments: 5 Upper Left: (235, -10) ft Lower Left: (235, -40) ft Lower Right: (265, -40) ft X Increments: 6 Y Increments: 6 Starting Angle: 0

Angle Increments: 5

Shear/Normal Strength Functions

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 %

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 3000 Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 30 $^{\circ}$ Resisting Side Maximum Convex Angle: 10 ° Materials EMBANKMENT FILL, EL. +2.5 TO 0.0 Model: Undrained (Phi=0) Unit Weight: 118 pcf Cohesion: 800 psf MARSH 1, EL. -6.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi-B: 0 ° BEACH SAND, EL. -27.0/-28.0 TO -42.0 Model: Shear/Normal Fn Unit Weight: 122 pcf Strength Function: Sand BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi-B: 0 ° EMBANKMENT FILL 2, EL 0.0 TO -6.0 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Spatial Fn: Fill 2 Phi-B: 0 °

Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (0, 0) Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Unit Weight Functions

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 102) Data Point: (200, 104) Data Point: (235, 102) Lacustrine Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (181.4, 102) Data Point: (200, 103) Data Point: (235, 102) Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 106

Data Points: X (ft), Unit Weight (pcf)

Data Point: (181.4, 106) Data Point: (200, 108)

Data Point: (235, 106)

Marsh 1

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 105 Data Points: X (ft), Unit Weight (pcf)

Data Point: (181.4, 105) Data Point: (200, 99) Data Point: (235, 105)

Spatial Functions

Lacustrine Model: Linear Interpolation wide: Linear interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf) Data Point: (181.4, -15, 200) Data Point: (181.4, -28, 400) Data Point: (200, -16, 275) Data Point: (200, -27, 425)
Data Point: (235, -15, 200) Data Point: (235, -28, 400)
Data Point: (60, -15, 200)
Data Point: (60, -28, 400)
Data Point: (310, -15, 200)

Data Point: (310, -28, 400)

Fill 2

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, 0, 400)

Data Point: (181.4, 0, 400)
Data Point: (181.4, -6, 400)
Data Point: (235, -1, 400)
Data Point: (235, -6, 400)
Data Point: (200, 0, 425)
Data Point: (200, -6, 425)
Data Point: (168.9, -6, 400)
Data Point: (168.9, -6, 400)
Data Point: (310, -3.6, 400)
Data Point: (310, -6, 400)

Points

	X (ft)	Y (ft)
Point 1	60	-13.1
Point 2	95.6	-12.9
Point 3	122.5	-12.8
Point 4	160.8	-3.8
Point 5	183	0.3
Point 6	200	2.5
Point 7	200	5.5
Point 8	213	4.9
Point 9	235	-1
Point 10	262.6	-3
Point 11	310	-3.6
Point 12	310	-6
Point 13	310	-15
Point 14	310	-28
Point 15	310	-42
Point 16	60	-42
Point 17	60	-28
Point 18	200	12.5
Point 19	200	0
Point 20	200	-6
Point 21	200.5	12.5
Point 22	201	5.5
Point 23	140.8	-9.9
Point 24	60	-15
Point 25	287.5	-3.6
Point 26	231.27119	0
Point 27	235	-6
Point 28	235	-15
Point 29	235	-28
Point 30	200	-27
Point 31	184.8	1.7
Point 32	181.4	-6
Point 33	181.4	-15

Marsh 1

Model: Linear Interpolation Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -6, 200)
Data Point: (181.4, -15, 200)
Data Point: (235, -6, 200)
Data Point: (235, -15, 200)
Data Point: (200, -6, 275)
Data Point: (200, -6, 275)
Data Point: (200, -6, 275) Data Point: (200, -16, 275) Data Point: (153.4, -6, 200)

Data Point: (153.4, -15, 200) Data Point: (60, -13.1, 200) Data Point: (60, -15, 200) Data Point: (310, -3.6, 200) Data Point: (310, -15, 200)

Regions

	Material	Points	Area (ft²)
Region 1	EMBANKMENT FILL, EL. +2.5 TO 0.0	46,22,8,26,19,6	109.66442
Region 2		6,42,31,5,43,19	34.363658
Region 3	BEACH SAND, EL27.0/- 28.0 TO -42.0	17,16,40,41,15,14,29,30,34	3526.8
Region 4	MARSH 1, EL6.0 TO -16.0	1,45,2,3,23,44,32,20,27,12,13,28,35,33,24	1721.2756
Region 5	LACUSTRINE, EL16.0 TO - 27.0	17,24,33,35,28,13,14,29,30,34	3196.4
Region 6	BAY SOUND CLAY, EL42 TO -70	36,37,38,39,15,41,40,16	7000
Region 7	EMBANKMENT FILL 2, EL 0.0 TO -6.0	20,19,26,9,10,25,11,12,27	439.7656
Region 8		43,19,20,32,44,4	204.04076
Region 9	Sheet Pile	18,21,48,22,46,6,7,47	8.325

Point 34	181.4	-28
Point 35	200	-16
Point 36	60	-70
Point 37	181.4	-70
Point 38	235	-70
Point 39	310	-70
Point 40	181.4	-42
Point 41	235	-42
Point 42	199	2.5
Point 43	181.37561	0
Point 44	153.58689	-6
Point 45	70	-13
Point 46	201	2.5
Point 47	200	10
Point 48	200.7	10

Critical Slip Surfaces

-	rical Slip Surfaces									
		Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)			
	1	Optimized	1.53	(231.756, - 2.555)	25.21267	(200, 12.5)	(262.604, - 3.00008)			
	2	2572	1.64	(231.756, - 2.555)	25.403	(200, 12.5)	(263.508, - 3.02189)			

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	-3.07797	436.59206	-192.26429	0	424.82
2	Optimize d	200.6	-3.220234	387.64595	536.61512	0	424.57
3	Optimize d	200.85	-3.321851	393.78018	546.8826	0	424.39
4	Optimize d	201.41955	- 3.553350	408.20481	909.78014	0	423.99

			5				
5	Optimize d	203.14625	-4.86194	431.72786	878.34189	0	422.75
6	Optimize d	205.24545	-6.6896	452.74102	1118.9859	0	263.76
7	Optimize d	207.2466	-8.22551	479.55091	1297.4469	0	259.47
8	Optimize d	209.59175	-9.79597	516.98153	1452.4843	0	254.45
9	Optimize d	211.8639	-11.24427	560.0695	1580.6348	0	249.58
10	Optimize d	213.39705	-12.2215	596.62972	1657.9773	0	246.29
11	Optimize d	214.6646	- 12.88895 5	619.49803	1733.5572	0	243.58
12	Optimize d	216.4056	- 13.71770 5	650.30438	1763.9487	0	239.85
13	Optimize d	218.19005	- 14.42364 5	676.49019	1828.9731	0	236.02
14	Optimize d	220.018	- 15.00677 5	697.96276	1833.351	0	232.1
15	Optimize d	221.22725	- 15.34170 5	710.53998	1884.1624	0	229.51
16	Optimize d	222.67375	-15.55415	715.25348	1862.2803	0	229.41
17	Optimize d	224.9762	- 15.89230 5	724.53524	1827.2589	0	230.53
18	Optimize d	227.4119	-16.04726	724.2947	1817.8987	0	228.76
19	Optimize d	229.9809	-16.01902	714.1745	1736.3144	0	224.04
20	Optimize d	231.2683	-16.00442	709.543	1741.107	0	221.66

Slices	of	qil2	Surface:	2572

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	2572	200.25	- 2.830412 5	412.46922	-239.50139	0	424.82
2	2572	200.6	3.084702 5	372.18017	436.50511	0	424.57
3	2572	200.85	- 3.266338 5	387.35733	454.64058	0	424.39
4	2572	201.90315	-4.03149	442.61914	859.63684	0	423.64
5	2572	203.70945	-5.34383	438.68666	982.71724	0	422.35
6	2572	205.661	- 6.761728 5	440.37855	1167.4623	0	262.87
7	2572	207.75785	-8.285186	470.66567	1300.7642	0	258.38
8	2572	209.8547	- 9.808642 5	513.29913	1435.1078	0	253.88
9	2572	211.95155	-11.3321	563.84197	1570.4546	0	249.39
10	2572	214	-12.82037	622.78127	1679.4383	0	245
11	2572	216	- 14.27345 5	684.63062	1762.0794	0	240.71
12	2572	218.01935	-15	710.2913	1992.5532	0	236.39
13	2572	220.0581	-15	697.29308	1930.2599	0	232.02
14	2572	222.09685	-15	686.10971	1867.9666	0	227.65
15	2572	224.1356	-15	676.00544	1805.6732	0	223.28
16	2572	226.17435	-15	666.98026	1743.3308	0	218.91
17	2572	228.21305	-15	659.42658	1681.0375	0	214.54
18	2572	230.2518	-15	652.51054	1618.7441	0	210.17
19	2572	232.2034	-15	646.58698	1562.0533	0	205.99
20	2572	234.0678	-15	641.70607	1511.0987	0	202
21	2572	236.25	-15	636.56	1476.04	0	200

21	Optimize d	232.2034	- 15.85063 5	697.66408	1698.5913	0	217.76
22	Optimize d	234.0678	-15.54403	674.53563	1613.8576	0	209.94
23	Optimize d	235.67515	- 15.27969 5	654.76138	1554.5121	0	204.3
24	Optimize d	236.7078	-15.08433	640.68016	1545.1033	0	201.3
25	Optimize d	238.15515	-14.7429	616.73462	1497.0952	0	200
26	Optimize d	240.33485	-14.2287	581.10225	1424.8927	0	200
27	Optimize d	242.5986	-13.6153	539.54122	1358.594	0	200
28	Optimize d	244.9464	-12.9027	491.9778	1263.1818	0	200
29	Optimize d	247.33135	- 12.06342 5	436.76864	1176.6944	0	200
30	Optimize d	249.7534	- 11.09747 5	373.80937	1052.2868	0	200
31	Optimize d	252.1974	-9.983355	301.88897	936.47235	0	200
32	Optimize d	254.6634	-8.721065	220.88662	777.8247	0	200
33	Optimize d	257.46005	-7.04496	113.87443	600.95668	0	200
34	Optimize d	259.26965	-5.835615	36.969486	555.42955	0	400
35	Optimize d	261.0578	- 4.337160 5	-57.747497	434.32611	0	400
36	Optimize d	262.60175	- 3.001587 5	-142.15389	268.2001	0	400

22	2572	238.75	-15	631.36	1456.84	0	200
23	2572	241.10395	-14.4375	592.48797	1508.9033	0	200
24	2572	243.3119	-13.3125	519.72841	1367.5003	0	200
25	2572	245.51985	-12.1875	447.00921	1226.0974	0	200
26	2572	247.72775	-11.0625	374.22948	1084.6945	0	200
27	2572	249.9357	-9.9375	301.58291	943.33189	0	200
28	2572	252.14365	-8.8125	229.19059	801.92896	0	200
29	2572	254.3516	-7.6875	156.80229	660.52602	0	200
30	2572	256.55955	-6.5625	84.587524	519.12309	0	200
31	2572	258.8976	-5.371181	8.345291	444.62734	0	400
32	2572	261.36585	- 4.113543 5	-71.915775	285.24449	0	400
33	2572	263.0542	3.253306 5	-126.76989	178.65883	0	400

R12 Slope Stability Gap (Block) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 763 Last Edited By: Redell, Chris MVS Date: 2/26/2013 Time: 4:03:48 PM File Name: 17thReach12.gsz Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/26/2013 Last Solved Time: 4:04:22 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Gap (Block) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: Yes Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant

Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL, EL. +2.4 TO -3 Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 500 psf Phi-B: 0 ° MARSH 1b, EL. -5 TO -8 Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion Spatial Fn: Marsh 1b Phi-B: 0 ° BEACH SAND, EL. -25 TO -42 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Phi-B: 0 ° BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Phi: 0

Restrict Block Crossing: Yes

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf

Cohesion: 0.01 psf

MARSH 2, EL. -8 TO -15 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Marsh 2 Phi-R·∩°

Lacustrine 1, EL. -15 TO -19 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Lacustrine 1

Phi-B: 0°

Lacustrine 2, EL. -19 TO -25 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine 2

Phi-B: 0 °

MARSH 1a, EL. -0.4 TO -5 Model: Spatial Mohr-Coulomb

Weight Spatial Fn: Marsh 1a unit wt Cohesion Spatial Fn: Marsh 1a Phi: 0 ° Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (40, -12) ft Right Coordinate: (310, -1.8) ft

Slip Surface Block

Left Grid Upper Left: (200, 0) ft Lower Left: (200, -30) ft Lower Right: (230, -30) ft X Increments: 6 Y Increments: 6 Starting Angle: 135 ° Ending Angle: 180 ° Angle Increments: 5 Right Grid

Upper Left: (235, 0) ft Lower Left: (235, -30) ft Lower Right: (265, -30) ft X Increments: 6 Y Increments: 6 Starting Angle: 0 ° Ending Angle: 45 ° Angle Increments: 5

Unit Weight Functions

Clav

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 102 Data Points: X (ft), Unit Weight (pcf) Data Point: (175.3, 102) Data Point: (200, 104) Data Point: (265, 102)

Spatial Functions

Marsh 1a unit wt Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Unit Weight (pcf) Data Point: (184.169, 0.445, 104) Data Point: (175.3, -3, 104) Data Point: (168.898, -5, 67) Data Point: (200, -5, 104) Data Point: (200, 0.4364, 104) Data Point: (265, -1.2, 104) Data Point: (265, -3, 104) Data Point: (265, -5, 67) Data Point: (310, -1.8, 104) Data Point: (310, -3, 104) Data Point: (310, -5, 67) Lacustrine 1 Model: Linear Internolation Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (175.3, -15, 250)

Data Point: (175.3, -19, 290) Data Point: (200, -15, 275) Data Point: (200, -19, 311) Data Point: (265, -15, 250) Data Point: (265, -19, 290) Data Point: (40, -15, 250) Data Point: (40, -19, 290) Data Point: (310, -15, 250) Data Point: (310, -19, 290)

Lacustrine 2

Model: Linear Interpolation

Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (175.3, -19, 290)
Data Point: (175.3, -25, 350) Data Point: (200, -19, 290)
Data Point: (200, -25, 365)
Data Point: (265, -19, 290)
Data Point: (265, -25, 350) Data Point: (40, -19, 290) Data Point: (40, -25, 350) Data Point: (310, -19, 290) Data Point: (310, -25, 350)

Marsh 1a

Model: Linear Interpolation Limit Range By: Data Values
Data Points: X (ft), V (ft), Cohesion (psf)
Data Point: (175.3, -3, 700)
Data Point: (168.898, -5, 275)

Data Point: (168.898, -5, 275)
Data Point: (265, -1.2, 700)
Data Point: (265, -3, 700)
Data Point: (310, -3, 700)
Data Point: (310, -5, 275)
Data Point: (200, 0.4364, 500) Data Point: (200, -5, 500) Data Point: (184.169, 0.445, 700) Data Point: (265, -5, 275) Data Point: (310, -1.8, 700)

Marsh 1b

Model: Linear Interpolation

Data Point: (156.5, -8, 150)

Data Point: (175.5, -8, 150)

Data Point: (175.3, -8, 150)

Data Point: (175.3, -8, 150)

Data Point: (200, -5, 275) Data Point: (200, -8, 275) Data Point: (265, -5, 150) Data Point: (265, -8, 150)
Data Point: (310, -5, 150) Data Point: (310, -8, 150)

Marsh 2

Model: Linear Interpolation

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), V (ft), Cohesion (psf)
Data Point: (40, -12, 250)
Data Point: (40, -15, 250)
Data Point: (175.3, -8, 250)
Data Point: (175.3, -15, 250)
Data Point: (200, -8, 275)
Data Point: (200, -8, 275)
Data Point: (200, -15, 275)
Data Point: (265, -8, 250)
Data Point: (265, -15, 250)
Data Point: (310, -8, 250)
Data Point: (310, -8, 250)
Data Point: (310, -8, 250) Data Point: (310, -15, 250)

Regions

5

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL25 TO -42	15,14,33,35,13,12,32	4590
Region 2	Sheet Pile	16,17,6,21,5	8.275
Region 3	Lacustrine 1, EL15 TO -19	24,37,31,38,25,30	1080
Region 4	Lacustrine 2, EL19 TO -25	15,32,12,38,31,37	1620
Region 5	BAY SOUND CLAY, EL42 TO -70	22,34,36,23,13,35,33,14	7560
Region 6	MARSH 2, EL8 TO -15	24,1,18,45,42,49,11,25,30	1489.9512
Region 7	MARSH 1a, EL0.4 TO -5	27,29,28,26	155
Region 8		27,40,39	31.102
Region 9	EMBANKMENT FILL, EL. +2.4 TO -3	5,46,44,8,7,6,21	109.67894
Region 10		5,46,43,4,20	27.4692
Region 11	MARSH 1a, EL0.4 TO -5	46,27,29,28,10,9,19,44	331.06608
Region 12		46,27,39,3,43	92.53579
Region 13	MARSH 1b, EL5 TO -8	47,48,26,27	110
Region 14		41,47,27,40	32.692
Region 15	MARSH 1b, EL5 TO -8	41,2,42,49,11,48,47	297.52797

6

Points

	X (ft)	Y (ft)
Point 1	40	-12
Point 2	165.4	-6.1
Point 3	181.3	-1.1
Point 4	187.8	2.4
Point 5	200	2.4
Point 6	201	5.5
Point 7	211.5	5
Point 8	225	2
Point 9	284.9	-1.8
Point 10	310	-1.8
Point 11	310	-8
Point 12	310	-25
Point 13	310	-42
Point 14	40	-42
Point 15	40	-25
Point 16	200	12.4
Point 17	200.5	12.4
Point 18	140.9	-11.4
Point 19	265	-1.2
Point 20	199	2.4
Point 21	201	2.4
Point 22	40	-70
Point 23	310	-70
Point 24	40	-15
Point 25	310	-15
Point 26	310	-5
Point 27	200	-5
Point 28	310	-3
Point 29	265	-3
Point 30	175.3	-15
Point 31	175.3	-19
Point 32	175.3	-25
Point 33	175.3	-42

Point 34	175.3	-70
Point 35	265	-42
Point 36	265	-70
Point 37	40	-19
Point 38	310	-19
Point 39	175.3	-3
Point 40	168.898	-5
Point 41	165.718	-6
Point 42	156.61698	-8
Point 43	184.16903	0.44486
Point 44	244.84451	0.41244
Point 45	149	-9.64775
Point 46	200	0.4364
Point 47	200	-6
Point 48	310	-6
Point 49	200	-8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)			
1	Optimized	2.44	(242.742, - 0.883)	34.2717	(200, 12.4)	(283.733, - 1.76482)			
2	8128	2.56	(242.742, - 0.883)	35.035	(200, 12.4)	(285.719, -1.8)			

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	-5.8356	842.82874	57.639922	0	274.52
2	Optimize d	200.75	- 6.159128	809.44739	752.86029	0	273.56
3	Optimize d	202.2975	- 7.160446	718.14987	1121.6299	0	270.58
4	Optimize	204.1356	-8.34979	702.42411	1201.613	0	273.41

	d						
5	Optimize d	205.888	-9.64274	709.01826	1299.9374	0	272.74
6	Optimize d	208.31155	- 11.52905 5	755.09223	1477.6885	0	271.8
7	Optimize d	210.51165	- 13.16559 5	803.07131	1646.729	0	270.96
8	Optimize d	212.3132	- 14.42949	846.67616	1751.1363	0	270.26
9	Optimize d	214.02565	- 15.63089 5	891.94681	1832.5511	0	275.42
10	Optimize d	216.5061	- 16.94553 5	942.27796	1967.3916	0	286.66
11	Optimize d	219.66845	- 18.31302	998.44023	2033.3932	0	298.25
12	Optimize d	223.1248	- 19.27426	1038.0052	2120.6664	0	293.18
13	Optimize d	225.07965	- 19.56354 5	1048.48	2104.7859	0	296.5
14	Optimize d	226.5002	19.62095 5	1048.0164	2126.2934	0	297.13
15	Optimize d	229.182	-19.7122	1047.0847	2111.8339	0	298.1
16	Optimize d	231.8638	- 19.80344 5	1047.1592	2097.2626	0	299.06
17	Optimize d	234.5383	- 19.80186	1042.6104	2090.5414	0	298.96
18	Optimize d	237.2055	- 19.70743 5	1033.0933	2057.1191	0	297.83
19	Optimize d	239.8727	- 19.61301	1023.9509	2023.547	0	296.72

20	Optimize d	243.0254	19.38769 5	1006.7004	1987.3312	0	294.2
21	Optimize d	245.96315	- 19.10007	986.18873	1931.2733	0	291.07
22	Optimize d	248.82355	- 18.61731	954.04559	1881.7342	0	291.49
23	Optimize d	252.30705	- 17.87083	905.26124	1768.8958	0	283.03
24	Optimize d	255.3522	- 17.08242	854.31722	1677.9678	0	274.23
25	Optimize d	257.95905	- 16.25207 5	801.13485	1562.8672	0	265.09
26	Optimize d	260.5659	- 15.42173	747.91593	1447.657	0	255.89
27	Optimize d	263.43465	-14.3423	679.02055	1323.4035	0	250.6
28	Optimize d	265.61525	- 13.41695 5	620.1308	1206.4624	0	250
29	Optimize d	268.2602	- 12.05423	533.80255	1071.3724	0	250
30	Optimize d	271.49605	- 10.23175	418.42657	871.86732	0	250
31	Optimize d	273.90835	-8.79007	327.25448	707.00889	0	250
32	Optimize d	276.88685	- 7.034615	216.18058	514.88157	0	150
33	Optimize d	279.0567	-5.76796	136.03036	419.87777	0	150
34	Optimize d	279.75825	-5.26796	104.47315	409.4168	0	150
35	Optimize d	281.19695	-4	24.640092	442.69715	0	487.5
36	Optimize d	283.03235	- 2.382408 5	-77.216171	355.3175	0	700

lices	OÎ	Slip	Surface:	8128
	_	<u> → ∸</u>		

	Slip					Frictiona	Cohesiv
	Surfac	X (ft)	Y (ft)	PWP (psf)	Base Normal	1	e
	e	\ (IL)	1 (11)	PVVP (psi)	Stress (psf)	Strength	Strength
	"					(psf)	(psf)
1	8128	200.25	-5.650785	831.45911	74.961895	0	274.52
2	8128	200.61535	5.916210 5	817.70477	729.3507	0	273.82
3	8128	200.86535	-6.097846	801.09668	740.81394	0	273.34
4	8128	202.2417	-7.097846	719.19736	1108.5223	0	270.69
5	8128	204.8195	- 8.970731 5	706.93009	1251.2511	0	273.15
6	8128	207.4917	- 10.91219 7	739.022	1434.0539	0	272.12
7	8128	210.1639	-12.85366	792.30666	1616.7355	0	271.09
8	8128	212.30905	- 14.41219 5	845.8204	1749.1888	0	270.27
9	8128	214.4945	-16	906.9821	1858.0775	0	278.65
10	8128	217.24725	-18	992.68119	1993.3563	0	296.16
11	8128	219.3118	-19.5	1062.7155	2095.6891	0	295.88
12	8128	221.25	-20	1082.96	2273.64	0	301.68
13	8128	223.75	-20	1075.96	2214.88	0	301.59
14	8128	226.41745	-20	1069.4091	2173.0343	0	301.48
15	8128	229.2524	-20	1063.342	2148.0601	0	301.37
16	8128	232.08735	-20	1058.1214	2122.9448	0	301.27
17	8128	234.92225	-20	1053.571	2097.6885	0	301.16
18	8128	237.7572	-20	1049.585	2072.291	0	301.05
19	8128	240.59215	-20	1046.0928	2046.7525	0	300.94
20	8128	243.42705	-20	1043.024	2021.0728	0	300.83
21	8128	246.1334	-20	1040.4055	1996.4349	0	300.73
22	8128	248.71115	-20	1038.1554	1972.8484	0	300.63
23	8128	250.9813	-19.5	1005.9069	2021.0298	0	295.27
24	8128	253.271	-	932.71214	1873.6983	0	287.24

			18.33333				
			5				
25	8128	255.8878	-17	848.78064	1701.1705	0	273.22
26	8128	258.50465	-	764 64405	4520 4725	0	259.1
26	8128	258.50465	15.66666 5	764.64485	1528.4725	U	259.1
27	8128	261.1098	-14.33928	680.6554	1357.9096	0	251.5
28	8128	263.70325	-13.01784	596.86181	1189.4979	0	250.5
			-				
29	8128	266.4252	11.63093 5	508.92025	1022.0291	0	250
30	8128	269.27565	- 10.17856	416.64505	855.60869	0	250
50	0120	203.27303	2	120.01303	033.00003		230
			-				
31	8128	272.1261	8.726186 5	324.43236	689.18823	0	250
32	8128	275.5139	-7	214.86006	507.69752	0	150
33	8128	278.45785	-5.5	119.67645	394.58589	0	150
34	8128	281.4018	-4	24.531374	349.14136	0	487.5
35	8128	284.1322	-2.608781	-63.656534	249.29967	0	700
36	8128	285.30975	-2.008781	-101.68861	182.49348	0	700

10

R12 Slope Stability Gap (Entry/Exit)

File Information

Created By: USACE St. Louis District Revision Number: 763 Last Edited By: Redell, Chris MVS Date: 2/26/2013 Time: 4:03:48 PM File Name: 17thReach12.gsz Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/26/2013 Last Solved Time: 4:04:56 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Gap (Entry/Exit) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: Yes Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant

Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL, EL. +2.4 TO -3 Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 500 psf Phi: 0 Phi-B: 0° MARSH 1b, EL. -5 TO -8 Model: Snatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion Spatial Fn: Marsh 1b Phi-B: 0° BEACH SAND, EL. -25 TO -42 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi-B: 0 ° BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi-B: 0 ° Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf

Number of Slices: 30

Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Marsh 2 Phi-B: 0° Lacustrine 1, EL. -15 TO -19 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Lacustrine 1 Phi-B: 0 ° Lacustrine 2, EL. -19 TO -25 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine 2 MARSH 1a, EL. -0.4 TO -5 Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh 1a unit wt

MARSH 2, EL. -8 TO -15

Slip Surface Entry and Exit

Cohesion Spatial Fn: Marsh 1a

Phi-B: 0°

Left Projection: Range Left-Zone Left Coordinate: (163 73682 -6 45979) ft Left-Zone Right Coordinate: (200, 12.4) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (225, 2) ft Right-Zone Right Coordinate: (284.9, -1.8) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (40, -12) ft Right Coordinate: (310, -1.8) ft

Unit Weight Functions

Cohesion: 0.01 psf

```
Clav
     Model: Spline Data Point Function
     Function: Unit Weight vs. X
Curve Fit to Data: 100 %
           Segment Curvature: 0 %
      Y-Intercept: 102
     Data Points: X (ft), Unit Weight (pcf)
           Data Point: (175.3, 102)
           Data Point: (200, 104)
           Data Point: (265, 102)
```

```
Spatial Functions
Marsh 1a unit wt
       Model: Linear Interpolation
       Limit Range By: Data Values
Data Points: X (ft), Y (ft), Unit Weight (pcf)
Data Point: (184.169, 0.445, 104)
Data Point: (175.3, -3, 104)
              Data Point: (168.898, -5, 67)
Data Point: (200, -5, 104)
              Data Point: (200, 0.4364, 104)
Data Point: (265, -1.2, 104)
              Data Point: (265, -3, 104)
Data Point: (265, -5, 67)
               Data Point: (310, -1.8, 104)
               Data Point: (310, -3, 104)
               Data Point: (310, -5, 67)
Lacustrine 1
       Model: Linear Interpolation
       Limit Range By: Data Values
       Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (175.3, -15, 250)
              Data Point: (175.3, -19, 290)
Data Point: (200, -15, 275)
              Data Point: (200, -19, 311)
Data Point: (265, -15, 250)
               Data Point: (265, -19, 290)
               Data Point: (40, -15, 250)
               Data Point: (40, -19, 290)
               Data Point: (310, -15, 250)
               Data Point: (310, -19, 290)
```

Lacustrine 2

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (175.3, -19, 290)
Data Point: (200, -19, 290)
Data Point: (200, -19, 290)
Data Point: (200, -25, 365)
Data Point: (265, -19, 290)
Data Point: (265, -25, 350)
Data Point: (40, -19, 290)
Data Point: (40, -19, 290)
Data Point: (40, -25, 350)
Data Point: (10, -19, 290)

Data Point: (310, -25, 350)

Marsh 1a

Model: Linear Interpolation
Limit Range By : Data Values
Data Points: X (ft), V (ft), Cohesion (psf)
Data Point: (175.3, -3, 700)
Data Point: (188.898, -5, 275)
Data Point: (265, -1.2, 700)
Data Point: (265, -3, 700)
Data Point: (310, -3, 700)
Data Point: (310, -5, 275)
Data Point: (200, -4364, 500)
Data Point: (200, -5, 500)
Data Point: (200, -5, 500)
Data Point: (255, -5, 275)
Data Point: (255, -5, 275)
Data Point: (310, -1.8, 700)

Marsh 1b

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (156.5, -8, 150)
Data Point: (175.3, -8, 150)
Data Point: (175.3, -8, 150)
Data Point: (200, -8, 275)
Data Point: (200, -8, 275)
Data Point: (265, -5, 150)
Data Point: (265, -8, 150)
Data Point: (310, -5, 150)
Data Point: (310, -8, 150)

Marsh 2

Model: Linear Interpolation

Point 5	200	2.4
Point 6	201	5.5
Point 7	211.5	5
Point 8	225	2
Point 9	284.9	-1.8
Point 10	310	-1.8
Point 11	310	-8
Point 12	310	-25
Point 13	310	-42
Point 14	40	-42
Point 15	40	-25
Point 16	200	12.4
Point 17	200.5	12.4
Point 18	140.9	-11.4
Point 19	265	-1.2
Point 20	199	2.4
Point 21	201	2.4
Point 22	40	-70
Point 23	310	-70
Point 24	40	-15
Point 25	310	-15
Point 26	310	-5
Point 27	200	-5
Point 28	310	-3
Point 29	265	-3
Point 30	175.3	-15
Point 31	175.3	-19
Point 32	175.3	-25
Point 33	175.3	-42
Point 34	175.3	-70
Point 35	265	-42
Point 36	265	-70
Point 37	40	-19
Point 38	310	-19
Point 39	175.3	-3
Point 40	168.898	-5

Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (40, -12, 250)
Data Point: (40, -12, 250)
Data Point: (175.3, -8, 250)
Data Point: (175.3, -15, 250)
Data Point: (175.3, -15, 250)
Data Point: (200, -15, 275)
Data Point: (200, -15, 275)
Data Point: (255, -8, 250)
Data Point: (255, -18, 250)
Data Point: (310, -8, 250)

Data Point: (310, -15, 250)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL25 TO -42	15,14,33,35,13,12,32	4590
Region 2	Sheet Pile	16,17,6,21,5	8.275
Region 3	Lacustrine 1, EL15 TO -19	24,37,31,38,25,30	1080
Region 4	Lacustrine 2, EL19 TO -25	15,32,12,38,31,37	1620
Region 5	BAY SOUND CLAY, EL42 TO -70	22,34,36,23,13,35,33,14	7560
Region 6	MARSH 2, EL8 TO -15	24,1,18,45,42,49,11,25,30	1489.9512
Region 7	MARSH 1a, EL0.4 TO -5	27,29,28,26	155
Region 8		27,40,39	31.102
Region 9	EMBANKMENT FILL, EL. +2.4 TO -3	5,46,44,8,7,6,21	109.67894
Region 10		5,46,43,4,20	27.4692
Region 11	MARSH 1a, EL0.4 TO -5	46,27,29,28,10,9,19,44	331.06608
Region 12		46,27,39,3,43	92.535792
Region 13	MARSH 1b, EL5 TO -8	47,48,26,27	110
Region 14		41,47,27,40	32.692
Region 15	MARSH 1b, EL5 TO -8	41,2,42,49,11,48,47	297.52797

Points

	X (ft)	Y (ft)
Point 1	40	-12
Point 2	165.4	-6.1
Point 3	181.3	-1.1
Point 4	187.8	2.4

5

Point 41	165.718	-6
Point 42	156.61698	-8
Point 43	184.16903	0.44486
Point 44	244.84451	0.41244
Point 45	149	-9.64775
Point 46	200	0.4364
Point 47	200	-6
Point 48	310	-6
Point 49	200	-8

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.44	(238.236, 41.183)	34.01473	(200, 12.4)	(282.33, - 1.72252)
2	6141	2.51	(238.236, 41.183)	61.206	(199.249, - 6)	(281.899, - 1.70953)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	- 5.794209	840.27871	57.627588	0	274.52
2	Optimize d	200.53015	-5.98	828.59226	739.08567	0	273.98
3	Optimize d	200.78015	- 6.145791	807.26925	749.55301	0	273.5
4	Optimize d	202.2881	- 7.145791	718.1763	1117.9611	0	270.6
5	Optimize d	204.29915	- 8.479455	702.46826	1211.0488	0	273.35
6	Optimize d	206.34345	- 10.01184 5	717.28501	1331.437	0	272.56
7	Optimize	208.98615	-	772.47671	1529.92	0	271.54

9 0	d Optimize d Optimize d Optimize d Optimize d	210.90375 212.2247 213.4284 214.94695	12.11771 5 - 13.58351 5 - 14.49819 - 15.33168	818.77022 850.8408 881.95212	1688.7653 1761.9779	0	270.81
9 0	d Optimize d Optimize d Optimize d	212.2247	5 - 14.49819 -	850.8408	1761.9779		
10 0	d Optimize d Optimize	213.4284	-			0	270.3
10	d Optimize		- 15.33168 -	881.95212			
11 0		214.94695	-		1818.3987	0	272.89
			16.17398 5	912.71962	1911.7811	0	280.09
12 0	Optimize d	217.02605	- 17.19523 5	952.13467	1967.2125	0	288.78
13 0	Optimize d	219.11145	- 18.02667	985.66275	2047.107	0	295.78
14 0	Optimize d	221.2031	- 18.66829 5	1011.6241	2064.5213	0	301.06
15 0	Optimize d	223.62445	- 19.15121 5	1029.8192	2104.2216	0	291.75
16 O	Optimize d	225.2437	- 19.34204	1035.7718	2088.8214	0	293.94
17 O	Optimize d	226.92325	- 19.42497	1036.0754	2102.0771	0	294.87
18 O	Optimize d	229.79495	- 19.53339	1035.6926	2087.6708	0	296.06
19 0	Optimize d	232.66665	- 19.64181	1036.3886	2073.0904	0	297.22
20 0	Optimize d	235.2741	- 19.65349	1032.7019	2069.2423	0	297.28
21 0	Optimize d	237.61725	- 19.56842 5	1024.2574	2039.6439	0	296.28
22 0	Optimize d	239.9604	- 19.48336	1016.1115	2009.9602	0	295.3
23 O	ptimize	242.98825	-	999.63897	1974.3601	0	292.92

	d		19.26963				
24	Optimize d	245.4039	- 19.04684	983.58059	1929.6906	0	290.5
25	Optimize d	247.3982	-18.6872	959.66498	1902.636	0	292.64
26	Optimize d	250.268	- 18.07110 5	919.36095	1809.6267	0	285.68
27	Optimize d	253.1378	- 17.45501	879.05693	1716.4471	0	278.66
28	Optimize d	256.21115	- 16.61022	824.56773	1620.3961	0	269.26
29	Optimize d	259.55895	- 15.51351 5	754.34261	1469.1015	0	257.18
30	Optimize d	263.13415	- 14.01116 5	658.76701	1305.67	0	250.72
31	Optimize d	267.0041	- 12.05657 5	534.84701	1069.2041	0	250
32	Optimize d	270.0898	- 10.37369	428.20453	895.54033	0	250
33	Optimize d	272.25295	-9.03233	343.39261	742.19761	0	250
34	Optimize d	273.63775	- 8.180825	289.54871	641.32668	0	250
35	Optimize d	275.6179	-7	214.79822	517.8144	0	150
36	Optimize d	277.58205	-5.8287	140.65527	430.03123	0	150
37	Optimize d	278.24195	-5.3287	109.12824	418.81296	0	150
38	Optimize d	279.74825	-4	25.430809	447.64469	0	487.5
39	Optimize d	281.606	- 2.361258 5	-77.77199	357.95621	0	700

Slices of Slip Surface: 6141

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	6141	199.6245	-6.305295	848.08972	758.22112	0	273.1
2	6141	200.25	- 6.808472 5	830.43805	88.940221	0	274.52
3	6141	200.75	7.200052 5	795.06453	803.0011	0	273.56
4	6141	201.40225	-7.696875	765.36077	1144.5816	0	272.3
5	6141	203.01645	- 8.853078 5	750.36891	1250.3787	0	273.84
6	6141	205.44035	- 10.47557 3	754.52049	1415.2092	0	272.91
7	6141	207.8642	-11.93793	780.09439	1563.8061	0	271.98
8	6141	210.28805	-13.2531	809.82135	1697.3033	0	271.04
9	6141	212.72605	- 14.43766 5	843.37448	1795.7664	0	270.11
10	6141	215.3331	-15.55744	879.03484	1862.0148	0	274.25
11	6141	218.0951	-16.59628	915.22212	1916.3938	0	282.85
12	6141	220.85705	-17.48676	949.07212	1955.5281	0	290.16
13	6141	223.619	- 18.23557 5	979.28503	1980.0515	0	296.21
14	6141	226.0445	- 18.78765 5	1002.521	2005.7925	0	300.59
15	6141	228.5686	- 19.23675 5	1021.5233	2039.8432	0	292.7
16	6141	231.52785	- 19.63671 5	1038.1902	2065.1619	0	297.19

17	6141	234.48715	- 19.89075 5	1047.8868	2075.9411	0	299.95
18	6141	237.4464	- 20.00069 5	1050.0764	2072.1751	0	301.07
19	6141	240.40565	-19.96731	1044.3705	2053.8216	0	300.59
20	6141	243.3649	- 19.79036 5	1030.5074	2020.7751	0	298.56
21	6141	245.9793	- 19.52116 5	1011.6299	1979.8592	0	295.59
22	6141	248.2489	-19.18821	989.30499	1934.013	0	292
23	6141	250.6974	- 18.72675 5	958.97016	1872.9263	0	291.95
24	6141	253.3248	- 18.11926 5	919.55804	1793.3779	0	285.12
25	6141	255.95215	- 17.38766 5	872.51674	1699.8958	0	277.02
26	6141	258.5795	- 16.52722 5	817.56369	1591.7652	0	267.59
27	6141	261.2069	-15.53207	754.22603	1468.2361	0	256.75
28	6141	263.7603	- 14.43103 5	684.29329	1333.8367	0	250.48
29	6141	266.20855	-13.24092	608.80544	1199.0284	0	250
30	6141	268.6256	-11.92827	525.75654	1058.8028	0	250
31	6141	271.04265	- 10.46918 4	433.50986	902.36267	0	250
32	6141	273.4597	- 8.850798 5	331.32292	728.16142	0	250
33	6141	275.94595	-7	214.59762	532.71906	0	150

34	6141	277.81345	-5.5	120.04134	427.02201	0	150
35	6141	279.4982	-4	25.575459	449.58428	0	487.5
36	6141	281.24635	- 2.354766 5	-77.980979	383.62568	0	700

R13 Slope Stability Gap (Block) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 552 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 3:09:41 PM File Name: 17thReach13.gsz Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/27/2013

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Last Solved Time: 3:10:14 PM

Analysis Settings

Slope Stability Gap (Block) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: Tension Crack Line Percentage Wet: 1 Tension Crack Fluid Unit Weight: 62.4 pcf FOS Distribution FOS Calculation Option: Constant Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 **Ending Optimization Points: 16** Complete Passes per Insertion: Driving Side Maximum Convex Angle: 30 ° Resisting Side Maximum Convex Angle: 10 °

Materials EMBANKMENT FILL, EL. +3.0 TO 2.0 Model: Undrained (Phi=0) Unit Weight: 108 pcf Cohesion: 750 psf BEACH SAND, EL. -21.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand **Sheet Pile** Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf EMBANKMENT FILL , EL -1.6 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: FILL 2 Phi-B: 0 ° MARSH 1, EL. -7.0 TO -15.0 Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf

Phi-B: 0 °

Lacustrine, EL. -15.0 TO -21.0 Model: Spatial Mohr-Coulomb

Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine Phi-B: 0° BAY SOUND CLAY, EL. -42 TO -70

Unit Weight: 103 pcf Cohesion Spatial Fn: Clay Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (56.6, -11.8) ft Right Coordinate: (310, -1.9) ft

Slip Surface Block Left Grid

Upper Left: (194, -5) ft Lower Left: (194, -35) ft Lower Right: (224, -35) ft X Increments: 6 Y Increments: 6 Starting Angle: 135 ° Ending Angle: 175 °

Angle Increments: 5 Right Grid Upper Left: (226, -5) ft Lower Left: (226, -35) ft Lower Right: (256, -35) ft X Increments: 6 Starting Angle: 0 Ending Angle: 45 Angle Increments: 5

Tension Crack Line

	X (ft)	Y (ft)
Г	200	-6
	202	-6

Cohesion Functions

Cohesion Fn: MARSH 1

Phi: 0 °

FILL 2 Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 680 Data Points: X (ft), Cohesion (psf) Data Point: (0, 680) Data Point: (184.5, 680) Data Point: (200, 450) Data Point: (310, 680) MARSH 1 Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 200 Data Points: X (ft), Cohesion (psf) Data Point: (0, 200) Data Point: (175.1, 200) Data Point: (200, 350) Data Point: (242.2, 200)

Shear/Normal Strength Functions

Data Point: (310, 200)

Sand

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (0, 0) Data Point: (10000, 5773) **Estimation Properties** Intact Rock Param : 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf

Spatial Functions

Lacustrine Model: Linear Interpolation

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (175.1, -15, 200)
Data Point: (175.1, -21, 260)
Data Point: (200, -15, 350)
Data Point: (200, -21, 450)
Data Point: (242.2, -15, 200)
Data Point: (242.2, -15, 200)
Data Point: (56.6, -15, 200)
Data Point: (56.6, -15, 200)
Data Point: (310, -15, 200)
Data Point: (310, -12, 200)
Data Point: (310, -21, 260)

Data Point: (310, -21, 260)

Clay

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (175.1, -42, 420)
Data Point: (175.1, -70, 670)
Data Point: (200, -42, 600)
Data Point: (200, -70, 850)
Data Point: (242.2, -42, 420)
Data Point: (242.2, -70, 670)
Data Point: (58.3, -42, 420)
Data Point: (58.3, -70, 670)
Data Point: (310, -42, 420)
Data Point: (310, -70, 670)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	8,7,34,22,21,19	7.425
Region 2	BEACH SAND, EL21.0 TO -42.0	18,17,16,15	5321.4
Region 3	MARSH 1, EL7.0 TO -15.0	23,1,2,3,4,33,29,28,25,13,14	1558.5203
Region 4	BAY SOUND CLAY, EL42 TO -70	17,16,27,26	7095.2
Region 5	Lacustrine, EL15.0 TO -21.0	23,14,15,18	1520.4
Region 6	EMBANKMENT FILL , EL -1.6 TO -7.0	33,32,35,28,29	51.522975

5

Point 29 174.4 Point 30 Point 32 162.72973 Point 33 159.82432 Point 34 Point 35 Point 36 180.3182 0.40126 0.40041 Point 37 231.10097

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.25	(232.965, - 0.775)	27.43592	(200, 12.3)	(264.434, - 1.88145)
2	6575	2.46	(232.965, - 0.775)	28.424	(200, 12.3)	(265.913, -1.9)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	Optimize d	200.0668	- 1.932777 5	505.176	-907.12488	0	750
2	Optimize d	200.3168	- 2.179536 5	136.29317	382.12131	0	452.08
3	Optimize d	200.75	- 2.607098 5	192.95751	418.42571	0	454.93
4	Optimize d	202.1307	- 3.969888 5	291.34412	805.1209	0	464
5	Optimize d	204.5339	- 6.474163 5	306.89335	979.91347	0	479.79

Region 7		32,31,20,35	125.83784
Region 8	EMBANKMENT FILL , EL -1.6 TO -7.0	28,35,20,10,11,12,13,25	589.875
Region 9		20,31,5,36,6,30,7	99.583923
Region 10	EMBANKMENT FILL, EL. +3.0 TO 2.0	22,9,24,37,10,20,7,34	182.65003

Points

	X (ft)	Y (ft)
Point 1	56.6	-11.8
Point 2	97	-11.5
Point 3	138.4	-11.8
Point 4	157.5	-7.8
Point 5	179	-0.4
Point 6	184.1	2.7
Point 7	200	3.3
Point 8	200	6
Point 9	210	5.5
Point 10	242.2	-1.6
Point 11	265.9	-1.9
Point 12	310	-1.9
Point 13	310	-7
Point 14	310	-15
Point 15	310	-21
Point 16	310	-42
Point 17	56.6	-42
Point 18	56.6	-21
Point 19	200	12.3
Point 20	200	-2
Point 21	200.5	12.3
Point 22	201	6
Point 23	56.6	-15
Point 24	225	1.5
Point 25	242.2	-7
Point 26	56.6	-70
Point 27	310	-70
Point 28	200	-8

6	Optimize d	206.66975	- 8.804223 5	390.44697	1241.0914	0	326.29
7	Optimize d	208.76655	-10.91362	505.28735	1451.5677	0	318.84
8	Optimize d	210.737	- 12.77882 5	608.58923	1595.4774	0	311.84
9	Optimize d	212.5363	- 14.23822 5	690.98125	1730.188	0	305.44
10	Optimize d	214.29335	-15.49823	763.01949	1798.7423	0	306.37
11	Optimize d	216.0981	- 16.53821 5	822.93182	1899.5156	0	314.5
12	Optimize d	218.31815	-17.62172	886.28409	1941.3726	0	321
13	Optimize d	220.5897	-18.4816	936.88269	2013.1394	0	323.52
14	Optimize d	222.91275	-19.11786	974.49749	2009.818	0	322.28
15	Optimize d	224.53715	-19.46312	994.95422	2051.1407	0	319.87
16	Optimize d	226.32395	- 19.56785 5	1000.6805	2022.474	0	313.57
17	Optimize d	228.9718	-19.72306	1009.3142	1986.3557	0	304.12
18	Optimize d	230.69835	- 19.75117 5	1010.465	1998.695	0	297.03
19	Optimize d	231.9994	- 19.59126 5	1000.1177	1956.3773	0	289.57
20	Optimize d	233.79625	-19.37042	985.86656	1897.9367	0	279.38
21	Optimize d	235.59315	- 19.14957	971.56022	1839.5514	0	269.31

Γ				5				
	22	Optimize d	237.75795	- 18.57304 5	935.07429	1789.0391	0	254.03
	23	Optimize d	240.29065	-17.64083	876.27088	1639.6036	0	233.99
	24	Optimize d	241.8785	-17.00623	836.26015	1569.7871	0	221.31
	25	Optimize d	243.0767	- 16.37830 5	796.74754	1495.5939	0	213.78
	26	Optimize d	244.83005	- 15.45943 5	738.95657	1396.5309	0	204.59
	27	Optimize d	246.23255	-14.72444	692.71081	1319.4732	0	200
	28	Optimize d	247.905	- 13.80152 5	634.63699	1233.6556	0	200
	29	Optimize d	250.1982	-12.50682	553.18564	1104.0929	0	200
	30	Optimize d	252.40575	- 11.19185 5	470.50959	982.02323	0	200
	31	Optimize d	254.5277	-9.85662	386.55897	848.20163	0	200
	32	Optimize d	257.23305	-8.044175	272.67975	675.49813	0	200
	33	Optimize d	260.44305	-5.5073	113.47364	658.10702	0	680
	34	Optimize d	263.22155	- 2.998348 5	-43.854422	420.59123	0	680

Slices	of	Slip	Surface:	657	75
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Slip Base Surfac X (ft) Y (ft) PWP (psf) Normal	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
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26 6575 248.983 -14.2 659.12759 1293.1274 0 200 27 6575 251.1852 558.6898 1132.111 -12.6 0 200 458.21527 28 6575 -11 971.1313 0 200 29 6575 255.58965 -9.4 357.75544 810.15164 0 200 30 6575 257.7919 -7.8 257.27357 649.17198 200 31 6575 260.0608 -6.151515 153.76905 643.83904 680 0 4.454545 262.39645 47.238416 32 6575 476.60992 0 680 264.73215 -2.757576 -59.299141 309.40158 680 33 6575 34 6575 265.90625 1.904545 -112.85594 225.35628 680

1	6575	200.25	-1.25	147.12063	-68.684108	0	750
2	6575	200.75	-1.75	93.881151	244.2771	0	750
3	6575	201.973	-2.972994	207.10076	730.43943	0	462.97
4	6575	203.919	- 4.918981 5	261.54761	886.03299	0	475.75
5	6575	205.865	-6.864969	296.83777	1041.6265	0	488.54
6	6575	208.419	- 9.418981 5	417.282	1316.4509	0	320.07
7	6575	211	-12	561.40745	1515.7542	0	310.9
8	6575	213	-14	675.53449	1643.6698	0	303.79
9	6575	215.25	-16.25	806.72396	1787.0568	0	313.62
10	6575	217.75	-18.75	955.04668	1946.3821	0	338.89
11	6575	220	-20	1029.65	2250.8	0	346.45
12	6575	222	-20	1028.85	2192.8	0	337.76
13	6575	224	-20	1028.15	2134.8	0	329.07
14	6575	226.01685	-20	1027.4102	2085.8483	0	320.31
15	6575	228.0505	-20	1026.7218	2045.8711	0	311.47
16	6575	230.08415	-20	1026.0826	2005.8938	0	302.64
17	6575	232.0909	-20	1025.454	1966.4553	0	293.92
18	6575	234.0707	-20	1024.8479	1927.5121	0	285.32
19	6575	236.0505	-20	1024.2418	1888.6194	0	276.72
20	6575	238.0303	-20	1023.6862	1849.7267	0	268.11
21	6575	240.0101	-20	1023.1305	1810.7835	0	259.51
22	6575	241.6	- 19.56407 5	995.56254	1883.9978	0	248.21
23	6575	243.147	- 18.44012 5	925.13015	1749.0248	0	234.4
24	6575	245.04095	- 17.06407 5	838.84504	1598.8802	0	220.64
25	6575	246.9349	- 15.68802 5	752.51722	1448.6928	0	206.88

10

R13 Slope Stability Gap (Entry & Exit)

File Information

Created By: USACE St. Louis District Revision Number: 552 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 3:09:41 PM File Name: 17thReach13.gsz

Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_Hlgh_water_ analyses\High water cases\

Last Solved Date: 2/27/2013 Last Solved Time: 3:10:54 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Gap (Entry & Exit) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer Settings
PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution

FOS Calculation Option: Constant

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1

Driving Side Maximum Convex Angle: 30 $^{\circ}$

Resisting Side Maximum Convex Angle: 10 °

Materials

EMBANKMENT FILL, EL. +3.0 TO 2.0 Model: Undrained (Phi=0)

Unit Weight: 108 pcf Cohesion: 750 psf

BEACH SAND, EL. -21.0 TO -42.0

Model: Shear/Normal Fn Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf

EMBANKMENT FILL, EL-1.6 TO -7.0

Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: FILL 2 Phi: 0 ° Phi-B: 0°

MARSH 1, EL. -7.0 TO -15.0 Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion Fn: MARSH 1

Phi-B: 0 °

Lacustrine, EL. -15.0 TO -21.0

Model: Spatial Mohr-Coulomb

Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine Phi-R·∩°

BAY SOUND CLAY, EL. -42 TO -70

Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: Clay Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (191.4, -6) ft Left-Zone Right Coordinate: (200, 6.4) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (220.20678, 2.77819) ft Right-Zone Right Coordinate: (280, -1.9) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (56.6, -11.8) ft Right Coordinate: (310, -1.9) ft

Cohesion Functions

FILL 2 Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 680 Data Points: X (ft), Cohesion (psf) Data Point: (0, 680) Data Point: (184.5, 680) Data Point: (200, 450) Data Point: (235, 680)

Data Point: (310, 680)

MARSH 1

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 200 Data Points: X (ft), Cohesion (psf) Data Point: (0, 200) Data Point: (175.1, 200) Data Point: (200, 350) Data Point: (242.2, 200) Data Point: (310, 200)

Shear/Normal Strength Functions

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (0, 0)
Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 Sigma3: 300000 nsf Num. Points: 20

Spatial Functions

Lacustrine

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (175.1, -15, 200) Data Point: (175.1, -21, 260) Data Point: (200, -15, 350) Data Point: (200, -21, 450) Data Point: (242.2, -15, 200) Data Point: (242.2, -21, 260)

Data Point: (56.6, -15, 200) Data Point: (56.6, -21, 260) Data Point: (310, -15, 200) Data Point: (310, -21, 260)

Clay

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (175.1, -42, 420)
Data Point: (175.1, -70, 670)
Data Point: (200, -42, 600)
Data Point: (200, -70, 850)
Data Point: (242.2, -42, 420)
Data Point: (242.2, -42, 420)
Data Point: (58.3, -70, 670)
Data Point: (58.3, -70, 670)
Data Point: (310, -42, 420)
Data Point: (310, -670)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	8,7,34,22,21,19	7.425
Region 2	BEACH SAND, EL21.0 TO -42.0	18,17,16,15	5321.4
Region 3	MARSH 1, EL7.0 TO -15.0	23,1,2,3,4,33,29,28,25,13,14	1558.5203
Region 4	BAY SOUND CLAY, EL42 TO -70	17,16,27,26	7095.2
Region 5	Lacustrine, EL15.0 TO -21.0	23,14,15,18	1520.4
Region 6	EMBANKMENT FILL , EL -1.6 TO -7.0	33,32,35,28,29	51.522975
Region 7		32,31,20,35	125.83784
Region 8	EMBANKMENT FILL , EL -1.6 TO -7.0	28,35,20,10,11,12,13,25	589.875
Region 9		20,31,5,36,6,30,7	99.583923
Region 10	EMBANKMENT FILL, EL. +3.0 TO 2.0	22,9,24,37,10,20,7,34	182.65003

Points

	X (ft)	Y (ft)
Point 1	56.6	-11.8
Point 2	97	-11.5
Point 3	138.4	-11.8
Point 4	157.5	-7.8

Point 5	179	-0.4
Point 6	184.1	2.7
Point 7	200	3.3
Point 8	200	6
Point 9	210	5.5
Point 10	242.2	-1.6
Point 11	265.9	-1.9
Point 12	310	-1.9
Point 13	310	-7
Point 14	310	-15
Point 15	310	-21
Point 16	310	-42
Point 17	56.6	-42
Point 18	56.6	-21
Point 19	200	12.3
Point 20	200	-2
Point 21	200.5	12.3
Point 22	201	6
Point 23	56.6	-15
Point 24	225	1.5
Point 25	242.2	-7
Point 26	56.6	-70
Point 27	310	-70
Point 28	200	-8
Point 29	174.4	-7
Point 30	199	3.3
Point 31	174.35135	-2
Point 32	162.72973	-6
Point 33	159.82432	-7
Point 34	201	3.3
Point 35	200	-6
Point 36	180.3182	0.40126
Point 37	231.10097	0.40041

5

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.25	(231.262, 19.107)	26.5495	(200, 12.3)	(262.444, - 1.85626)
2	6039	2.39	(231.262, 19.107)	37.143	(200, 12.3)	(261.928, - 1.84973)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	Optimize d	200.0824	-1.926311	478.01256	-674.69624	0	750
2	Optimize d	200.3324	- 2.145115 5	131.19182	403.03163	0	452.18
3	Optimize d	200.75	2.510597 5	179.92165	434.17479	0	454.93
4	Optimize d	201.964	-3.573121	264.77957	797.83964	0	462.91
5	Optimize d	203.7608	-5.27555	286.1675	895.74947	0	474.71
6	Optimize d	205.42635	- 6.992969 5	309.73788	1032.8497	0	485.66
7	Optimize d	206.7578	- 8.365899 5	363.88638	1212.4427	0	325.98
8	Optimize d	208.62825	- 10.12190 5	458.43385	1388.2182	0	319.33
9	Optimize d	210.38865	-11.7155	546.40957	1516.0822	0	313.07
10	Optimize d	211.5978	-12.68144	600.30686	1605.2903	0	308.78
11	Optimize	213.2388	-13.9097	669.53363	1673.5902	0	302.94

	d						
12	Optimize d	214.4745	- 14.76191 5	718.523	1756.6867	0	298.55
13	Optimize d	215.7567	- 15.49719 5	760.65733	1790.3587	0	301.04
14	Optimize d	217.4844	-16.36617	810.90738	1857.4339	0	306.85
15	Optimize d	219.20575	- 17.10972 5	854.31933	1880.8998	0	310.49
16	Optimize d	221.16865	-17.72556	890.37777	1935.5884	0	311.07
17	Optimize d	223.37315	-18.21368	918.85533	1921.0618	0	308.62
18	Optimize d	224.7377	- 18.46621 5	933.63034	1952.3908	0	306.29
19	Optimize d	226.01685	-18.50754	935.51047	1929.1125	0	301.57
20	Optimize d	228.0505	- 18.57324 5	938.65587	1895.8893	0	294.01
21	Optimize d	230.08415	-18.63895	941.89957	1862.666	0	286.42
22	Optimize d	231.31675	-18.67877	943.86581	1842.4955	0	281.8
23	Optimize d	232.529	- 18.51406 5	933.21664	1847.7422	0	274.89
24	Optimize d	234.522	- 18.17071 5	911.21264	1772.4836	0	262.84
25	Optimize d	236.515	- 17.82736 5	889.1592	1697.2745	0	251.02
26	Optimize d	238.6836	-17.17855	848.06701	1633.1957	0	235.49

27	Optimize d	241.02785	- 16.22426 5	787.85484	1484.7593	0	216.64
28	Optimize d	242.41555	- 15.65937 5	752.22248	1401.1924	0	206.59
29	Optimize d	243.1642	- 15.28581 5	728.71331	1383.1128	0	202.86
30	Optimize d	245.2279	-14.17936	659.09009	1270.072	0	200
31	Optimize d	247.79255	-12.76851	570.27746	1134.2978	0	200
32	Optimize d	249.86065	-11.58809	495.99021	1016.0429	0	200
33	Optimize d	252.28745	-10.13787	404.80228	877.47889	0	200
34	Optimize d	255.2152	-8.13893	279.19195	693.70292	0	200
35	Optimize d	257.0062	-6.81006	195.73873	737.01225	0	680
36	Optimize d	258.5577	-5.429154	109.1469	663.67815	0	680
37	Optimize d	261.1487	3.047221	-40.213361	427.27939	0	680

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesive Strength (psf)
1	6039	200.25	1.3293685	152.21147	-183.96117	0	750
2	6039	200.5973	- 1.8510765	100.34844	104.94217	0	750
3	6039	200.8473	-2.211292	139.1263	308.34269	0	455.57
4	6039	202.18125	- 3.9208855	283.6383	753.81988	0	464.33
5	6039	204.54375	-6.63847	312.41629	1024.1568	0	479.86

	3.2550405		

6	6039	206.79375	-8.80135	389.55922	1295.8455	0	325.85
7	6039	208.93125	10.543281	482.22685	1468.8412	0	318.25
8	6039	211.09245	-12.05528	564.42906	1593.9646	0	310.57
9	6039	213.27735	-13.36737	636.8524	1674.2099	0	302.81
10	6039	215.46225	-14.48619	700.10238	1734.6006	0	295.04
11	6039	217.61035	-15.41743	753.30869	1777.9371	0	293.2
12	6039	219.7217	-16.1801	797.17002	1806.5976	0	295.89
13	6039	221.83305	- 16.802535	833.39136	1821.1195	0	296.22
14	6039	223.94435	-17.29196	861.92085	1822.0511	0	294.42
15	6039	226.01685	- 17.649295	882.65404	1819.7803	0	290.79
16	6039	228.0505	- 17.882685	896.04313	1815.0617	0	285.57
17	6039	230.08415	-18.00325	902.59849	1798.6112	0	278.85
18	6039	232.2109	- 18.007155	901.94643	1768.6761	0	270.32
19	6039	234.4307	-17.88371	893.42822	1723.9731	0	259.99
20	6039	236.6505	-17.62583	876.59752	1665.0316	0	248.29
21	6039	238.8703	- 17.230635	851.25746	1591.4008	0	235.32
22	6039	241.0901	- 16.693565	817.05387	1502.5659	0	221.18
23	6039	243.1424	-16.07062	777.58989	1424.8358	0	210.71
24	6039	245.02715	-15.37618	733.72018	1360.2157	0	203.76
25	6039	246.9456	- 14.545115	681.28823	1284.6645	0	200
26	6039	248.89775	-13.56335	619.46189	1197.5422	0	200
27	6039	250.84985	- 12.430245	548.21441	1095.9937	0	200
28	6039	252.80195	- 11.128685	466.45002	978.50199	0	200
29	6039	254.7541	-9.635598	372.70451	842.73596	0	200
30	6039	256.70625	-7.918923	265.0111	685.71757	0	200
31	6039	258.7438	-5.830177	134.10814	739.65377	0	680
32	6039	260.86685	-	-27.164811	557.15629	0	680

R14 Slope Stability Gap (Block) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

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File Information
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Created By: USACE St. Louis District Revision Number: 504 Last Edited By: Redell, Chris MVS Date: 2/26/2013 Time: 4:17:51 PM File Name: 17thReach14.gsz Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/26/2013 Last Solved Time: 4:18:36 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

```
Slope Stability Gap (Block)
     Kind: SLOPE/W
     Parent: Seepage Analysis (Gap)
     Method: Spencer
          PWP Conditions Source: Parent Analysis
          Direction of movement: Left to Right
          Use Passive Mode: No
          Slip Surface Option: Block
          Critical slip surfaces saved: 1
          Optimize Critical Slip Surface Location: Yes
          Tension Crack
               Tension Crack Option: (none)
    FOS Distribution
          FOS Calculation Option: Constant
```

Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL, EL. +4.2 TO +2 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 860 psf Phi-B: 0 ° BEACH SAND, EL. -19 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand **Sheet Pile** Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf Fill 2, EL. -3.3 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Fill Phi-B: 0 ° MARSH 1, EL. -7 TO -16 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Spatial Fn: Marsh 1 Cohesion Phi-B: 0 °

BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Cohesion

Phi-B: 0° Silty Sand El. -16 to -19

> Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0°

Slip Surface Limits

Left Coordinate: (54.7, -12.6) ft Right Coordinate: (310, -3.7) ft

Slip Surface Block

Left Grid Upper Left: (192, -3) ft Lower Left: (192, -33) ft Lower Right: (222, -33) ft X Increments: 6 Y Increments: 6 Starting Angle: 135 ° Ending Angle: 175 ° Angle Increments: 5 Right Grid Upper Left: (225, -3) ft Lower Left: (225, -33) ft Lower Right: (255, -33) ft X Increments: 6 Y Increments: 6 Ending Angle: 45 Angle Increments: 5

Cohesion Functions

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 %

```
Segment Curvature: 0 %
Y-Intercept: 500
Data Points: X (ft), Cohesion (psf)
      Data Point: (0, 500)
Data Point: (176, 500)
      Data Point: (200, 450)
Data Point: (240, 500)
       Data Point: (400, 500)
```

Shear/Normal Strength Functions

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (10000, 5773) **Estimation Properties** Intact Rock Param : 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Unit Weight Functions

Bay Sound

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 104 Data Points: X (ft), Unit Weight (pcf) Data Point: (0, 104) Data Point: (176, 104) Data Point: (200, 102) Data Point: (240 104) Data Point: (400, 104)

Spatial Functions

Marsh 1 Cohesion

Model: Linear Interpolation

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), V (ft), Cohesion (psf)
Data Point: (181.4, -7, 150)
Data Point: (181.4, -16, 210)
Data Point: (200, -7, 350)
Data Point: (200, -16, 350)
Data Point: (245.3, -7, 150)
Data Point: (245.3, -7, 150)
Data Point: (0, -7, 150)
Data Point: (0, -7, 150)
Data Point: (0, -16, 210)
Data Point: (10, -16, 210)
Data Point: (310, -7, 150)
Data Point: (310, -7, 150)
Data Point: (310, -7, 150) Data Point: (310, -16, 210)

Bay Sound Cohesion

Model: Linear Interpolation Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -46, 490)
Data Point: (181.4, -70, 710)
Data Point: (200, -46, 710) Data Point: (200, -46, /10)
Data Point: (200, -70, 920)
Data Point: (245.3, -46, 490)
Data Point: (245.3, -70, 710)
Data Point: (0, -46, 490)
Data Point: (0, -70, 710)
Data Point: (310, -46, 490) Data Point: (310, -70, 710)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	8,9,10,22,17	6.675
Region 2	BEACH SAND, EL19 TO -46	25,23,42,32,24,26,31,41	6893.1
Region 3	Silty Sand El16 to - 19	28,25,41,31,26,27,30,40	765.9
Region 4		45,11,16,19,17,35	27.803888
Region	EMBANKMENT FILL,	17,35,50,4,3,10,22	55

5

Point 23 54.7 -19 Point 26 Point 27 -16 Point 28 54.7 -16 Point 29 Point 30 245.3 -16 245.3 -19 Point 32 -46 -70 Point 34 245.3 Point 35 200 Point 37 200 -4.5 Point 38 181.4 -4.5 Point 39 181.4 Point 40 181.4 -16 181.4 -19 Point 41 181.4 -70 Point 43 181.4 Point 44 181.4 -3.3 Point 45 181.38889 -2.6 Point 46 167 Point 47 164.76472 Point 48 161.1815 -4.5 Point 49 Point 50 177.96971 0.4 Point 52 227.04519 0.4 Point 53 200 0.4

Critical Slip Surfaces

	- 1						
	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)	1

5	EL. +4.2 TO +2		
Region 6	MARSH 1, EL7 TO - 16	28,40,30,27,29,34,36,39,49,15,13,2,1	1813.045
Region BAY SOUND CLAY, 7 EL46 TO -70		23,42,32,24,21,33,43,20	6127.2
Region 8		35,53,51,12,45	31.903683
Region 9		53,37,38,48,47,46,51	150.77277
Region 10	Fill 2, EL3.3 TO -7	35,53,37,38,48,49,39,36,34,29,7,18,6,14,5,52,50	670.08058

	X (ft)	Y (ft)
Point 1	54.7	-12.6
Point 2	111	-12.5
Point 3	210	5.2
Point 4	219	3
Point 5	230.2	-0.6
Point 6	245.3	-3.5
Point 7	310	-3.7
Point 8	200	12.5
Point 9	200.5	12.5
Point 10	201	6
Point 11	182.4	2.7
Point 12	179.8	0.9
Point 13	134.7	-12
Point 14	242.5	-1.7
Point 15	152.3	-7.4
Point 16	193	3.8
Point 17	200	4.2
Point 18	290.7	-3.7
Point 19	199	4.2
Point 20	54.7	-70
Point 21	310	-70
Point 22	201	4.2

6

1 Optimized		1.69	(231.744, -	23.61595	(200,	(259.528, -	
1	Optimized	1.09	3.576)	23.61595	12.5)	3.56268)	
2	4900	1.84	(231.744, -	24.417	(200,	(263.488, -	1
	4900	1.04	3.576)	24.417	12.5)	3.58012)	

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	- 3.560184 5	590.83445	-131.01813	0	450.31
2	Optimize d	200.75	-3.893709	602.36464	669.99838	0	450.94
3	Optimize d	201.94265	- 4.689263 5	529.86374	927.3498	0	452.43
4	Optimize d	203.82795	-5.946848	429.24347	1032.7224	0	454.78
5	Optimize d	205.09725	-6.78782	423.54459	1109.3415	0	456.37
6	Optimize d	206.2993	-7.568645	414.03689	1209.7031	0	322.72
7	Optimize d	208.0501	-8.705935	425.06293	1295.5836	0	316.48
8	Optimize d	209.46275	- 9.575738 5	439.75359	1387.6102	0	311.81
9	Optimize d	211.22775	- 10.56514 8	462.94948	1440.1452	0	306.32
10	Optimize d	213.2389	- 11.59923 5	493.16103	1518.8423	0	300.51
11	Optimize d	214.8057	-12.2909	516.54536	1540.8545	0	296.16
12	Optimize d	216.3773	- 12.93361	541.77837	1578.8586	0	292

			5				
13	Optimize d	218.08275	- 13.46516 5	562.63648	1621.633	0	287.37
14	Optimize d	219.75	-13.89171	580.73567	1609.301	0	282.83
15	Optimize d	221.25	-14.27547	598.12234	1590.248	0	278.93
16	Optimize d	222.0139	-14.47091	607.51646	1580.5937	0	277.01
17	Optimize d	223.14185	- 14.53070 5	609.07826	1614.8104	0	273.48
18	Optimize d	225.36995	-14.64317	612.39529	1551.2938	0	266.53
19	Optimize d	226.7646	- 14.68801 5	613.23402	1537.278	0	262.12
20	Optimize d	227.8339	- 14.64463 5	609.551	1497.115	0	258.43
21	Optimize d	229.4113	- 14.58064 5	604.10983	1437.8892	0	252.96
22	Optimize d	231.03215	-14.51489	598.56071	1397.0279	0	247.31
23	Optimize d	232.69645	-14.44737	592.87534	1374.4545	0	241.48
24	Optimize d	234.36075	-14.37985	587.26201	1351.9412	0	235.62
25	Optimize d	235.98605	-14.28058	579.76041	1338.1358	0	229.68
26	Optimize d	237.73265	-14.10628	567.70727	1312.771	0	222.87
27	Optimize d	239.6396	- 13.88870 5	552.7539	1272.9648	0	215.18
28	Optimize d	241.54655	-13.67113	537.85262	1233.1586	0	207.36

29	Optimize d	242.86615	- 13.52056 5	527.54093	1184.0671	0	201.88
30	Optimize d	243.9749	-13.23125	508.881	1131.1802	0	196.18
31	Optimize d	245.00875	- 12.82848 5	483.22645	1063.5194	0	189.89
32	Optimize d	246.2432	-12.17058	441.64491	974.74851	0	184.47
33	Optimize d	248.1296	- 11.16521 5	377.88112	871.26686	0	177.77
34	Optimize d	250.016	-10.15985	314.0191	767.83199	0	171.07
35	Optimize d	251.96415	-9.07017	244.63866	664.57957	0	163.8
36	Optimize d	254.28545	-7.70553	157.79017	523.77612	0	154.7
37	Optimize d	256.5833	-6.086587	55.108139	601.32386	0	500
38	Optimize d	258.5463	-4.403981	-51.282904	406.85185	0	500

		Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
	1	4900	200.25	3.715323 5	617.93635	-70.622047	0	450.31
ľ	2	4900	200.75	-3.992478	617.604	724.7799	0	450.94
	3	4900	202.29395	- 4.848291 5	491.88245	988.25991	0	452.87
ľ	4	4900	204.8818	-6.282764	407.52498	1105.9751	0	456.1
ľ	5	4900	207.1318	-7.529959	395.12738	1235.9023	0	319.07
ſ	6	4900	209.04395	-	401.63165	1314.0267	0	312.19

			5				
30	4900	262.36895	-4.150101	-69.79355	237.55694	0	500

			8.589877				
			5				
			-				
7	4900	211.16665	9.766528	427.91396	1381.2745	0	305.25
\vdash			5				
8	4900	213.5	11.05991	465.88496	1437.65	0	298.46
			5				
			-				
9	4900	215.83335	12.35330	514.76371	1493.8006	0	292.57
			5				
10	4900	218	-13	538.9	1663.55	0	286.42
11	4900	220.5	-13	531.3	1579.7	0	277.59
12	4900	223.2613	-13	524.18244	1481.1732	0	267.84
13	4900	225.7839	-13	518.71188	1396.6967	0	258.93
14	4900	228.6226	-13	513.40651	1301.6949	0	248.9
15	4900	231.225	-13	509.21951	1239.0732	0	239.71
16	4900	233.275	-13	506.19512	1219.4146	0	232.47
17	4900	235.325	-13	503.60976	1199.8049	0	225.23
18	4900	237.375	-13	501.21951	1180.1463	0	217.99
19	4900	239.425	-13	498.97561	1160.5366	0	210.75
20	4900	241.475	-13	496.97561	1140.9268	0	203.51
21	4900	243.75	-13	494.88	1046.48	0	195.47
22	4900	245.15	-12.92357	488.95464	1049.071	0	190.02
			-				
23	4900	246.44755	12.26242	447.14677	970.77202	0	185.08
- 24	4000	240 7427	5	272 00442	054 04007	-	477.00
24	4900	248.7427	-11.093	372.88112	851.31807	0	177.29
25	4900	251.03785	9.923573	298.43301	731.86412	0	169.49
23	4300	231.03783	5.323373	298.43301	731.00412	U	105.45
			-				
26	4900	253.33295	8.754142	223.81796	612.37135	0	161.69
			5				
27	4900	255.6281	-7.584714	149.2068	492.91739	0	153.9
28	4900	257.89435	-6.43002	75.524388	491.56165	0	500
29	4900	260.13165	5.290060	2.8105793	364.55133	0	500
		<u> </u>	3.290000				

R14 Slope Stability Gap (Entry & Exit)

File Information

Created By: USACE St. Louis District Revision Number: 504 Last Edited By: Redell, Chris MVS Date: 2/26/2013 Time: 4:17:51 PM File Name: 17thReach14.gsz

Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/26/2013

Last Solved Time: 4:20:00 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Gap (Entry & Exit) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: Yes Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +4.2 TO +2 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 860 psf Phi-B: 0° BEACH SAND, EL. -19 TO -46 Model: Shear/Normal Fn Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 ° Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Fill 2, EL. -3.3 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Fill Phi: 0 Phi-B: 0 °

MARSH 1, EL. -7 TO -16 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Spatial Fn: Marsh 1 Cohesion Phi-B: 0 °

BAY SOUND CLAY, EL. -46 TO -70

Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Cohesion

Phi-B: 0° Silty Sand El. -16 to -19 Unit Weight: 122 pcf

Strength Function: Sand

Phi-B: 0°

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (190, -4.5) ft Left-Zone Right Coordinate: (200, 6.9) ft Left-Zone Increment: 25 Right Projection: Range Right-Zone Left Coordinate: (215, 3.97778) ft Right-Zone Right Coordinate: (280.01474, -3.65293) ft Right-Zone Increment: 25 Radius Increments: 25

Slip Surface Limits

Left Coordinate: (54.7, -12.6) ft Right Coordinate: (310, -3.7) ft

Cohesion Functions

Model: Spline Data Point Function Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 500 Data Points: X (ft), Cohesion (psf) Data Point: (0, 500) Data Point: (176, 500) Data Point: (200, 450) Data Point: (240, 500) Data Point: (400, 500)

Shear/Normal Strength Functions

Sand Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (0, 0) Data Point: (10000, 5773) Estimation Properties Intact Rock Param : 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Unit Weight Functions

Bay Sound Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 104
Data Points: X (ft), Unit Weight (pcf) Data Point: (0, 104) Data Point: (176, 104) Data Point: (200, 102) Data Point: (240, 104) Data Point: (400, 104)

Spatial Functions

Marsh 1 Cohesion Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -7, 150) Data Point: (181.4, -16, 210) Data Point: (200, -7, 350)

Data Point: (200, -16, 350)
Data Point: (245.3, -7, 150)
Data Point: (245.3, -16, 210)
Data Point: (0, -7, 150)
Data Point: (0, -16, 210)
Data Point: (310, -7, 150)
Data Point: (310, -16, 210)

Bay Sound Cohesion

y Sound Cohesion
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -46, 490)
Data Point: (181.4, -70, 710)
Data Point: (200, -70, 920)
Data Point: (200, -70, 920)
Data Point: (245.3, -46, 490)
Data Point: (245.3, -46, 490)
Data Point: (0, -46, 490)
Data Point: (0, -70, 710)
Data Point: (310, -46, 490)
Data Point: (310, -46, 490)
Data Point: (310, -70, 710)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	8,9,10,22,17	6.675
Region 2	BEACH SAND, EL19 TO -46	25,23,42,32,24,26,31,41	6893.1
Region 3	Silty Sand El16 to - 19	28,25,41,31,26,27,30,40	765.9
Region 4		45,11,16,19,17,35	27.803888
Region 5	EMBANKMENT FILL, EL. +4.2 TO +2	17,35,50,4,3,10,22	55
Region 6	MARSH 1, EL7 TO - 16	28,40,30,27,29,34,36,39,49,15,13,2,1	1813.045
Region 7	BAY SOUND CLAY, EL46 TO -70	23,42,32,24,21,33,43,20	6127.2
Region 8		35,53,51,12,45	31.903683
Region		53,37,38,48,47,46,51	150.77277

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Point 30	245.3	-16
Point 31	245.3	-19
Point 32	245.3	-46
Point 33	245.3	-70
Point 34	245.3	-7
Point 35	200	2
Point 36	200	-7
Point 37	200	-4.5
Point 38	181.4	-4.5
Point 39	181.4	-7
Point 40	181.4	-16
Point 41	181.4	-19
Point 42	181.4	-46
Point 43	181.4	-70
Point 44	181.4	-3.3
Point 45	181.38889	2
Point 46	167	-2.6
Point 47	164.76472	-3.33
Point 48	161.1815	-4.5
Point 49	153.52503	-7
Point 50	222	2
Point 51	177.96971	0.4
Point 52	227.04519	0.4
Point 53	200	0.4

Critical Slip Surfaces

 	· · ·					
	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.63	(229.059, 26.414)	23.63811	(200, 12.5)	(258.083, - 3.55631)
2	8565	1.66	(229.059, 26.414)	42.23	(200, 12.5)	(258.807, - 3.5595)

Slices of Slip Surface: Optimized

			-				
	Slip	X (ft)	Y (ft)	PWP (psf)	Base	Frictiona	Cohesiv
	Surface	X (IL)	Y (IL)	PWP (psi)	Normal	- I	е

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Region 10	Fill 2, EL3.3 TO -7	35,53,37,38,48,49,39,36,34,29,7,18,6,14,5,52,50	670.08058

Points

	X (ft)	Y (ft)
Point 1	54.7	-12.6
Point 2	111	-12.5
Point 3	210	5.2
Point 4	219	3
Point 5	230.2	-0.6
Point 6	245.3	-3.5
Point 7	310	-3.7
Point 8	200	12.5
Point 9	200.5	12.5
Point 10	201	6
Point 11	182.4	2.7
Point 12	179.8	0.9
Point 13	134.7	-12
Point 14	242.5	-1.7
Point 15	152.3	-7.4
Point 16	193	3.8
Point 17	200	4.2
Point 18	290.7	-3.7
Point 19	199	4.2
Point 20	54.7	-70
Point 21	310	-70
Point 22	201	4.2
Point 23	54.7	-46
Point 24	310	-46
Point 25	54.7	-19
Point 26	310	-19
Point 27	310	-16
Point 28	54.7	-16
Point 29	310	-7

					Stress (psf)	Strength (psf)	Strengt h (psf)
1	Optimize d	200.25	- 4.585366 5	740.68629	-156.56989	0	450.31
2	Optimize d	200.75	-4.891538	662.5685	781.12674	0	450.94
3	Optimize d	201.87465	-5.580212	536.85124	1030.1674	0	452.34
4	Optimize d	203.36405	-6.5579	476.55145	1073.5598	0	454.21
5	Optimize d	204.74435	- 7.550582 5	462.56505	1196.4974	0	329.44
6	Optimize d	206.2755	- 8.651747 5	455.7411	1280.8556	0	323.82
7	Optimize d	207.78085	-9.67386	469.95033	1383.729	0	318.71
8	Optimize d	209.2603	-10.61692	485.93814	1454.691	0	314.04
9	Optimize d	210.2935	- 11.27552 5	502.86104	1499.3023	0	311.03
10	Optimize d	211.3205	-11.85675	518.85713	1557.5922	0	308.11
11	Optimize d	212.7875	- 12.64505 5	544.79098	1590.7976	0	304.17
12	Optimize d	214.3442	-13.38564	571.84283	1656.077	0	300.15
13	Optimize d	215.99065	- 14.07850 5	599.72122	1676.0621	0	296.06
14	Optimize d	217.90695	- 14.74216 5	628.70287	1730.5034	0	291.34
15	Optimize d	219.80735	- 15.29369	654.85197	1723.0755	0	286.73

			5				1
			5				
16	Optimize d	221.30735	- 15.62611 5	671.16795	1749.6952	0	282.98
17	Optimize d	222.95515	-15.85952	682.71061	1714.6029	0	278.58
18	Optimize d	224.694	-15.99427	689.14699	1717.6998	0	273.66
19	Optimize d	226.26145	- 15.99319 5	688.19002	1665.1302	0	268.81
20	Optimize d	228.45885	-15.99169	686.87416	1591.4117	0	262.01
21	Optimize d	230.03625	- 15.97278 5	684.86103	1571.0464	0	257.05
22	Optimize d	231.29895	- 15.83449 5	676.01916	1541.3617	0	252.51
23	Optimize d	233.49685	-15.59378	660.32513	1496.5862	0	244.48
24	Optimize d	235.69475	- 15.35306 5	644.45019	1451.7655	0	236.29
25	Optimize d	237.74475	-15.04603	624.48218	1426.8425	0	228.05
26	Optimize d	239.64685	- 14.67267 5	600.44181	1371.2814	0	219.73
27	Optimize d	241.54895	-14.29932	576.24667	1315.6686	0	211.19
28	Optimize d	242.74465	- 14.06461 5	560.94358	1266.2089	0	205.72
29	Optimize d	243.7359	- 13.72520 5	539.37469	1212.6759	0	200.19
30	Optimize d	244.89125	- 13.18790	505.43032	1127.371	0	192.69

			5				
31	Optimize d	246.58585	- 12.16844 5	441.23013	991.61823	0	184.46
32	Optimize d	249.0526	-10.60724	342.57087	842.78696	0	174.05
33	Optimize d	251.41445	-9.03192	242.73054	677.66032	0	163.55
34	Optimize d	253.3673	-7.62213	153.41328	552.29588	0	154.15
35	Optimize d	254.6612	-6.579285	87.375716	648.75499	0	500
36	Optimize d	256.6329	- 4.857440 5	-21.554896	486.48417	0	500

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	8565	200.25	-4.461265	745.67577	-184.70438	0	450.31
2	8565	200.75	-4.920388	661.2941	694.47753	0	450.94
3	8565	202.1177	-6.073123	522.41304	1004.9159	0	452.65
4	8565	204.36285	- 7.813465 5	482.28198	1226.2406	0	331.26
5	8565	206.6177	9.334670 5	475.86083	1370.4522	0	323.06
6	8565	208.87255	- 10.65633 5	492.15113	1494.837	0	315.6
7	8565	210.9	-11.69906	515.53294	1577.3432	0	309.41
8	8565	212.7	- 12.50614 5	538.83797	1622.0964	0	304.22
9	8565	214.5	- 13.21506	563.09237	1656.9976	0	299.2

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			5				
10	8565	216.3	- 13.83102 5	586.6154	1682.5805	0	294.42
11	8565	218.1	-14.35825	608.56759	1699.3001	0	289.69
12	8565	219.75	- 14.76967 5	627.18488	1700.1118	0	285.39
13	8565	221.25	- 15.08034 5	641.66989	1686.4636	0	281.45
14	8565	222.84085	-15.34669	654.5431	1668.9114	0	277.21
15	8565	224.5226	-15.56276	665.02278	1646.861	0	272.63
16	8565	226.20435	-15.71061	672.1694	1617.8934	0	267.9
17	8565	227.8339	-15.79048	675.63586	1583.3275	0	263.12
18	8565	229.4113	-15.80679	675.57973	1543.6208	0	258.27
19	8565	231.225	-15.74755	670.91992	1514.6363	0	252.34
20	8565	233.275	-15.59201	660.38926	1494.2969	0	245.17
21	8565	235.325	-15.33529	643.66865	1463.7998	0	237.37
22	8565	237.375	-14.97551	620.5257	1422.8331	0	228.86
23	8565	239.425	-14.50994	590.71036	1370.9947	0	219.51
24	8565	241.475	-13.9349	554.02192	1307.6838	0	209.22
25	8565	243.9	- 13.09358 5	500.49515	1131.3129	0	195.55
26	8565	246.25825	- 12.14020 5	439.75896	951.28223	0	184.27
27	8565	248.17475	- 11.22608 5	381.60158	870.82053	0	178.17
28	8565	250.09125	- 10.18883 2	315.74371	777.2118	0	171.26
29	8565	252.0077	-9.017585	241.334	668.97322	0	163.45
30	8565	253.92415	-7.698473	157.65887	544.15292	0	154.66
31	8565	255.86355	-6.193498	62.359701	601.59001	0	500
32	8565	257.8258	-4.473249	-46.437891	445.17275	0	500

Reach 14 Slope Stability Gap (Block) Extreme Water Level

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File Information
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Created By: USACE St. Louis District Revision Number: 503 Last Edited By: Goltz, Amanda MVS Date: 12/4/2014 Time: 2:17:40 PM File Name: 17thReach14.gsz Directory: Y:\EC-G\Support For Others (SFP)\MVN\17th Street Canal\Extreme water level April Last Solved Date: 12/4/2014 Last Solved Time: 2:18:14 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Slope Stability Gap (Block) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer Settings PWP Conditions Source: Parent Analysis Slip Surface Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes Tension Crack

Phi-B: 0 ° BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Cohesion Phi-B: 0 ° Silty Sand El. -16 to -19 Model: Shear/Normal En Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 °

Cohesion Spatial Fn: Marsh 1 Cohesion

Slip Surface Limits

Left Coordinate: (54.7, -12.6) ft Right Coordinate: (310, -3.7) ft

Slip Surface Block

Left Grid Upper Left: (192, -3) ft Lower Left: (192, -33) ft Lower Right: (222, -33) ft X Increments: 6 Starting Angle: 135 Ending Angle: 175 Angle Increments: 5 Right Grid Upper Left: (225, -3) ft Lower Left: (225, -33) ft Lower Right: (255, -33) ft X Increments: 6 Y Increments: 6 Starting Angle: 0 Angle Increments: 5

Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 Materials

EMBANKMENT FILL, EL. +4.2 TO +2 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Phi: ∩ ° BEACH SAND, EL. -19 TO -46 Model: Shear/Normal Fn Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 **Sheet Pile** Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf Fill 2, EL. -3.3 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Phi: 0 MARSH 1, EL. -7 TO -16 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf

Cohesion Functions

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 500 Data Points: X (ft), Cohesion (psf) Data Point: (0, 500) Data Point: (176, 500) Data Point: (200, 450) Data Point: (400, 500)

Shear/Normal Strength Functions

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-10000, 0) Data Point: (0, 0)
Data Point: (10000, 5773) **Estimation Properties** Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 nsf Num. Points: 20

Unit Weight Functions

Bay Sound Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 104 Data Points: X (ft), Unit Weight (pcf)

Data Point: (0, 104) Data Point: (176, 104) Data Point: (200, 102) Data Point: (240, 104)
Data Point: (400, 104)

Spatial Functions

Marsh 1 Cohesion

Arsh 1 Cohesion

Model: Linear Interpolation
Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -7.150)
Data Point: (181.4, -16, 210)
Data Point: (200, -7, 350)
Data Point: (200, -16, 350)
Data Point: (200, -16, 350)
Data Point: (245.3, -7, 150)
Data Point: (245.3, -16, 210)
Data Point: (0, -7, 150)
Data Point: (0, -7, 150)
Data Point: (310, -16, 210)

Bay Sound Cohesion

y Sound Cohesion
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -46, 490)
Data Point: (181.4, -70, 710)
Data Point: (200, -70, 920)
Data Point: (200, -70, 920)
Data Point: (245.3, -46, 490)
Data Point: (245.3, -46, 490)
Data Point: (0, -46, 490)
Data Point: (0, -70, 710)
Data Point: (310, -46, 490)
Data Point: (310, -46, 490)
Data Point: (310, -70, 710)

Regions

Т.	0			
ı		Material	Points	Area (ft²)
	Region 1	Sheet Pile	8,9,10,22,17	6.675
ı	Dogion	BEACH CAND EL 10	25 22 42 22 24 26 21 41	6002.1

Point 17	200	4.2
Point 18	290.7	-3.7
Point 19	199	4.2
Point 20	54.7	-70
Point 21	310	-70
Point 22	201	4.2
Point 23	54.7	-46
Point 24	310	-46
Point 25	54.7	-19
Point 26	310	-19
Point 27	310	-16
Point 28	54.7	-16
Point 29	310	-7
Point 30	245.3	-16
Point 31	245.3	-19
Point 32	245.3	-46
Point 33	245.3	-70
Point 34	245.3	-7
Point 35	200	2
Point 36	200	-7
Point 37	200	-4.5
Point 38	181.4	-4.5
Point 39	181.4	-7
Point 40	181.4	-16
Point 41	181.4	-19
Point 42	181.4	-46
Point 43	181.4	-70
Point 44	181.4	-3.3
Point 45	181.38889	2
Point 46	167	-2.6
Point 47	164.76472	-3.33
Point 48	161.1815	-4.5
Point 49	153.52503	-7
Point 50	222	2
Point 51	177.96971	0.4
Point 52	227.04519	0.4

2	TO -46		
Region 3	Silty Sand El16 to - 19	28,25,41,31,26,27,30,40	765.9
Region 4		45,11,16,19,17,35	27.803888
Region 5	EMBANKMENT FILL, EL. +4.2 TO +2	17,35,50,4,3,10,22	55
Region 6	MARSH 1, EL7 TO - 16	28,40,30,27,29,34,36,39,49,15,13,2,1	1813.045
Region 7	BAY SOUND CLAY, EL46 TO -70	23,42,32,24,21,33,43,20	6127.2
Region 8		35,53,51,12,45	31.903683
Region 9		53,37,38,48,47,46,51	150.77277
Region 10	Fill 2, EL3.3 TO -7	35,53,37,38,48,49,39,36,34,29,7,18,6,14,5,52,50	670.08058

Points

	X (ft)	Y (ft)
Point 1	54.7	-12.6
Point 2	111	-12.5
Point 3	210	5.2
Point 4	219	3
Point 5	230.2	-0.6
Point 6	245.3	-3.5
Point 7	310	-3.7
Point 8	200	12.5
Point 9	200.5	12.5
Point 10	201	6
Point 11	182.4	2.7
Point 12	179.8	0.9
Point 13	134.7	-12
Point 14	242.5	-1.7
Point 15	152.3	-7.4
Point 16	193	3.8

Point 53	200	0.4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.62	(231.744, - 3.576)	23.59575	(200, 12.5)	(259.105, - 3.56081)
2	4900	1.76	(231.744, - 3.576)	24.417	(200, 12.5)	(263.488, - 3.58012)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	- 3.573383 5	640.84247	-355.37888	0	450.31
2	Optimize d	200.75	-3.895131	649.57137	670.61155	0	450.94
3	Optimize d	202.0483	- 4.730588 5	555.91007	929.64529	0	452.56
4	Optimize d	204.14495	-6.079756	450.7444	1041.469	0	455.18
5	Optimize d	205.3845	-6.87717	439.57243	1108.0164	0	456.73
6	Optimize d	206.3724	-7.5117	429.86456	1196.3653	0	322.35
7	Optimize d	207.9658	-8.5351	435.44084	1272.9863	0	316.63
8	Optimize d	209.38125	-9.388236	445.71278	1365.1488	0	311.88
9	Optimize d	211.228	- 10.40731 6	466.6767	1419.3873	0	306.06
10	Optimize d	213.201	-11.4079	492.86312	1497.8817	0	300.28

11	Optimize d	214.691	-12.05378	512.78972	1517.6482	0	296.07
12	Optimize d	216.48795	- 12.77015 5	539.07816	1555.9321	0	291.21
13	Optimize d	218.26995	-13.36481	562.10037	1597.0119	0	286.45
14	Optimize d	219.75	-13.77275	579.08589	1588.0483	0	282.49
15	Optimize d	221.25	-14.18619	597.47997	1571.8523	0	278.65
16	Optimize d	222.02015	-14.39846	607.54095	1563.5477	0	276.76
17	Optimize d	223.15425	- 14.50532 5	611.50733	1599.3062	0	273.35
18	Optimize d	225.38215	-14.70795	619.59818	1544.6371	0	266.73
19	Optimize d	226.77065	- 14.79695 5	622.86327	1552.2552	0	262.53
20	Optimize d	227.8339	-14.7493	618.92807	1511.8544	0	258.86
21	Optimize d	229.4113	- 14.67860 5	613.07622	1451.8793	0	253.38
22	Optimize d	231.1255	-14.60178	606.75472	1408.8886	0	247.4
23	Optimize d	232.97645	- 14.51882 5	599.90026	1382.9819	0	240.9
24	Optimize d	235.02195	-14.3644	588.65281	1365.0545	0	233.33
25	Optimize d	237.20165	- 14.10955 5	571.2105	1328.5999	0	224.68
26	Optimize d	239.321	- 13.82576 5	551.98932	1279.9624	0	215.9

			5				
4	4900	204.8818	-6.282764	431.89267	1097.5934	0	456.1
5	4900	207.1318	-7.529959	413.58358	1227.3488	0	319.07
6	4900	209.04395	- 8.589877 5	416.16791	1305.0616	0	312.19
7	4900	211.16665	9.766528 5	439.34649	1371.9785	0	305.25
8	4900	213.5	- 11.05991 5	474.54369	1428.0542	0	298.46
9	4900	215.83335	- 12.35330 5	521.32335	1483.9049	0	292.57
10	4900	218	-13	544.4	1666	0	286.42
11	4900	220.5	-13	536.3	1582.1	0	277.59
12	4900	223.2613	-13	528.70159	1483.512	0	267.84
13	4900	225.7839	-13	522.83462	1398.9562	0	258.93
14	4900	228.6226	-13	517.21023	1303.8503	0	248.9
15	4900	231.225	-13	512.73171	1241.122	0	239.71
16	4900	233.275	-13	509.56098	1221.4634	0	232.47
17	4900	235.325	-13	506.78049	1201.7561	0	225.23
18	4900	237.375	-13	504.19512	1182.0488	0	217.99
19	4900	239.425	-13	501.80488	1162.3415	0	210.75
20	4900	241.475	-13	499.70732	1142.6829	0	203.51
21	4900	243.75	-13	497.48	1048.16	0	195.47
22	4900	245.15	-12.92357	491.47916	1059.5255	0	190.02
23	4900	246.44755	- 12.26242 5	449.59253	980.6327	0	185.08
24	4900	248.7427	-11.093	375.27253	860.28585	0	177.29
25	4900	251.03785	- 9.923573 5	300.72348	739.939	0	169.49
26	4900	253.33295	- 8.754142 5	226.00362	619.59216	0	161.69

27	Optimize d	241.44035	- 13.54197 5	532.76814	1231.2781	0	206.94
28	Optimize d	242.70475	-13.37266	521.23052	1190.1394	0	201.51
29	Optimize d	243.7871	- 13.07004 5	501.73315	1131.3868	0	195.79
30	Optimize d	244.98235	- 12.62572 5	473.30731	1055.7646	0	188.64
31	Optimize d	246.71965	-11.70077	414.72478	936.67488	0	181.34
32	Optimize d	249.5859	- 10.13096 5	314.99066	780.08158	0	170.87
33	Optimize d	252.0367	- 8.737742 5	226.18047	637.49924	0	161.58
34	Optimize d	254.0884	- 7.554277 5	150.69836	513.61565	0	153.7
35	Optimize d	256.1282	-6.102749	58.547543	624.63741	0	500
36	Optimize d	258.1128	- 4.408126 5	-48.745552	426.71997	0	500

Slices of Slip Surface: 4900

		Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
	1	4900	200.25	- 3.715323 5	666.65267	-296.93341	0	450.31
ſ	2	4900	200.75	-3.992478	665.16582	718.64007	0	450.94
	3	4900	202.29395	- 4.848291	527.67354	980.55418	0	452.87

27	4900	255.6281	-7.584714	151.28375	499.24531	0	153.9
28	4900	257.89435	-6.43002	77.491749	505.50045	0	500
29	4900	260.13165	5.290060 5	4.6758692	377.75336	0	500
30	4900	262.36895	-4.150101	-68.025314	250.00229	0	500

Reach 14 Slope Stability Gap (Entry & Exit) Extreme Water Level

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File Information
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Created By: USACE St. Louis District
Revision Number: 503
Last Edited By: Goltz, Amanda MVS
Date: 12/4/2014
Time: 2:17:40 PM
File Name: 17thReach14.gsz
Directory: Y\EC-G\Support For Others (SFP)\MVN\17th Street Canal\Extreme water level April 2013\
Last Solved Date: 12/4/2014
Last Solved Time: 2:19:20 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Slope Stability Gap (Entry & Exit)
Kind: SLOPE/W
Parent: Seepage Analysis (Gap)
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: Yes
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes

Tension Crack

Phi: 0 °
Phi-B: 0 °

BAY SOUND CLAY, EL. -46 TO -70
Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound
Cohesion Spatial Fn: Bay Sound Cohesion
Phi: 0 °
Phi-B: 0 °

Silty Sand El. -16 to -19
Model: Shear/Normal Fn.
Unit Weight: 122 pcf
Strength Function: Sand
Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (190, -4.5) ft Left-Zone Right Coordinate: (200, 6.9) ft Left-Zone Increment: 25 Right Projection: Range Right-Zone Left Coordinate: (215, 3.97778) ft Right-Zone Right Coordinate: (280.01474, -3.65293) ft Right-Zone Increment: 25 Radius Increments: 25

Slip Surface Limits

Left Coordinate: (54.7, -12.6) ft Right Coordinate: (310, -3.7) ft

Cohesion Functions

Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 500
Data Points: X (ft), Cohesion (psf)
Data Point: (0, 500)
Data Point: (176, 500)
Data Point: (200, 450)

FOS Distribution FOS Calculation Option: Constant Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL, EL. +4.2 TO +2 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 860 psf Phi-B·∩° BEACH SAND, EL. -19 TO -46 Model: Shear/Normal Fn Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0° Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf Fill 2. EL. -3.3 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Fill Phi-B: 0 ° MARSH 1, EL. -7 TO -16 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Spatial Fn: Marsh 1 Cohesion

Tension Crack Option: (none)

Data Point: (240, 500)

Data Point: (400, 500)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function
Function: Shear Stress vs. Normal Stress
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf)
Data Point: (-10000, 0)
Data Point: (10000, 5773)
Estimation Properties
Intact Rock Param: 10
Geological Strength: 100
Disturbance Factor: 0
SigmaC: 600000 psf
SigmaC: 300000 psf
Num. Points: 20

Unit Weight Functions

Bay Sound
Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
V-Intercept: 104
Data Points: X (ft), Unit Weight (pcf)
Data Points: (0, 104)
Data Point: (200, 102)
Data Point: (240, 104)
Data Point: (240, 104)
Data Point: (240, 104)

Spatial Functions

Marsh 1 Cohesion Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -7, 150)
Data Point: (181.4, -16, 210)
Data Point: (200, -7, 350)
Data Point: (200, -16, 350)
Data Point: (245.3, -7, 150)
Data Point: (245.3, -16, 210)
Data Point: (0, -7, 150)
Data Point: (0, -16, 210)
Data Point: (310, -7, 150)
Data Point: (310, -7, 150)
Data Point: (310, -7, 150)

Bay Sound Cohesion

y Sound Cohesion
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.4, -46, 490)
Data Point: (181.4, -70, 710)
Data Point: (200, -46, 710)
Data Point: (200, -70, 920)
Data Point: (200, -70, 920)
Data Point: (245.3, -46, 490)
Data Point: (245.3, -70, 710)
Data Point: (0, -46, 490)
Data Point: (0, -70, 710)
Data Point: (310, -46, 490)
Data Point: (310, -46, 490)
Data Point: (310, -70, 710)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	8,9,10,22,17	6.675
Region 2	BEACH SAND, EL19 TO -46	25,23,42,32,24,26,31,41	6893.1
Region 3	Silty Sand El16 to - 19	28,25,41,31,26,27,30,40	765.9
Region 4		45,11,16,19,17,35	27.803888
Region 5	EMBANKMENT FILL, EL. +4.2 TO +2	17,35,50,4,3,10,22	55
Region 6	MARSH 1, EL7 TO - 16	28,40,30,27,29,34,36,39,49,15,13,2,1	1813.045
Region 7	BAY SOUND CLAY, EL46 TO -70	23,42,32,24,21,33,43,20	6127.2

Point 27	310	-16
Point 28	54.7	-16
Point 29	310	-7
Point 30	245.3	-16
Point 31	245.3	-19
Point 32	245.3	-46
Point 33	245.3	-70
Point 34	245.3	-7
Point 35	200	2
Point 36	200	-7
Point 37	200	-4.5
Point 38	181.4	-4.5
Point 39	181.4	-7
Point 40	181.4	-16
Point 41	181.4	-19
Point 42	181.4	-46
Point 43	181.4	-70
Point 44	181.4	-3.3
Point 45	181.38889	2
Point 46	167	-2.6
Point 47	164.76472	-3.33
Point 48	161.1815	-4.5
Point 49	153.52503	-7
Point 50	222	2
Point 51	177.96971	0.4
Point 52	227.04519	0.4
Point 53	200	0.4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.57	(229.059, 26.414)	23.81429	(200, 12.5)	(258.823, - 3.55957)
2	8565	1.61	(229.059, 26.414)	42.23	(200, 12.5)	(258.807, - 3.5595)

Region 8		35,53,51,12,45	31.903683
Region 9		53,37,38,48,47,46,51	150.77277
Region 10	Fill 2, EL3.3 TO -7	35,53,37,38,48,49,39,36,34,29,7,18,6,14,5,52,50	670.08058

Points

	X (ft)	Y (ft)
Point 1	54.7	-12.6
Point 2	111	-12.5
Point 3	210	5.2
Point 4	219	3
Point 5	230.2	-0.6
Point 6	245.3	-3.5
Point 7	310	-3.7
Point 8	200	12.5
Point 9	200.5	12.5
Point 10	201	6
Point 11	182.4	2.7
Point 12	179.8	0.9
Point 13	134.7	-12
Point 14	242.5	-1.7
Point 15	152.3	-7.4
Point 16	193	3.8
Point 17	200	4.2
Point 18	290.7	-3.7
Point 19	199	4.2
Point 20	54.7	-70
Point 21	310	-70
Point 22	201	4.2
Point 23	54.7	-46
Point 24	310	-46
Point 25	54.7	-19
Point 26	310	-19

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	- 4.376876 5	784.89577	-380.72415	0	450.31
2	Optimize d	200.75	- 4.671695 5	720.77272	761.0176	0	450.94
3	Optimize d	202.12275	- 5.481117 5	550.25867	1018.6537	0	452.65
4	Optimize d	203.8467	-6.571565	486.07353	1062.6446	0	454.81
5	Optimize d	205.67915	-7.877385	462.57743	1209.6067	0	325.66
6	Optimize d	207.6828	9.248051 5	469.36964	1337.0112	0	318.62
7	Optimize d	209.2276	- 10.23461 7	483.23785	1410.8258	0	313.65
8	Optimize d	210.77615	- 11.22355 5	506.03297	1472.0949	0	309.12
9	Optimize d	212.4308	-12.16532	532.5881	1558.4355	0	304.57
10	Optimize d	214.1878	- 13.05754 5	563.54367	1593.4001	0	300.01
11	Optimize d	216.0497	- 13.86927 5	594.50256	1666.2751	0	295.37
12	Optimize d	218.01655	- 14.60050 5	625.57395	1681.3342	0	290.61
13	Optimize	219.08475	-14.99762	644.11	1688.68	0	288.2

	d						
14	Optimize d	220.40575	- 15.33395 5	659.9447	1716.618	0	284.94
15	Optimize d	221.821	- 15.66097 5	676.0188	1739.5814	0	281.47
16	Optimize d	223.24895	-15.83795	684.51597	1708.4095	0	277.59
17	Optimize d	225.77155	- 15.99404 5	691.58389	1683.3632	0	270.33
18	Optimize d	228.32505	-15.99666	690.15873	1598.0382	0	262.45
19	Optimize d	229.90245	-15.96716	687.50802	1577.6598	0	257.44
20	Optimize d	231.2741	- 15.82514 5	678.356	1543.2715	0	252.54
21	Optimize d	233.42225	- 15.60273 5	663.77019	1500.6716	0	244.75
22	Optimize d	235.5704	15.38032 5	648.95285	1458.0255	0	236.83
23	Optimize d	237.6204	-15.08775	629.83876	1434.8174	0	228.68
24	Optimize d	239.5722	- 14.72501 5	606.31551	1379.7116	0	220.28
25	Optimize d	241.52405	-14.36228	582.69152	1324.5554	0	211.66
26	Optimize d	242.6919	-14.14525	568.46654	1280.1193	0	206.41
27	Optimize d	243.80765	- 13.75653 5	543.76153	1217.0431	0	200.15
28	Optimize d	245.01575	-13.23758	510.88393	1130.3618	0	192.58

			12.50614				
			5				
			-				
9	8565	214.5	13.21506	569.24581	1650.8441	0	299.24
			3				
10	8565	216.3	13.83102	591.85824	1677.4966	0	294.42
			5				
11	8565	218.1	-14.35825	613.0743	1695.2763	0	289.69
			-				
12	8565	219.75	14.76967	631.20351	1697.1206	0	285.39
			5				
40	05.65	224.25	-	645 27450	4504.0574		204 45
13	8565	221.25	15.08034	645.37158	1684.3671	0	281.45
14	8565	222.84085	-15.34669	657.95432	1667,7939	0	277.21
15	8565	224.5226	-15.56276	668.27429	1646.7428	0	272.63
16	8565	226,20435	-15.71061	675.25438	1618.6646	0	267.9
17	8565	227.8339	-15.79048	678.61418	1585.0384	0	263.12
18	8565	229,4113	-15.80679	678,49581	1546.1565	0	258.27
19	8565	231.225	-15.74755	673.84289	1518.0464	0	252.34
20	8565	233.275	-15.59201	663.20439	1498.7138	0	245.17
21	8565	235.325	-15.33529	646.41834	1469.2027	0	237.37
22	8565	237.375	-14.97551	623.25171	1429.1938	0	228.86
23	8565	239.425	-14.50994	593.40572	1378.2296	0	219.51
24	8565	241.475	-13.9349	556.67943	1315.6564	0	209.22
			-				
25	8565	243.9	13.09358	503.0695	1139.7047	0	195.55
			5				
20	05.05	246 25025	- 12 14020	442.25447	050.05064	0	104.27
26	8565	246.25825	12.14020 5	442.25117	959.85964	0	184.27
27	8565	248.17475	11.22608	384.01613	879.75298	0	178.17
			5				
			-				
28	8565	250.09125	10.18883	318.08724	786.39592	0	171.26
			2				

29	Optimize d	246.16285	- 12.56809 5	468.69041	1039.5991	0	187.12
30	Optimize d	247.8885	- 11.56092 5	404.97418	934.39796	0	180.41
31	Optimize d	249.95745	- 10.28034 8	323.87683	813.60398	0	171.87
32	Optimize d	252.3697	- 8.726362 5	225.16819	649.80981	0	161.51
33	Optimize d	254.16935	-7.474685	145.67399	544.26929	0	153.16
34	Optimize d	255.4531	-6.44801	80.652461	650.3227	0	500
35	Optimize d	257.48315	- 4.727796 5	-28.321568	480.50188	0	500

Slices of Slip Surface: 8565

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	8565	200.25	-4.461265	799.73737	-420.03394	0	450.31
2	8565	200.75	-4.920388	707.92305	683.6291	0	450.94
3	8565	202.1177	-6.073123	555.22957	992.62265	0	452.65
4	8565	204.36285	7.813465 5	505.29917	1215.0916	0	331.26
5	8565	206.6177	9.334670 5	492.23745	1360.0853	0	323.06
6	8565	208.87255	- 10.65633 5	504.14722	1485.4894	0	315.6
7	8565	210.9	-11.69906	524.81143	1569.0678	0	309.41
8	8565	212.7	-	546.31543	1614.875	0	304.22

29	8565	252.0077	-9.017585	243.58946	678.17023	0	163.45
30	8565	253.92415	-7.698473	159.82199	553.09212	0	154.66
31	8565	255.86355	-6.193498	64.430484	622.49469	0	500
32	8565	257.8258	-4.473249	-44.461334	466.7284	0	500

R15A Slope Stability Gap (Block) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

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File Information
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Created By: USACE St. Louis District Revision Number: 620 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 7:52:37 AM File Name: 17thReach15A.gsz

Directory: Y\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/27/2013

Last Solved Time: 7:53:14 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

```
Slope Stability Gap (Block)
     Kind: SLOPE/W
     Parent: Seepage Analysis (Gap)
     Method: Spencer
          PWP Conditions Source: Parent Analysis
          Direction of movement: Left to Right
          Use Passive Mode: No
          Slip Surface Option: Block
          Critical slip surfaces saved: 1
          Optimize Critical Slip Surface Location: Yes
          Tension Crack
               Tension Crack Option: (none)
    FOS Distribution
          FOS Calculation Option: Constant
```

```
Restrict Block Crossing: Yes
     Advanced
           Number of Slices: 30
           Optimization Tolerance: 0.01
           Minimum Slip Surface Depth: 0.1 ft
          Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
          Starting Optimization Points: 8
Ending Optimization Points: 16
           Complete Passes per Insertion:
           Driving Side Maximum Convex Angle: 5
           Resisting Side Maximum Convex Angle: 1 °
Materials
EMBANKMENT FILL 1, EL. +5.9 TO +2.0
     Model: Spatial Mohr-Coulomb
     Unit Weight: 114 pcf
     Cohesion: 800 psf
     Phi-B: 0 °
MARSH, EL. -5.0 TO -13.0
     Model: Spatial Mohr-Coulomb
     Unit Weight: 94 pcf
     Cohesion Fn: MARSH 1
     Phi-B: 0 °
BEACH SAND, EL. -13 TO -46
     Model: Shear/Normal Fn
Unit Weight: 122 pcf
```

Strength Function: Sand Phi-B: 0 ° BAY SOUND CLAY, EL. -46 TO -70

Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

EMBANKMENT FILL 2, EL. +2.0 TO -3.0

Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf

EMBANKMENT FILL 3, EL. -3.0 TO -5.0

Unit Weight: 114 pcf Cohesion: 500 psf Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (67.1, -12.2) ft Right Coordinate: (310, -3.2) ft

Slip Surface Block

Left Grid Upper Left: (177, -7) ft Lower Left: (177, -50) ft Lower Right: (222, -50) ft X Increments: 8 Y Increments: 8 Starting Angle: 135 ° Ending Angle: 180 ° Angle Increments: 5 Right Grid Upper Left: (227, -7) ft Lower Left: (227, -50) ft Lower Right: (272, -50) ft X Increments: 8 Starting Angle: 0 Ending Angle: 45

Cohesion Functions

Model: Spline Data Point Function Function: Cohesion vs. X

Angle Increments: 5

```
Curve Fit to Data: 100 %
       Segment Curvature: 0 %
Y-Intercept: 200
Data Points: X (ft), Cohesion (psf)
Data Point: (67.1, 200)
      Data Point: (168.1, 200)
Data Point: (200, 350)
       Data Point: (264.2, 200)
       Data Point: (310, 200)
```

Shear/Normal Strength Functions

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (0, 0) Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Unit Weight Functions

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 104 Data Points: X (ft), Unit Weight (pcf) Data Point: (67.1, 104) Data Point: (168.8, 104) Data Point: (200, 102) Data Point: (264.2, 104) Data Point: (310, 104)

Spatial Functions

Clay

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Points: (671, -70, -740)
Data Point: (671, -70, -740)
Data Point: (168.1, -46, 520)
Data Point: (168.1, -70, 740)
Data Point: (200, -46, 735)
Data Point: (200, -67, 735)
Data Point: (200, -70, -945)
Data Point: (264.2, -46, 520)
Data Point: (264.2, -70, 740)
Data Point: (310, -46, 520)
Data Point: (310, -70, 740)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	3,6,7,8,39,20	7.775
Region 2	EMBANKMENT FILL 1, EL. +5.9 TO +2.0	10,20,39,8,4,22	58.84
Region 3	EMBANKMENT FILL 3, EL3.0 TO - 5.0	23,24,25,5,13,26	102.66
Region 4	BEACH SAND, EL13 TO -46	17,16,1,29,32,27,14,15,28,33	8037.6009
Region 5		18,19,38,20,10,40	19.57
Region 6	EMBANKMENT FILL 3, EL3.0 TO - 5.0	42,30,31,41	3.4
Region 7	EMBANKMENT FILL 3, EL3.0 TO - 5.0	31,30,9,11,23,26,21	176.45
Region 8	MARSH, EL5.0 TO -13.0	1,2,12,41,31,21,26,13,14,27,32,29	1379.1041
Region 9	BAY SOUND CLAY, EL46 TO -70	17,33,28,15,37,36,35,34	5829.6
Region 10	EMBANKMENT FILL 2, EL. +2.0 TO - 3.0	11,44,46,45,23	163.39
Region 11	EMBANKMENT FILL 2, EL. +2.0 TO - 3.0	44,10,22,46	34.495
Region 12		11,43,47,44	72.2
Region 13		47,48,40,10,44	28.71125

Point 31	168.1	-5
Point 32	168.1	-13
Point 33	168.1	-46
Point 34	67.1	-70
Point 35	168.1	-70
Point 36	264.2	-70
Point 37	310	-70
Point 38	199	3.6
Point 39	201	3.6
Point 40	183.7	2
Point 41	160.6	-5
Point 42	162	-4.5
Point 43	171.5	-2.1
Point 44	200	0.4
Point 45	235	0.4
Point 46	226.6	1.1
Point 47	181	0.4
Point 48	182.9	1.875

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.23	(237.291, - 0.003)	28.78882	(200, 13)	(273.654, - 2.34693)
2	5279	2.37	(237.291, - 0.003)	28.988	(200, 13)	(274.509, - 2.37832)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	- 1.389294 5	563.57197	47.270208	0	375
2	Optimize d	200.75	- 1.748607	544.06621	476.16147	0	375

Region	42 20 0 11 42	66,975
14	42,30,9,11,43	66.975

Points

	X (ft)	Y (ft)
Point 1	67.1	-12.2
Point 2	131.7	-11.2
Point 3	200	6.5
Point 4	207.9	6.4
Point 5	310	-3.2
Point 6	200	13
Point 7	200.5	13
Point 8	201	6.5
Point 9	200	-4.5
Point 10	200	2
Point 11	200	-3
Point 12	151.6	-8.3
Point 13	310	-5
Point 14	310	-13
Point 15	310	-46
Point 16	67.1	-18
Point 17	67.1	-46
Point 18	184.6	2.5
Point 19	190.3	3.3
Point 20	200	3.6
Point 21	200	-5
Point 22	220.5	2.3
Point 23	264.2	-2
Point 24	275.1	-2.4
Point 25	298.4	-3.2
Point 26	264.2	-5
Point 27	264.2	-13
Point 28	264.2	-46
Point 29	121.85217	-13
Point 30	168.1	-4.5

3	Optimize d	201.71925	-2.44514	497.82295	862.74784	0	375
4	Optimize d	203.23155	- 3.531913 5	392.07103	943.71067	0	500
5	Optimize d	204.54695	- 4.550905	360.82523	1011.2484	0	500
6	Optimize d	206.48465	- 6.216923	401.96143	1217.5901	0	334.85
7	Optimize d	207.9536	- 7.479918	461.51016	1325.9184	0	331.42
8	Optimize d	209.673	- 8.843575	527.16489	1404.1095	0	327.4
9	Optimize d	212.2738	- 10.64198 5	619.32181	1543.1447	0	321.32
10	Optimize d	214.1438	- 11.60363	669.20806	1564.1645	0	316.95
11	Optimize d	216.86705	- 12.54175	716.86035	1618.9293	0	310.59
12	Optimize d	219.57765	- 12.99842	736.90202	1629.0554	0	304.26
13	Optimize d	222.025	- 12.99675	729.99976	1560.2946	0	298.54
14	Optimize d	225.075	- 12.99466 5	721.44239	1491.4421	0	291.41
15	Optimize d	228.02345	- 12.99265	713.13132	1443.2988	0	284.52
16	Optimize d	230.87035	- 12.99070 5	705.12255	1415.8302	0	277.87
17	Optimize d	232.4927	- 12.99184	700.71469	1397.7594	0	274.08
18	Optimize d	232.8197	- 12.99577 5	700.06165	1394.1539	0	273.32
19	Optimize d	233.9739	- 12.99761	696.97295	1386.5878	0	270.62

20	Optimize d	236.29435	12.99763	690.57135	1364.4936	0	265.2
21	Optimize d	238.8831	12.99765	683.38635	1340.0414	0	259.15
22	Optimize d	241.47185	- 12.99767 5	676.23997	1315.5892	0	253.1
23	Optimize d	244.06055	-12.9977	669.05497	1291.0984	0	247.05
24	Optimize d	246.64925	- 12.99772	661.9086	1266.6462	0	241.01
25	Optimize d	248.98775	- 12.90691 5	649.75212	1253.659	0	235.54
26	Optimize d	251.07605	- 12.72528	632.67347	1216.4486	0	230.66
27	Optimize d	253.1055	- 12.44855	609.76552	1190.6086	0	225.92
28	Optimize d	255.0761	- 12.07673 5	581.14225	1135.8055	0	221.32
29	Optimize d	257.8899	- 11.32068	526.17345	1058.4555	0	214.74
30	Optimize d	261.54215	- 9.984825	432.74449	911.24327	0	206.21
31	Optimize d	263.78295	- 8.975937 5	363.58812	816.21421	0	200.97
32	Optimize d	265.71085	- 7.851784	288.11976	694.48356	0	200
33	Optimize d	268.73255	- 6.089841 5	169.82427	507.74032	0	200
34	Optimize d	270.3678	- 5.104435	103.81219	436.68767	0	200
35	Optimize d	272.07295	- 3.673462 5	9.9333953	388.56956	0	500

			11.121714				
27	5279	265.3168	- 9.0570235	364.41174	834.33301	0	200
28	5279	267.5504	-7.434214	256.97167	662.6129	0	200
29	5279	269.784	- 5.8114045	149.53884	490.85656	0	200
30	5279	272.705	- 3.6891605	9.1595413	346.39182	0	500

ces of Slip Surface: 5279							
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Strength (psf)	e Strengt h (psf)
1	5279	200.25	- 0.6595017 5	520.74805	28.974134	0	375
2	5279	200.75	- 1.0227732	505.0693	402.43741	0	375
3	5279	202.1993	-2.075736	441.28049	826.1993	0	375
4	5279	204.8114	- 3.9735315	346.64075	994.54142	0	500
5	5279	207.0621	-5.608776	361.96373	1198.6929	0	333.5
6	5279	209.3125	- 7.2437935	436.84054	1294.5418	0	328.24
7	5279	212.1375	- 9.2962775	540.73837	1379.5959	0	321.64
8	5279	214.9625	-11.34876	651.25153	1464.6501	0	315.04
9	5279	217.40625	-12.375	705.21212	1650.5212	0	309.33
10	5279	219.46875	-12.375	699.2	1573.8667	0	304.51
11	5279	222.025	-12.375	691.83607	1501.2131	0	298.54
12	5279	225.075	-12.375	683.18033	1432.5574	0	291.41
13	5279	228	-12.375	674.92857	1384.8571	0	284.58
14	5279	230.8	-12.375	667.07143	1358.0357	0	278.04
15	5279	233.6	-12.375	659.28571	1331.2143	0	271.5
16	5279	236.2875	-12.375	651.80583	1305.6311	0	265.22
17	5279	238.8625	-12.375	644.66019	1281.3204	0	259.2
18	5279	241.4375	-12.375	637.51456	1256.9709	0	253.18
19	5279	244.0125	-12.375	630.36893	1232.6602	0	247.17
20	5279	246.5875	-12.375	623.2233	1208.3107	0	241.15
21	5279	249.1625	-12.375	616.1165	1184	0	235.13
22	5279	251.7375	-12.375	608.97087	1159.6505	0	229.12
23	5279	254.3125	-12.375	601.86408	1135.3398	0	223.1
24	5279	256.8875	-12.375	594.71845	1110.9903	0	217.09
25	5279	259.4625	-12.375	587.61165	1086.6796	0	211.07
26	5279	262.475	-	501.07459	1063.7752	0	204.03

R15A Slope Stability Gap (Entry & Exit) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 620 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 7:52:37 AM File Name: 17thReach15A.gsz

Directory: Y\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/27/2013

Last Solved Time: 7:54:08 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Gap (Entry & Exit) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution

FOS Calculation Option: Constant

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 1, EL. +5.9 TO +2.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi-B: 0° MARSH, EL. -5.0 TO -13.0 Model: Snatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0 Phi-R·∩° BEACH SAND, EL. -13 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay

Phi-B: 0° **Sheet Pile**

> Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

EMBANKMENT FILL 2, EL. +2.0 TO -3.0

Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf

EMBANKMENT FILL 3, EL. -3.0 TO -5.0

Unit Weight: 114 pcf Cohesion: 500 psf Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (196.8, -4.5) ft Left-Zone Right Coordinate: (200, 7.55658) ft Left-Zone Increment: 25 Right Projection: Range Right-Zone Left Coordinate: (210, 5.71667) ft Right-Zone Right Coordinate: (280, -2.56824) ft Right-Zone Increment: 20 Radius Increments: 25

Slip Surface Limits

Left Coordinate: (67.1, -12.2) ft Right Coordinate: (310, -3.2) ft

Cohesion Functions

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %
Y-Intercept: 200
Data Points: X (ft), Cohesion (psf)
Data Point: (67.1, 200) Data Point: (168.1, 200) Data Point: (200, 350) Data Point: (264.2, 200) Data Point: (310, 200)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (10000, 5)

Data Point: (10000, 5773) Estimation Properties Intact Rock Param : 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Unit Weight Functions

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 104
Data Points: X (ft), Unit Weight (pcf) Data Point: (67.1, 104) Data Point: (168.8, 104) Data Point: (200, 102) Data Point: (264.2 104) Data Point: (310, 104)

Spatial Functions

Model: Linear Internolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (67.1, -46, 520) Data Point: (67.1, -70, 740) Data Point: (168.1, -46, 520)

Data Point: (168.1, -70, 740)
Data Point: (200, -46, 735)
Data Point: (200, -70, 945)
Data Point: (264.2, -46, 520)
Data Point: (264.2, -70, 740)
Data Point: (310, -46, 520)
Data Point: (310, -70, 740)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	3,6,7,8,39,20	7.775
Region 2	EMBANKMENT FILL 1, EL. +5.9 TO +2.0	10,20,39,8,4,22	58.84
Region 3	EMBANKMENT FILL 3, EL3.0 TO - 5.0	23,24,25,5,13,26	102.66
Region 4	BEACH SAND, EL13 TO -46	17,16,1,29,32,27,14,15,28,33	8037.6009
Region 5		18,19,38,20,10,40	19.57
Region 6	EMBANKMENT FILL 3, EL3.0 TO - 5.0	42,30,31,41	3.4
Region 7	EMBANKMENT FILL 3, EL3.0 TO - 5.0	31,30,9,11,23,26,21	176.45
Region 8	MARSH, EL5.0 TO -13.0	1,2,12,41,31,21,26,13,14,27,32,29	1379.1041
Region 9	BAY SOUND CLAY, EL46 TO -70	17,33,28,15,37,36,35,34	5829.6
Region 10	EMBANKMENT FILL 2, EL. +2.0 TO - 3.0	11,44,46,45,23	163.39
Region 11	EMBANKMENT FILL 2, EL. +2.0 TO - 3.0	44,10,22,46	34.495
Region 12		11,43,47,44	72.2
Region 13		47,48,40,10,44	28.71125
Region 14		42,30,9,11,43	66.975

Points

	X (ft)	Y (ft)
Point 1	67.1	-12.2

Point 38	199	3.6
Point 39	201	3.6
Point 40	183.7	2
Point 41	160.6	-5
Point 42	162	-4.5
Point 43	171.5	-2.1
Point 44	200	0.4
Point 45	235	0.4
Point 46	226.6	1.1
Point 47	181	0.4
Point 48	182.9	1.875

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.25	(233.231, 41.695)	26.70966	(200, 13)	(267.279, - 2.11299)
2	5885	2.38	(233.231, 41.695)	54.576	(200, 13)	(265.85, -2.06054)

Slices of Slip Surface: Optimized

						Frictiona	Cohesiv
	Slip	X (ft)	Y (ft)	PWP (psf)	Base Normal	1	e
	Surface	λ (11)	1 (11)	FVVF (psi)	Stress (psf)	Strength	Strengt
						(psf)	h (psf)
1	Optimize d	200.25	- 1.022479 1	542.0437	31.192133	0	375
2	Optimize d	200.75	- 1.384615	524.50146	436.51493	0	375
3	Optimize d	201.9588	- 2.260118 5	469.18119	841.43458	0	375
4	Optimize d	203.4831	- 3.364107	383.45527	924.22845	0	500
5	Optimize d	204.75935	-4.38683	353.58725	993.17413	0	500

Point 2	131.7	-11.2
Point 3	200	6.5
Point 4	207.9	6.4
Point 5	310	-3.2
Point 6	200	13
Point 7	200.5	13
Point 8	201	6.5
Point 9	200	-4.5
Point 10	200	2
Point 11	200	-3
Point 12	151.6	-8.3
Point 13	310	-5
Point 14	310	-13
Point 15	310	-46
Point 16	67.1	-18
Point 17	67.1	-46
Point 18	184.6	2.5
Point 19	190.3	3.3
Point 20	200	3.6
Point 21	200	-5
Point 22	220.5	2.3
Point 23	264.2	-2
Point 24	275.1	-2.4
Point 25	298.4	-3.2
Point 26	264.2	-5
Point 27	264.2	-13
Point 28	264.2	-46
Point 29	121.85217	-13
Point 30	168.1	-4.5
Point 31	168.1	-5
Point 32	168.1	-13
Point 33	168.1	-46
Point 34	67.1	-70
Point 35	168.1	-70
Point 36	264.2	-70
Point 37	310	-70

6	Optimize d	206.68505	- 6.048121 5	390.53858	1201.6236	0	334.38
7	Optimize d	208.05165	- 7.227086 5	446.1355	1299.2171	0	331.19
8	Optimize d	209.05645	- 8.033877 5	484.81541	1352.7425	0	328.84
9	Optimize d	210.76275	9.385772 5	552.89353	1413.9301	0	324.85
10	Optimize d	212.70095	- 10.59785 5	614.93196	1528.7989	0	320.32
11	Optimize d	214.87105	- 11.67012 5	670.74473	1549.2072	0	315.25
12	Optimize d	217.6367	- 12.59388 5	717.7795	1602.1683	0	308.79
13	Optimize d	219.90865	- 12.98277 5	735.00727	1614.6638	0	303.48
14	Optimize d	221.58365	- 12.98636 5	730.58139	1568.6229	0	299.57
15	Optimize d	223.75095	- 12.99101	724.86002	1520.3143	0	294.51
16	Optimize d	225.7173	- 12.99395 5	719.61844	1476.6792	0	289.91
17	Optimize d	227.5998	- 12.99528 5	714.48933	1447.3822	0	285.51
18	Optimize d	229.66635	- 12.99615	708.80067	1427.7726	0	280.69
19	Optimize d	231.7998	- 12.99647	702.94165	1407.3832	0	275.7

20	Optimize d	233.93325	- 12.99678 5	697.03576	1386.9469	0	270.72
21	Optimize d	236.2483	- 12.99713	690.66068	1364.9791	0	265.31
22	Optimize d	238.7449	- 12.99750 5	683.7713	1341.387	0	259.47
23	Optimize d	241.05185	- 12.90383 5	671.52962	1330.1687	0	254.08
24	Optimize d	243.16915	- 12.71612	653.98159	1292.0618	0	249.14
25	Optimize d	245.13375	- 12.46033	632.61052	1267.9375	0	244.55
26	Optimize d	246.94565	- 12.13646 5	607.34739	1219.3671	0	240.31
27	Optimize d	248.89925	- 11.70191	574.85917	1175.1681	0	235.75
28	Optimize d	250.9945	- 11.15666 5	535.04489	1102.0521	0	230.85
29	Optimize d	253.2251	- 10.46111 5	485.47051	1031.2368	0	225.64
30	Optimize d	255.59105	- 9.615265	426.16972	925.45055	0	220.11
31	Optimize d	257.85065	-8.62846	358.35487	834.81472	0	214.83
32	Optimize d	260.00395	-7.5007	282.04001	701.72653	0	209.8
33	Optimize d	262.5217	- 5.925285	176.78218	544.93475	0	203.92
34	Optimize d	264.0814	- 4.813569	103.13332	564.7294	0	500
35	Optimize d	265.73945	3.413187 5	11.336449	385.49931	0	500

17	5885	231.85	-12.85333	693.87287	1387.4125	0	275.58
18	5885	233.95	- 12.86607 5	688.84506	1377.2616	0	270.68
19	5885	236.1034	- 12.79407 5	678.40665	1358.7591	0	265.65
20	5885	238.3102	-12.63275	662.23223	1331.4125	0	260.49
21	5885	240.51705	-12.38092	640.43694	1295.1996	0	255.33
22	5885	242.7239	-12.03731	612.8974	1249.9805	0	250.18
23	5885	244.9307	- 11.60014 5	579.49808	1195.4223	0	245.02
24	5885	247.1375	- 11.06709 5	540.14026	1131.3719	0	239.87
25	5885	249.3443	-10.43521	494.62386	1057.3911	0	234.71
26	5885	251.55115	-9.700838	442.71339	973.01335	0	229.55
27	5885	253.758	-8.859502	384.1093	877.741	0	224.4
28	5885	255.9648	- 7.905746 5	318.49918	770.93459	0	219.24
29	5885	258.1716	- 6.832925 5	245.46472	651.73794	0	214.09
30	5885	260.3784	-5.632918	164.49104	519.12472	0	208.93
31	5885	262.8409	-4.121667	63.536626	430.10739	0	500
32	5885	265.0249	2.651938	-34.045723	253.29856	0	500

Slic

ices of S	lip Surf	ace: 5885			_		
	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	5885	200.25	- 1.786992 5	586.90915	35.673151	0	375
2	5885	200.75	- 2.161771 5	566.2844	522.15041	0	375
3	5885	201.4352	-2.658896	532.55642	891.17666	0	375
4	5885	203.4253	-3.985433	386.58305	1017.2884	0	500
5	5885	206.4401	-5.823089	380.08781	1253.7826	0	334.95
6	5885	208.95	- 7.167945 5	435.35423	1352.1184	0	329.09
7	5885	211.05	- 8.156898 5	479.70645	1379.863	0	324.18
8	5885	213.15	- 9.039679 5	520.74109	1397.2474	0	319.28
9	5885	215.25	9.821757 5	558.70769	1404.7944	0	314.37
10	5885	217.35	-10.50767	592.47563	1402.944	0	309.46
11	5885	219.45	- 11.10117 5	621.60166	1392.0265	0	304.56
12	5885	221.51665	-11.59872	645.716	1387.3551	0	299.73
13	5885	223.55	- 12.00547 5	664.72711	1389.6156	0	294.98
14	5885	225.58335	-12.33267	679.09912	1384.1526	0	290.23
15	5885	227.65	-12.58454	688.89204	1384.2263	0	285.4
16	5885	229.75	- 12.75962 5	693.91708	1389.735	0	280.49

R15B Slope Stability Gap Block Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

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File Information
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Created By: USACE St. Louis District Revision Number: 700 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 7:40:46 AM File Name: 17thReach15B.gsz Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/27/2013 Last Solved Time: 7:41:16 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

```
Slope Stability Gap Block
     Kind: SLOPE/W
     Parent: Seepage Analysis (Gap)
     Method: Spencer
          PWP Conditions Source: Parent Analysis
          Direction of movement: Left to Right
          Use Passive Mode: No
          Slip Surface Option: Block
          Critical slip surfaces saved: 1
          Optimize Critical Slip Surface Location: Yes
          Tension Crack
               Tension Crack Option: (none)
    FOS Distribution
          FOS Calculation Option: Constant
```

Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 ° Materials FILL top, EL. +6.5 to 2 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi-B: 0 ° MARSH, EL. -5 to -13 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi-B: 0 ° BEACH SAND, EL. -13 to -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Phi-B: 0 ° BAY SOUND CLAY, EL. -46 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi: 0 **Sheet Pile** Model: Undrained (Phi=0)

Restrict Block Crossing: Yes

Cohesion: 0.01 psf

FILL middle, EL. 2 to -3 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi-B: 0° FILL bottom, EL. -3 to -5 $\,$

Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi-B: 0°

Slip Surface Limits

Left Coordinate: (67.1, -15.6) ft Right Coordinate: (310, -3) ft

Slip Surface Block

Left Grid Upper Left: (193, -6) ft Lower Left: (193, -46) ft Lower Right: (223, -46) ft X Increments: 6 Y Increments: 8 Starting Angle: 135° Ending Angle: 180° Angle Increments: 5 Right Grid Upper Left: (227, -6) ft Lower Left: (227, -46) ft Lower Right: (267, -46) ft X Increments: 9 Y Increments: 8 Starting Angle: 0 ° Ending Angle: 45 ° Angle Increments: 6

Cohesion Functions

Unit Weight: 0.1 pcf

MARSH 1

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 200 Data Points: X (ft), Cohesion (psf) Data Point: (157, 200) Data Point: (200, 350) Data Point: (264, 200)

Unit Weight Functions

Clay

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 104 Data Points: X (ft), Unit Weight (pcf)
Data Point: (67.2, 104) Data Point: (157.5, 104) Data Point: (200, 102) Data Point: (264, 104) Data Point: (310, 104)

Spatial Functions

Clay

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Points: (67.2, -46, 520)
Data Point: (67.2, -70, 740)
Data Point: (157.5, -46, 520)
Data Point: (157.5, -70, 740) Data Point: (200, -46, 735) Data Point: (200, -70, 945) Data Point: (264, -46, 520) Data Point: (264, -70, 740) Data Point: (310, -46, 520) Data Point: (310, -70, 740)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	7,8,9,35,4,21	4.275
Region 2	FILL top, EL. +6.5 to 2	11,4,35,9,5,40,23	97.81
Region 3	BEACH SAND, EL13 to -46	18,17,1,2,3,39,31,28,15,16	7921.135
Region 4		19,20,34,21,4,11,36	82.845
Region 5	BAY SOUND CLAY, EL46 to -70	16,33,32,18	5829.6
Region 6	MARSH, EL5 to -13	13,39,31,28,15,14,27,22,30,37	1436.19
Region 7	FILL bottom, EL3 to -5	12,10,29,38,37,30,22,27,14,6,26,25,24	267.885
Region 8		42,12,10,29,38	89.578
Region 9		42,43,41,12	92.934
Region 10		43,36,11,41	36
Region 11	FILL middle, EL. 2 to -3	41,11,23,45,44	47.86
Region 12	FILL middle, EL. 2 to -3	12,41,44,46,47,48,24	146.875

Points

	X (ft)	Y (ft)
Point 1	67.1	-15.6
Point 2	101.1	-14.9
Point 3	117.4	-13.3
Point 4	200	7.3
Point 5	207.9	7.3
Point 6	310	-3
Point 7	200	13
Point 8	200.5	13
Point 9	201	7.3
Point 10	200	-4.5
Point 11	200	2
Point 12	200	-3
Point 13	138.2	-6.3
Point 14	310	-5
Point 15	310	-13
Point 16	310	-46
Point 17	67.1	-18
Point 18	67.1	-46

Point 19	179.1	3.1
Point 20	190.3	6.7
Point 21	200	7.5
Point 22	200	-5
Point 23	227	2
Point 24	264.2	-2.6
Point 25	275.1	-2.6
Point 26	296.4	-3
Point 27	264.2	-5
Point 28	264.2	-13
Point 29	160.3	-4.5
Point 30	160.3	-5
Point 31	160.3	-13
Point 32	67.1	-70
Point 33	310	-70
Point 34	199	7.5
Point 35	200.9	7.3
Point 36	178.2	2
Point 37	145.7	-5
Point 38	148.6	-4.5
Point 39	118.3	-13
Point 40	220	4.5
Point 41	200	0.4
Point 42	162.46	-2.11
Point 43	176.8	0.4
Point 44	233.6	0.4
Point 45	228.7	1.4
Point 46	235.6	0
Point 47	245.2	-1.7
Point 48	254.5	-1.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.96	(226.349, 3.06)	22.58525	(200, 13)	(251.49, -1.83527)

5

2	5137	2.15	(226.349, 3.06)	22,279	(200, 13)	(252.256, -
2	3137	2.13	(220.343, 3.00)	22.273	(200, 13)	1.85173)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	1.774788	71.847528	435.5823	0	375
2	Optimize d	200.7	1.366546	91.279577	486.00477	0	375
3	Optimize d	200.95	1.139745	102.05208	510.11966	0	375
4	Optimize d	201.3827	0.7471925	120.70215	552.2554	0	375
5	Optimize d	202.12625	0.072645	153.96062	624.75049	0	375
6	Optimize d	203.4378	-1.090565	212.15938	756.1745	0	375
7	Optimize d	204.98115	-2.445846	279.15724	902.73403	0	375
8	Optimize d	206.44075	-3.725111	344.07275	991.59087	0	500
9	Optimize d	207.60385	-4.718378	394.93272	1126.1649	0	500
10	Optimize d	208.8383	-5.6913655	448.18239	1254.2746	0	329.29
11	Optimize d	210.6843	-7.1463875	530.15801	1339.9089	0	324.96
12	Optimize d	212.4058	-8.35064	597.33645	1452.2845	0	320.92
13	Optimize d	214.0334	-9.32822	651.11306	1500.3726	0	317.11
14	Optimize d	215.572	-10.18416	697.8078	1563.6212	0	313.5
15	Optimize d	217.02155	-10.91846	737.43989	1594.1453	0	310.11
16	Optimize	218.87315	-11.64894	775.27564	1661.9143	0	305.77

	d						
17	Optimize d	221.085	-12.3621	810.62186	1655.8493	0	300.5
18	Optimize d	222.975	-12.741515	826.57965	1689.9665	0	296.1
19	Optimize d	224.585	-12.800685	823.78653	1630.0694	0	292.3
20	Optimize d	226.195	-12.859855	820.9934	1570.1724	0	288.6
21	Optimize d	227.70555	-12.91537	818.38288	1514.3199	0	285.0
22	Optimize d	228.55555	-12.93509	816.20712	1501.5555	0	283.0
23	Optimize d	229.60135	-12.89013	809.18192	1470.2826	0	280.6
24	Optimize d	231.4041	-12.81263	797.10045	1420.682	0	276.
25	Optimize d	232.95275	-12.64376	780.29385	1405.4832	0	272.7
26	Optimize d	234.6	-12.3126	752.98429	1334.9895	0	268.9
27	Optimize d	235.94505	-12.04219	730.60412	1278.6353	0	265.7
28	Optimize d	237.34385	-11.56635	695.13217	1244.9692	0	262.4
29	Optimize d	239.45135	-10.75341	635.45581	1121.6765	0	257.5
30	Optimize d	241.6455	-9.68876	559.39239	1010.9391	0	252.3
31	Optimize d	243.99295	-8.173322	454.00402	836.81556	0	246.8
32	Optimize d	245.28595	-7.255032	390.52642	719.09991	0	243.8
33	Optimize d	246.6539	-6.097	311.47792	625.17836	0	240.6
34	Optimize d	248.09485	-4.86397	226.2127	625.52082	0	500
35	Optimize	249.39655	-3.7065265	137.82826	493.86558	0	500

	d						
36	Optimize d	251.0147	-2.260192	30.770437	248.89237	0	375

Slices of Slip Surface: 5137

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strength (psf)	Cohesiv e Strengt h (psf)
1	5137	200.0535	2.038883	58.92628	306.71355	0	800
2	5137	200.3035	1.857247	67.450859	481.33598	0	375
3	5137	200.7	1.5691855	80.822819	512.26955	0	375
4	5137	200.95	1.38755	89.258843	531.62933	0	375
5	5137	201.6546	0.8756115	113.0619	586.93692	0	375
6	5137	203.07925	-0.1594709	163.01773	698.86503	0	375
7	5137	204.61935	-1.2784129	215.9369	819.84264	0	375
8	5137	206.15945	-2.3973545	270.51077	940.87278	0	375
9	5137	207.41475	-3.3093725	315.58572	1003.5187	0	500
10	5137	208.82085	-4.33096	367.10672	1090.984	0	500
11	5137	210.56755	-5.6	434.94148	1223.328	0	325.23
12	5137	212.2192	-6.8	502.06655	1290.0906	0	321.36
13	5137	213.87085	-8	569.46593	1356.9022	0	317.49
14	5137	215.5225	-9.2	636.96327	1423.6648	0	313.62
15	5137	217.17415	-10.4	704.60755	1490.4274	0	309.75
16	5137	219	-11	734.45	1683.95	0	305.47
17	5137	220.875	-11	726.8	1621.8286	0	301.07
18	5137	222.625	-11	719.71429	1550.4	0	296.97
19	5137	224.375	-11	712.57143	1479.0286	0	292.87
20	5137	226.125	-11	705.48571	1407.6571	0	288.77
21	5137	227.85	-11	698.47059	1337.6471	0	284.73
22	5137	229.51665	-11	691.71443	1284.3064	0	280.82
23	5137	231.15	-11	685.04096	1246.2247	0	276.99
24	5137	232.78335	-11	678.36749	1208.0819	0	273.16
25	5137	234.6	-11	670.9	1166.1	0	268.91
26	5137	236.3889	-11	663.59146	1127.2182	0	264.71
27	5137	237.9667	-11	657.06329	1095.2745	0	261.02
28	5137	239.54445	-11	650.53512	1063.2675	0	257.32

29	5137	241.14445	-10.377613	604.81248	1127.3662	0	253.57
30	5137	242.7667	-9.1328375	519.66827	966.95661	0	249.77
31	5137	244.3889	-7.8880625	434.33821	806.49815	0	245.96
32	5137	245.93815	-6.6992565	352.54118	667.15425	0	242.33
33	5137	247.4145	-5.566419	274.76115	548.93118	0	238.87
34	5137	248.9082	-4.4202885	190.83148	526.84085	0	500
35	5137	250.4192	-3.260866	103.18394	382.69732	0	500
36	5137	251.71515	-2.266444	29.934516	207.19661	0	375

R15B Slope Stability Gap Entry & Exit

File Information

Created By: USACE St. Louis District Revision Number: 700 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 7:40:46 AM File Name: 17thReach15B.gsz

Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/27/2013

Last Solved Time: 7:41:30 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Gap Entry & Exit Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant

FILL middle, EL. 2 to -3

Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi · ∩ ° Phi-B: 0°

FILL bottom, EL. -3 to -5 Unit Weight: 114 pcf

Cohesion: 500 psf Phi · ∩ ° Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (190, -4.5) ft Left-Zone Right Coordinate: (200, 11) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (215, 5.65702) ft Right-Zone Right Coordinate: (300, -3) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (67.1, -15.6) ft Right Coordinate: (310, -3) ft

Cohesion Functions

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %
Y-Intercept: 200
Data Points: X (ft), Cohesion (psf)
Data Point: (157, 200) Data Point: (200, 350) Data Point: (264, 200)

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

FILL top, EL. +6.5 to 2 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0 Phi-B: 0°

MARSH, EL. -5 to -13

Model: Snatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0 Phi-R·∩°

BEACH SAND, EL. -13 to -46

Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi-B: 0°

BAY SOUND CLAY, EL. -46 to -70

Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Unit Weight Functions

Clav

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 104 Data Points: X (ft), Unit Weight (pcf) Data Point: (67.2, 104) Data Point: (157.5, 104) Data Point: (200, 102) Data Point: (264, 104) Data Point: (310, 104)

Spatial Functions

Model: Linear Interpolation Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf) Data Point: (67.2, -46, 520) Data Point: (67.2, -70, 740) Data Point: (157.5, -46, 520) Data Point: (157.5, -70, 740) Data Point: (200, -46, 735) Data Point: (200, -70, 945) Data Point: (264, -46, 520) Data Point: (264, -70, 740) Data Point: (310, -46, 520) Data Point: (310, -70, 740)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	7,8,9,35,4,21	4.275
Region 2	FILL top, EL. +6.5 to 2	11,4,35,9,5,40,23	97.81
Region 3	BEACH SAND, EL13 to -46	18,17,1,2,3,39,31,28,15,16	7921.135
Region 4		19,20,34,21,4,11,36	82.845
Region 5	BAY SOUND CLAY, EL46 to -70	16,33,32,18	5829.6
Region 6	MARSH, EL5 to -13	13,39,31,28,15,14,27,22,30,37	1436.19
Region 7	FILL bottom, EL3 to -5	12,10,29,38,37,30,22,27,14,6,26,25,24	267.885

Region 8		42,12,10,29,38	89.578
Region 9		42,43,41,12	92.934
Region 10		43,36,11,41	36
Region 11	FILL middle, EL. 2 to -3	41,11,23,45,44	47.86
Region 12	FILL middle, EL. 2 to -3	12,41,44,46,47,48,24	146.875

Points

	X (ft)	Y (ft)
Point 1	67.1	-15.6
Point 2	101.1	-14.9
Point 3	117.4	-13.3
Point 4	200	7.3
Point 5	207.9	7.3
Point 6	310	-3
Point 7	200	13
Point 8	200.5	13
Point 9	201	7.3
Point 10	200	-4.5
Point 11	200	2
Point 12	200	-3
Point 13	138.2	-6.3
Point 14	310	-5
Point 15	310	-13
Point 16	310	-46
Point 17	67.1	-18
Point 18	67.1	-46
Point 19	179.1	3.1
Point 20	190.3	6.7
Point 21	200	7.5
Point 22	200	-5
Point 23	227	2
Point 24	264.2	-2.6
Point 25	275.1	-2.6
Point 26	296.4	-3
Point 27	264.2	-5

Point 28	264.2	-13
Point 29	160.3	-4.5
Point 30	160.3	-5
Point 31	160.3	-13
Point 32	67.1	-70
Point 33	310	-70
Point 34	199	7.5
Point 35	200.9	7.3
Point 36	178.2	2
Point 37	145.7	-5
Point 38	148.6	-4.5
Point 39	118.3	-13
Point 40	220	4.5
Point 41	200	0.4
Point 42	162.46	-2.11
Point 43	176.8	0.4
Point 44	233.6	0.4
Point 45	228.7	1.4
Point 46	235.6	0
Point 47	245.2	-1.7
Point 48	254.5	-1.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.95	(228.032, 22.398)	23.10604	(200, 13)	(252.844, -1.8644)
2	5933	2.00	(228.032, 22.398)	34.624	(200, 13)	(252.735, - 1.86205)

Slices of Slip Surface: Optimized

5

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize	200.25	1.6942825	75.997725	433.97865	0	375

	d						
	-						
2	Optimize d	200.7	1.2665295	96.441308	486.91771	0	375
3	Optimize d	200.95	1.0288887	107.76988	512.13344	0	375
4	Optimize d	201.3058	0.6906802	123.90107	548.36443	0	375
5	Optimize d	202.3647	-0.31589	174.49537	656.34858	0	375
6	Optimize d	204.1695	-1.9996245	258.45823	844.01234	0	375
7	Optimize d	205.74485	-3.4493895	331.90429	948.05709	0	500
8	Optimize d	206.8714	-4.465655	383.94485	1067.7617	0	500
9	Optimize d	207.68715	-5.1886475	422.3216	1209.0391	0	331.9
10	Optimize d	208.1268	-5.5783025	444.41328	1238.4044	0	330.9
11	Optimize d	209.5638	-6.69294	506.93449	1334.767	0	327.5
12	Optimize d	211.73015	-8.18455	589.94357	1453.1086	0	322.5
13	Optimize d	213.6424	-9.34051	653.49386	1510.3039	0	318.0
14	Optimize d	215.47795	-10.28405	704.40687	1598.6435	0	313.7
15	Optimize d	217.2369	-11.01517	742.57231	1621.1123	0	309.6
16	Optimize d	218.9959	-11.74629	780.79024	1643.5285	0	305.4
17	Optimize d	219.9377	-12.124265	800.44193	1710.9722	0	303.2
18	Optimize d	220.9963	-12.33519	809.31149	1689.1049	0	300.7
19	Optimize d	222.98885	-12.732205	825.94758	1646.1857	0	296.1
20	Optimize	224.73885	-12.936555	831.65007	1643.9965	0	292.0

	d						
21	Optimize d	226.2463	-12.94824	826.27688	1583.631	0	288.4
22	Optimize d	227.85	-12.96067	820.62244	1519.8368	0	284.7
23	Optimize d	229.7954	-12.975755	813.757	1461.4579	0	280.1
24	Optimize d	231.5681	-12.905235	802.23961	1443.0194	0	276.0
25	Optimize d	232.9227	-12.7472	786.91486	1396.0186	0	272.8
26	Optimize d	233.8327	-12.641035	776.61482	1364.497	0	270.
27	Optimize d	234.8327	-12.421715	758.84572	1351.1942	0	268.3
28	Optimize d	236.6404	-11.96897	723.18711	1268.0599	0	264.1
29	Optimize d	238.99265	-11.208765	665.92722	1174.1348	0	258.6
30	Optimize d	241.20215	-10.244855	596.21256	1062.2587	0	253.4
31	Optimize d	242.9975	-9.316305	530.26356	933.03233	0	249.2
32	Optimize d	244.5476	-8.4158945	466.96264	840.38111	0	245.5
33	Optimize d	245.8972	-7.5136745	404.27997	734.81059	0	242.4
34	Optimize d	247.8984	-6.023795	301.7395	601.09646	0	237.7
35	Optimize d	249.4416	-4.812225	217.1838	594.16409	0	500
36	Optimize d	250.79715	-3.650501	129.82893	477.59415	0	500
37	Optimize d	252.37895	-2.2704735	28.828307	242.47541	0	375

Slices of Slip Surface: 5933

	Slip	X (ft)	Y (ft)	PWP (psf)	Base	Friction	Cohesiv
	Surfac	A (11)	1 (11)	P VVP (psi)	Normal	al	e

	e				Stress (psf)	Strengt h (psf)	Strengt h (psf)
1	5933	200.02725	2.0375	59.063735	15.998585	0	800
2	5933	200.27725	1.701306	75.565304	367.66142	0	375
3	5933	200.7	1.1454012	102.69077	436.57809	0	375
4	5933	200.95	0.82542105	118.27466	476.11423	0	375
5	5933	201.14715	0.5813258	130.13608	506.47255	0	375
6	5933	202.0882	-0.499523	185.74131	641.46163	0	375
7	5933	203.676	-2.185598	271.30474	852.56977	0	375
8	5933	205.666	-3.986075	362.59393	1033.7323	0	500
9	5933	207.38105	-5.3857385	435.88498	1264.0208	0	332.7
10	5933	208.7643	-6.3507295	489.31057	1347.4062	0	329.46
11	5933	210.49285	-7.4380515	549.04499	1423.0085	0	325.41
12	5933	212.2214	-8.389957	600.56413	1484.788	0	321.36
13	5933	213.95	-9.2187415	644.67408	1533.9745	0	317.3
14	5933	215.6786	-9.933915	681.83525	1571.7283	0	313.25
15	5933	217.40715	-10.54291	712.56279	1598.8341	0	309.2
16	5933	219.1357	-11.051545	737.08728	1615.8447	0	305.15
17	5933	220.875	-11.46633	755.81932	1610.9311	0	301.07
18	5933	222.625	-11.789635	768.78749	1584.1955	0	296.97
19	5933	224.375	-12.02099	776.14569	1548.1433	0	292.87
20	5933	226.125	-12.16224	777.84536	1502.9709	0	288.77
21	5933	227.85	-12.214985	774.166	1450.1569	0	284.73
22	5933	229.51665	-12.18439	765.51927	1405.2157	0	280.82
23	5933	231.15	-12.07546	752.13369	1367.4992	0	276.99
24	5933	232.78335	-11.888415	733.8645	1322.1205	0	273.16
25	5933	234.6	-11.58195	707.30773	1262.4324	0	268.91
26	5933	236.56	-11.14458	671.90488	1190.4594	0	264.31
27	5933	238.48	-10.596505	629.65376	1110.7944	0	259.81
28	5933	240.4	-9.925179	579.49484	1018.9925	0	255.31
29	5933	242.32	-9.1226865	520.90869	914.25855	0	250.81
30	5933	244.24	-8.178647	453.299	795.46485	0	246.31
31	5933	246.20045	-7.0525775	373.82168	676.64421	0	241.72
32	5933	248.20135	-5.717693	281.10886	555.24918	0	237.03
33	5933	249.8784	-4.44942	189.5919	551.01849	0	500
34	5933	251.2316	-3.287712	103.01646	433.84819	0	500

35 5933 252.3218 -2.269318 28.867134 260.96881 0 375

Slope Stability Gap Entry & Exit Report generated using GeoStudio 2007, version 7.22. Copyright © 1991-2013 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 711 Last Edited By: Goetz, Ryan MVS Date: 7/30/2014 Time: 9:28:04 AM File Name: 17thReach15B.gsz Directory: C:\Users\B3ECGANG\Desktop\
Last Solved Date: 7/30/2014 Last Solved Time: 9:28:54 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Slope Stability Gap Entry & Exit Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer Settings PWP Conditions Source: Parent Analysis Slip Surface Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack
Tension Crack Option: (none) FOS Distribution
FOS Calculation Option: Constant Advanced

FILL middle, EL. 2 to -3 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi · ∩ ° Phi-B: 0 ° FILL bottom, EL. -3 to -5 Unit Weight: 114 pcf Cohesion: 500 psf Phi · ∩ °

Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (190, -4.5) ft Left-Zone Right Coordinate: (200, 11) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (215, 5.65702) ft Right-Zone Right Coordinate: (300, -3) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (67.1, -15.6) ft Right Coordinate: (310, -3) ft

Cohesion Functions

MARSH 1

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 200 Data Points: X (ft), Cohesion (psf) Data Point: (157, 200) Data Point: (200, 350) Data Point: (264, 200)

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 $^{\circ}$

Materials

FILL top, EL. +6.5 to 2 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0° Phi-B: 0 °

MARSH, EL. -5 to -13 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Phi-B: 0°

BEACH SAND, EL. -13 to -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf

Phi: 30 ° Phi-B: 0 °

BAY SOUND CLAY, EL. -46 to -70

Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi: 0 Phi-B: 0°

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Unit Weight Functions

Clav Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 104 Data Points: X (ft), Unit Weight (pcf) Data Point: (67.2, 104) Data Point: (157.5, 104) Data Point: (200, 102) Data Point: (264, 104) Data Point: (310, 104)

Spatial Functions

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf) Data Point: (67.2, -46, 520) Data Point: (67.2, -70, 740) Data Point: (157.5, -46, 520) Data Point: (157.5, -70, 740) Data Point: (200, -46, 735) Data Point: (200, -70, 945) Data Point: (264, -46, 520) Data Point: (264, -70, 740) Data Point: (310, -46, 520) Data Point: (310, -70, 740)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	7,8,9,35,4,21	4.275
Region 2	FILL top, EL. +6.5 to 2	11,4,35,9,5,40,23	97.81
Region 3	BEACH SAND, EL13 to -46	18,17,1,2,3,39,31,28,15,16	7921.135
Region 4		19,20,34,21,4,11,36	82.845
Region 5	BAY SOUND CLAY, EL46 to -70	16,33,32,18	5829.6
Region 6	MARSH, EL5 to -13	13,39,31,28,15,14,27,22,30,37	1436.19
Region 7	FILL bottom, EL3 to -5	12,10,29,38,37,30,22,27,14,6,26,25,24	267.885

Region 8		42,12,10,29,38	89.578
Region 9		42,43,41,12	92.934
Region 10		43,36,11,41	36
Region 11	FILL middle, EL. 2 to -3	41,11,23,45,44	47.86
Region 12	FILL middle, EL. 2 to -3	12,41,44,46,47,48,24	146.875

Points

	X (ft)	Y (ft)
Point 1	67.1	-15.6
Point 2	101.1	-14.9
Point 3	117.4	-13.3
Point 4	200	7.3
Point 5	207.9	7.3
Point 6	310	-3
Point 7	200	13
Point 8	200.5	13
Point 9	201	7.3
Point 10	200	-4.5
Point 11	200	2
Point 12	200	-3
Point 13	138.2	-6.3
Point 14	310	-5
Point 15	310	-13
Point 16	310	-46
Point 17	67.1	-18
Point 18	67.1	-46
Point 19	179.1	3.1
Point 20	190.3	6.7
Point 21	200	7.5
Point 22	200	-5
Point 23	227	2
Point 24	264.2	-2.6
Point 25	275.1	-2.6
Point 26	296.4	-3
Point 27	264.2	-5

	d						
2	Optimize d	200.7	1.329442	134.35076	468.30999	0	375
3	Optimize d	200.95	1.082122	145.87809	494.42862	0	375
4	Optimize d	201.31975	0.716329	162.94368	533.38545	0	375
5	Optimize d	202.8338	-0.781505	237.19358	693.13408	0	375
6	Optimize d	204.55865	-2.465651	319.56613	882.77672	0	375
7	Optimize d	206.1614	-3.984146	395.86746	991.36126	0	500
8	Optimize d	207.5668	-5.3157155	465.46357	1200.0122	0	332.27
9	Optimize d	208.2106	-5.9257055	499.97301	1246.7773	0	330.76
10	Optimize d	209.2561	-6.788585	548.22089	1341.2793	0	328.31
11	Optimize d	210.7259	-7.925795	611.71723	1407.1433	0	324.86
12	Optimize d	212.28285	-8.984905	670.02445	1509.801	0	321.21
13	Optimize d	213.92695	-9.965915	723.35271	1557.6972	0	317.36
14	Optimize d	215.61015	-10.837865	769.83884	1635.8213	0	313.41
15	Optimize d	217.3324	-11.60076	809.54917	1662.1002	0	309.38
16	Optimize d	219.09675	-12.239805	841.46164	1718.7494	0	305.24
17	Optimize d	220.46115	-12.628915	859.69574	1713.1981	0	302.04
18	Optimize d	221.8854	-12.879585	869.04953	1723.5694	0	298.71
19	Optimize d	223.88635	-12.997285	867.68136	1687.6212	0	294.02
20	Optimize	225.9621	-12.994375	858.43175	1602.6404	0	289.15

264.2	-13
160.3	-4.5
160.3	-5
160.3	-13
67.1	-70
310	-70
199	7.5
200.9	7.3
178.2	2
145.7	-5
148.6	-4.5
118.3	-13
220	4.5
200	0.4
162.46	-2.11
176.8	0.4
233.6	0.4
228.7	1.4
235.6	0
245.2	-1.7
254.5	-1.9
	160.3 160.3 160.3 67.1 310 199 200.9 178.2 145.7 148.6 118.3 220 200 162.46 176.8 233.6 228.7 235.6 245.2

Critical Slip Surfaces

		Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
ſ	1	Optimized	1.91	(229.868, 26.149)	24.47457	(200, 13)	(256.825, - 2.06782)
ſ	2	5512	1.98	(229.868, 26.149)	39.175	(200, 13)	(257.028, - 2.08243)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize	200.25	1.774618	113.54891	389.25001	0	375

	d						
21	Optimize d	227.85	-12.99173	850.05782	1525.7629	0	284.73
22	Optimize d	229.51665	-12.989395	842.63179	1472.2026	0	280.8
23	Optimize d	231.15	-12.987105	835.40731	1433.8149	0	276.9
24	Optimize d	232.78335	-12.984815	828.1216	1395.4271	0	273.1
25	Optimize d	234.1262	-12.98293	822.17604	1364.149	0	270.0
26	Optimize d	235.1262	-12.950745	815.79799	1353.468	0	267.6
27	Optimize d	236.1624	-12.881975	806.96712	1324.5867	0	265.2
28	Optimize d	238.0115	-12.644285	783.93834	1284.5884	0	260.9
29	Optimize d	240.0971	-12.18978	746.11822	1234.3455	0	256.0
30	Optimize d	241.6949	-11.6815	706.87395	1151.7417	0	252.2
31	Optimize d	243.7892	-10.827485	643.39584	1055.4564	0	247.3
32	Optimize d	245.1423	-10.194655	597.18051	986.82081	0	244.
33	Optimize d	246.5887	-9.36829	538.12369	899.98865	0	240.8
34	Optimize d	249.12435	-7.8516325	430.32925	753.79525	0	234.8
35	Optimize d	251.4182	-6.4051375	328.27816	603.64095	0	229.4
36	Optimize d	252.96705	-5.340945	253.97358	528.95115	0	225.8
37	Optimize d	253.9345	-4.5202605	192.76007	574.15397	0	500
38	Optimize d	255.31945	-3.345373	101.19298	423.16048	0	500
39	Optimize	256.48215	-2.35902	23.177675	229.67747	0	375

	d					
		I	l		1	

Slices of Slip Surface: 5512

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictional Strength (psf)	Cohesiv e Strengt h (psf)
1	5512	200.17205	0.6	173.16714	442.1329	0	375
2	5512	200.42205	0.31119025	187.4996	551.49183	0	375
3	5512	200.7	-0.00070275	203.59801	589.43293	0	375
- 4	5512	200.95	-0.2784976	217.87116	623.19543	0	375
5	5512	202.335	-1.6551716	287.12904	792.8317	0	375
6	5512	204.89035	-3.988567	402.83048	1036.35	0	500
7	5512	207.00535	-5.643344	488.41622	1290.0559	0	333.58
8	5512	208.90835	-6.9256735	558.36649	1402.3455	0	329.12
9	5512	210.925	-8.1220045	622.89762	1480.9713	0	324.39
10	5512	212.94165	-9.1626835	678.06038	1543.9244	0	319.67
11	5512	214.95835	-10.061199	724.59947	1592.6241	0	314.94
12	5512	216.975	-10.827965	763.20187	1628.1952	0	310.21
13	5512	218.99165	-11.471065	794.18613	1651.3946	0	305.49
14	5512	220.875	-11.969015	816.88768	1650.5158	0	301.07
15	5512	222.625	-12.34011	832.30519	1627.322	0	296.97
16	5512	224.375	-12.62872	842.61685	1595.7272	0	292.87
17	5512	226.125	-12.83668	847.92955	1556.0449	0	288.77
18	5512	227.7231	-12.960345	848.6267	1513.3877	0	285.02
19	5512	228.5731	-13.0042	847.6902	1490.3976	371.06728	0
20	5512	229.99495	-13.0042	841.48797	1465.21	360.10605	0
21	5512	232.44495	-12.923825	825.79729	1412.1229	0	273.96
22	5512	234.6	-12.725925	804.01556	1355.9418	0	268.91
23	5512	236.56	-12.437715	777.30378	1297.1998	0	264.31
24	5512	238.48	-12.054825	744.75009	1232.3079	0	259.81
25	5512	240.4	-11.57037	705.61477	1157.3467	0	255.31
26	5512	242.32	-10.98037	659.72246	1071.9009	0	250.81
27	5512	244.24	-10.279681	606.63201	975.42707	0	246.31
28	5512	246.25315	-9.4157385	542.61821	880.6766	0	241.59
29	5512	248.3595	-8.3663065	466.48502	785.53783	0	236.66

30	5512	250.46585	-7.1506365	379.85677	674.03581	0	231.72
31	5512	252.57215	-5.749597	281.64438	544.13496	0	226.78
32	5512	254.06265	-4.6565245	202.28867	560.77607	0	500
33	5512	255.4635	-3.4807395	110.40948	433.0769	0	500
34	5512	256.72745	-2.3654275	22.382007	241.56723	0	375

Slope Stability Gap Block

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File Information
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Created By: USACE St. Louis District Revision Number: 711 Last Edited By: Goetz, Ryan MVS Date: 7/30/2014 Time: 9:28:04 AM File Name: 17thReach158.gsz Directory: C:\Users\B3EGGANG\Desktop\ Last Solved Date: 7/30/2014 Last Solved Time: 9:28:36 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

```
Slope Stability Gap Block
Kind: SLOPE/W
Parent: Seepage Analysis (Gap)
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Block
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack Option: (none)
FOS Distribution
FOS Calculation Option: Constant
Restrict Block Crossing: Yes
```

```
FILL middle, EL. 2 to -3
Model: Spatial Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 375 psf
Phi: 0 *
Phi-B: 0 *
Phi-B: 0 *
Model: Spatial Mohr-Coulomb
Unit Weight: 114 pcf
Cohesion: 500 psf
Phi: 0 *
Phi-B: 0 *
```

Slip Surface Limits

Left Coordinate: (67.1, -15.6) ft Right Coordinate: (310, -3) ft

Slip Surface Block

Left Grid
Upper Left: (193, -6) ft
Lower Left: (193, -46) ft
Lower Right: (223, -46) ft
X Increments: 6
Y Increments: 8
Starting Angle: 135 °
Ending Angle: 180 °
Angle Increments: 5
Right Grid
Upper Left: (227, -6) ft
Lower Left: (227, -46) ft
Lower Right: (267, -46) ft
X Increments: 9

Starting Angle: 0 ° Ending Angle: 45 °

Angle Increments: 6

Cohesion Functions

MARSH 1

Model: Spline Data Point Function Function: Cohesion vs. X

```
Number of Slices: 30
            Optimization Tolerance: 0.01
           Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
           Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
           Ending Optimization Points: 16
Complete Passes per Insertion: 1
            Driving Side Maximum Convex Angle: 5 °
            Resisting Side Maximum Convex Angle: 1 °
Materials
FILL top, EL. +6.5 to 2
     Model: Spatial Mohr-Coulomb
Unit Weight: 114 pcf
      Cohesion: 800 psf
      Phi: 0
     Phi-B: 0°
MARSH, EL. -5 to -13
     Model: Spatial Mohr-Coulomb
      Unit Weight: 94 pcf
      Cohesion Fn: MARSH 1
      Phi: 0
     Phi-B: 0 °
BEACH SAND, EL. -13 to -46
```

Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Phi-B: 0 °

BAY SOUND CLAY, EL. -46 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi: 0 * Phi-B: 0 *

Sheet Pile

Model: Undrained (Phi=0)
Unit Weight: 0.1 pcf
Cohesion: 0.01 psf

Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 200 Data Points: X (ft), Cohesion (psf) Data Point: (157, 200) Data Point: (200, 350) Data Point: (264, 200)

Unit Weight Functions

Model: Spline Data Point Function
Function: Unit Weight vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 104
Data Points: X (ft), Unit Weight (pcf)
Data Point: (67.2, 104)
Data Point: (157.5, 104)
Data Point: (200, 102)
Data Point: (264, 104)
Data Point: (210, 104)

Spatial Functions

Clay

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (67.2, -46, 520)
Data Point: (67.2, -70, 740)
Data Point: (157.5, -46, 520)
Data Point: (157.5, -70, 740)
Data Point: (200, -46, 735)
Data Point: (200, -70, 945)
Data Point: (264, -46, 520)
Data Point: (264, -70, 740)
Data Point: (310, -46, 520)
Data Point: (310, -46, 520)
Data Point: (310, -70, 740)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	7,8,9,35,4,21	4.275

Region 2	FILL top, EL. +6.5 to 2	11,4,35,9,5,40,23	97.81
Region 3	BEACH SAND, EL13 to -46	18,17,1,2,3,39,31,28,15,16	7921.135
Region 4		19,20,34,21,4,11,36	82.845
Region 5	BAY SOUND CLAY, EL46 to -70	16,33,32,18	5829.6
Region 6	MARSH, EL5 to -13	13,39,31,28,15,14,27,22,30,37	1436.19
Region 7	FILL bottom, EL3 to -5	12,10,29,38,37,30,22,27,14,6,26,25,24	267.885
Region 8		42,12,10,29,38	89.578
Region 9		42,43,41,12	92.934
Region 10		43,36,11,41	36
Region 11	FILL middle, EL. 2 to -3	41,11,23,45,44	47.86
Region 12	FILL middle, EL. 2 to -3	12,41,44,46,47,48,24	146.875

Points

	X (ft)	Y (ft)
Point 1	67.1	-15.6
Point 2	101.1	-14.9
Point 3	117.4	-13.3
Point 4	200	7.3
Point 5	207.9	7.3
Point 6	310	-3
Point 7	200	13
Point 8	200.5	13
Point 9	201	7.3
Point 10	200	-4.5
Point 11	200	2
Point 12	200	-3
Point 13	138.2	-6.3
Point 14	310	-5
Point 15	310	-13
Point 16	310	-46
Point 17	67.1	-18
Point 18	67.1	-46
Point 19	179.1	3.1
Point 20	190.3	6.7
Point 21	200	7.5

Point 22	200	-5
Point 23	227	2
Point 24	264.2	-2.6
Point 25	275.1	-2.6
Point 26	296.4	-3
Point 27	264.2	-5
Point 28	264.2	-13
Point 29	160.3	-4.5
Point 30	160.3	-5
Point 31	160.3	-13
Point 32	67.1	-70
Point 33	310	-70
Point 34	199	7.5
Point 35	200.9	7.3
Point 36	178.2	2
Point 37	145.7	-5
Point 38	148.6	-4.5
Point 39	118.3	-13
Point 40	220	4.5
Point 41	200	0.4
Point 42	162.46	-2.11
Point 43	176.8	0.4
Point 44	233.6	0.4
Point 45	228.7	1.4
Point 46	235.6	0
Point 47	245.2	-1.7
Point 48	254.5	-1.9

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.94	(226.349, 3.06)	22.75112	(200, 13)	(251.927, - 1.84466)
2	5137	2.13	(226.349, 3.06)	22.279	(200, 13)	(252.256, - 1.85173)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	1.762806	114.14674	401.40539	0	375
2	Optimize d	200.7	1.3406345	133.78234	479.71368	0	375
3	Optimize d	200.95	1.106095	144.66351	504.47716	0	375
4	Optimize d	201.3513	0.7295935	162.14694	544.61734	0	375
5	Optimize d	201.9853	0.13482	190.82578	608.09593	0	375
6	Optimize d	203.2685	-1.06949	250.54073	736.548	0	375
7	Optimize d	204.8045	-2.4876745	319.45053	898.58945	0	375
8	Optimize d	206.47645	-3.9833645	394.14708	1008.9444	0	500
9	Optimize d	207.75645	-5.128432	452.96671	1196.0491	0	331.8
10	Optimize d	208.264	-5.582472	478.52362	1227.5612	0	330.6
11	Optimize d	209.3254	-6.4279925	525.61425	1313.9638	0	328.1
12	Optimize d	210.7202	-7.4678175	583.40911	1372.822	0	324.8
13	Optimize d	212.1158	-8.408315	635.09688	1459.7474	0	321.6
14	Optimize d	213.5122	-9.249485	680.85968	1501.0935	0	318.3
15	Optimize d	215.1753	-10.08419	725.06037	1581.162	0	314.4
16	Optimize d	217.10515	-10.912425	767.86783	1608.1131	0	309.9
17	Optimize	219.03505	-11.74066	810.77053	1635.0166	0	305.3

	d						
18	Optimize d	220.28085	-12.275305	838.50236	1648.5044	0	302.47
19	Optimize d	221.4998	-12.496275	846.91286	1707.9754	0	299.61
20	Optimize d	223.37605	-12.69717	851.20545	1651.0058	0	295.21
21	Optimize d	225.2523	-12.898065	855.55104	1593.9832	0	290.81
22	Optimize d	226.5952	-12.955445	853.25968	1601.1823	0	287.67
23	Optimize d	227.85	-12.821955	839.49806	1537.1495	0	284.73
24	Optimize d	229.67985	-12.627285	819.31861	1460.8907	0	280.44
25	Optimize d	231.6396	-12.4188	797.75358	1394.7749	0	275.84
26	Optimize d	233.10975	-12.220255	778.84935	1361.9098	0	272.4
27	Optimize d	234.6	-11.933605	754.32251	1299.381	0	268.91
28	Optimize d	235.77315	-11.70795	734.92573	1250.8198	0	266.16
29	Optimize d	237.05415	-11.35038	706.75419	1212.8224	0	263.15
30	Optimize d	239.2332	-10.59573	649.37146	1118.3066	0	258.05
31	Optimize d	241.49325	-9.551275	573.01398	992.75092	0	252.75
32	Optimize d	243.94105	-8.0990965	469.54938	826.82743	0	247.01
33	Optimize d	245.335	-7.1711065	404.01281	706.81433	0	243.75
34	Optimize d	246.13175	-6.5609225	361.36485	665.6502	0	241.88
35	Optimize d	247.45525	-5.5203075	289.06218	557.02692	0	238.78
36	Optimize	248.54515	-4.6634	224.83093	584.25926	0	500

	d						
37	Optimize d	249.9514	-3.504741	130.4584	457.27162	0	500
38	Optimize d	251.42805	-2.26367	32.402254	240.09944	0	375

Slices of Slip Surface: 5137

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strength (psf)	Cohesiv e Strengt h (psf)
1	5137	200.0535	2.038883	100.9126	169.30884	0	800
2	5137	200.3035	1.857247	109.20439	479.38017	0	375
3	5137	200.7	1.5691855	122.19392	510.18633	0	375
4	5137	200.95	1.38755	130.38927	529.48543	0	375
5	5137	201.6546	0.8756115	153.51751	584.57645	0	375
6	5137	203.07925	-0.1594709	202.25272	696.08091	0	375
7	5137	204.61935	-1.2784129	253.76407	816.58575	0	375
8	5137	206.15945	-2.3973545	307.06671	937.09059	0	375
9	5137	207.41475	-3.3093725	351.15653	999.51733	0	500
10	5137	208.82085	-4.33096	401.66011	1086.6352	0	500
11	5137	210.56755	-5.6	468.553	1218.5278	0	325.23
12	5137	212.2192	-6.8	535.03151	1285.0455	0	321.36
13	5137	213.87085	-8	601.79412	1351.5632	0	317.49
14	5137	215.5225	-9.2	668.70367	1418.0809	0	313.62
15	5137	217.17415	-10.4	735.76017	1484.5986	0	309.75
16	5137	219	-11	764.9	1684.9	0	305.47
17	5137	220.875	-11	756.62857	1622.6857	0	301.07
18	5137	222.625	-11	748.91429	1551.3143	0	296.97
19	5137	224.375	-11	741.2	1479.8857	0	292.87
20	5137	226.125	-11	733.48571	1408.5143	0	288.77
21	5137	227.85	-11	725.82353	1338.5294	0	284.73
22	5137	229.51665	-11	718.46953	1285.1635	0	280.82
23	5137	231.15	-11	711.18382	1247.0207	0	276.99
24	5137	232.78335	-11	703.8981	1208.8778	0	273.16
25	5137	234.6	-11	695.75	1166.9	0	268.91
26	5137	236.3889	-11	687.67596	1128.0421	0	264.71

27	5137	237.9667	-11	680.57737	1096.0351	0	261.02
28	5137	239.54445	-11	673.47878	1064.028	0	257.32
29	5137	241.14445	-10.377613	626.8688	1134.3107	0	253.57
30	5137	242.7667	-9.1328375	540.59976	973.11868	0	249.77
31	5137	244.3889	-7.8880625	454.07152	811.87774	0	245.96
32	5137	245.93815	-6.6992565	371.06996	671.88317	0	242.33
33	5137	247.4145	-5.566419	292.18293	553.06899	0	238.87
34	5137	248.9082	-4.4202885	204.43042	532.66896	0	500
35	5137	250.4192	-3.260866	110.50321	387.85861	0	500
36	5137	251.71515	-2.266444	32.045382	210.6976	0	375

R17 Slope Stability Gap Block Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

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Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

```
Slope Stability Gap Block
     Kind: SLOPE/W
     Parent: Seepage Analysis (Gap)
     Method: Spencer
          PWP Conditions Source: Parent Analysis
          Direction of movement: Left to Right
          Use Passive Mode: No
          Slip Surface Option: Block
          Critical slip surfaces saved: 1
          Optimize Critical Slip Surface Location: Yes
          Tension Crack
               Tension Crack Option: (none)
    FOS Distribution
          FOS Calculation Option: Constant
```

Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL, EL. +9.6 TO +4.5 Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 800 psf Phi-B: 0 ° MARSH, EL. -3.0 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 1 Phi-B: 0 ° BEACH SAND, EL. -12 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 ° BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Clay Phi-B: 0 ° Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

EMBANKMENT FILL 2, EL. +4.5 TO -3.0

Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 650 psf Phi-B: 0°

EMBANKMENT FILL 3, EL. +1.2 TO -3.0

Unit Weight: 113 pcf Cohesion Fn: Fill Phi · ∩ ° Phi-B: 0 °

MARSH, EL. -7.0 TO -12.0

Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 2 Phi-B: 0°

Slip Surface Limits

Left Coordinate: (58.7, -8.4) ft Right Coordinate: (310, -1.4) ft

Slip Surface Block

Left Grid Upper Left: (170, -5) ft Lower Left: (170, -50) ft Lower Right: (220, -50) ft X Increments: 8 Y Increments: 8 Starting Angle: 115 ° Ending Angle: 180 ° Angle Increments: 5 Upper Left: (225, -5) ft Lower Left: (225, -50) ft Lower Right: (265, -50) ft X Increments: 8 Y Increments: 8 Starting Angle: 0 ° Ending Angle: 45 ° Angle Increments: 5

Cohesion Functions

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 800 Data Points: X (ft), Cohesion (psf) Data Point: (177, 800) Data Point: (200, 650) Data Point: (239.2, 800)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (0, 0)
Data Point: (10000, 5773) **Estimation Properties** Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Spatial Functions

Bay Sound Clay Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (116.5, -46, 555)
Data Point: (116.5, -70, 790)
Data Point: (177, -46, 555) Data Point: (177, -70, 790) Data Point: (200, -46, 835)

Data Point: (200, -70, 1070) Data Point: (239.2, -46, 555) Data Point: (239.2, -70, 790) Data Point: (310, -46, 555) Data Point: (310, -70, 790)

Marsh 1

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (177, -3, 425)
Data Point: (200, -3, 450) Data Point: (239.2, -3, 425) Data Point: (177, -7, 425)

Data Point: (177, -7, 425)
Data Point: (200, -7, 450)
Data Point: (239.2, -7, 425)
Data Point: (310, -3, 425)
Data Point: (310, -7, 425)
Data Point: (143, -7, 425)
Data Point: (154.7, -3, 425)

Marsh 2

Model: Linear Interpolation

Data Point: (310, -7, 320) Data Point: (310, -12, 320) Data Point: (116.5, -8.4, 320) Data Point: (116.5, -12, 320)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	12,47,13,14,15,25	2.725
Region 2		4,5,38,12,43,45	63.226664
Region 3	BEACH SAND, EL12 TO -46	22,21,30,27,18,19,34,36	8544.2
Region 4	EMBANKMENT FILL, EL. +9.6 TO +4.5	44,7,6,15,25,12,43	84.332835
Region 5	MARSH, EL7.0 TO -12.0	21,1,2,40,33,32,17,18,27,30	1141.5954
Region 6	BAY SOUND CLAY, EL46 TO -70	22,23,37,35,20,19,34,36	6031.2

5

Point 25 201 9.9 239.2 Point 28

Point 29 Point 30 -12 Point 31 Point 32 239.2 Point 33 Point 34 239.2 -70 Point 36 177 -46 Point 37 Point 38 Point 39 Point 40 Point 41 Point 42 156.18675 -2.5 Point 43 200 4.5 Point 44 222.86567 179.66667 4.5 Point 45 Point 46 310 -3.4 200 Point 47 10 165.10004 Point 48 0.40634 Point 49 200 0.4 Point 50 234.61639 0.40305

Critical Slip Surfaces

160.05

-1.2

-1.2

Point 51

Point 52 200

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.85	(223.984, 0.956)	19.5459	(200, 13.5)	(247.379, - 1.27174)
2	5309	2.02	(223.984,	19.857	(200,	(247.868, -

Region 7	MARSH, EL3.0 TO -7.0	40,41,29,28,26,24,46,17,32,33	644.89156
Region 8		41,42,51,52,16,28,29	76.72322
Region 9	EMBANKMENT FILL 3, EL. +1.2 TO - 3.0	52,8,9,10,11,24,26,28,16	186.725
Region 10		51,3,48,39,45,43,49,52	172.96918
Region 11	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	8,50,44,43,49,52	176.91624

Points

	X (ft)	Y (ft)
Point 1	58.7	-8.4
Point 2	138.7	-8.4
Point 3	163.3	-0.1
Point 4	185	6.1
Point 5	196.6	9.9
Point 6	208	10
Point 7	220	5.5
Point 8	239.2	-1.2
Point 9	250.6	-1.3
Point 10	274.1	-1.4
Point 11	310	-1.4
Point 12	200	9.9
Point 13	200	13.5
Point 14	200.5	13.5
Point 15	201	10
Point 16	200	-2.5
Point 17	310	-7
Point 18	310	-12
Point 19	310	-46
Point 20	310	-70
Point 21	58.7	-12
Point 22	58.7	-46
Point 23	58.7	-70
Point 24	310	-3

6

0.956) 1.27603) 13.5)

Sli

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.0751	- 1.151744 5	685.67862	-1528.0566	0	650
2	Optimize d	200.3251	-1.312433	659.8992	1025.7965	0	651.24
3	Optimize d	200.75	- 1.585554 5	601.52119	1054.0964	0	652.83
4	Optimize d	201.36805	- 1.982821 5	492.92163	1106.174	0	655.23
5	Optimize d	202.2427	-2.6097	233.80967	1115.1777	0	658.5
6	Optimize d	203.61145	-3.664265	195.17116	1291.9684	0	447.7
7	Optimize d	205.33575	-4.992795	232.9154	1424.9645	0	446.6
8	Optimize d	207.09895	- 6.306515 5	283.74423	1575.2214	0	445.4
9	Optimize d	208.03055	- 6.977985 5	313.84157	1641.5858	0	444.8
10	Optimize d	208.4387	-7.272175	326.92436	1661.5298	0	422.0
11	Optimize d	209.46175	- 7.923732 5	356.26487	1737.146	0	418.6
12	Optimize d	210.7526	- 8.682497 5	393.29718	1762.5244	0	414.3
13	Optimize	212.55955	-9.59796	439.61456	1832.1703	0	408.3

	d						
14	Optimize d	214.574	- 10.43686 5	484.22998	1878.3469	0	401.67
15	Optimize d	216.27975	- 11.04251 5	517.6103	1870.6123	0	396.01
16	Optimize d	217.84945	- 11.46584 5	541.41093	1924.0888	0	390.81
17	Optimize d	219.28315	- 11.70685 5	554.96822	1888.5276	0	386.05
18	Optimize d	220.5132	-11.91363	566.79711	1859.5718	0	381.97
19	Optimize d	221.94605	- 11.99748 5	571.2667	1878.9765	0	377.22
20	Optimize d	223.7225	-11.99282	570.27963	1807.1547	0	371.33
21	Optimize d	225.4361	-11.98832	569.3226	1738.762	0	365.65
22	Optimize d	227.14975	-11.98382	568.36557	1670.4277	0	359.96
23	Optimize d	228.9621	- 11.89960 5	562.45562	1619.6407	0	353.95
24	Optimize d	230.6122	- 11.67819 5	548.09805	1570.3699	0	348.48
25	Optimize d	232.00145	- 11.39930 5	530.25743	1482.8605	0	343.87
26	Optimize d	233.65625	-10.87377	496.92472	1425.8382	0	338.38
27	Optimize d	235.44005	-10.15648	451.59488	1269.7533	0	332.47
28	Optimize d	236.99775	9.380688	402.6238	1180.4076	0	327.3

				3				
	29	Optimize d	238.4659	- 8.491505 5	346.5776	1013.842	0	322.43
	30	Optimize d	239.22055	-8.034477	317.73384	929.08408	0	320
	31	Optimize d	239.9045	-7.51102	284.81238	915.30202	0	320
	32	Optimize d	241.17385	-6.533265	223.26396	852.83916	0	425
	33	Optimize d	242.91275	-5.13132	134.99145	704.32986	0	425
	34	Optimize d	244.7273	-3.598055	38.506328	537.15873	0	425
	35	Optimize d	246.3938	- 2.135871 5	-53.463814	575.16531	0	800
slic	ces of S	Slip Surfac	e: 5309					

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	5309	200.25	0.30708445	572.36799	230.99886	0	650
2	5309	200.75	-0.0978076	532.3916	845.58141	0	650
3	5309	201.55555	-0.7501268	436.97642	923.68318	0	650
4	5309	203.2225	-2.1	178.60814	1059.7407	0	662.33
5	5309	205.25045	-3.7421855	170.06057	1294.9143	0	446.65
6	5309	207.0835	-5.2265565	225.63806	1442.369	0	445.48
7	5309	208.63675	-6.484371	282.66567	1541.9071	0	444.49
8	5309	210.0196	-7.6041665	336.42681	1606.4594	0	416.77
9	5309	211.51175	-8.8125	398.15923	1668.1762	0	411.82
10	5309	213.0039	-10.020834	462.75613	1729.945	0	406.87
11	5309	214.53125	-10.625	495.1296	2047.04	0	401.81
12	5309	216.09375	-10.625	493.344	1978.752	0	396.63
13	5309	217.65625	-10.625	491.808	1910.528	0	391.45
14	5309	219.21875	-10.625	490.3936	1842.24	0	386.26
15	5309	220.7164	-10.625	489.18403	1778.9906	0	381.3

16	5309	222.14925	-10.625	488.10226	1720.7145	0	376.55
17	5309	223.705	-10.625	487.03322	1658.3923	0	371.39
18	5309	225.38365	-10.625	485.96094	1591.9708	0	365.82
19	5309	227.06235	-10.625	484.94228	1525.4898	0	360.25
20	5309	228.74105	-10.625	484.01893	1459.0683	0	354.69
21	5309	230.4197	-10.625	483.11346	1392.5872	0	349.12
22	5309	232.09835	-10.625	482.27947	1326.1658	0	343.55
23	5309	233.77705	-10.625	481.45739	1259.7443	0	337.98
24	5309	234.8082	-10.625	480.98329	1218.8942	0	334.56
25	5309	235.7	-10.11642	448.97558	1357.2995	0	331.61
26	5309	237.1	-9.0992605	385.07479	1175.5018	0	326.96
27	5309	238.5	-8.082101	321.07576	993.70411	0	322.32
28	5309	239.5947	-7.2867605	270.99629	868.72135	0	320
29	5309	240.907	-6.3333335	210.93263	802.63551	0	425
30	5309	242.74215	-5	126.88227	644.02165	0	425
31	5309	244.5773	-3.6666665	42.857042	485.36371	0	425
32	5309	246.6813	-2.1380165	-53.45743	467.88463	0	800

R17 Slope Stability Gap Entry & Exit

File Information

Created By: USACE St. Louis District Revision Number: 561 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 9:36:37 AM File Name: 17thReach17.gsz Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_Hlgh_water_ analyses\High water cases\

Last Solved Date: 2/27/2013

Last Solved Time: 9:37:46 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Gap Entry & Exit Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution

FOS Calculation Option: Constant

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +9.6 TO +4.5 Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 800 psf Phi: 0 Phi-B: 0° MARSH, EL. -3.0 TO -7.0 Model: Snatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 1 Phi-B: 0° BEACH SAND, EL. -12 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Clay Phi-B: 0° **Sheet Pile** Model: Undrained (Phi=0) Unit Weight: 0.1 pcf

EMBANKMENT FILL 2, EL. +4.5 TO -3.0

Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 650 psf Phi · ∩ °

EMBANKMENT FILL 3, EL. +1.2 TO -3.0

Unit Weight: 113 pcf Cohesion Fn: Fill Phi · ∩ ° Phi-B: 0 °

MARSH, EL. -7.0 TO -12.0

Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 2 Phi-B: 0°

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (156.15, -3) ft Left-Zone Right Coordinate: (200, 13.5) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (213.93507, 7.77435) ft Right-Zone Right Coordinate: (310, -1.4) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (58.7, -8.4) ft Right Coordinate: (310, -1.4) ft

Cohesion Functions

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 800

Cohesion: 0.01 psf

Data Points: X (ft), Cohesion (psf) Data Point: (177, 800) Data Point: (200, 650) Data Point: (239.2, 800)

Shear/Normal Strength Functions

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0)
Data Point: (0, 0) Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Spatial Functions

Bay Sound Clay

Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf) Data Point: (116.5, -46, 555) Data Point: (116.5, -70, 790) Data Point: (177, -46, 555) Data Point: (177, -70, 790) Data Point: (200, -46, 835) Data Point: (200, -70, 1070) Data Point: (239.2, -46, 555) Data Point: (239.2. -70. 790) Data Point: (310 -70 790)

Marsh 1

Model: Linear Interpolation

Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (177, -3, 425)
Data Point: (200, -3, 450)
Data Point: (209, -3, 425)
Data Point: (277, -7, 425)
Data Point: (200, -7, 450)
Data Point: (239, 2, -7, 425)
Data Point: (310, -3, 425)
Data Point: (310, -7, 425)
Data Point: (143, -7, 425)
Data Point: (143, -7, 425)
Data Point: (154, 7, -3, 425)

Marsh 2

Arsh 2

Model: Linear Interpolation
Limit Range By: Data Values

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (200, -7, 450)
Data Point: (200, -7, 450)
Data Point: (239.2, -7, 320)
Data Point: (219.2, -7, 320)
Data Point: (219.2, -12, 320)
Data Point: (219.2, -12, 320)
Data Point: (310, -7, 320)
Data Point: (310, -7, 320)
Data Point: (310, -12, 320)
Data Point: (116.5, -8.4, 320)
Data Point: (116.5, -8.4, 320)
Data Point: (116.5, -12, 320)

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	12,47,13,14,15,25	2.725
Region 2		4,5,38,12,43,45	63.226664
Region 3	BEACH SAND, EL12 TO -46	22,21,30,27,18,19,34,36	8544.2
Region 4	EMBANKMENT FILL, EL. +9.6 TO +4.5	44,7,6,15,25,12,43	84.332835
Region 5	MARSH, EL7.0 TO -12.0	21,1,2,40,33,32,17,18,27,30	1141.5954
Region 6	BAY SOUND CLAY, EL46 TO -70	22,23,37,35,20,19,34,36	6031.2
Region 7	MARSH, EL3.0 TO -7.0	40,41,29,28,26,24,46,17,32,33	644.89156
Region 8		41,42,51,52,16,28,29	76.72322
Region 9	EMBANKMENT FILL 3, EL. +1.2 TO - 3.0	52,8,9,10,11,24,26,28,16	186.725
Region 10		51,3,48,39,45,43,49,52	172.96918

5

Point 31	177	-2.5
Point 32	239.2	-7
Point 33	177	-7
Point 34	239.2	-46
Point 35	239.2	-70
Point 36	177	-46
Point 37	177	-70
Point 38	199	9.9
Point 39	177	3.7
Point 40	142.8494	-7
Point 41	154.70482	-3
Point 42	156.18675	-2.5
Point 43	200	4.5
Point 44	222.86567	4.5
Point 45	179.66667	4.5
Point 46	310	-3.4
Point 47	200	10
Point 48	165.10004	0.40634
Point 49	200	0.4
Point 50	234.61639	0.40305
Point 51	160.05	-1.2
Point 52	200	-1.2

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.87	(224.239, 16.722)	20.07785	(200, 13.5)	(247.91, -1.2764)
2	7215	1.95	(224.239, 16.722)	28.66	(200, 13.5)	(246.552, - 1.26449)

Slices of Slip Surface: Optimized

 ices of Slip Surface. Optimized										
					Base	Frictiona	Cohesiv			
	Slip	X (ft)	Y (ft)	PWP (psf)	Normal		e			
	Surface	\ \(\(\text{(i.i.)}\)	1 (10)	1 441 (631)	Stress (psf)	Strength	Strengt			
					Stress (psi)	(psf)	h (psf)			

Region 11	EMBANKMENT FILL 2, EL. +4.5 TO -	8,50,44,43,49,52	176.91624
11	3.0		

Points

	X (ft)	Y (ft)
oint 1	58.7	-8.4
oint 2	138.7	-8.4
oint 3	163.3	-0.1
oint 4	185	6.1
oint 5	196.6	9.9
oint 6	208	10
oint 7	220	5.5
oint 8	239.2	-1.2
oint 9	250.6	-1.3
oint 10	274.1	-1.4
oint 11	310	-1.4
oint 12	200	9.9
oint 13	200	13.5
oint 14	200.5	13.5
oint 15	201	10
oint 16	200	-2.5
oint 17	310	-7
oint 18	310	-12
oint 19	310	-46
oint 20	310	-70
oint 21	58.7	-12
oint 22	58.7	-46
oint 23	58.7	-70
oint 24	310	-3
oint 25	201	9.9
oint 26	239.2	-3
oint 27	239.2	-12
oint 28	200	-3
oint 29	177	-3
oint 30	177	-12

1	Optimize d	200.25	- 0.2635445 5	607.41476	261.54166	0	650
2	Optimize d	200.75	- 0.6478168	556.59071	906.25382	0	650
3	Optimize d	201.23425	- 1.0199764	493.01653	955.80554	0	650
4	Optimize d	201.67075	-1.35545	430.63505	988.82791	0	656.39
5	Optimize d	202.69735	-2.25545	214.63864	1024.738	0	660.32
6	Optimize d	203.9975	-3.42971	177.0474	1227.1106	0	447.45
7	Optimize d	205.5394	-4.725825	216.3727	1387.0418	0	446.47
8	Optimize d	207.30275	- 6.1287185	272.69173	1543.0555	0	445.34
9	Optimize d	208.21755	- 6.8326035	304.6798	1604.8922	0	444.76
10	Optimize d	208.92715	-7.37861	329.72299	1638.9508	0	420.39
11	Optimize d	210.2895	-8.26931	372.00366	1741.9227	0	415.88
12	Optimize d	212.0301	-9.29349	423.74786	1776.2373	0	410.1
13	Optimize d	213.7489	- 10.144875	468.65536	1866.2937	0	404.4
14	Optimize d	215.4459	- 10.823465	505.5446	1866.622	0	398.78
15	Optimize d	217.00745	- 11.322705	533.5167	1922.7756	0	393.6
16	Optimize d	218.43355	-11.64259	551.55875	1896.1607	0	388.87
17	Optimize d	219.5733	-11.83935	562.75269	1923.1265	0	385.09
18	Optimize d	220.7155	-11.93792	568.17557	1886.5849	0	381.3
19	Optimize	222.14835	-	571.15037	1870.4943	0	376.55

	d		11.996905				
20	Optimize d	223.73195	11.990805	570.15549	1806.3812	0	371.3
21	Optimize d	225.4645	- 11.984135	569.05309	1737.0049	0	365.55
22	Optimize d	227.1971	-11.97746	567.95646	1667.6863	0	359.81
23	Optimize d	228.92965	- 11.970785	566.85406	1598.3678	0	354.06
24	Optimize d	230.55195	- 11.833785	557.74007	1579.6253	0	348.68
25	Optimize d	232.0641	- 11.566455	540.57363	1488.7786	0	343.66
26	Optimize d	233.7183	-11.10909	511.51022	1432.5848	0	338.18
27	Optimize d	235.12355	10.602605	479.44246	1316.9549	0	333.52
28	Optimize d	236.3621	- 10.007678	441.89905	1262.875	0	329.41
29	Optimize d	237.82485	9.1833925	389.95227	1105.1645	0	324.56
30	Optimize d	238.8781	- 8.5416065	349.48499	1030.1828	0	321.07
31	Optimize d	240.1195	- 7.6559815	293.73695	911.73328	0	320
32	Optimize d	241.1418	-6.92666	247.80646	874.96041	0	425
33	Optimize d	241.94175	-6.27956	207.05573	835.64349	0	425
34	Optimize d	243.33605	-5.13204	134.83819	698.7508	0	425
35	Optimize d	244.73035	-3.98452	62.609578	561.80273	0	425
36	Optimize d	245.66635	-3.20538	13.583224	479.93633	0	425
37	Optimize d	246.9075	-2.138201	-53.545538	558.68014	0	800

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Slices of Slip Surface: 7215

32	7215	242.6772	-5.19474	139.0575	697.21174	0	425
33	7215	244.24805	-3.7669985	49.271606	567.91242	0	425
34	7215	245,79255	-2.132244	-53.420972	681.61829	0	800

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	7215	200.25	1.047399	529.01538	89.297875	0	650
2	7215	200.75	0.3070674	514.44664	577.12564	0	650
3	7215	201.4372	-0.62533164	453.10926	721.04449	0	650
4	7215	202.6594	-2.1	225.96999	927.02417	0	660.18
5	7215	204.2037	-3.743295	188.47042	1246.8854	0	447.32
6	7215	205.72225	-5.129957	234.81505	1428.1731	0	446.35
7	7215	207.24075	-6.333109	284.16912	1587.3866	0	445.38
8	7215	208.07845	-6.946447	311.81477	1665.9463	0	444.85
9	7215	208.8971	-7.4694165	334.77696	1709.6523	0	420.49
10	7215	210.3775	-8.348089	376.03977	1768.973	0	415.58
11	7215	211.85785	-9.1120825	413.98156	1814.0628	0	410.68
12	7215	213.3382	-9.77137	448.02599	1846.4518	0	405.77
13	7215	214.8186	-10.33364	477.93447	1866.9804	0	400.86
14	7215	216.299	-10.804865	503.67225	1876.6258	0	395.95
15	7215	217.7794	-11.189665	525.10765	1875.925	0	391.04
16	7215	219.2598	-11.49159	542.1189	1865.3361	0	386.13
17	7215	220.7164	-11.710975	554.52009	1847.9155	0	381.3
18	7215	222.14925	-11.852125	562.38737	1824.1603	0	376.55
19	7215	223.6001	-11.9209	565.95233	1792.1937	0	371.73
20	7215	225.0689	-11.915995	565.04546	1751.8716	0	366.86
21	7215	226.53775	-11.83559	559.51753	1702.847	0	361.99
22	7215	228.0066	-11.679045	549.27152	1644.926	0	357.12
23	7215	229.47545	-11.445085	534.20767	1577.9712	0	352.25
24	7215	230.9443	-11.13175	514.17758	1501.8523	0	347.38
25	7215	232.41315	-10.73632	489.01727	1416.143	0	342.51
26	7215	233.882	-10.255176	458.47181	1320.5065	0	337.64
27	7215	235.38035	-9.670172	421.42318	1211.8705	0	332.67
28	7215	236.9082	-8.97099	377.18981	1088.9811	0	327.6
29	7215	238.43605	-8.1583895	325.85907	952.75777	0	322.53
30	7215	239.7605	-7.361241	275.55687	847.44047	0	320
31	7215	241.1064	-6.4277415	216.71739	807.49352	0	425

R18 Slope Stability Gap Block

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File Information

Created By: USACE St. Louis District
Revision Number: 720
Last Edited By: Redell, Chris MVS
Date: 2/27/2013
Time: 10:21:28 AM
Tile Name: 17thReach18.gsz
Directory: Y\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case
_LWL_and_Hlgh_water_analyses\High water cases\
Last Solved Date: 2/27/2013
Last Solved Time: 10:21:46 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: Ibf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Slope Stability Gap Block
Kind: SLOPE/W
Parent: Seepage Analysis (Gap)
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Slip Surface
Direction of movement: Left to Right
Use Passive Mode: No
Slip Surface Option: Block
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes
Tension Crack
Tension Crack
Option: (none)
FOS Distribution
FOS Calculation Option: Constant

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 3000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL, EL. +8.6 TO 0 Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 800 psf Phi-B: 0 ° MARSH 1, EL. -3 TO -7/-8 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: Marsh 1 Phi-B: 0 ° BEACH SAND, EL. -17 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Phi-B: 0 ° BAY SOUND CLAY, EL. -46 TO -70

Restrict Block Crossing: Yes

Advanced

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf

Cohesion Spatial Fn: Bay Sound Cohesion

Phi: 0 ° Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0)
Unit Weight: 0.1 pcf

Cohesion: 0.01 psf

MARSH 2, EL. -7/-8 TO -17 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: MARSH 2 Phi: 0 ° Phi-B: 0 °

Phi-B: 0 °
Fill 2, El. 0 to -3
Model: Spatial Mohr-Coulomb
Weight Fn: Fill
Cohesion Fn: Fill
Phi: 0 °
Phi-B: 0 °

Fill 2, El -1.3 to -3 (Protected)

Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 800 psf Phi: 0 ° Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (59.5, -8.9) ft Right Coordinate: (310, -1.4) ft

Slip Surface Block

Left Grid
Upper Left: (192, -2) ft
Lower Left: (192, -32) ft
Lower Right: (222, -32) ft
X Increments: 6
Y Increments: 6
Y Increments: 135 *
Ending Angle: 135 *
Angle Increments: 5
Right Grid
Upper Left: (225, -32) ft
Lower Left: (225, -32) ft
Lower Right: (255, -32) ft
X Increments: 6
Y Increments: 6
Starting Angle: 0 *
Ending Angle: 45 *

Cohesion Functions

Fill

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 800 Data Points: X (ft), Cohesion (psf) Data Point: (163.4, 800) Data Point: (200, 500)

Data Point: (244, 800)

Angle Increments: 5

MARSH 2
Model: Spline Data Point Function

Function: Cohesion vs. X

Curve Fit to Data: 100 %

Segment Curvature: 0 %

Y-Intercept: 280

Data Points: X (ft), Cohesion (psf

Data Points: X (ft), Cohesion (psf)
Data Point: (163.4, 280)
Data Point: (200, 500)
Data Point: (244, 280)

Marsh 1

arsh 1
Model: Spline Data Point Function
Function: Cohesion vs. X
Curve Fit to Data: 100 %
Segment Curvature: 0 %
Y-Intercept: 480
Data Points: X (ft), Cohesion (psf)
Data Point: (163.4, 480)
Data Point: (200, 650)
Data Point: (244, 480)

Unit Weight Functions

Fil

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 115

Data Points: X (ft), Unit Weight (pcf)
Data Point: (163.4, 115)
Data Point: (200, 112)
Data Point: (244, 115)

Spatial Functions

Bay Sound Cohesion

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (163.4, -46, 560)
Data Point: (200, -46, 780)
Data Point: (200, -70, 1015)
Data Point: (200, -70, 1015)
Data Point: (244, -46, 560)
Data Point: (244, -70, 795)
Data Point: (59.5, -46, 560)
Data Point: (59.5, -70, 795)
Data Point: (310, -46, 560)
Data Point: (310, -46, 560)
Data Point: (310, -70, 795)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL17 TO -46	20,19,33,44,26,16,17,36,34	7792.5
Region 2	Fill 2, El -1.3 to -3 (Protected)	7,27,22,9,8	111.3
Region 3	Sheet Pile	11,10,24,13,12	3.6
Region 4	MARSH 1, EL3 TO -7/-8	15,22,27,28,31,41,2,43,32,30,25	799.65271
Region 5	MARSH 2, EL7/-8 TO -17	1,19,33,44,26,16,15,25,30,32,43	1744.5767
Region 6	BAY SOUND CLAY, EL46 TO -70	20,21,35,37,18,17,36,34	6012
Region 7		45,42,39,3,23,10,24,29,46	193.86675
Region 8	Fill 2, El. 0 to -3	29,14,28,27,7	110
Region 9	EMBANKMENT FILL, EL. +8.6 TO 0	7,6,5,4,13,24,29	211.6
Region 10	Fill 2, El. 0 to -3	40,38,14,28,31,41	22.875
Region 11		40,38,14,29,46,45	81.911745

5

Points

	X (ft)	Y (ft)
Point 1	59.5	-8.9

Point 38	163.4	-2.5
Point 39	168.1	1.4
Point 40	155.08434	-2.5
Point 41	153.41566	-3
Point 42	163.42771	0
Point 43	108.885	-8
Point 44	200	-17
Point 45	160.1	-1
Point 46	163.4	-1

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.19	(225.066, 1.284)	21.08143	(200, 13.3)	(250.076, - 1.08528)
2	4847	2.37	(225.066, 1.284)	21.142	(200, 13.3)	(250.024, - 1.08455)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	- 0.3567075 5	613.7789	283.02333	0	501.7
2	Optimize d	200.75	- 0.6537470 5	569.94983	886.65741	0	505.11
3	Optimize d	201.6452	- 1.1855784	463.57651	940.45098	0	511.22
4	Optimize d	203.2892	-2.284445	234.38336	1013.267	0	522.43
5	Optimize d	204.4138	-3.09012	189.35481	1066.1992	0	632.95
6	Optimize d	205.33985	-3.826875	206.75602	1105.9484	0	629.37

Point 2	140.4	-6.9
Point 3	196.9	8.6
Point 4	212	8.3
Point 5	220	5.5
Point 6	234	0
Point 7	244	-1
Point 8	272.5	-1.4
Point 9	310	-1.4
Point 10	200	8.6
Point 11	200	13.3
Point 12	200.5	13.3
Point 13	201	8.5
Point 14	200	-2.5
Point 15	310	-8
Point 16	310	-11
Point 17	310	-46
Point 18	310	-70
Point 19	59.5	-17
Point 20	59.5	-46
Point 21	59.5	-70
Point 22	310	-3
Point 23	199	8.6
Point 24	200	8.5
Point 25	244	-8
Point 26	244	-11
Point 27	244	-3
Point 28	200	-3
Point 29	200	0
Point 30	200	-7
Point 31	163.4	-3
Point 32	163.4	-8
Point 33	163.4	-17
Point 34	163.4	-46
Point 35	163.4	-70
Point 36	244	-46
Point 37	244	-70

7	Optimize d	206.9403	-5.120145	250.50894	1233.8101	0	623.19
8	Optimize d	208.54075	-6.413415	302.24169	1361.6719	0	617
9	Optimize d	209.4578	- 7.1388275	334.55556	1485.2731	0	613.46
10	Optimize d	210.7873	-8.035582	372.98969	1615.0126	0	446.06
11	Optimize d	212.58725	- 9.2496595	428.88978	1715.2768	0	437.06
12	Optimize d	213.88865	- 10.022095	465.91181	1796.1231	0	430.56
13	Optimize d	215.317	-10.77477	503.11762	1819.7832	0	423.41
14	Optimize d	216.8538	- 11.441775	536.20276	1891.1318	0	415.73
15	Optimize d	218.499	- 12.023105	566.02141	1888.4955	0	407.51
16	Optimize d	219.6608	-12.37467	584.27243	1941.7715	0	401.7
17	Optimize d	220.678	-12.5573	593.35253	1917.8382	0	396.61
18	Optimize d	222.034	-12.80076	606.11296	1883.7959	0	389.83
19	Optimize d	223.49665	- 12.928785	612.27156	1891.9613	0	382.52
20	Optimize d	225.0659	-12.94138	611.87647	1822.4386	0	374.67
21	Optimize d	226.6351	- 12.953975	611.65344	1752.9796	0	366.82
22	Optimize d	228.2043	- 12.966565	611.64069	1683.4568	0	358.98
23	Optimize d	229.8703	- 12.873665	605.28709	1635.9156	0	350.65
24	Optimize d	231.88575	- 12.475635	580.19221	1545.8718	0	340.57
25	Optimize d	233.5099	-11.98605	549.57425	1452.8483	0	332.45

26	Optimize d	235.1524	-11.34676	509.49032	1343.573	0	324.24
27	Optimize d	237.2724	- 10.405475	450.54454	1243.9326	0	313.64
28	Optimize d	239.2076	-9.419985	388.78996	1107.4012	0	303.96
29	Optimize d	240.90665	- 8.4367805	327.15135	1013.0263	0	295.47
30	Optimize d	242.3578	- 7.4637655	266.18449	955.41126	0	486.34
31	Optimize d	243.53875	- 6.6148035	212.9424	882.39363	0	481.78
32	Optimize d	245.21595	- 5.2824785	129.43948	719.89885	0	480
33	Optimize d	247.17435	-3.65828	27.596032	555.82095	0	480
34	Optimize d	248.9965	-2.04264	-73.622889	511.83985	0	800

Slices of Slip Surface: 4847

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	4847	200.25	0.62203035	555.89826	165.5252	0	800
2	4847	200.75	0.2452533	528.79257	678.16936	0	800
3	4847	201.05445	0.015831185	511.51972	702.44679	0	800
4	4847	202.09585	-0.76890172	406.63203	856.63814	0	514.29
5	4847	204.0697	-2.2563005	209.16261	1005.2106	0	527.75
6	4847	205.995	-3.707148	188.07251	1124.699	0	626.84
7	4847	207.87185	-5.121444	238.87992	1264.4406	0	619.59
8	4847	209.7487	-6.5357405	298.14247	1404.1823	0	612.33
9	4847	211.34355	-7.7375595	352.46656	1565.1528	0	443.28
10	4847	212.83335	-8.8601915	405.74193	1646.8501	0	435.83
11	4847	214.5	-10.116117	468.48593	1712.1146	0	427.5
12	4847	216.16665	-11.37204	534.19126	1777.3791	0	419.17
13	4847	217.75	-12	566.17333	2043.2	0	411.25
14	4847	219.25	-12	563.22667	1982.8667	0	403.75

15	4847	220.875	-12	560.36571	1913.1429	0	395.63
16	4847	222.625	-12	557.97143	1834.0571	0	386.88
17	4847	224.375	-12	556	1755.0286	0	378.13
18	4847	226.125	-12	554.38286	1675.9429	0	369.38
19	4847	227.875	-12	553.13143	1596.8571	0	360.63
20	4847	229.625	-12	552.05714	1517.7143	0	351.88
21	4847	231.375	-12	551.21714	1438.6286	0	343.13
22	4847	233.125	-12	550.55429	1359.5429	0	334.38
23	4847	234.5	-12	550.13	1314.2	0	327.5
24	4847	235.93525	-11.3205	507.63924	1422.7047	0	320.32
25	4847	237.80575	-9.9614965	422.84095	1240.0549	0	310.97
26	4847	239.67625	-8.602491	337.89129	1057.4051	0	301.62
27	4847	241.45865	-7.307521	256.73374	957.07511	0	489.82
28	4847	243.1529	-6.076585	179.54888	792.33385	0	483.27
29	4847	244.84685	-4.845838	102.30943	637.72031	0	480
30	4847	246.54055	-3.6152795	25.086086	493.22897	0	480
31	4847	248.0465	-2.5211365	-43.544704	480.35361	0	800
32	4847	249.3647	-1.563409	-103.60977	359.65148	0	800

R18 Slope Stability Gap Entry & Exit

File Information

Created By: USACE St. Louis District Revision Number: 720 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 10:21:28 AM File Name: 17thReach18.gsz

Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case

_LWL_and_HIgh_water_ analyses\High water cases\ Last Solved Date: 2/27/2013

Last Solved Time: 10:22:00 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Gap Entry & Exit Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution

FOS Calculation Option: Constant

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 3000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +8.6 TO 0 Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 800 psf Phi: 0 Phi-B: 0°

MARSH 1, EL. -3 TO -7/-8 Model: Snatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: Marsh 1

Phi: 0 Phi-R·∩°

BEACH SAND, EL. -17 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf

Phi-B: 0 °

BAY SOUND CLAY, EL. -46 TO -70

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

MARSH 2, EL. -7/-8 TO -17

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: MARSH 2 Phi · ∩ ° Phi-B: 0°

Fill 2, El. 0 to -3

Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion Fn: Fill Phi · ∩ ° Phi-B: 0 °

Fill 2, El -1.3 to -3 (Protected)

Model: Spatial Mohr-Coulo Unit Weight: 115 pcf Cohesion: 800 psf Phi-B: 0°

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (187.58235, -2.5) ft Left-Zone Right Coordinate: (200, 8.6) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (222.80415, 4.39837) ft Right-Zone Right Coordinate: (263, -1,26667) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (59.5, -8.9) ft Right Coordinate: (310, -1.4) ft

Cohesion Functions

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 800 Data Points: X (ft), Cohesion (psf) Data Point: (163.4, 800) Data Point: (200, 500) Data Point: (244, 800)

MARSH 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 280 Data Points: X (ft), Cohesion (psf) Data Point: (163.4, 280) Data Point: (200, 500) Data Point: (244, 280)

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 480
Data Points: X (ft), Cohesion (psf) Data Point: (163.4, 480) Data Point: (200, 650) Data Point: (244, 480)

Unit Weight Functions

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 115 Data Points: X (ft), Unit Weight (pcf) Data Point: (163.4, 115) Data Point: (200, 112) Data Point: (244, 115)

Spatial Functions

Bay Sound Cohesion Model: Linear Interpolation

Limit Range By: Data Values
Data Points: X (ft) Y (ft) Cohesion

Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (163.4, -46, 560)
Data Point: (163.4, -70, 795)
Data Point: (200, -46, 780)
Data Point: (200, -70, 1015)
Data Point: (244, -70, 795)
Data Point: (244, -70, 795)
Data Point: (59.5, -46, 560)
Data Point: (59.5, -70, 795)
Data Point: (310, -46, 560)

Data Point: (310, -70, 795)

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL17 TO -46	20,19,33,44,26,16,17,36,34	7792.5
Region 2	Fill 2, El -1.3 to -3 (Protected)	7,27,22,9,8	111.3
Region 3	Sheet Pile	11,10,24,13,12	3.6
Region 4	MARSH 1, EL3 TO -7/-8	15,22,27,28,31,41,2,43,32,30,25	799.65271
Region 5	MARSH 2, EL7/-8 TO -17	1,19,33,44,26,16,15,25,30,32,43	1744.5767
Region 6	BAY SOUND CLAY, EL46 TO -70	20,21,35,37,18,17,36,34	6012
Region 7		45,42,39,3,23,10,24,29,46	193.86675
Region 8	Fill 2, El. 0 to -3	29,14,28,27,7	110
Region 9	EMBANKMENT FILL, EL. +8.6 TO 0	7,6,5,4,13,24,29	211.6
Region 10	Fill 2, El. 0 to -3	40,38,14,28,31,41	22.875
Region 11		40,38,14,29,46,45	81.911745

Points

	X (ft)	Y (ft)
Point 1	59.5	-8.9
Point 2	140.4	-6.9
Point 3	196.9	8.6
Point 4	212	8.3
Point 5	220	5.5
Point 6	234	0
Point 7	244	-1
Point 8	272.5	-1.4

5

Point 45	160.1	-1
Point 46	163.4	-1

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.17	(226.504, 22.22)	21.81768	(200, 13.3)	(252.57, -1.12028)
2	5617	2.22	(226.504, 22.22)	35.11	(200, 13.3)	(252.731, - 1.12254)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	- 0.7625226 5	639.06001	287.02405	0	501.7
2	Optimize d	200.75	1.0997969	587.2627	910.21657	0	505.11
3	Optimize d	202.3283	-2.164427	349.82471	1017.4875	0	515.87
4	Optimize d	204.5165	- 3.7437635	219.20083	1103.3788	0	632.55
5	Optimize d	206.2363	-5.11045	258.82833	1238.9909	0	625.91
6	Optimize d	207.95605	- 6.4771365	312.22188	1374.6485	0	619.26
7	Optimize d	209.5146	-7.66435	362.46811	1565.0766	0	452.43
8	Optimize d	210.88345	-8.6515	405.96641	1663.77	0	445.58
9	Optimize d	211.7768	-9.27423	434.50506	1758.6531	0	441.12
10	Optimize d	212.67535	-9.835625	461.27426	1790.6455	0	436.62
11	Optimize	214.026	-	502.17567	1826.4986	0	429.87

Point 9	310	-1.4
Point 10	200	8.6
Point 11	200	13.3
Point 12	200.5	13.3
Point 13	201	8.5
Point 14	200	-2.5
Point 15	310	-8
Point 16	310	-11
Point 17	310	-46
Point 18	310	-70
Point 19	59.5	-17
Point 20	59.5	-46
Point 21	59.5	-70
Point 22	310	-3
Point 23	199	8.6
Point 24	200	8.5
Point 25	244	-8
Point 26	244	-11
Point 27	244	-3
Point 28	200	-3
Point 29	200	0
Point 30	200	-7
Point 31	163.4	-3
Point 32	163.4	-8
Point 33	163.4	-17
Point 34	163.4	-46
Point 35	163.4	-70
Point 36	244	-46
Point 37	244	-70
Point 38	163.4	-2.5
Point 39	168.1	1.4
Point 40	155.08434	-2.5
Point 41	153.41566	-3
Point 42	163.42771	0
Point 43	108.885	-8
Point 44	200	-17

10.679515 d 12 215.71225 543.45435 1924.7055 0 421.44 11.511865 d Optimize 217.73415 13 585,29378 1932.8168 0 411.33 12.332675 Optimize 14 219.37255 -12.87025 613.5619 1997.5399 0 403.14 Optimize 221.27375 15 1957.5609 0 393.63 13.255575 d 16 223.5389 644.47416 1965.9686 0 382.31 13.469085 Optimize 17 225.52175 637.92462 1866.2142 0 372.39 13.379795 Optimize 18 227.4342 627.47832 1787.8148 0 362.83 13.221915 d Optimize 19 229.31925 612.60165 1676.0196 0 353.4 12.990145 Optimize -12.74999 20 231.08585 597.29286 1577.4839 0 344.57 21 232.65285 582.20175 1479.3508 0 336.74 Optimize 22 233,70865 569.36666 1451.0467 0 331.46 12.309175 Optimize 23 235.19595 -11.86246 541.34979 1373.1546 0 324.02 Optimize 24 237.32315 -11.12938 495.37026 1292.7598 0 313.38 Optimize 25 239.1857 448.46997 1185.6859 0 304.07 d 10.381645 Optimize 26 241.0655 393,49623 1095.1413 0 294.67 9.5053295 Optimize 27 243.007 -8.476865 329.03776 953.62173 0 284.96 480 28 244.01215 295.61569 940.35198 0 7.9444255 Optimize 29 245.33795 -6.9612 480 234.02939 895.24495 0 247.9639 Optimize 108.4801 0 480

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	d						
31	Optimize d	249.8218	-3.465715	14.959225	518.42894	0	480
32	Optimize d	251.46855	-2.060138	-73.082071	495.13448	0	800

Slices of Slip Surface: 5617

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	5617	200.25	-1.088656	658.25133	206.34255	0	501.7
2	5617	200.75	1.640100 5	606.31004	855.14359	0	505.11
3	5617	201.5387	- 2.454974 5	484.43378	954.6435	0	510.49
4	5617	202.94605	-3.786909	252.94819	1073.9538	0	638.62
5	5617	204.6834	5.263531 5	291.05942	1260.6309	0	631.9
6	5617	206.4208	-6.559458	333.426	1425.8399	0	625.19
7	5617	208.0746	-7.650061	374.08698	1602.2465	0	459.63
8	5617	209.64475	-8.56441	409.8183	1717.3982	0	451.78
9	5617	211.2149	-9.37429	443.44961	1820.6813	0	443.93
10	5617	212.8	- 10.09349 6	475.04956	1884.5245	0	436
11	5617	214.4	-10.72669	503.29029	1908.935	0	428
12	5617	216	-11.27151	529.0336	1923.0104	0	420
13	5617	217.6	- 11.73222 5	551.1067	1927.1414	0	412
14	5617	219.2	-12.11223	569.84002	1921.8613	0	404
15	5617	220.875	- 12.42460 5	585.29569	1902.0277	0	395.63

16	5617	222.625	-12.66408	597.40332	1867.0629	0	386.88
17	5617	224.375	-12.81456	604.76983	1821.6103	0	378.13
18	5617	226.125	-12.87719	607.33603	1765.8399	0	369.38
19	5617	227.875	-12.85244	604.85252	1699.7309	0	360.63
20	5617	229.625	-12.74013	597.22509	1623.3162	0	351.88
21	5617	231.375	- 12.53940 5	584.29098	1536.4165	0	343.13
22	5617	233.125	- 12.24871 5	565.82746	1438.8392	0	334.38
23	5617	234.83335	-11.87707	542.42822	1361.7389	0	325.83
24	5617	236.5	- 11.42592 5	513.9748	1305.7144	0	317.5
25	5617	238.16665	-10.88477	479.95862	1239.397	0	309.17
26	5617	239.83335	- 10.24908 8	440.05968	1162.2731	0	300.83
27	5617	241.5	-9.513183	393.87652	1073.5084	0	292.5
28	5617	243.16665	-8.66986	341.00162	972.28368	0	284.17
29	5617	244.18895	- 8.110170 5	305.8952	907.37555	0	280
30	5617	245.19705	- 7.484521 5	266.67431	913.17832	0	480
31	5617	246.8353	- 6.386874 5	197.84872	810.79911	0	480
32	5617	248.47355	- 5.147129 5	120.16628	693.67524	0	480
33	5617	250.1118	- 3.744776 5	32.304277	559.75171	0	480
34	5617	251.8309	-2.061269	-73.086464	568.42037	0	800

R19 Slope Stability Gap Block

Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District
Revision Number: 946
Last Edited By: Redell, Chris MVS
Date: 2/27/2013
Time: 10:36:05 AM
Tile Name: 17thReach19.gsz
Directory: Yt\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case
_LWL_and_Hlgh_water_analyses\High water cases\
Last Solved Date: 2/27/2013
Last Solved Time: 10:36:52 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: Ibf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Gap Block
Kind: SLOPE/W
Parent: Seepage Analysis (Gap)
Method: Spencer
Settings
PWP Conditions Source: Parent Analysis
Silp Surface
Direction of movement: Left to Right
Use Passive Mode: No
Silp Surface Option: Block
Critical slip surfaces saved: 1
Optimize Critical Silp Surface Location: Yes
Tension Crack
Tension Crack
Option: (none)
FOS Distribution
FOS Calculation Option: Constant

Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL 2, EL. +2.0 TO -5.0 Model: Spatial Mohr-Coulomb Weight Fn: Fill (2) Cohesion: 500 psf Phi: 0° Phi-B: 0 ° MARSH 1, EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi-B: 0 ° BEACH SAND, EL. -36 TO -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Phi-B: 0 ° BAY SOUND CLAY 1, EL. -40 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Bay Sound 1 Phi-B: 0 ° Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

```
Lacustrine 1. EL. -13.0 TO -36.0
    Model: Spatial Mohr-Coulomb
     Weight Fn: Lacustrine 1
    Cohesion Spatial Fn: Lacustrine 1
    Phi-B: 0°
Pleistocene, EL. -60 TO -70
    Unit Weight: 124 pcf
    Cohesion: 1000 psf
    Phi · ∩ °
    Phi-B: 0 °
EMBANKMENT FILL, EL. +7.2 TO 0.0
    Model: Spatial Mohr-Coulomb
     Weight Fn: Fill
     Cohesion Spatial Fn: Embankment Fill
MARSH 2, EL. -13.0 TO -16.0
    Model: Spatial Mohr-Coulomb
Weight Fn: Marsh 2
     Cohesion Fn: MARSH 2
    Phi-B: 0 °
BAY SOUND CLAY 2, EL. -50 TO -60
    Model: Spatial Mohr-Coulomb
     Unit Weight: 101 pcf
    Cohesion Fn: Bay Sound 2
    Phi-B: 0 °
```

Slip Surface Limits

Left Coordinate: (62, -33.8) ft Right Coordinate: (310, -0.5) ft

Slip Surface Block

Left Grid Upper Left: (184, -3.5) ft Lower Left: (184, -49) ft Lower Right: (223, -49) ft X Increments: 9

```
Y Increments: 9
Starting Angle: 135 °
Ending Angle: 130 °
Angle Increments: 5
Right Grid
Upper Left: (233, -3.5) ft
Lower Left: (233, -49) ft
Lower Right: (272, -49) ft
X Increments: 9
Y Increments: 9
Starting Angle: 0 °
Ending Angle: 45 °
Angle Increments: 5
```

Cohesion Functions

```
MARSH 2
     Model: Spline Data Point Function
     Function: Cohesion vs. X
            Curve Fit to Data: 100 %
            Segment Curvature: 0 %
      Y-Intercept: 150
     Data Points: X (ft), Cohesion (psf)
Data Point: (190, 150)
            Data Point: (200, 340)
            Data Point: (228.6, 180)
Bay Sound 1
     Model: Spline Data Point Function
Function: Cohesion vs. X
            Curve Fit to Data: 100 %
            Segment Curvature: 0 %
      Y-Intercept: 200
     Data Points: X (ft), Cohesion (psf)
Data Point: (190, 200)
            Data Point: (200, 650)
            Data Point: (228.6, 410)
Bay Sound 2
     Model: Spline Data Point Function
Function: Cohesion vs. X
            Curve Fit to Data: 100 %
            Segment Curvature: 0 %
     Data Points: X (ft), Cohesion (psf)
            Data Point: (190, 625)
```

Data Point: (200, 650) Data Point: (228.6, 410)

Shear/Normal Strength Functions

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0)
Data Point: (0, 0)
Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf

Unit Weight Functions

Num. Points: 20

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 101 Data Points: X (ft), Unit Weight (pcf) Data Point: (188.6, 101)
Data Point: (200, 115) Data Point: (228.6, 101) Fill (2)

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 101 Data Points: X (ft), Unit Weight (pcf) Data Point: (190, 101)
Data Point: (200, 103)

5

Marsh 2

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 74 Data Points: X (ft), Unit Weight (pcf)

Data Point: (228.6, 101)

Data Point: (190, 74) Data Point: (200, 96) Data Point: (228.6, 99)

Lacustrine 1

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 100 Data Points: X (ft), Unit Weight (pcf)

Data Point: (190, 100) Data Point: (200, 100) Data Point: (228.6, 99)

Marsh 1

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 98 Data Points: X (ft), Unit Weight (pcf) Data Point: (190, 98) Data Point: (200, 90) Data Point: (228.6, 98)

Spatial Functions

Lacustrine 1

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (190, -16, 280) Data Point: (190, -36, 280) Data Point: (200, -18, 340) Data Point: (200 -36, 480)

Data Point: (228.6, -13, 180)

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Data Point: (310, -13, 180) Data Point: (310, -36, 180) Data Point: (62, -13, 280) Data Point: (62, -36, 280) Marsh 1 Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (190, -5, 200)
Data Point: (190, -13, 250) Data Point: (200, -5, 400) Data Point: (200, -15, 400) Data Point: (228.6, -5, 200) Data Point: (228.6, -13, 250) Data Point: (62, -5, 200)
Data Point: (62, -13, 250) Data Point: (310, -5, 200)

Data Point: (310, -13, 250) **Embankment Fill** Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf) Data Point: (200, 7.2, 1000) Data Point: (190, 2, 500) Data Point: (200, 0, 1000) Data Point: (228.6, 2, 500)

Data Point: (228.6, -36, 180)

Regions

	Material	Points	Area (ft²)
Regio n 1	Sheet Pile	7,8,9,10,52,6	6.275
Regio n 2		16,14,44,20,38	2446.4
Regio n 3	Lacustrine 1, EL13.0 TO -36.0	44,14,16,31,26,27,21	2762.1
Regio n 4	MARSH 2, EL13.0 TO -16.0	31,16,57	42.9
Regio	MARSH 1,	15,57,31,26,25,74	908.6

n 5	EL5.0 TO - 13.0		
Regio n 6	BEACH SAND, EL 36 TO -40	21,27,28,33,18,40,22	992
Regio n 7	Pleistocene, EL60 TO - 70	23,41,19,34,29,30,35,42,24	2480
Regio n 8	BAY SOUND CLAY 2, EL 50 TO -60	41,56,55,23	1280
Regio n 9	BAY SOUND CLAY 1, EL 40 TO -60	22,40,18,33,28,29,34,19,41,56,55	3680
Regio n 10		61,37,57,16,38,20,58,59,60	264.03029
Regio n 11		63,64,47,48,15,57,37,61,62	301.62504
Regio n 12	EMBANKME NT FILL, EL. +7.2 TO 0.0	6,67,45,12,11,10,52	140.32
Regio n 13		6,67,66,68,65,70,69,73,64,63,62,61,60,59,58,1,2,54,51,3,50, 36,4,53,5,49	135.30281
Regio n 14		68,66,67,45	17.775
Regio n 15		65,68,45,71	7.0102262
Regio n 16		71,15,48,47,64,73,69,70,65	97.436825
Regio n 17	EMBANKME NT FILL 2, EL. +2.0 TO - 5.0	12,46,13,72,71,45	202.61875
Regio n 18	EMBANKME NT FILL 2, EL. +2.0 TO - 5.0	71,15,74,25,72	368.15625

Points

	X (ft)	Y (ft)
Point 1	62	-13.9
Point 2	135.6	-13.9
Point 3	166	-8.1
Point 4	181.9	-1
Point 5	190.8	2.3
Point 6	200	4.9
Point 7	200	7.2
Point 8	200	12.5
Point 9	200.5	12.5
Point 10	201	7.2
Point 11	219.5	6.4
Point 12	228.6	2
Point 13	310	-0.5
Point 14	200	-33.8
Point 15	200	-5
Point 16	200	-18
oint 17	200	-36
Point 18	200	-40
oint 19	200	-60
oint 20	62	-16
oint 21	62	-36
oint 22	62	-40
oint 23	62	-60
oint 24	62	-70
oint 25	310	-5
oint 26	310	-13
oint 27	310	-36
oint 28	310	-40
oint 29	310	-60
oint 30	310	-70
oint 31	228.6	-13
oint 32	228.6	-36
Point 33	228.6	-40

Point 34	228.6	-60
Point 35	228.6	-70
Point 36	176.2	-3.7
Point 37	190	-13
Point 38	190	-16
Point 39	190	-36
Point 40	190	-40
Point 41	190	-60
Point 42	190	-70
Point 43	190	-33.8
Point 44	62	-33.8
Point 45	200	0
Point 46	254.9	-0.5
Point 47	180.21184	-5
Point 48	190	-5
Point 49	199	4.9
Point 50	173.44082	-5
Point 51	145.7	-12.2
Point 52	201	4.9
Point 53	189.99091	2
Point 54	140.94706	-13
Point 55	62	-50
Point 56	190	-50
Point 57	200	-15
Point 58	62	-14.9
Point 59	135.6	-14.9
Point 60	140.94706	-14
Point 61	145.7	-13
Point 62	166	-9.1
Point 63	173.44082	-6
Point 64	175.41256	-5
Point 65	189.99091	1
Point 66	199	3.9
Point 67	200	3.9
Point 68	191.5	1.5
Point 69	181.9	-2

9

Point 70	188.475	0.43792
Point 71	200	-0.75
Point 72	310	-2.55625
Point 73	175.5775	-4.92373
Point 74	228.155	-5

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.86	(235.505, 0.125)	30.14581	(200, 12.5)	(269.777, -0.5)
2	13703	2.01	(235.505, 0.125)	30.105	(200, 12.5)	(271.004, -0.5)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.17635	- 0.6052144 5	507.62056	197.97935	0	500
2	Optimize d	200.42635	- 0.8186541	491.56656	414.35661	0	500
3	Optimize d	200.75	- 1.0949555	504.97468	440.771	0	500
4	Optimize d	201.96705	-2.134014	546.42424	791.20625	0	500
5	Optimize d	203.90115	- 3.7852515	597.03218	939.0192	0	500
6	Optimize d	205.1	-4.805435	633.98234	1034.5044	0	500
7	Optimize d	206.42325	- 5.9160825	683.88341	1185.0938	0	356.16
8	Optimize d	208.60615	- 7.7482475	776.79891	1336.5727	0	344.22
9	Optimize d	210.85955	-9.65845	877.09661	1493.1078	0	333.63
10	Optimize	213.1835	-11.64669	984.37542	1662.0531	0	324.68

	d						
11	Optimize d	215.15375	- 13.262295	1072.5516	1820.0177	0	318.51
12	Optimize d	216.66435	-14.42382	1135.9846	1948.3697	0	246.77
13	Optimize d	218.43335	- 15.784015	1210.769	2073.7513	0	239.24
14	Optimize d	219.77795	-16.8179	1267.8863	2157.088	0	233.93
15	Optimize d	221.0382	-17.62046	1311.2547	2206.439	0	227.94
16	Optimize d	223.00275	- 18.798115	1374.6039	2227.5263	0	217.31
17	Optimize d	225.6076	-19.77078	1422.4176	2265.5405	0	200.81
18	Optimize d	227.6926	- 20.143865	1435.6905	2248.5026	0	186.43
19	Optimize d	228.3775	- 20.127935	1431.4105	2214.2099	0	181.58
20	Optimize d	229.9337	- 20.091735	1421.7658	2187.2368	0	180
21	Optimize d	232.60115	-20.02969	1405.3875	2155.4546	0	180
22	Optimize d	235.28265	-19.77766	1377.1448	2127.8987	0	180
23	Optimize d	237.97815	- 19.335645	1337.0207	2057.9011	0	180
24	Optimize d	240.4488	- 18.818315	1293.3055	1998.7058	0	180
25	Optimize d	242.6946	- 18.225665	1245.9459	1917.8069	0	180
26	Optimize d	245.0032	-17.50365	1190.1908	1838.2709	0	180
27	Optimize d	247.3746	-16.65227	1126.1329	1729.9996	0	180
28	Optimize d	249.97095	-15.48431	1041.1828	1612.9017	0	180
29	Optimize	252.7923	-13.99977	935.41461	1435.8686	0	180

10

12

	d						
30	Optimize d	254.3745	-13.12875	873.84977	1364.8248	0	180
31	Optimize d	254.723	- 12.867085	855.85451	1364.8905	0	249.17
32	Optimize d	256.54775	- 11.496975	761.70075	1221.9	0	240.61
33	Optimize d	259.8041	-9.03085	592.81577	969.68269	0	225.19
34	Optimize d	263.0884	-6.40096	414.32034	708.29801	0	208.76
35	Optimize d	265.14775	-4.67925	296.01945	673.93767	0	500
36	Optimize d	266.9001	- 3.1147525	182.29298	532.98785	0	500
37	Optimize d	269.02315	- 1.1855025	46.3144	332.3441	0	500

Slices of Slip Surface: 13703

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	13703	200.25	-0.25	490.68967	195.57159	0	500
2	13703	200.63125	- 0.6312604 5	483.19146	373.16096	0	500
3	13703	200.88125	- 0.8812604 5	489.1824	396.96754	0	500
4	13703	202	-2	537.93151	752.397	0	500
5	13703	204	-4	606.98049	932.81531	0	500
6	13703	206.12745	-6.127451	699.29785	1178.4266	0	358.41
7	13703	208.38235	-8.382353	816.92414	1365.92	0	346.65
8	13703	210.63725	-10.637257	937.84308	1555.7025	0	336.94
9	13703	212.89215	-12.89216	1062.1488	1747.7115	0	329.4
10	13703	214.6705	-14.67052	1161.6178	1934.1105	0	257.93
11	13703	216.99405	-16.99405	1292.8036	2148.0143	0	250.25

12	13703	219.08335	-18.66667	1385.7601	2507.1601	0	241.98
13	13703	220.58185	-18.66667	1378.394	2449.5436	0	232.61
14	13703	222.7456	-18.66667	1367.7181	2340.2426	0	218.81
15	13703	224.9094	-18.66667	1357.1346	2233.1138	0	204.7
16	13703	227.07315	-18.66667	1346.5973	2128.0647	0	190.32
17	13703	228.3775	-18.66667	1340.2697	2065.8202	0	181.51
18	13703	229.84285	-18.66667	1333.2185	2043.3566	0	180
19	13703	232.32855	-18.66667	1321.391	2019.46	0	180
20	13703	234.81425	-18.66667	1309.6841	1995.6037	0	180
21	13703	237.3	-18.66667	1298.1381	1971.7474	0	180
22	13703	239.78575	-18.66667	1286.7933	1947.891	0	180
23	13703	242.27145	-18.66667	1275.5691	1924.0347	0	180
24	13703	244.75715	-18.66667	1264.5461	1900.1381	0	180
25	13703	247.2999	-17.722225	1193.9058	1897.9515	0	180
26	13703	249.89975	-15.833335	1063.5213	1680.1875	0	180
27	13703	252.4996	-13.944445	933.13667	1462.4234	0	180
28	13703	254.34975	-12.60022	840.47884	1334.2684	0	247.5
29	13703	256.1388	-11.300385	750.85003	1194.7968	0	239.38
30	13703	258.61645	-9.5002745	627.0308	1009.166	0	228.13
31	13703	261.0941	-7.7001645	503.73401	823.53506	0	216.88
32	13703	263.57175	-5.900055	380.95966	637.90416	0	205.63
33	13703	265.88255	-4.221157	261.81723	581.5645	0	500
34	13703	268.0265	-2.6634715	149.05892	419.94753	0	500
35	13703	270.0514	-1.1923145	46.262827	267.28266	0	500

R19 Slope Stability Gap Entry & Exit

File Information

Created By: USACE St. Louis District Revision Number: 946 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 10:36:05 AM File Name: 17thReach19.gsz

Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/27/2013

Last Solved Time: 10:37:22 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Gap Entry & Exit Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution

FOS Calculation Option: Constant

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL 2, EL. +2.0 TO -5.0 Model: Spatial Mohr-Coulomb Weight Fn: Fill (2) Cohesion: 500 psf Phi: 0 Phi-B: 0° MARSH 1, EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi-R·∩°

BEACH SAND, EL. -36 TO -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

BAY SOUND CLAY 1, EL. -40 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Bay Sound 1 Phi-B: 0°

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Lacustrine 1. EL. -13.0 TO -36.0

Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1 Phi-B: 0°

Pleistocene, EL. -60 TO -70 Unit Weight: 124 pcf Cohesion: 1000 psf Phi · ∩ ° Phi-B: 0 °

EMBANKMENT FILL, EL. +7.2 TO 0.0

Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion Spatial Fn: Embankment Fill

MARSH 2, EL. -13.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2

Cohesion Fn: MARSH 2 Phi-B: 0 °

BAY SOUND CLAY 2, EL. -50 TO -60

Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Bay Sound 2 Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (195, -33.8) ft Left-Zone Right Coordinate: (200, 2.26509) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (225, 3.74066) ft Right-Zone Right Coordinate: (301, -0.5) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits Left Coordinate: (62, -33.8) ft Right Coordinate: (310, -0.5) ft

Cohesion Functions

MARSH 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 150 Data Points: X (ft), Cohesion (psf)
Data Point: (190, 150) Data Point: (200, 340) Data Point: (228.6, 180) Bay Sound 1 Model: Spline Data Point Function

Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 200 Data Points: X (ft), Cohesion (psf)
Data Point: (190, 200) Data Point: (200, 650)

Data Point: (228.6, 410) Bay Sound 2 Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 %

Segment Curvature: 0 % Y-Intercept: 625 Data Points: X (ft), Cohesion (psf) Data Point: (190, 625) Data Point: (200, 650) Data Point: (228.6, 410)

Shear/Normal Strength Functions

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress

Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (0, 0) Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20 **Unit Weight Functions** Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 101 Data Points: X (ft), Unit Weight (pcf) Data Point: (188.6, 101) Data Point: (200, 115) Data Point: (228.6, 101) Fill (2) Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 101 Data Points: X (ft), Unit Weight (pcf) Data Point: (190, 101)
Data Point: (200, 103) Data Point: (228.6, 101) Marsh 2 Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 74
Data Points: X (ft), Unit Weight (pcf)

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Data Point: (190, 74)

Data Point: (200, 96)

Lacustrine 1

Marsh 1

Data Point: (228.6, 99)

Model: Spline Data Point Function Function: Unit Weight vs. X

Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 100 Data Points: X (ft), Unit Weight (pcf)

Data Point: (190, 100) Data Point: (200, 100)

Data Point: (228.6, 99)

Model: Spline Data Point Function Function: Unit Weight vs. X

Curve Fit to Data: 100 %

Segment Curvature: 0 % Y-Intercept: 98 Data Points: X (ft), Unit Weight (pcf)

Data Point: (190, 98) Data Point: (200, 90)

Spatial Functions

Model: Linear Interpolation

Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)

Data Point: (190, -16, 280)

Data Point: (190, -36, 280) Data Point: (200, -18, 340)

Data Point: (200, -36, 480) Data Point: (228.6, -13, 180) Data Point: (228.6, -36, 180) Data Point: (310, -13, 180)

Data Point: (310, -36, 180)

Data Point: (62, -13, 280)

Data Point: (62, -36, 280)

Model: Linear Interpolation Limit Range By: Data Values

Lacustrine 1

Marsh 1

Data Point: (228.6, 98)

Data Point: (190, -5, 200)
Data Point: (190, -13, 250)
Data Point: (200, -5, 400)
Data Point: (200, -5, 400)
Data Point: (200, -15, 400)
Data Point: (228, 6, -5, 200)
Data Point: (62, -5, 200)
Data Point: (62, -5, 200)
Data Point: (61, -13, 250)
Data Point: (310, -5, 200)
Data Point: (310, -5, 200)
Data Point: (310, -13, 250)

Embankment Fill
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), V (ft), Cohesion (psf)

Data Points: X (ft), Y (ft), Cohesion (psf)

Data Point: (200, 7.2, 1000)
Data Point: (190, 2, 500)
Data Point: (200, 0, 1000)
Data Point: (228.6, 2, 500)

Regions

	Material	Points	Area (ft²)
Regio n 1	Sheet Pile	7,8,9,10,52,6	6.275
Regio n 2		16,14,44,20,38	2446.4
Regio n 3	Lacustrine 1, EL13.0 TO -36.0	44,14,16,31,26,27,21	2762.1
Regio n 4	MARSH 2, EL13.0 TO -16.0	31,16,57	42.9
Regio n 5	MARSH 1, EL5.0 TO - 13.0	15,57,31,26,25,74	908.6
Regio n 6	BEACH SAND, EL 36 TO -40	21,27,28,33,18,40,22	992
Regio n 7	Pleistocene, EL60 TO - 70	23,41,19,34,29,30,35,42,24	2480

Regio n 8	BAY SOUND CLAY 2, EL 50 TO -60	41,56,55,23	1280
Regio n 9	BAY SOUND CLAY 1, EL 40 TO -60	22,40,18,33,28,29,34,19,41,56,55	3680
Regio n 10		61,37,57,16,38,20,58,59,60	264.03029
Regio n 11		63,64,47,48,15,57,37,61,62	301.62504
Regio n 12	EMBANKME NT FILL, EL. +7.2 TO 0.0	6,67,45,12,11,10,52	140.32
Regio n 13		6,67,66,68,65,70,69,73,64,63,62,61,60,59,58,1,2,54,51,3,50, 36,4,53,5,49	135.30281
Regio n 14		68,66,67,45	17.775
Regio n 15		65,68,45,71	7.0102262
Regio n 16		71,15,48,47,64,73,69,70,65	97.436825
Regio n 17	EMBANKME NT FILL 2, EL. +2.0 TO - 5.0	12,46,13,72,71,45	202.61875
Regio n 18	EMBANKME NT FILL 2, EL. +2.0 TO - 5.0	71,15,74,25,72	368.15625

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Points

711165					
	X (ft)	Y (ft)			
Point 1	62	-13.9			
Point 2	135.6	-13.9			
Point 3	166	-8.1			
Point 4	181.9	-1			
Point 5	190.8	2.3			

Point 6	200	4.9
Point 7	200	7.2
Point 8	200	12.5
Point 9	200.5	12.5
Point 10	201	7.2
Point 11	219.5	6.4
Point 12	228.6	2
Point 13	310	-0.5
Point 14	200	-33.8
Point 15	200	-5
Point 16	200	-18
Point 17	200	-36
Point 18	200	-40
Point 19	200	-60
Point 20	62	-16
Point 21	62	-36
Point 22	62	-40
Point 23	62	-60
Point 24	62	-70
Point 25	310	-5
Point 26	310	-13
Point 27	310	-36
Point 28	310	-40
Point 29	310	-60
Point 30	310	-70
Point 31	228.6	-13
Point 32	228.6	-36
Point 33	228.6	-40
Point 34	228.6	-60
Point 35	228.6	-70
Point 36	176.2	-3.7
Point 37	190	-13
Point 38	190	-16
Point 39	190	-36
Point 40	190	-40
Point 41	190	-60

Point 42	190	-70
Point 43	190	-33.8
Point 44	62	-33.8
Point 45	200	0
Point 46	254.9	-0.5
Point 47	180.21184	-5
Point 48	190	-5
Point 49	199	4.9
Point 50	173.44082	-5
Point 51	145.7	-12.2
Point 52	201	4.9
Point 53	189.99091	2
Point 54	140.94706	-13
Point 55	62	-50
Point 56	190	-50
Point 57	200	-15
Point 58	62	-14.9
Point 59	135.6	-14.9
Point 60	140.94706	-14
Point 61	145.7	-13
Point 62	166	-9.1
Point 63	173.44082	-6
Point 64	175.41256	-5
Point 65	189.99091	1
Point 66	199	3.9
Point 67	200	3.9
Point 68	191.5	1.5
Point 69	181.9	-2
Point 70	188.475	0.43792
Point 71	200	-0.75
Point 72	310	-2.55625
Point 73	175.5775	-4.92373
Point 74	228.155	-5

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.80	(237.31, 20.765)	32.33353	(200, 12.5)	(273.909, -0.5)
2	8665	1.98	(237.31, 20.765)	42.597	(200, 12.5)	(274.219, -0.5)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.1565	- 0.6072149 5	510.87024	163.20866	0	500
2	Optimize d	200.4065	- 0.8435503	493.51933	384.65991	0	500
3	Optimize d	200.75	- 1.1682974	509.74234	415.86882	0	500
4	Optimize d	202.5124	- 2.8343815	573.45483	824.19417	0	500
5	Optimize d	204.39915	-4.632065	635.00274	975.82815	0	500
6	Optimize d	205.74145	- 5.9513675	693.26631	1157.1631	0	360.84
7	Optimize d	207.6773	- 7.8541025	790.52548	1316.6092	0	350.36
8	Optimize d	209.7281	-9.840125	895.22054	1490.8213	0	340.8
9	Optimize d	211.89395	- 11.909435	1007.8242	1667.6554	0	332.5
10	Optimize d	213.5728	- 13.476635	1094.2226	1816.8225	0	327.31
11	Optimize d	214.87705	-14.64223	1158.7669	1951.6462	0	256.77
12	Optimize d	216.56405	-16.14986	1242.9014	2091.3627	0	250.28
13	Optimize d	218.52135	- 17.899025	1341.0352	2254.4874	0	243.67

14	Optimize d	219.78285	- 19.026395	1404.6029	2347.2433	0	238.35
15	Optimize d	221.43925	-20.10971	1463.5941	2429.5942	0	229.5
16	Optimize d	224.18635	- 21.770765	1553.5248	2462.0528	0	212.47
17	Optimize d	226.85745	-22.71422	1599.6576	2523.3505	0	193.28
18	Optimize d	228.3775	- 22.846515	1600.8473	2464.3919	0	181.71
19	Optimize d	228.8022	- 22.883475	1601.1979	2455.5528	0	180
20	Optimize d	230.1437	-22.86752	1594.053	2460.9164	0	180
21	Optimize d	232.4223	-22.80042	1579.4013	2432.4026	0	180
22	Optimize d	234.7009	-22.73332	1564.8373	2403.8449	0	180
23	Optimize d	236.82595	- 22.540145	1543.155	2386.5829	0	180
24	Optimize d	238.7975	-22.22089	1514.3147	2335.812	0	180
25	Optimize d	240.8131	-21.77326	1477.2643	2291.4569	0	180
26	Optimize d	242.87275	- 21.197255	1432.0028	2214.0261	0	180
27	Optimize d	244.9324	-20.62125	1386.7413	2136.5953	0	180
28	Optimize d	246.95585	-19.92206	1333.9607	2068.7574	0	180
29	Optimize d	248.9431	-19.09968	1273.6538	1967.0678	0	180
30	Optimize d	251.1775	-17.99161	1194.3012	1857.2397	0	180
31	Optimize d	253.65915	- 16.597845	1095.997	1692.8138	0	180
32	Optimize d	254.9081	-15.89641	1046.6045	1610.1401	0	180

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12

33	Optimize d	256.01005	- 15.168895	996.09167	1551.4716	0	180
34	Optimize d	258.24805	- 13.689735	893.69535	1402.2482	0	180
35	Optimize d	260.8956	- 11.689975	757.03896	1254.7611	0	241.81
36	Optimize d	263.9024	-9.20284	588.69703	997.54573	0	226.27
37	Optimize d	267.1712	-6.41894	401.57677	715.80414	0	208.87
38	Optimize d	270.6068	-3.407715	194.80604	560.37909	0	500
39	Optimize d	273.09275	-1.21841	46.191544	333.54784	0	500

Slices of Slip Surface: 8665

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strength (psf)	Cohesiv e Strengt h (psf)
1	8665	200.05655	0.10987115	486.88503	-743.81519	0	999.01
2	8665	200.30655	-0.33143785	488.51819	154.48516	0	500
3	8665	200.52575	-0.7149196	485.7942	201.76615	0	500
4	8665	200.77575	-1.1331514	507.05335	252.89615	0	500
5	8665	202.1945	-3.253623	605.51264	756.37681	0	500
6	8665	204.57045	-6.422691	734.44899	1178.2439	0	369.21
7	8665	206.9333	-9.049111	867.16992	1438.6625	0	356.67
8	8665	209.29615	-11.28548	985.17411	1658.5161	0	345.92
9	8665	211.659	-13.210095	1088.2657	1847.3158	0	336.69
10	8665	213.82925	-14.755745	1171.1896	2022.8603	0	262.63
11	8665	215.9886	-16.08662	1241.9251	2158.6897	0	253.17
12	8665	218.32955	-17.34674	1307.8666	2287.7628	0	243.51
13	8665	220.9425	-18.5305	1368.1746	2342.8138	0	230.09
14	8665	223.8275	-19.613	1421.2012	2323.1989	0	212.79
15	8665	226.7125	-20.46543	1460.3654	2282.3476	0	193.47
16	8665	228.3775	-20.88392	1478.5344	2252.1553	0	181.62
17	8665	229.79545	-21.145985	1488.2029	2261.5135	0	180

18	8665	232.18635	-21.50523	1499.5377	2282.7518	0	180
19	8665	234.57725	-21.727015	1502.3908	2290.2538	0	180
20	8665	236.96815	-21.813495	1496.9556	2284.3296	0	180
21	8665	239.35905	-21.765495	1483.238	2265.0461	0	180
22	8665	241.75	-21.58256	1461.139	2232.3488	0	180
23	8665	244.14095	-21.26292	1430.5513	2186.1195	0	180
24	8665	246.53185	-20.80341	1391.281	2126.1001	0	180
25	8665	248.92275	-20.19931	1343.0316	2051.7688	0	180
26	8665	251.31365	-19.444075	1285.3509	1962.5873	0	180
27	8665	253.70455	-18.528955	1217.6392	1857.6669	0	180
28	8665	256.29655	-17.334225	1131.6808	1737.6408	0	180
29	8665	259.0896	-15.80659	1024.1058	1597.4352	0	180
30	8665	261.88265	-13.987455	898.40315	1428.9907	0	180
31	8665	264.6045	-11.892325	755.97025	1262.932	0	243.08
32	8665	267.2551	-9.4721345	593.80923	1036.1907	0	227.95
33	8665	269.9057	-6.5798095	402.55138	761.74884	0	209.87
34	8665	272.2865	-3.4771545	195.63264	697.03035	0	500
35	8665	273.78045	-1.2271545	46.33221	520.42771	0	500

Slope Stability Gap (Entry/Exit) Report generated using GeoStudio 2007, version 7.22. Copyright © 1991-2013 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 972 Last Edited By: Goltz, Amanda MVS Date: 7/30/2014 Time: 2:30:29 PM

File Name: 17thReach30_Modified.gsz Directory: C:\Users\B3ECGANG\Desktop\
Last Solved Date: 7/30/2014 Last Solved Time: 2:31:38 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Slope Stability Gap (Entry/Exit) Kind: SLOPE/W Parent: Steady-State Seepage Global Method: Spencer Settings PWP Conditions Source: Parent Analysis Slip Surface Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack
Tension Crack Option: (none) FOS Distribution
FOS Calculation Option: Constant Advanced

MARSH 2, EL. -11 TO -13 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 180 psf Phi-R·∩° Embankment Fill 1, El. -3 to -5 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 800 psf Phi-B: 0 ° Embankment Fill 2, El. -5 to -7 Model: Spatial Mohr-Coulomb

Phi-B: 0 °

Unit Weight: 100 pcf Cohesion: 500 psf Phi-B: 0 °

MARSH 3, EL. -13 TO -15 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 285 psf Phi: 0 ° Phi-B: 0 °

MARSH 1, EL. -7 TO -11 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1

MARSH 2, EL. -11 TO -13 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2

Phi-B: 0°

MARSH 3, EL. -13 TO -15 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 $^{\circ}$

Materials

EMBANKMENT FILL. EL. +8.2 TO +1.0

Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 850 psf Phi: 0 ° Phi-B: 0°

BEACH SAND, EL. -15 TO -46 Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Phi-B: 0°

BAY SOUND CLAY, EL. -46 TO -70

Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Clay Cohesion Spatial Fn: Bay Sound Cohesion Phi-B: 0 °

EMBANKMENT FILL 2, EL +1 TO -5

Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Emb. Fill Phi: 0 Phi-B: 0°

MARSH 1, EL. -7 TO -11 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 270 psf

> Phi: 0° Phi-B: 0 °

Phi: 0

EMBANKMENT FILL 3, EL -5 TO -7 Model: Spatial Mohr-Coulomb

Unit Weight: 105 pcf Cohesion Fn: Emb. Fill 2 Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (190, -12.4) ft Left-Zone Right Coordinate: (200, 8.2) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (220, 2.09565) ft Right-Zone Right Coordinate: (260, -3.8) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (61, -11) ft Right Coordinate: (310, -3.8) ft

Cohesion Functions

MARSH 1

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 270 Data Points: X (ft), Cohesion (psf) Data Point: (181.1, 270) Data Point: (200, 300) Data Point: (236.7, 270)

MARSH 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 180

Data Points: X (ft), Cohesion (psf)
Data Point: (181.1, 180) Data Point: (200, 300) Data Point: (236.7, 180)

Marsh 3

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 285 Data Points: X (ft), Cohesion (psf) Data Point: (181.1, 285)

Data Point: (200, 300) Data Point: (236.7, 285)

Emb. Fill

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %
Y-Intercept: 800
Data Points: X (ft), Cohesion (psf)
Data Point: (181.6, 800)

Data Point: (200, 280) Data Point: (236.7, 800)

Emb. Fill 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 500 Data Points: X (ft), Cohesion (psf) Data Point: (181.6, 500) Data Point: (200, 280)
Data Point: (236.7, 500)

Unit Weight Functions

Bay Sound Clay

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

10			
Region 11	49,48,50,42,51	146.6	MARSH 2, EL11 TO -13
Region 12	52,49,51,12	146.6	MARSH 3, EL13 TO -15
Region 13	30,46,56,47,54,38	240.2	MARSH 2, EL11 TO -13
Region 14	36,35,53,55,52,12,13	7719	BEACH SAND, EL15 TO - 46
Region 15	30,63,62,61,60,59,58,8,27,39,28,29,43,9,1	87.044896	
Region 16	7,2,3,14,31,22	89.05	EMBANKMENT FILL, EL. +8.2 TO +1.0
Region 17	64,45,7,22,32,10,20	193.4	EMBANKMENT FILL 2, EL +1 TO -5
Region 18	41,64,20,19	73.4	EMBANKMENT FILL 3, EL - 5 TO -7
Region 19	65,41,19,48	146.8	MARSH 1, EL7 TO -11 CL
Region 20	40,65,48,49,66	73.4	MARSH 2, EL11 TO -13 CL
Region 21	55,52,49,66	73.4	MARSH 3, EL13 TO -15 CL
Region 22	53,47,66,55	37.8	MARSH 3, EL13 TO -15 CL
Region 23	47,56,40,66	11.34	MARSH 2, EL11 TO -13 CL
Region 24	56,46,65,40	26.46	
Region 25	65,41,25,57,46	75.6	
Region 26	25,24,64,41	37.8	
Region 27	24,23,27,8,44,26,7,45,64	137.12795	

Y-Intercept: 104

Data Points: X (ft), Unit Weight (pcf)
Data Point: (181.1, 104) Data Point: (200, 102) Data Point: (236.7, 104)

Spatial Functions

Bay Sound Cohesion

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (181.1, -46, 490)
Data Point: (181.1, -70, 710) Data Point: (200, -46, 765)

Data Point: (200, -40, 703)

Data Point: (200, -70, 975)

Data Point: (236.7, -46, 490)

Data Point: (236.7, -70, 710)

Regions

	Points	Area (ft²)	Material
Region 1	2,5,6,3	3.525	
Region 2	20,19,11,21	146.6	Embankment Fill 2, El5 to -7
Region 3	10,20,21,4,15	95.04	Embankment Fill 1, El3 to -5
Region 4	28,29,25,24	51.24255	
Region 5	27,39,28,24,23	35.173485	
Region 6	36,13,18,37	5976	BAY SOUND CLAY, EL46 TO -70
Region 7	2,16,34,33,17,26,7	79.944595	
Region 8	46,30,1,9,43,29,25,57	154.62147	
Region 9	35,54,47,53	240.2	MARSH 3, EL13 TO -15
Region	48,19,11,50	293.2	MARSH 1, EL7 TO -11

Points

	X (ft)	Y (ft)
Point 1	133.1	-10.6
Point 2	200	8.2
Point 3	201	8.2
Point 4	310	-3.8
Point 5	200	12.9
Point 6	200.5	12.9
Point 7	200	1
Point 8	178.4	-0.3
Point 9	140.6	-9.7
Point 10	236.7	-3
Point 11	310	-7
Point 12	310	-15
Point 13	310	-46
Point 14	203.5	7.7
Point 15	254.4	-3.8
Point 16	199	8.2
Point 17	191.5	6.1
Point 18	310	-70
Point 19	236.7	-7
Point 20	236.7	-5
Point 21	310	-5
Point 22	223.5	1
Point 23	181.1	-3
Point 24	181.1	-5
Point 25	181.1	-7
Point 26	181.06094	1
Point 27	167.54255	-3
Point 28	159.5	-5
Point 29	151.45745	-7
Point 30	128.58	-11
Point 31	212	4.6
Point 32	229.9	-1
Point 33	194.71429	7

Point 34	198.28572	8
Point 35	61	-15
Point 36	61	-46
Point 37	61	-70
Point 38	61	-11
Point 39	163.50524	-4
Point 40	200	-12.4
Point 41	200	-7
Point 42	310	-12.4
Point 43	141.50175	-9.47575
Point 44	179.74326	0.35625
Point 45	200	-3.74756
Point 46	181.1	-11
Point 47	181.1	-13
Point 48	236.7	-11
Point 49	236.7	-13
Point 50	310	-11
Point 51	310	-13
Point 52	236.7	-15
Point 53	181.1	-15
Point 54	61	-13
Point 55	200	-15
Point 56	181.1	-12.4
Point 57	181.1	-10.10499
Point 58	176.4	-0.3
Point 59	170.28297	-0.3
Point 60	167.5	-1
Point 61	151.5	-5
Point 62	140.6	-7.7
Point 63	133.1	-8.6
Point 64	200	-5
Point 65	200	-11
Point 66	200	-13

	d		11.90467				
13	Optimize d	214.92455	- 12.47792	483.31626	1582.6872	0	251.2
14	Optimize d	217.3082	- 12.87042 5	500.35973	1572.9403	0	243.41
15	Optimize d	219.3184	- 12.99767	503.94586	1550.3635	0	236.83
16	Optimize d	220.99105	- 12.99787	500.90874	1489.7408	0	231.36
17	Optimize d	222.6637	- 12.99807	499.12115	1429.0583	0	225.9
18	Optimize d	224.3	- 12.99826 5	497.38125	1372.25	0	220.54
19	Optimize d	225.9	- 12.99845 5	495.675	1319.3125	0	215.31
20	Optimize d	227.5	- 12.99864 5	494.20625	1266.4375	0	210.08
21	Optimize d	229.1	- 12.99883 5	492.8	1213.5	0	204.85
22	Optimize d	230.5755	- 12.99901	491.4987	1165.977	0	200.03
23	Optimize d	232.00425	- 12.94304 5	486.90222	1136.8796	0	195.35
24	Optimize d	233.57825	- 12.74848 5	473.82595	1094.743	0	190.21
25	Optimize d	235.4394	- 12.32396 5	446.33114	1023.2438	0	184.12
26	Optimize d	236.5899	- 11.99311	425.01694	988.38312	0	180.36
27	Optimize d	237.91825	- 11.45191	390.69152	906.81177	0	180

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.35	(225.471, 22.992)	19.63842	(200, 8.2)	(249.468, - 3.5771)
2	6057	1.41	(225.471, 22.992)	36.043	(200, 8.2)	(249.81, - 3.59254)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	- 3.753881	456.571	47.306133	0	283.54
2	Optimize d	200.75	- 4.137265 5	137.05383	1128.8177	0	290.63
3	Optimize d	201.4376	- 4.664479	170.3734	1166.1995	0	300.37
4	Optimize d	202.3686	- 5.378325	217.21701	1218.0912	0	294.2
5	Optimize d	203.181	- 6.023444	259.64473	1237.8691	0	299.07
6	Optimize d	203.92435	- 6.645119	299.15851	1272.3592	0	303.52
7	Optimize d	205.1322	- 7.655235	339.22442	1317.7347	0	295.8
8	Optimize d	207.14075	- 9.097135	365.99518	1427.4052	0	294.16
9	Optimize d	209.4137	-10.4419	406.09881	1491.3902	0	292.3
10	Optimize d	210.5894	- 11.06805 5	430.46507	1505.8334	0	265.38
11	Optimize d	211.3586	- 11.36644 5	440.27773	1562.406	0	262.86
12	Optimize	212.8574	-	459.9631	1554.2861	0	257.96

28	Optimize d	239.92905	- 10.47545 2	328.73266	904.48563	0	270
29	Optimize d	241.5141	9.515237 5	267.85444	803.90329	0	270
30	Optimize d	243.04505	- 8.526347 5	205.33716	726.10672	0	270
31	Optimize d	244.522	- 7.508782 5	140.98949	619.39028	0	270
32	Optimize d	245.5676	- 6.788415	95.353014	689.69077	0	500
33	Optimize d	246.8192	- 5.788415	32.093839	645.07922	0	500
34	Optimize d	248.616	- 4.288548 5	-62.596096	702.65796	0	800

Slices of Slip Surface: 6057

	CI:					Frictiona	Cohesiv
	Slip Surfac	X (ft)	Y (ft)	PWP (psf)	Base Normal	1	e
	e	X (IL)	Y (11)	PWP (psi)	Stress (psf)	Strength	Strength
	e					(psf)	(psf)
1	6057	200.25	-2.754892	391.81593	88.935815	0	283.54
2	6057	200.75	- 3.235423 5	74.810289	996.08789	0	290.63
3	6057	201.8824	- 4.235531 5	136.16726	1087.4965	0	306.67
4	6057	203.1324	-5.29034	204.64274	1190.049	0	298.78
5	6057	204.49045	-6.29034	267.52978	1261.0975	0	306.92
6	6057	206.2958	-7.512238	311.52485	1336.613	0	294.85
7	6057	207.9256	- 8.478782 5	326.89795	1378.5589	0	293.52
8	6057	209.55535	-9.334289	347.05799	1409.5687	0	292.19

9 6057 211.1851 -10.08741 373.20899 1430.4448 0 290.86 10 6057 212.7425 10.71966 5 5								
11 6057 214.31955 11.27162 420.17214 1462.8975 0 253.18 12 6057 215.9887 -11.7709 440.46343 1466.4582 0 247.72 13 6057 217.6579 -12.18392 460.42581 1461.413 0 242.26 14 6057 219.3271 -12.51371 475.99764 1448.0109 0 236.81 15 6057 220.99625 -12.76258 487.20273 1426.5885 0 231.35 16 6057 222.6654 -12.93221 495.24684 1397.2176 0 225.89 17 6057 224.4855 13.02435 498.73107 1363.3109 0 289.99 18 6057 226.43235 -13.02566 496.77415 1318.8317 0 289.2 19 6057 228.02025 12.95556 491.14783 1265.1417 0 208.38 20 6057 229.2734 -12.84465 483.30846 1223.1499 0 204.28 21 6057 232.45 12.35858 450.89138 1100.9273 0 193.9 23 6057 234.15 11.97983 426.30375 1024.0539 </td <td>9</td> <td>6057</td> <td>211.1851</td> <td>-10.08741</td> <td>373.20899</td> <td>1430.4448</td> <td>0</td> <td>290.86</td>	9	6057	211.1851	-10.08741	373.20899	1430.4448	0	290.86
5 5 440.46343 1466.4582 0 247.72 13 6057 215.9887 -11.7709 440.46343 1466.4582 0 247.72 13 6057 217.6579 -12.18392 460.42581 1461.413 0 242.26 14 6057 229.9625 -12.76258 487.20273 1426.5885 0 231.35 16 6057 222.6654 -12.93221 495.24684 1397.2176 0 225.89 17 6057 224.4855 13.02435 498.73107 1363.3109 0 289.99 18 6057 226.43235 -13.02566 496.77415 1318.8317 0 289.2 19 6057 228.02025 12.95556 491.14783 1265.1417 0 208.38 20 6057 229.2734 -12.84465 483.30846 1223.1499 0 204.28 21 6057 230.75 -12.65228 470.26464 1169.0717 0 199.46 </td <td>10</td> <td>6057</td> <td>212.7425</td> <td></td> <td>399.12958</td> <td>1445.9336</td> <td>0</td> <td>289.58</td>	10	6057	212.7425		399.12958	1445.9336	0	289.58
13 6057 217.6579 -12.18392 460.42581 1461.413 0 242.26 14 6057 219.3271 -12.51371 475.99764 1448.0109 0 236.81 15 6057 220.99625 -12.76258 487.20273 1426.5885 0 231.35 16 6057 222.6654 -12.93221 495.24684 1397.2176 0 225.89 17 6057 224.4855 13.02435 5 5 1363.3109 0 289.99 18 6057 226.43235 -13.02566 496.77415 1318.8317 0 289.2 19 6057 228.02025 12.95556 491.14783 1265.1417 0 208.38 20 6057 229.2734 -12.84465 483.30846 1223.1499 0 204.28 21 6057 232.45 12.35858 450.89138 1100.9273 0 193.9 23 6057 234.15 11.97983 426.30375 <td< td=""><td>11</td><td>6057</td><td>214.31955</td><td></td><td>420.17214</td><td>1462.8975</td><td>0</td><td>253.18</td></td<>	11	6057	214.31955		420.17214	1462.8975	0	253.18
14 6057 219.3271 -12.51371 475.99764 1448.0109 0 236.81 15 6057 220.99625 -12.76258 487.20273 1426.5885 0 231.35 16 6057 222.6654 -12.93221 495.24684 1397.2176 0 225.89 17 6057 224.4855 13.02435 5 5 1363.3109 0 289.99 18 6057 226.43235 -13.02566 496.77415 1318.8317 0 289.2 19 6057 228.02025 12.95556 491.14783 1265.1417 0 208.38 20 6057 229.2734 -12.84465 483.30846 1223.1499 0 204.28 21 6057 232.45 12.35858 450.89138 1100.9273 0 193.9 23 6057 234.15 11.97983 426.30375 1024.0539 0 188.34 24 6057 235.85 11.51321 396.16052 9	12	6057	215.9887	-11.7709	440.46343	1466.4582	0	247.72
15 6057 220.99625 -12.76258 487.20273 1426.5885 0 231.35 16 6057 222.6654 -12.93221 495.24684 1397.2176 0 225.89 17 6057 224.4855 13.02435 5 5 1363.3109 0 289.99 18 6057 226.43235 -13.02566 496.77415 1318.8317 0 289.2 19 6057 228.02025 12.95556 491.14783 1265.1417 0 208.38 20 6057 229.2734 -12.84465 483.30846 1223.1499 0 204.28 21 6057 230.75 -12.65228 470.26464 1169.0717 0 199.46 22 6057 232.45 12.35858 450.89138 1100.9273 0 193.9 23 6057 234.15 11.97983 426.30375 1024.0539 0 188.34 24 6057 235.85 11.51321 396.16052 938	13	6057	217.6579	-12.18392	460.42581	1461.413	0	242.26
16 6057 222.6654 -12.93221 495.24684 1397.2176 0 225.89 17 6057 224.4855 13.02435 498.73107 1363.3109 0 289.99 18 6057 226.43235 -13.02566 496.77415 1318.8317 0 289.2 19 6057 228.02025 12.95556 491.14783 1265.1417 0 208.38 20 6057 229.2734 -12.84465 483.30846 1223.1499 0 204.28 21 6057 230.75 -12.65228 470.26464 1169.0717 0 199.46 22 6057 232.45 12.35858 450.89138 1100.9273 0 193.9 23 6057 234.15 11.97983 426.30375 1024.0539 0 188.34 24 6057 235.85 11.51321 396.16052 938.18301 0 182.78 25 6057 237.07855 -1.12877 371.41915 861.02564	14	6057	219.3271	-12.51371	475.99764	1448.0109	0	236.81
17 6057 224.4855 13.02435 5 498.73107 1363.3109 0 289.99 18 6057 226.43235 -13.02566 496.77415 1318.8317 0 289.2 19 6057 228.02025 12.95556 491.14783 1265.1417 0 208.38 20 6057 229.2734 -12.84465 483.30846 1223.1499 0 204.28 21 6057 230.75 -12.65228 470.26464 1169.0717 0 199.46 22 6057 232.45 12.35858 450.89138 1100.9273 0 193.9 23 6057 234.15 11.97983 426.30375 1024.0539 0 188.34 24 6057 235.85 11.51321 396.16052 938.18301 0 182.78 25 6057 237.07855 -11.12877 371.41915 861.02564 0 180 26 6057 238.2575 10.69620 343.76807 856.89423 0 270 27 6057 239.8583 10.04383 302.0695 804.51449 0 270	15	6057	220.99625	-12.76258	487.20273	1426.5885	0	231.35
18 6057 226.43235 -13.02566 496.77415 1318.8317 0 289.2 19 6057 228.02025 12.95556 491.14783 1265.1417 0 208.38 20 6057 229.2734 -12.84465 483.30846 1223.1499 0 204.28 21 6057 230.75 -12.65228 470.26464 1169.0717 0 199.46 22 6057 232.45 12.35858 450.89138 1100.9273 0 193.9 23 6057 234.15 11.97983 426.30375 1024.0539 0 188.34 24 6057 235.85 11.51321 396.16052 938.18301 0 182.78 25 6057 237.07855 -11.12877 371.41915 861.02564 0 180 26 6057 238.2575 10.69620 343.76807 856.89423 0 270 27 6057 239.8583 10.04383 302.0695 804.51449	16	6057	222.6654	-12.93221	495.24684	1397.2176	0	225.89
19 6057 228.02025 12.95556 491.14783 1265.1417 0 208.38 20 6057 229.2734 -12.84465 483.30846 1223.1499 0 204.28 21 6057 230.75 -12.65228 470.26464 1169.0717 0 199.46 22 6057 232.45 12.35858 450.89138 1100.9273 0 193.9 5	17	6057	224.4855		498.73107	1363.3109	0	289.99
5 5 483.30846 1223.1499 0 204.28 21 6057 230.75 -12.65228 470.26464 1169.0717 0 199.46 22 6057 232.45 12.35858 450.89138 1100.9273 0 193.9 23 6057 234.15 11.97983 426.30375 1024.0539 0 188.34 24 6057 235.85 11.51321 396.16052 938.18301 0 182.78 25 6057 237.07855 -11.12877 371.41915 861.02564 0 180 26 6057 238.2575 10.69620 343.76807 856.89423 0 270 27 6057 239.8583 10.04383 302.0695 804.51449 0 270	18	6057	226.43235	-13.02566	496.77415	1318.8317	0	289.2
21 6057 230.75 -12.65228 470.26464 1169.0717 0 199.46 22 6057 232.45 12.35858 450.89138 1100.9273 0 193.9 23 6057 234.15 11.97983 426.30375 1024.0539 0 188.34 24 6057 235.85 11.51321 396.16052 938.18301 0 182.78 25 6057 237.07855 -11.12877 371.41915 861.02564 0 180 26 6057 238.2575 10.69620 343.76807 856.89423 0 270 27 6057 239.8583 10.04383 302.0695 804.51449 0 270	19	6057	228.02025		491.14783	1265.1417	0	208.38
22 6057 232.45 12.35858 450.89138 1100.9273 0 193.9 23 6057 234.15 11.97983 426.30375 1024.0539 0 188.34 24 6057 235.85 11.51321 396.16052 938.18301 0 182.78 25 6057 237.07855 -11.12877 371.41915 861.02564 0 180 26 6057 238.2575 10.69620 343.76807 856.89423 0 270 27 6057 239.8583 10.04383 302.0695 804.51449 0 270	20	6057	229.2734	-12.84465	483.30846	1223.1499	0	204.28
5 - 23 6057 234.15 11.97983 426.30375 1024.0539 0 188.34 24 6057 235.85 11.51321 396.16052 938.18301 0 182.78 25 6057 237.07855 -11.12877 371.41915 861.02564 0 180 26 6057 238.2575 10.69620 343.76807 856.89423 0 270 27 6057 239.8583 10.04383 302.0695 804.51449 0 270	21	6057	230.75	-12.65228	470.26464	1169.0717	0	199.46
5	22	6057	232.45		450.89138	1100.9273	0	193.9
5	23	6057	234.15		426.30375	1024.0539	0	188.34
26 6057 238.2575 10.69620 343.76807 856.89423 0 270 27 6057 239.8583 10.04383 302.0695 804.51449 0 270 5	24	6057	235.85		396.16052	938.18301	0	182.78
5	25	6057	237.07855	-11.12877	371.41915	861.02564	0	180
5	26	6057	238.2575		343.76807	856.89423	0	270
28 6057 241.4591 - 254.49063 743.6709 0 270	27	6057	239.8583		302.0695	804.51449	0	270
	28	6057	241.4591	-	254.49063	743.6709	0	270

			9.298963				
			5				
29	6057	243.0599	- 8.454990 5	200.89598	673.76047	0	270
30	6057	244.6607	-7.503657	140.56001	593.91032	0	270
31	6057	246.1401	-6.524506	78.44741	649.78775	0	500
32	6057	247.49815	-5.524506	15.194346	567.34923	0	500
33	6057	248.9936	-4.296271	-62.379591	695.18893	0	800

Slope Stability Gap (Block) Report generated using GeoStudio 2007, version 7.22. Copyright © 1991-2013 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 974 Last Edited By: Goltz, Amanda MVS Date: 7/30/2014 Time: 2:41:02 PM File Name: 17thReach30_Modified.gsz

Directory: C:\Users\B3ECGANG\Desktop\
Last Solved Date: 7/30/2014 Last Solved Time: 2:41:18 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Slope Stability Gap (Block) Kind: SLOPE/W Parent: Steady-State Seepage Global Method: Spencer Settings PWP Conditions Source: Parent Analysis Slip Surface Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack
Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant Restrict Block Crossing: Yes

```
Phi: 0°
     Phi-B: 0 °
MARSH 2, EL. -11 TO -13
     Model: Spatial Mohr-Coulomb
     Unit Weight: 90 pcf
Cohesion: 180 psf
     Phi-B: 0°
Embankment Fill 1, El. -3 to -5
     Unit Weight: 100 pcf
     Cohesion: 800 psf
     Phi-B: 0 °
Embankment Fill 2, El. -5 to -7
     Model: Spatial Mohr-Coulomb
Unit Weight: 100 pcf
      Cohesion: 500 psf
     Phi: 0
      Phi-B: 0°
MARSH 3, EL. -13 TO -15
     Model: Spatial Mohr-Coulomb
Unit Weight: 90 pcf
     Phi-B: 0 °
MARSH 1, EL. -7 TO -11 CL
     Model: Spatial Mohr-Coulomb
      Unit Weight: 90 pcf
     Cohesion Fn: MARSH 1
     Phi-B: 0°
MARSH 2, EL. -11 TO -13 CL
Model: Spatial Mohr-Coulomb
      Unit Weight: 90 pcf
     Cohesion Fn: MARSH 2
     Phi-B·∩°
```

MARSH 3, EL. -13 TO -15 CL

Unit Weight: 90 pcf

Model: Spatial Mohr-Coulomb

```
Number of Slices: 30
           Optimization Tolerance: 0.01
           Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
           Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
           Ending Optimization Points: 16
Complete Passes per Insertion: 1
           Driving Side Maximum Convex Angle: 5 °
           Resisting Side Maximum Convex Angle: 1 °
Materials
EMBANKMENT FILL, EL. +8.2 TO +1.0
     Model: Spatial Mohr-Coulomb
Unit Weight: 115 pcf
     Cohesion: 850 psf
     Phi-B: 0 °
BEACH SAND, EL. -15 TO -46
     Model: Spatial Mohr-Coulomb
     Unit Weight: 122 pcf
     Cohesion: 0 psf
Phi: 30 °
     Phi-B: 0°
BAY SOUND CLAY, EL. -46 TO -70
     Model: Spatial Mohr-Coulomb
Weight Fn: Bay Sound Clay
     Cohesion Spatial Fn: Bay Sound Cohesion
     Phi-B: 0 °
EMBANKMENT FILL 2. EL +1 TO -5
     Model: Spatial Mohr-Coulomb
     Unit Weight: 105 pcf
     Cohesion Fn: Emb. Fill
     Phi-B: 0 °
MARSH 1, EL. -7 TO -11
     Model: Spatial Mohr-Coulomb
     Unit Weight: 90 pcf
     Cohesion: 270 psf
```

Cohesion Fn: Marsh 3 Phi-B: 0 ° EMBANKMENT FILL 3, EL -5 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Emb. Fill 2 Phi-B: 0 °

Slip Surface Limits Left Coordinate: (61, -11) ft Right Coordinate: (310, -3.8) ft

Slip Surface Block

Left Grid Upper Left: (200, 0) ft Lower Left: (200, -40) ft Lower Right: (235, -40) ft X Increments: 6 Y Increments: 6 Starting Angle: 115 Ending Angle: 180 ° Angle Increments: 5 Right Grid Upper Left: (240, 0) ft Lower Left: (240, -40) ft Lower Right: (280, -40) ft X Increments: 6 Y Increments: 6 Starting Angle: 25 Ending Angle: 45 Angle Increments: 5

Cohesion Functions

MARSH 1

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 270

Data Points: X (ft), Cohesion (psf) Data Point: (181.1, 270) Data Point: (200, 300) Data Point: (236.7, 270)

MARSH 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 180 Data Points: X (ft), Cohesion (psf) Data Point: (181.1, 180)
Data Point: (200, 300) Data Point: (236.7, 180)

Marsh 3

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 285 Data Points: X (ft), Cohesion (psf)

Data Point: (181.1, 285)
Data Point: (200, 300) Data Point: (236.7, 285)

Emb. Fill

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 800 Data Points: X (ft), Cohesion (psf)

Data Point: (181.6, 800) Data Point: (200, 280) Data Point: (236.7, 800)

Emb. Fill 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 500 Data Points: X (ft), Cohesion (psf) Data Point: (181.6, 500)
Data Point: (200, 280) Data Point: (236.7, 500)

7			
Region 8	46,30,1,9,43,29,25,57	154.62147	
Region 9	35,54,47,53	240.2	MARSH 3, EL13 TO -15
Region 10	48,19,11,50	293.2	MARSH 1, EL7 TO -11
Region 11	49,48,50,42,51	146.6	MARSH 2, EL11 TO -13
Region 12	52,49,51,12	146.6	MARSH 3, EL13 TO -15
Region 13	30,46,56,47,54,38	240.2	MARSH 2, EL11 TO -13
Region 14	36,35,53,55,52,12,13	7719	BEACH SAND, EL15 TO - 46
Region 15	30,63,62,61,60,59,58,8,27,39,28,29,43,9,1	87.044896	
Region 16	7,2,3,14,31,22	89.05	EMBANKMENT FILL, EL. +8.2 TO +1.0
Region 17	64,45,7,22,32,10,20	193.4	EMBANKMENT FILL 2, EL +1 TO -5
Region 18	41,64,20,19	73.4	EMBANKMENT FILL 3, EL - 5 TO -7
Region 19	65,41,19,48	146.8	MARSH 1, EL7 TO -11 CL
Region 20	40,65,48,49,66	73.4	MARSH 2, EL11 TO -13 CL
Region 21	55,52,49,66	73.4	MARSH 3, EL13 TO -15 CL
Region 22	53,47,66,55	37.8	MARSH 3, EL13 TO -15 CL
Region 23	47,56,40,66	11.34	MARSH 2, EL11 TO -13 CL
Region 24	56,46,65,40	26.46	
Region 25	65,41,25,57,46	75.6	
Region	25,24,64,41	37.8	

Unit Weight Functions

Bay Sound Clay Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %

Y-Intercept: 104
Data Points: X (ft), Unit Weight (pcf)
Data Point: (181.1, 104)
Data Point: (200, 102) Data Point: (236.7, 104)

Spatial Functions

Bay Sound Cohesion

Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf) Data Point: (181.1, -46, 490) Data Point: (181.1, -70, 710) Data Point: (200, -46, 765)
Data Point: (200, -70, 975)
Data Point: (236.7, -46, 490)
Data Point: (236.7, -70, 710)

Regions

egions			
	Points	Area (ft²)	Material
Region 1	2,5,6,3	3.525	
Region 2	20,19,11,21	146.6	Embankment Fill 2, El5 to -7
Region 3	10,20,21,4,15	95.04	Embankment Fill 1, El3 to -5
Region 4	28,29,25,24	51.24255	
Region 5	27,39,28,24,23	35.173485	
Region 6	36,13,18,37	5976	BAY SOUND CLAY, EL46 TO -70
Region	2,16,34,33,17,26,7	79.944595	

ı	26			
	Region 27	24,23,27,8,44,26,7,45,64	137.12795	

Points

	X (ft)	Y (ft)
Point 1	133.1	-10.6
Point 2	200	8.2
Point 3	201	8.2
Point 4	310	-3.8
Point 5	200	12.9
Point 6	200.5	12.9
Point 7	200	1
Point 8	178.4	-0.3
Point 9	140.6	-9.7
Point 10	236.7	-3
Point 11	310	-7
Point 12	310	-15
Point 13	310	-46
Point 14	203.5	7.7
Point 15	254.4	-3.8
Point 16	199	8.2
Point 17	191.5	6.1
Point 18	310	-70
Point 19	236.7	-7
Point 20	236.7	-5
Point 21	310	-5
Point 22	223.5	1
Point 23	181.1	-3
Point 24	181.1	-5
Point 25	181.1	-7
Point 26	181.06094	1
Point 27	167.54255	-3
Point 28	159.5	-5
Point 29	151.45745	-7

Point 30	128.58	-11
Point 31	212	4.6
Point 32	229.9	-1
Point 33	194.71429	7
Point 34	198.28572	8
Point 35	61	-15
Point 36	61	-46
Point 37	61	-70
Point 38	61	-11
Point 39	163.50524	-4
Point 40	200	-12.4
Point 41	200	-7
Point 42	310	-12.4
Point 43	141.50175	-9.47575
Point 44	179.74326	0.35625
Point 45	200	-3.74756
Point 46	181.1	-11
Point 47	181.1	-13
Point 48	236.7	-11
Point 49	236.7	-13
Point 50	310	-11
Point 51	310	-13
Point 52	236.7	-15
Point 53	181.1	-15
Point 54	61	-13
Point 55	200	-15
Point 56	181.1	-12.4
Point 57	181.1	-10.10499
Point 58	176.4	-0.3
Point 59	170.28297	-0.3
Point 60	167.5	-1
Point 61	151.5	-5
Point 62	140.6	-7.7
Point 63	133.1	-8.6
Point 64	200	-5
Point 65	200	-11

			5				
12	Optimize d	212.4775	-11.78587	455.5341	1532.7037	0	259.2
13	Optimize d	213.8015	- 12.15981 5	469.6685	1602.2014	0	254.87
14	Optimize d	215.4945	-12.4947	482.67686	1572.4183	0	249.34
15	Optimize d	217.1875	- 12.82958 5	498.25792	1542.5773	0	243.8
16	Optimize d	218.945	-12.99465	504.45498	1564.0453	0	238.05
17	Optimize d	220.767	-12.98989	500.83809	1497.4704	0	232.1
18	Optimize d	222.589	-12.98513	498.44512	1430.9503	0	226.14
19	Optimize d	224.0655	- 12.98127 5	496.62082	1378.8146	0	221.31
20	Optimize d	225.73525	- 12.98216 5	494.87645	1322.2063	0	215.85
21	Optimize d	227.9437	-12.9869	493.11049	1249.5755	0	208.63
22	Optimize d	229.47395	-12.98921	491.88485	1199.8451	0	203.63
23	Optimize d	230.5808	-12.98905	490.88906	1164.5551	0	200.01
24	Optimize d	231.94235	- 12.98885 5	489.74331	1122.1035	0	195.56
25	Optimize d	233.3975	- 12.97971 5	488.1088	1078.9114	0	190.8
26	Optimize d	235.37965	- 12.81743 5	476.69035	1031.289	0	184.32
27	Optimize	236.6437	-12.64848	465.32001	1013.4548	0	180.18

Point 66	200	-13
. 0 00	200	10

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.36	(227.387, - 1.491)	21.45955	(200, 8.2)	(253.554, - 3.76175)
2	4665	1.68	(227.387, - 1.491)	22.22	(200, 8.2)	(254.68, -3.8)

Slices of Slip Surface: Optimized

ces or s	es of Slip Surface: Optimized						
	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	-3.110277	414.85059	106.62364	0	283.54
2	Optimize d	200.75	-3.518507	93.808473	1056.1509	0	290.63
3	Optimize d	201.6095	-4.220266	136.98648	1105.0802	0	302.81
4	Optimize d	202.37195	-4.858955	177.85408	1111.0022	0	313.61
5	Optimize d	203.01245	-5.44971	217.64072	1162.228	0	298.06
6	Optimize d	204.0966	-6.44971	282.99318	1221.1004	0	304.56
7	Optimize d	205.1512	-7.422435	329.37094	1272.5768	0	295.79
8	Optimize d	206.4004	-8.426855	347.6824	1370.1022	0	294.77
9	Optimize d	208.44455	-9.796215	382.96065	1442.7081	0	293.1
10	Optimize d	210.1789	- 10.79179 5	418.63591	1529.3837	0	291.68
11	Optimize d	211.33015	- 11.28968	436.7772	1532.5432	0	262.95

	d						
28	Optimize d	237.67445	12.36063 5	446.87784	959.67099	0	180
29	Optimize d	239.6234	-11.81638	411.89401	900.02204	0	180
30	Optimize d	241.6177	-11.25947	375.9385	838.96587	0	180
31	Optimize d	243.8834	-10.30091	314.92594	845.02916	0	270
32	Optimize d	246.23785	- 8.970347 5	230.52837	721.61624	0	270
33	Optimize d	248.4986	7.630932 5	145.7165	581.3502	0	270
34	Optimize d	250.84395	-5.97415	40.946077	632.10953	0	500
35	Optimize d	252.7954	- 4.380874 5	-59.58896	672.29749	0	800

Slices of Slip Surface: 4665

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	4665	200.25	- 2.074839 5	347.7434	113.0575	0	283.54
2	4665	200.75	-2.318706	13.291366	1048.8207	0	290.63
3	4665	202.25	3.050304 5	54.445345	1089.7697	0	311.88
4	4665	204.18685	- 3.994977 5	107.03871	1123.4485	0	339.32
5	4665	205.5606	- 4.664992	141.3225	1131.496	0	358.79

			5				
6	4665	207.27265	-5.5	173.12592	1153.5299	0	323.6
7	4665	209.32295	-6.5	200.61617	1168.9605	0	335.89
	4005	209.52295	-0.5	200.01017	1100.9003	0	333.09
8	4665	211.17405	7.402848 5	224.3062	1188.454	0	290.87
9	4665	212.81865	-8.204985	258.29341	1196.3629	0	289.52
10	4665	214.45595	-9.003561	292.66263	1208.769	0	288.18
11	4665	216.0933	9.802134 5	328.67868	1221.23	0	286.84
12	4665	217.73065	-10.60071	369.57481	1233.6361	0	285.51
13	4665	219.57445	-11.5	416.91727	1257.3361	0	236
14	4665	221.62475	-12.5	471.11748	1273.9066	0	229.29
15	4665	222.9916	- 13.16666 5	508.71217	1271.7278	0	290.6
16	4665	223.41665	-13.33333	518.1119	1435.1997	0	290.43
17	4665	224.3	-13.33333	517.25	1405.9375	0	290.07
18	4665	225.9	-13.33333	515.6875	1353.375	0	289.41
19	4665	227.5	-13.33333	514.325	1300.8125	0	288.76
20	4665	229.1	-13.33333	513.0125	1248.25	0	288.11
21	4665	230.75	-13.33333	511.65294	1195.7059	0	287.43
22	4665	232.45	-13.33333	510.38235	1143.1765	0	286.74
23	4665	234.15	-13.33333	509.2	1090.6471	0	286.04
24	4665	235.85	-13.33333	508.01765	1038.0588	0	285.35
25	4665	237.525	-13.33333	506.91515	988.06061	0	285
26	4665	239.175	-13.33333	505.89091	980.60606	0	285
27	4665	240.25665	- 13.16666 5	494.91345	1168.0546	0	285
28	4665	241.28325	-12.5	452.99818	1044.509	0	180
29	4665	242.8231	-11.5	390.05424	938.79454	0	180
30	4665	244.6196	- 10.33333 4	316.42842	860.82909	0	270
31	4665	246.67275	-9	232.07338	719.82207	0	270

32	4665	248.7259	7.666666 5	147.79186	578.81504	0	270
33	4665	250.5224	-6.5	73.940214	566.15242	0	500
34	4665	252.06225	-5.5	10.623732	449.46892	0	500
35	4665	253.6161	-4.490932	-53.224655	483.25165	0	800
36	4665	254.54	-3.890932	-91.244341	413.9357	0	800

Reach 30 Slope Stability Partial Gap (Entry/Exit)

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File Information

Created By: USACE St. Louis District
Revision Number: 996
Last Edited By: Goltz, Amanda MVS
Date: 2/9/2015
Time: 4-04:41 PM
File Name: 17thReach30_Partial Gap.gsz
Directory: Y:\EC-G\Support For Others (SFP)\MVN\17th Street Canal\Extreme water level April
2013\
Last Solved Date: 2/9/2015

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Last Solved Time: 4:04:49 PM

Analysis Settings

Slope Stability Gap (Entry/Exit) Kind: SLOPE/W Parent: Steady-State Seepage Global Method: Spencer Settings PWP Conditions Source: Parent Analysis Slip Surface Direction of movement: Left to Right Use Passive Mode: Yes

Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack

MARSH 1, EL. -7 TO -11 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 270 psf Phi: 0 °

MARSH 2, EL. -11 TO -13 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 180 psf Phi: 0 ° Phi-B: 0 °

Embankment Fill 1, El. -3 to -5

Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 800 psf Phi: 0 °

Embankment Fill 2, El. -5 to -7

Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 500 psf Phi: 0 ° Phi-B: 0 °

MARSH 3, EL. -13 TO -15

Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 285 psf Phi: 0 ° Phi-B: 0 °

MARSH 1, EL. -7 TO -11 CL

Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Phi-B: 0 °

MARSH 2, EL. -11 TO -13 CL

Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Phi: 0 ° Tension Crack Option: (none)
FOS Distribution
FOS Calculation Option: Constant
Advanced
Number of Slices: 30
Optimization Tolerance: 0.01
Minimum Slip Surface Depth: 0.1 ft
Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °

Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +8.2 TO +1.0

Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 850 psf Phi: 0 ° Phi-B: 0 °

BEACH SAND, EL. -15 TO -46

Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Phi-B: 0 °

BAY SOUND CLAY, EL. -46 TO -70

Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Clay Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 ° Phi-B: 0 °

EMBANKMENT FILL 2, EL +1 TO -5

Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Emb. Fill Phi: 0 ° Phi-B: 0 °

Phi-B: 0 °

MARSH 3, EL. -13 TO -15 CL

Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi: 0 °

EMBANKMENT FILL 3, EL -5 TO -7

Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Emb. Fill 2 Phi: 0 ° Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Point Left Coordinate: (200, -12.4) ft Left-Zone Increment: 20 Right Projection: Range

Right-Zone Left Coordinate: (210, 5.32941) ft Right-Zone Right Coordinate: (300, -3.8) ft Right-Zone Increment: 20

Radius Increments: 20

Slip Surface Limits

Left Coordinate: (61, -11) ft Right Coordinate: (310, -3.8) ft

Point Loads

	Coordinate (ft)	Magnitude (lbs)	Direction (°)
Point Load 1	(200, -8.94)	1702	180

Cohesion Functions

MARSH 1

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 270

Data Points: X (ft), Cohesion (psf)
Data Point: (181.1, 270) Data Point: (200, 300) Data Point: (236.7, 270)

MARSH 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 180
Data Points: X (ft), Cohesion (psf)
Data Point: (181.1, 180)

Data Point: (200, 300) Data Point: (236.7, 180)

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 %
Y-Intercept: 285
Data Points: X (ft), Cohesion (psf)
Data Point: (181.1, 285)

Data Point: (200, 300) Data Point: (236.7, 285)

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 800 Data Points: X (ft), Cohesion (psf) Data Point: (181.6, 800) Data Point: (200, 280)
Data Point: (236.7, 800)

Emb. Fill 2

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 500
Data Points: X (ft), Cohesion (psf)
Data Point: (181.6, 500)

Data Point: (200, 280)

Region 6	36,13,18,37	5976	BAY SOUND CLAY, EL46 TO -70
Region 7	2,16,34,33,17,26,7	79.944595	
Region 8	46,30,1,9,43,29,25,57	154.62147	
Region 9	35,54,47,53	240.2	MARSH 3, EL13 TO -15
Region 10	48,19,11,50	293.2	MARSH 1, EL7 TO -11
Region 11	49,48,50,42,51	146.6	MARSH 2, EL11 TO -13
Region 12	52,49,51,12	146.6	MARSH 3, EL13 TO -15
Region 13	30,46,56,47,54,38	240.2	MARSH 2, EL11 TO -13
Region 14	36,35,53,55,52,12,13	7719	BEACH SAND, EL15 TO - 46
Region 15	30,63,62,61,60,59,58,8,27,39,28,29,43,9,1	87.044896	
Region 16	7,2,3,14,31,22	89.05	EMBANKMENT FILL, EL. +8.2 TO +1.0
Region 17	64,45,7,22,32,10,20	193.4	EMBANKMENT FILL 2, EL +1 TO -5
Region 18	41,64,20,19	73.4	EMBANKMENT FILL 3, EL - 5 TO -7
Region 19	65,41,19,48	146.8	MARSH 1, EL7 TO -11 CL
Region 20	40,65,48,49,66	73.4	MARSH 2, EL11 TO -13 CL
Region 21	55,52,49,66	73.4	MARSH 3, EL13 TO -15 CL
Region 22	53,47,66,55	37.8	MARSH 3, EL13 TO -15 CL
Region 23	47,56,40,66	11.34	MARSH 2, EL11 TO -13 CL
Region 24	56,46,65,40	26.46	

Unit Weight Functions

Data Point: (236.7, 500)

Bay Sound Clay Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 104 Data Points: X (ft), Unit Weight (pcf)

Data Point: (181.1, 104) Data Point: (200, 102) Data Point: (236.7, 104)

Spatial Functions

Bay Sound Cohesion

Limit Range By: Data Values
Data Points: X (ft), V (ft), Cohesion (psf)
Data Point: (181.1, -46, 490)
Data Point: (181.1, -70, 710)

Data Point: (200, -46, 765)
Data Point: (200, -70, 975)
Data Point: (236.7, -46, 490)
Data Point: (236.7, -70, 710)

Regions

	Points	Area (ft²)	Material
Region 1	2,5,6,3	3.525	
Region 2	20,19,11,21	146.6	Embankment Fill 2, El5 to -7
Region 3	10,20,21,4,15	95.04	Embankment Fill 1, El3 to -5
Region 4	28,29,25,24	51.24255	
Region 5	27,39,28,24,23	35.173485	

Region 25	65,41,25,57,46	75.6	
Region 26	25,24,64,41	37.8	
Region 27	24,23,27,8,44,26,7,45,64	137.12795	

Points

	X (ft)	Y (ft)
Point 1	133.1	-10.6
Point 2	200	8.2
Point 3	201	8.2
Point 4	310	-3.8
Point 5	200	12.9
Point 6	200.5	12.9
Point 7	200	1
Point 8	178.4	-0.3
Point 9	140.6	-9.7
Point 10	236.7	-3
Point 11	310	-7
Point 12	310	-15
Point 13	310	-46
Point 14	203.5	7.7
Point 15	254.4	-3.8
Point 16	199	8.2
Point 17	191.5	6.1
Point 18	310	-70
Point 19	236.7	-7
Point 20	236.7	-5
Point 21	310	-5
Point 22	223.5	1
Point 23	181.1	-3
Point 24	181.1	-5
Point 25	181.1	-7
Point 26	181.06094	1

Point 27	167.54255	-3
Point 28	159.5	-5
Point 29	151.45745	-7
Point 30	128.58	-11
Point 31	212	4.6
Point 32	229.9	-1
Point 33	194.71429	7
Point 34	198.28572	8
Point 35	61	-15
Point 36	61	-46
Point 37	61	-70
Point 38	61	-11
Point 39	163.50524	-4
Point 40	200	-12.4
Point 41	200	-7
Point 42	310	-12.4
Point 43	141.50175	-9.47575
Point 44	179.74326	0.35625
Point 45	200	-3.74756
Point 46	181.1	-11
Point 47	181.1	-13
Point 48	236.7	-11
Point 49	236.7	-13
Point 50	310	-11
Point 51	310	-13
Point 52	236.7	-15
Point 53	181.1	-15
Point 54	61	-13
Point 55	200	-15
Point 56	181.1	-12.4
Point 57	181.1	-10.10499
Point 58	176.4	-0.3
Point 59	170.28297	-0.3
Point 60	167.5	-1
Point 61	151.5	-5
Point 62	140.6	-7.7

			5				
9	Optimize d	210.26185	-14.65483	605.72296	1950.1433	0	295.81
10	Optimize d	211.46215	-14.82963	613.62003	1974.1582	0	295.32
11	Optimize d	212.9095	- 14.93441 5	618.29633	1928.6393	0	294.72
12	Optimize d	214.7788	-14.9974	620.69706	1900.0675	0	293.96
13	Optimize d	216.65475	-14.99181	619.43261	1831.9378	0	293.19
14	Optimize d	218.48705	- 14.98635 5	618.23195	1765.3557	0	292.44
15	Optimize d	220.31935	-14.9809	616.97671	1698.828	0	291.7
16	Optimize d	222.36775	- 14.84777 5	608.08342	1658.4652	0	290.86
17	Optimize d	223.8166	-14.68092	597.44408	1591.2702	0	290.27
18	Optimize d	224.87205	-14.46486	583.98212	1587.7285	0	289.83
19	Optimize d	226.3497	-14.10566	561.51823	1504.4096	0	289.23
20	Optimize d	228.24435	-13.61413	530.6213	1404.9666	0	288.46
21	Optimize d	229.6501	-13.23928	506.86025	1315.5163	0	287.88
22	Optimize d	230.25025	-13.08818	497.19569	1281.8415	0	287.64
23	Optimize d	231.46925	-12.78128	477.44172	1189.6835	0	197.1
24	Optimize d	233.31745	- 12.33402 5	448.68388	1082.6838	0	191.06
25	Optimize	235.2763	-	419.0192	976.49346	0	184.66

Point 63	133.1	-8.6
Point 64	200	-5
Point 65	200	-11
Point 66	200	-13

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.38	(215.857, 43.111)	21.60423	(200, 8.2)	(249.108, - 3.56083)
2	195	1.44	(215.857, 43.111)	57.732	(200, 8.2)	(249.795, - 3.59186)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	- 12.44486 5	1262.3125	-1609.6434	0	299.18
2	Optimize d	200.75	-12.5346	1136.8363	2108.3146	0	297.55
3	Optimize d	202.1716	- 12.78973 5	902.54558	2104.6795	0	292.9
4	Optimize d	203.4216	- 13.01407 5	761.62791	2096.0457	0	298.6
5	Optimize d	203.9032	-13.10051	710.49154	2085.4089	0	298.4
6	Optimize d	205.2984	- 13.44146 5	591.3973	2017.6884	0	297.83
7	Optimize d	207.28245	-13.97865	590.61889	1983.9735	0	297.02
8	Optimize d	208.93695	- 14.38310	597.39774	1980.5311	0	296.35

	d		11.87695 5				
26	Optimize d	236.47785	- 11.56879 5	399.01377	939.82565	0	180.73
27	Optimize d	237.40015	-11.23821	377.90252	877.17647	0	180
28	Optimize d	238.769	-10.60113	337.4719	912.23672	0	270
29	Optimize d	240.10635	-9.828895	288.54472	831.16627	0	270
30	Optimize d	241.79525	-8.832085	225.25593	733.1078	0	270
31	Optimize d	243.8866	-7.58027	145.93605	601.42443	0	270
32	Optimize d	246.12155	-6.028585	47.578961	644.52541	0	500
33	Optimize d	247.3545	-5.05901	-13.704646	565.39988	0	500
34	Optimize d	248.26605	-4.280417	-62.856439	708.30831	0	800

Slices of Slip Surface: 195

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	195	200.25	-12.4702	1253.8465	-1539.7682	0	299.18
2	195	200.75	-12.60818	1119.4824	2075.6608	0	297.55
3	195	201.6375	-12.83798	959.18048	2089.0948	0	294.65
4	195	202.8875	- 13.14122 5	802.1954	2097.6395	0	298.82
5	195	204.35	-13.45536	660.58765	2088.6329	0	298.22
6	195	206.05	-13.77481	593.07429	2060.5433	0	297.53
7	195	207.75	- 14.04192 5	589.9181	2027.4686	0	296.83
8	195	209.45	-14.25743	589.56956	1989.3369	0	296.14

9	195	211.15	- 14.42190 5	592.5496	1946.2033	0	295.44
10	195	212.82145	-14.53471	597.11245	1903.9179	0	294.76
11	195	214.4643	- 14.59779 5	599.24446	1862.6136	0	294.09
12	195	216.10715	- 14.61406 5	598.90813	1816.8172	0	293.42
13	195	217.75	-14.58356	595.94547	1766.4583	0	292.75
14	195	219.39285	-14.5062	590.23772	1711.5375	0	292.07
15	195	221.0357	- 14.38180 5	581.62798	1651.9471	0	291.4
16	195	222.67855	-14.21007	570.41347	1587.7794	0	290.73
17	195	224.24245	-14.00332	557.02665	1524.7486	0	290.09
18	195	225.7273	-13.76548	541.6623	1463.3926	0	289.48
19	195	227.21215	- 13.48769 5	523.83024	1398.0076	0	288.88
20	195	228.697	- 13.16937 5	503.44549	1328.6233	0	288.27
21	195	229.6697	- 12.94325 5	488.93307	1259.4037	0	202.99
22	195	230.66	- 12.68488 5	472.32838	1208.1015	0	199.75
23	195	232.17995	-12.25922	445.04858	1126.8834	0	194.78
24	195	233.6999	-11.78818	414.96531	1040.8389	0	189.81
25	195	235.2199	-11.27059	381.84896	949.7725	0	184.84
26	195	236.33995	-10.86336	355.72154	911.8878	0	270.29
27	195	237.48245	- 10.41057 5	326.7678	840.20419	0	270
28	195	239.04735	-9.751181	284.67048	780.64058	0	270

29	195	240.61225	9.036497 5	239.00459	715.70912	0	270
30	195	242.17715	- 8.264211 5	189.73429	645.16826	0	270
31	195	243.74205	-7.43168	136.82419	568.63674	0	270
32	195	245.3352	- 6.518466 5	78.737527	600.88468	0	500
33	195	246.95665	- 5.518466 5	15.18609	505.55528	0	500
34	195	248.78115	-4.295931	-62.250085	571.82417	0	800

R33 Slope Stability Full Gap (Block) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

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File Information
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Created By: USACE St. Louis District Revision Number: 961 Last Edited By: Goltz, Amanda MVS Date: 2/22/2013 Time: 12:59:50 PM File Name: 17thReach33.gsz Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/22/2013

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Last Solved Time: 1:02:02 PM

Analysis Settings

Slope Stability Full Gap (Block) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant

Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 ° Materials

EMBANKMENT FILL, EL. +9.3 TO +6 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 750 psf Phi: 0° Phi-B: 0 °

MARSH 1, EL. -2.8/-4 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH -2.8 TO -9 Cohesion Fn: MARSH -2.8 to -9

Phi-B: 0 °

BEACH SAND, EL. -9 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Phi-B: 0°

Bay Sound, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion

EMBANKMENT FILL 2, EL. +6 TO +1

Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf

Cohesion: 325 psf Phi-B: 0° EMBANKMENT FILL 3, EL. +1 TO -2.8/-4 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 300 psf Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (57, -9) ft Right Coordinate: (310, -3.3) ft

Slip Surface Block

Left Grid Upper Left: (185, -4) ft Lower Left: (185, -25) ft Lower Right: (230, -25) ft X Increments: 8 Y Increments: 5 Starting Angle: 135 Ending Angle: 180 ° Angle Increments: 6 Right Grid Upper Left: (235, -4) ft Lower Left: (235, -25) ft Lower Right: (275, -25) ft X Increments: 8 Y Increments: 5 Starting Angle: 15 ° Ending Angle: 45 Angle Increments: 6

Cohesion Functions

MARSH -2.8 to -9 Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 285

Data Points: X (ft), Cohesion (psf) Data Point: (57, 285) Data Point: (160, 285) Data Point: (200, 300) Data Point: (257, 285) Data Point: (310, 285)

Unit Weight Functions

MARSH -2.8 TO -9

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 105 Data Points: X (ft), Unit Weight (pcf)
Data Point: (57, 105) Data Point: (160, 105) Data Point: (200, 106) Data Point: (257, 105) Data Point: (310, 105)

Spatial Functions

Bay Sound Cohesion Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf) Data Point: (160.5, -46, 750) Data Point: (160.5, -70, 985) Data Point: (200, -46, 825) Data Point: (200, -70, 1060) Data Point: (257.4, -46, 750) Data Point: (257.4, -70, 985) Data Point: (57, -46, 750) Data Point: (57, -70, 985) Data Point: (310, -46, 750) Data Point: (310, -70, 985)

Regions

	Points	Area (ft²)	Material
Region 1	11,33,15,17,14,34,13	2.775001	

Region 2	30,32,27,18,10,28	9361	BEACH SAND, EL9 TO -46
Region 3	30,28,29,31	6072	Bay Sound, EL46 TO -70
Region 4	14,17,36,22,5	60.543036	EMBANKMENT FILL, EL. +9.3 TO +6
Region 5	17,15,4,3,2,36	43.89	
Region 6	36,22,23,37	170.85955	EMBANKMENT FILL 2, EL. +6 TO +1
Region 7	36,37,24,2	120.85715	
Region 8	21,35,19	17.22	MARSH 1, EL2.8/-4 TO -9
Region 9	37,23,6,7,8,9,20,19,21	292.55241	EMBANKMENT FILL 3, EL. +1 TO -2.8/-
Region 10	21,25,38	63.212443	
Region 11	21,37,24,38	69.298993	
Region 12	26,25,21,35	24.15	
Region 13	27,16,1,12,26,35,19,20,10,18	858.59091	MARSH 1, EL2.8/-4 TO -9

Points

	X (ft)	Y (ft)
Point 1	151.1	-5.5
Point 2	181.9	6
Point 3	195	9.8
Point 4	199	9.8
Point 5	213.3	8.9
Point 6	247.7	0
Point 7	257.4	-1.9
Point 8	284.2	-3.1
Point 9	310	-3.3
Point 10	310	-9
Point 11	200	13.4
Point 12	158.1	-3.8
Point 13	200.5	13.4
Point 14	201	9.7
Point 15	200	9.8
Point 16	140.1	-8.4

Point 17	200	9.7
Point 18	257.4	-9
Point 19	257.4	-4
Point 20	310	-4
Point 21	200	-2.8
Point 22	224.50899	6
Point 23	243.83483	1
Point 24	169.75714	1
Point 25	160.5	-2.8
Point 26	159	-3.4
Point 27	127.06364	-9
Point 28	310	-46
Point 29	310	-70
Point 30	57	-46
Point 31	57	-70
Point 32	57	-9
Point 33	200	10
Point 34	200.95946	10
Point 35	200	-3.4
Point 36	200	6
Point 37	200	1
Point 38	168.29702	0.40063

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.69	(229.475, 3.768)	23.14844	(200, 9.7)	(257.567, - 1.90748)
2	6758	1.76	(229.475, 3.768)	23.671	(200, 9.7)	(258.413, - 1.94536)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
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1	Optimize d	200.25	1.8338495	254.85649	219.90385	0	325
2	Optimize d	200.72975	1.562962	221.92788	734.73099	0	325
3	Optimize d	200.97975	1.4217955	231.52474	748.55155	0	325
4	Optimize d	201.36335	1.205175	246.58379	767.29867	0	325
5	Optimize d	202.2976	0.67763	287.49337	818.6751	0	300
6	Optimize d	204.21115	-0.496285	330.52206	901.52958	0	300
7	Optimize d	206.2756	-1.7549895	352.94714	1030.2436	0	300
8	Optimize d	207.71925	-2.569309	375.59006	1100.2297	0	300
9	Optimize d	208.9033	-3.237183	394.86677	1158.463	0	297.66
10	Optimize d	209.68635	-3.6788885	411.89864	1196.77	0	297.45
11	Optimize d	210.8304	-4.274614	435.49957	1267.0745	0	297.15
12	Optimize d	212.4768	-5.104082	470.38358	1338.4047	0	296.72
13	Optimize d	213.48425	-5.611648	494.15058	1378.3193	0	296.45
14	Optimize d	214.72315	-6.1196825	516.78982	1433.1599	0	296.13
15	Optimize d	216.83245	-6.9500875	555.2127	1459.4956	0	295.57
16	Optimize d	218.93725	-7.589125	583.29375	1531.1112	0	295.02
17	Optimize d	221.03755	-8.036795	600.33714	1518.8176	0	294.46
18	Optimize d	223.29835	-8.3081965	606.06611	1547.6434	0	293.87
19	Optimize d	225.569	-8.3974115	600.56012	1493.812	0	293.27

20	Optimize d	227.5829	-8.46893	595.23279	1449.5472	0	292.74
21	Optimize d	229.49065	-8.52867	589.73157	1404.018	0	292.24
22	Optimize d	231.16625	-8.631305	588.01595	1345.0625	0	291.8
23	Optimize d	232.6098	-8.776835	590.08369	1321.3524	0	291.42
24	Optimize d	234.23735	-8.81367	584.51759	1329.4369	0	290.99
25	Optimize d	236.04885	-8.74181	571.33464	1272.1269	0	290.51
26	Optimize d	237.8604	-8.66995	558.09654	1214.817	0	290.04
27	Optimize d	239.85095	-8.59981	544.13927	1150.1974	0	289.51
28	Optimize d	242.02045	-8.53139	529.44277	1083.4872	0	288.94
29	Optimize d	243.47	-8.4153445	515.19715	1092.3233	0	288.56
30	Optimize d	244.7948	-8.118169	490.2895	1022.8615	0	288.21
31	Optimize d	246.7148	-7.6874895	454.12064	922.18639	0	287.71
32	Optimize d	247.6874	-7.4666185	435.5832	935.89265	0	287.45
33	Optimize d	248.8686	-6.9472225	397.34466	851.87249	0	287.14
34	Optimize d	251.2058	-5.919494	321.33022	685.92382	0	286.52
35	Optimize d	253.59745	-4.6758515	230.60944	534.68445	0	285.9
36	Optimize d	254.98985	-3.8450315	169.87333	415.54232	0	300
37	Optimize d	256.2796	-2.8894335	90.552969	317.44635	0	300
38	Optimize d	257.4835	-1.971178	5.3552787	184.32631	0	300

Slices of Slip Surface: 6758

	Slip				Base	Friction	Cohesiv
	Surfac	X (ft)	Y (ft)	PWP (psf)	Normal	al	e
	e	λ (ιι)	. ()	· • • (ps.)	Stress (psf)	Strengt	Strengt
						h (psf)	h (psf)
1	6758	200.25	2.48098	211.08502	232.30264	0	325
2	6758	200.72975	2.2040075	177.20291	672.50513	0	325
3	6758	200.97975	2.05967	186.61416	686.60391	0	325
4	6758	201.90755	1.5239835	223.12715	732.84715	0	325
5	6758	203.68195	0.49952098	279.00272	826.90782	0	300
6	6758	205.4157	-0.50143702	300.57705	913.07527	0	300
7	6758	207.14945	-1.502395	324.77886	999.24273	0	300
8	6758	208.88315	-2.503353	353.15668	1085.4102	0	300
9	6758	210.1893	-3.257466	381.68187	1151.1666	0	297.32
10	6758	211.9643	-4.2822705	424.87362	1240.2251	0	296.85
11	6758	214.20835	-5.5778675	487.24654	1334.7438	0	296.26
12	6758	216.025	-6.6267205	539.97081	1389.7562	0	295.78
13	6758	217.84165	-7.6755735	594.1252	1444.721	0	295.3
14	6758	219.70985	-8.2	616.98329	1652.738	0	294.81
15	6758	221.6295	-8.2	607.55456	1597.8846	0	294.31
16	6758	223.54915	-8.2	598.17791	1543.0313	0	293.8
17	6758	225.4753	-8.2	588.79718	1489.2496	0	293.3
18	6758	227.4079	-8.2	579.43148	1436.5223	0	292.79
19	6758	229.34045	-8.2	570.06578	1383.795	0	292.28
20	6758	231.273	-8.2	560.70008	1331.0676	0	291.77
21	6758	233.2056	-8.2	551.38612	1278.3403	0	291.26
22	6758	235.1382	-8.2	542.02042	1225.613	0	290.75
23	6758	237.0708	-8.2	532.70647	1172.9374	0	290.24
24	6758	239.0034	-8.2	523.39251	1120.21	0	289.74
25	6758	240.93595	-8.2	514.04234	1067.5345	0	289.23
26	6758	242.8685	-8.2	504.70251	1014.8071	0	288.72
27	6758	244.4174	-8.2	497.20642	972.56194	0	288.31
28	6758	246.35	-7.5704845	448.62241	990.2253	0	287.8
29	6758	248.76355	-6.445026	366.50997	801.40503	0	287.1
30	6758	250.89065	-5.4531395	293.77892	643.45891	0	286.63
31	6758	253.01775	-4.461253	220.27241	485.59802	0	286.05

32	6758	254.9288	-3.5701285	151.1048	349.03449	0	300
33	6758	256.58815	-2.796366	80.313821	226.14461	0	300
34	6758	257.90655	-2.181574	20.477794	137.0673	0	300

R33 Slope Stability Full Gap (Entry & Exit)

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File Information

Created By: USACE St. Louis District
Revision Number: 957
Last Edited By: Goltz, Amanda MVS
Date: 12/4/2012
Time: 8:55:17 AM
File Name: 17thReach33.gsz
Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case
_LWL_and_High_water_ analyses\High water cases\
Last Solved Date: 12/4/2012

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf View: 2D

Last Solved Time: 8:56:56 AM

Analysis Settings

Slope Stability Full Gap (Entry & Exit) Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer Settings PWP Conditions Source: Parent Analysis Slip Surface Direction of movement: Left to Right

Use Passive Mode: No
Slip Surface Option: Entry and Exit
Critical slip surfaces saved: 1
Optimize Critical Slip Surface Location: Yes

Tension Crack

1

Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 ° Phi-B: 0 ° EMBANKMENT FILL 2, EL. +6 TO +1

Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 325 psf Phi: 0 ° Phi-B: 0 °

EMBANKMENT FILL 3, EL. +1 TO -2.8/-4

Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 300 psf Phi: 0 ° Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (186.35998, -3.4) ft Left-Zone Right Coordinate: (200.98207, 9.83271) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (219.76835, 7.2265) ft Right-Zone Right Coordinate: (280.27205, -2.92412) ft Right-Zone Increment: 20 Radius Increment: 20

Slip Surface Limits

Left Coordinate: (57, -9) ft Right Coordinate: (310, -3.3) ft

Cohesion Functions

MARSH -2.8 to -9

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 285 Data Points: X (ft), Cohesion (psf) Data Point: (57, 285) Tension Crack Option: (none)
FOS Distribution

FOS Calculation Option: Constant Advanced

Number of Slices: 30

Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007

Starting Optimization Points: 8
Ending Optimization Points: 16
Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 °
Resisting Side Maximum Convex Angle: 1 °

Materials

EMBANKMENT FILL, EL. +9.3 TO +6

Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 750 psf Phi: 0 °

MARSH 1, EL. -2.8/-4 TO -9

Model: Spatial Mohr-Coulomb Weight Fn: MARSH -2.8 TO -9 Cohesion Fn: MARSH -2.8 to -9 Phi: 0 $^\circ$ Phi-B: 0 $^\circ$

BEACH SAND, EL. -9 TO -46

Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Phi-B: 0 °

Sheet Pile

Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Bay Sound, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf

> Data Point: (160, 285) Data Point: (200, 300)

Data Point: (310, 285)

Unit Weight Functions

MARSH -2.8 TO -9

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 105 Data Points: X (ft), Unit Weight (pcf)

Data Points: X (ft), Unit Weight (p Data Point: (57, 105) Data Point: (160, 105) Data Point: (200, 106) Data Point: (257, 105) Data Point: (310, 105)

Spatial Functions

Bay Sound Cohesion

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (160.5, -46, 750)
Data Point: (160.5, -70, 985)
Data Point: (200, -46, 825)
Data Point: (207, -70, 1060)
Data Point: (257.4, -46, 750)
Data Point: (557.4, -70, 985)
Data Point: (57, -70, 985)

Data Point: (57, -70, 985) Data Point: (310, -46, 750) Data Point: (310, -70, 985)

Regions

0.0			
	Material	Points	Area (ft²)
Region 1	Sheet Pile	11,33,15,17,14,34,13	2.775001
Region 2	BEACH SAND, EL9 TO -46	30,32,27,18,10,28	9361
Region 3	Bay Sound, EL46 TO -70	30,28,29,31	6072

Region 4	EMBANKMENT FILL, EL. +9.3 TO +6	14,17,36,22,5	60.543036
Region 5		17,15,4,3,2,36	43.89
Region 6	EMBANKMENT FILL 2, EL. +6 TO +1	36,22,23,37	170.85955
Region 7		36,37,24,2	120.85715
Region 8	MARSH 1, EL2.8/-4 TO -9	21,35,19	17.22
Region 9	EMBANKMENT FILL 3, EL. +1 TO -2.8/-	37,23,6,7,8,9,20,19,21	292.55241
Region 10		21,25,38	63.212443
Region 11		21,37,24,38	69.298993
Region 12		26,25,21,35	24.15
Region 13	MARSH 1, EL2.8/-4 TO -9	27,16,1,12,26,35,19,20,10,18	858.59091

Points

	X (ft)	Y (ft)
Point 1	151.1	-5.5
Point 2	181.9	6
Point 3	195	9.8
Point 4	199	9.8
Point 5	213.3	8.9
Point 6	247.7	0
Point 7	257.4	-1.9
Point 8	284.2	-3.1
Point 9	310	-3.3
Point 10	310	-9
Point 11	200	13.4
Point 12	158.1	-3.8
Point 13	200.5	13.4
Point 14	201	9.7
Point 15	200	9.8
Point 16	140.1	-8.4
Point 17	200	9.7
Point 18	257.4	-9

Point 19 257.4 -4 Point 20 310 -4 Point 21 200 -2.8 Point 22 224.50899 6 Point 23 243.83483 1 Point 24 169.75714 1 Point 25 160.5 -2.8 Point 26 159 -3.4 Point 27 127.06364 -9 Point 28 310 -46 Point 29 310 -70 Point 30 57 -46 Point 31 57 -70 Point 32 57 -9 Point 33 200 10 Point 35 200 3.4 Point 35 200 -3.4 Point 36 200 6 Point 37 200 1 Point 38 168.29702 0.40063			
Point 21 200 -2.8 Point 22 224.50899 6 Point 23 243.83483 1 Point 24 169.75714 1 Point 25 160.5 -2.8 Point 26 159 -3.4 Point 27 127.06364 -9 Point 28 310 -46 Point 29 310 -70 Point 30 57 -46 Point 31 57 -70 Point 31 57 -70 Point 32 57 -9 Point 33 200 10 Point 34 200.95946 10 Point 35 200 -3.4 Point 36 200 6 Point 37 200 1	Point 19	257.4	-4
Point 22 224.50899 6 Point 23 243.83483 1 Point 24 169.75714 1 Point 25 160.5 -2.8 Point 26 159 -3.4 Point 27 127.06364 -9 Point 28 310 -46 Point 29 310 -70 Point 30 57 -46 Point 31 57 -70 Point 32 57 -9 Point 33 200 10 Point 34 200.95946 10 Point 35 200 -3.4 Point 36 200 6 Point 37 200 1	Point 20	310	-4
Point 23 243.83483 1 Point 24 169.75714 1 Point 25 160.5 -2.8 Point 26 159 -3.4 Point 27 127.06364 -9 Point 28 310 -46 Point 29 310 -70 Point 30 57 -46 Point 31 57 -70 Point 32 57 -9 Point 33 200 10 Point 34 200.95946 10 Point 35 200 -3.4 Point 36 200 6 Point 37 200 1	Point 21	200	-2.8
Point 24 169.75714 1 Point 25 160.5 -2.8 Point 26 159 -3.4 Point 27 127.06364 -9 Point 28 310 -46 Point 29 310 -70 Point 30 57 -46 Point 31 57 -70 Point 32 57 -9 Point 33 200 10 Point 34 200.95946 10 Point 35 200 -3.4 Point 37 200 1	Point 22	224.50899	6
Point 25 160.5 -2.8 Point 26 159 -3.4 Point 27 127.06364 -9 Point 28 310 -46 Point 29 310 -70 Point 30 57 -46 Point 31 57 -70 Point 32 57 -9 Point 33 200 10 Point 34 200.95946 10 Point 35 200 -3.4 Point 36 200 6 Point 37 200 1	Point 23	243.83483	1
Point 26 159 -3.4 Point 27 127.06364 -9 Point 28 310 -46 Point 29 310 -70 Point 30 57 -46 Point 31 57 -70 Point 32 57 -9 Point 33 200 10 Point 34 200.95946 10 Point 35 200 -3.4 Point 36 200 6 Point 37 200 1	Point 24	169.75714	1
Point 27 127.06364 -9 Point 28 310 -46 Point 29 310 -70 Point 30 57 -46 Point 31 57 -70 Point 32 57 -9 Point 33 200 10 Point 34 200.95946 10 Point 35 200 -3.4 Point 36 200 6 Point 37 200 1	Point 25	160.5	-2.8
Point 28 310 -46 Point 29 310 -70 Point 30 57 -46 Point 31 57 -70 Point 32 57 -9 Point 33 200 10 Point 34 200.95946 10 Point 35 200 -3.4 Point 36 200 6 Point 37 200 1	Point 26	159	-3.4
Point 29 310 -70 Point 30 57 -46 Point 31 57 -70 Point 32 57 -9 Point 33 200 10 Point 34 200.95946 10 Point 35 200 -3.4 Point 36 200 6 Point 37 200 1	Point 27	127.06364	-9
Point 30 57 -46 Point 31 57 -70 Point 32 57 -9 Point 33 200 10 Point 34 200,95946 10 Point 35 200 -3.4 Point 36 200 6 Point 37 200 1	Point 28	310	-46
Point 31 57 -70 Point 32 57 -9 Point 33 200 10 Point 34 200.95946 10 Point 35 200 -3.4 Point 36 200 6 Point 37 200 1	Point 29	310	-70
Point 32 57 -9 Point 33 200 10 Point 34 200.95946 10 Point 35 200 -3.4 Point 36 200 6 Point 37 200 1	Point 30	57	-46
Point 33 200 10 Point 34 200.95946 10 Point 35 200 -3.4 Point 36 200 6 Point 37 200 1	Point 31	57	-70
Point 34 200.95946 10 Point 35 200 -3.4 Point 36 200 6 Point 37 200 1	Point 32	57	-9
Point 35 200 -3.4 Point 36 200 6 Point 37 200 1	Point 33	200	10
Point 36 200 6 Point 37 200 1	Point 34	200.95946	10
Point 37 200 1	Point 35	200	-3.4
	Point 36	200	6
Point 38 168.29702 0.40063	Point 37	200	1
	Point 38	168.29702	0.40063

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	1.67	(232.339, 44.642)	23.40885	(200, 13.4)	(257.643, - 1.91088)
2	5131	1.71	(232.339, 44.642)	53.552	(200, 13.4)	(258.723, - 1.95924)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	1.7306865	504.37217	225.5285	0	325

2	Optimize d	200.72975	1.444876	500.41014	738.47096	0	325
3	Optimize d	200.97975	1.295933	498.09883	752.83808	0	325
4	Optimize d	201.23825	1.1419285	495.47547	766.28394	0	325
5	Optimize d	202.4394	0.426315	468.87895	834.66787	0	300
6	Optimize d	204.2246	-0.684125	428.18948	915.54491	0	300
7	Optimize d	205.8692	-1.757635	404.10048	1008.7746	0	300
8	Optimize d	207.2718	-2.6292725	405.83271	1106.3755	0	300
9	Optimize d	208.3091	-3.2278935	415.20222	1158.8251	0	297.81
10	Optimize d	209.562	-3.950941	437.53822	1221.7683	0	297.48
11	Optimize d	211.0934	-4.7819145	469.09905	1316.6469	0	297.08
12	Optimize d	212.56445	-5.525243	499.44121	1380.656	0	296.69
13	Optimize d	214.1744	-6.3387435	536.44219	1433.1494	0	296.27
14	Optimize d	216.35555	-7.267375	578.53438	1513.1175	0	295.7
15	Optimize d	218.49565	-7.965305	609.28266	1568.0479	0	295.13
16	Optimize d	220.1624	-8.387575	626.6143	1565.1399	0	294.69
17	Optimize d	221.76925	-8.69049	637.28826	1601.2448	0	294.27
18	Optimize d	223.3162	-8.87405	641.05	1576.7871	0	293.86
19	Optimize d	224.29935	-8.969209	642.16403	1597.2316	0	293.61
20	Optimize d	225.3027	-8.985379	638.3035	1571.3201	0	293.34

21	Optimize d	227.04385	-8.9980805	630.69191	1531.2129	0	292.88
22	Optimize d	228.93875	-8.997902	621.56216	1479.4953	0	292.38
23	Optimize d	230.83365	-8.9977235	612.37963	1427.7776	0	291.89
24	Optimize d	232.72855	-8.997545	603.24988	1376.0071	0	291.39
25	Optimize d	234.62345	-8.9973665	594.12012	1324.2894	0	290.89
26	Optimize d	236.51835	-8.997188	584.93759	1272.5717	0	290.39
27	Optimize d	238.4133	-8.9970095	575.80784	1220.854	0	289.89
28	Optimize d	240.3301	-8.973315	565.07693	1173.8315	0	289.39
29	Optimize d	242.5671	-8.8023015	543.65605	1123.6681	0	288.8
30	Optimize d	243.9888	-8.6369865	526.50234	1066.6147	0	288.42
31	Optimize d	244.9056	-8.42379	508.8107	1062.0464	0	288.18
32	Optimize d	246.4312	-8.03321	477.07948	976.51115	0	287.78
33	Optimize d	247.447	-7.7323975	453.3821	964.16426	0	287.51
34	Optimize d	248.58525	-7.2576565	418.16536	884.77907	0	287.21
35	Optimize d	250.35575	-6.519219	363.14882	764.10131	0	286.75
36	Optimize d	252.1785	-5.6062045	296.65355	667.01144	0	286.27
37	Optimize d	254.11055	-4.4855295	215.85134	496.77032	0	285.76
38	Optimize d	256.25255	-3.005416	99.495384	337.69676	0	300
39	Optimize d	257.5215	-2.006532	8.0258815	194.33089	0	300

Slices of Slip Surface: 5131

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	5131	200.25	1.7697185	501.98618	212.84496	0	325
2	5131	200.72975	1.4146205	502.2236	709.097	0	325
3	5131	200.97975	1.2319955	501.86728	728.77632	0	325
4	5131	201.1517	1.1086765	501.3358	741.19246	0	325
5	5131	202.3882	0.2678055	477.23233	832.71158	0	300
6	5131	204.55785	-1.1229045	429.92875	971.67364	0	300
7	5131	206.7275	-2.372372	406.68982	1097.2692	0	300
8	5131	208.3403	-3.228012	414.65182	1184.3567	0	297.81
9	5131	209.97625	-4.002025	435.9974	1263.4617	0	297.37
10	5131	212.1921	-4.9613325	468.92607	1361.8717	0	296.79
11	5131	214.2341	-5.7469245	500.71836	1423.6648	0	296.25
12	5131	216.10225	-6.379779	526.81137	1450.6696	0	295.76
13	5131	217.9704	-6.9372255	549.68458	1469.6585	0	295.2
14	5131	219.8386	-7.4216905	569.36772	1480.8557	0	294.7
15	5131	221.70675	-7.8351975	585.16778	1484.4816	0	294.2
16	5131	223.5749	-8.179415	597.08444	1480.6448	0	293.8
17	5131	225.4753	-8.4592815	605.03146	1470.3958	0	293.3
18	5131	227.4079	-8.6735385	608.8629	1453.5011	0	292.7
19	5131	229.34045	-8.8170955	608.43523	1428.8438	0	292.2
20	5131	231.273	-8.890522	603.63162	1396.5577	0	291.7
21	5131	233.2056	-8.8941075	594.5147	1356.5034	0	291.2
22	5131	235.1382	-8.827866	581.11926	1308.7327	0	290.7
23	5131	237.0708	-8.691537	563.29941	1253.0822	0	290.2
24	5131	239.0034	-8.4845805	541.09087	1189.486	0	289.74
25	5131	240.93595	-8.206165	514.45641	1117.7284	0	289.2
26	5131	242.8685	-7.855152	483.27918	1037.7073	0	288.7
27	5131	244.8011	-7.430071	447.44716	949.14255	0	288.2
28	5131	246.7337	-6.9290885	406.7811	851.69901	0	287.7
29	5131	248.5872	-6.3768135	363.17465	755.92694	0	287.2
30	5131	250.3616	-5.777119	316.75476	662.24076	0	286.7
31	5131	252.136	-5.1069245	265.58107	560.18185	0	286.2

32	5131	253.93855	-4.35032	208.2796	447.42877	0	285.81
33	5131	256.12695	-3.3152945	123.66655	302.22095	0	300
34	5131	258.06145	-2.3215265	30.95622	170.656	0	300

R34 Slope Stability Full Gap Entry & Exit

File Information

Created By: USACE St. Louis District Revision Number: 787 Last Edited By: Goltz, Amanda MVS Date: 5/30/2013 Time: 7:57:53 AM File Name: 17thReach34.gsz

Directory: Z-\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_Hlgh_water_analyses\High water cases\ Last Solved Date: 5/30/2013

Last Solved Time: 7:58:20 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Full Gap (Entry & Exit) Kind: SLOPE/W Parent: Seepage Analysis (Full Gap) Method: Spencer Settings PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant

Phi: 0° Phi-B: 0 ° Bay Sound, El. -46 to -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi-B: 0° EMBANKMENT FILL EL. +2.0 TO -2.3 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 650 psf Phi-B: 0 °

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (180, -3.4) ft Left-Zone Right Coordinate: (205, 9.50328) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (215, 8.70979) ft Right-Zone Right Coordinate: (310, -2.3) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (42, -8.4) ft Right Coordinate: (310, -2.3) ft

Cohesion Functions

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 650 Data Points: X (ft), Cohesion (psf) Data Point: (180.5, 650) Data Point: (200, 300)

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007
Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 ° Materials

EMBANKMENT FILL, EL. +9.9 TO +6.0 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: FILL 1 Phi: 0 Phi-B: 0 ° MARSH 1, EL. -2.8 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: MARSH 1 Phi: 0 Phi-B: 0 ° BEACH SAND, EL. -13/-15 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi-B: 0 ° MARSH 2. EL. -7 TO -13/-15 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Fn: MARSH 2 Phi-B: 0 ° EMBANKMENT FILL 2, EL. +6 TO -2.8

Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: FILL 2

Data Point: (234, 650)

Function: Cohesion vs. X

MARSH 2 Model: Spline Data Point Function

Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 330 Data Points: X (ft), Cohesion (psf) Data Point: (42, 330) Data Point: (156.8, 330) Data Point: (200, 350) Data Point: (248, 330) Data Point: (310, 330)

MARSH 1

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 215 Data Points: X (ft), Cohesion (psf) Data Point: (42, 215) Data Point: (156.8, 215) Data Point: (200, 230) Data Point: (248, 215) Data Point: (310, 215)

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 650 Data Points: X (ft), Cohesion (psf) Data Point: (156.8, 650) Data Point: (200, 700) Data Point: (248, 650)

Spatial Functions

Bay Sound Cohesion Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (156.8, -46, 780) Data Point: (156.8, -70, 1015)
Data Point: (200, -46, 800)
Data Point: (200, -70, 1035)
Data Point: (204, -46, 780)
Data Point: (248, -46, 780)
Data Point: (42, -46, 780)
Data Point: (42, -46, 780)
Data Point: (310, -46, 780)
Data Point: (310, -70, 1015)

Regions

gions			
	Points	Area (ft²)	Material
Region 1	17,18,47,19,20,21,46,8	2.7706535	
Region 2	24,16,36,31,15,14,27,25,35	8752.8	BEACH SAND, EL13/-15 TO -46
Region 3	12,43,26,28,13	285.275	MARSH 1, EL2.8 TO -7
Region 4	30,37,38,34,29,26,43	363.12	MARSH 1, EL2.8 TO -7
Region 5	20,21,7,6,39,32	46.120367	
Region 6	42,41,38,34	31.90707	MARSH 1, EL2.8 TO -7
Region 7	41,38,40	0.731952	MARSH 1, EL2.8 TO -7
Region 8	40,38,37,30	25.92	
Region 9	10,11,12,43	107.85	EMBANKMENT FILL EL. +2.0 TO -2.3
Region 10	16,36,31,15,44,45	6432	Bay Sound, El46 to -70
Region 11	24,1,22,23,2,3,42,34,29,26,28,14,27,25,35	1596.2586	MARSH 2, EL7 TO -13/- 15
Region 12	40,4,5,39,32,30	274.51963	
Region 13	32,33,10,43,30	375.4	EMBANKMENT FILL 2, EL. +6 TO -2.8
Region	32,20,19,9,33	67.345	EMBANKMENT FILL, EL.

Point 32	200	6
Point 33	227.5	6
Point 34	156.8	-7
Point 35	156.8	-13
Point 36	156.8	-46
Point 37	200	-3.4
Point 38	156.8	-3.4
Point 39	181.14853	6
Point 40	156.8	-2.8
Point 41	154.36016	-3.4
Point 42	141.51369	-7
Point 43	248	-2.55
Point 44	310	-70
Point 45	42	-70
Point 46	200	10
Point 47	200.95711	10

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.08	(239.486, 47.362)	31.52203	(200, 9.7)	(278.16, - 0.784026)
2	6014	2.11	(239.486, 47.362)	60.618	(200, 9.7)	(276.515, - 0.632144)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	1.6259365	192.60808	390.2888	0	302.57
2	Optimize d	200.72855	1.2158985	154.96344	741.9825	0	307.5
3	Optimize d	200.97855	1.0016924	169.82114	762.52731	0	310.07
4	Optimize	202.50325	-0.3046961	233.99485	880.41692	0	325.77

14 +9.9 TO +6.0

Points

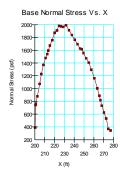
	X (ft)	Y (ft)
Point 1	42	-8.4
Point 2	132.9	-7.9
Point 3	140.8	-7.2
Point 4	165.8	-0.3
Point 5	170.7	3.1
Point 6	195.2	9.9
Point 7	199	9.9
Point 8	200	10.4
Point 9	213.2	9.1
Point 10	248	2
Point 11	280.5	-1
Point 12	297	-2.3
Point 13	310	-2.3
Point 14	310	-13
Point 15	310	-46
Point 16	42	-46
Point 17	200	13.4
Point 18	200.5	13.4
Point 19	201	9.7
Point 20	200	9.7
Point 21	200	9.9
Point 22	61.3	-8.2
Point 23	97.4	-8
Point 24	42	-13
Point 25	200	-15
Point 26	248	-7
Point 27	248	-13
Point 28	310	-7
Point 29	200	-7
Point 30	200	-2.8
Point 31	248	-46

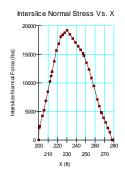
	d						
5	Optimize d	204.79535	-2.181813	251.04503	1074.9641	0	349.36
6	Optimize d	206.5949	-3.525688	239.22227	1228.2973	0	227.94
7	Optimize d	208.7033	-4.960345	254.82808	1370.1346	0	227.28
8	Optimize d	210.89875	-6.320115	289.10177	1479.6044	0	226.59
9	Optimize d	212.59825	-7.372698	322.12992	1540.3634	0	344.75
10	Optimize d	213.66185	-8.031448	345.62386	1594.9888	0	344.31
11	Optimize d	215.3046	-8.9708775	381.26168	1674.2393	0	343.62
12	Optimize d	217.6664	-10.277632	440.46449	1756.9676	0	342.64
13	Optimize d	220.02725	-11.356485	493.02046	1874.2192	0	341.66
14	Optimize d	222.38715	-12.20743	536.78958	1910.2948	0	340.67
15	Optimize d	224.5503	-12.79814	568.44197	1983.9051	0	339.77
16	Optimize d	226.51675	-13.128625	586.29511	1974.0257	0	338.95
17	Optimize d	228.81705	-13.51521	607.96544	1965.4517	0	337.99
18	Optimize d	231.6434	-13.67543	616.23168	1990.3982	0	336.82
19	Optimize d	234.66205	-13.553185	607.36075	1913.6382	0	335.56
20	Optimize d	237.62455	-13.43167	598.5811	1838.4402	0	334.32
21	Optimize d	240.5309	-13.31089	589.84922	1764.1848	0	333.11
22	Optimize d	243.2705	-13.191345	581.32537	1694.8981	0	331.97
23	Optimize	245.8433	-13.07303	572.93863	1627.9207	0	330.9

	d						
24	Optimize d	247.56485	-12.931835	563.45458	1617.6286	0	330.18
25	Optimize d	249.3708	-12.591395	541.56412	1557.1985	0	330
26	Optimize d	252.1124	-12.07458	508.26522	1472.8221	0	330
27	Optimize d	254.75715	-11.431805	467.12713	1406.8673	0	330
28	Optimize d	257.3051	-10.66308	418.16746	1295.7968	0	330
29	Optimize d	260.4729	-9.529135	346.13705	1162.3086	0	330
30	Optimize d	263.4051	-8.3569575	271.81568	1004.1842	0	330
31	Optimize d	265.4819	-7.5117725	218.2348	888.45063	0	330
32	Optimize d	266.6353	-7.04459	188.61935	819.98187	0	330
33	Optimize d	267.88575	-6.5596475	157.85528	733.17371	0	215
34	Optimize d	270.15665	-5.6789425	101.9825	625.32023	0	215
35	Optimize d	272.38285	-4.5311685	29.467068	531.59719	0	215
36	Optimize d	274.5643	-3.116325	-59.69411	369.86042	0	215
37	Optimize d	276.90765	-1.5964642	-155.44161	345.00161	0	650

Slices of Slip Surface: 6014

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Friction al Strengt h (psf)	Cohesiv e Strengt h (psf)
1	6014	200.25	1.1558526	229.54574	405.04754	0	302.57
2	6014	200.72855	0.75350605	193.55589	794.9803	0	307.5
3	6014	200.97855	0.54580965	208.12175	816.74914	0	310.07





4	6014	202.10245	-0.33590375	254.1662	904.16688	0	321.64
5	6014	204.3074	-1.985901	264.27968	1068.855	0	344.34
6	6014	206.6191	-3.5524145	239.8534	1251.7413	0	227.93
7	6014	209.0375	-5.0356865	250.3694	1384.2159	0	227.18
8	6014	211.4559	-6.369184	282.66789	1503.4879	0	226.42
9	6014	212.93255	-7.1303155	306.07736	1551.4967	0	344.61
10	6014	214.39165	-7.8027215	326.15271	1602.5396	0	344
11	6014	216.775	-8.826479	364.29569	1670.3499	0	343.01
12	6014	219.15835	-9.732423	403.57534	1725.5711	0	342.02
13	6014	221.54165	-10.5261	441.44493	1768.6652	0	341.02
14	6014	223.925	-11.212085	475.91144	1800.1586	0	340.03
15	6014	226.30835	-11.794125	506.89034	1820.333	0	339.04
16	6014	228.78125	-12.28951	534.06365	1832.3868	0	338.01
17	6014	231.34375	-12.69315	556.5857	1835.7699	0	336.94
18	6014	233.90625	-12.985325	572.89299	1826.9003	0	335.87
19	6014	236.46875	-13.16766	582.808	1805.9915	0	334.8
20	6014	239.03125	-13.24114	586.20792	1773.0624	0	333.74
21	6014	241.59375	-13.206165	582.94472	1728.0858	0	332.67
22	6014	244.15625	-13.06255	572.96423	1671.0354	0	331.6
23	6014	246.71875	-12.80951	556.19141	1601.7383	0	330.53
24	6014	249.30765	-12.44074	532.20511	1533.6412	0	330
25	6014	251.9229	-11.951795	500.68672	1466.3583	0	330
26	6014	254.53815	-11.34232	461.65374	1385.665	0	330
27	6014	257.1534	-10.60851	414.81073	1290.9937	0	330
28	6014	259.76865	-9.74556	359.92376	1181.7419	0	330
29	6014	262.3839	-8.7474905	296.59239	1057.1571	0	330
30	6014	264.99915	-7.6069255	224.37005	916.23	0	330
31	6014	267.60205	-6.321615	143.11664	734.90388	0	215
32	6014	270.1926	-4.881924	52.238602	578.12894	0	215
33	6014	272.78315	-3.2687825	-49.462304	403.50997	0	215
34	6014	275.29665	-1.5245453	-159.27763	380.00027	0	650

R34 Slope Stability Full Gap Block

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File Information
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Created By: USACE St. Louis District Revision Number: 790 Last Edited By: Goltz, Amanda MVS Date: 5/31/2013 Time: 1:08:38 PM File Name: 17thReach34.gsz Directory: Z:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case LWL and HIgh water analyses\High water cases\

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Full Gap (block) Kind: SLOPE/W Parent: Seepage Analysis (Full Gap) Method: Spencer PWP Conditions Source: Parent Analysis Slip Surface
Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Block Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant Restrict Block Crossing: Yes

Phi-B: 0 °

Bay Sound, El. -46 to -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi-B: 0 ° EMBANKMENT FILL EL. +2.0 TO -2.3 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 650 psf Phi-B: 0 °

Slip Surface Limits

Left Coordinate: (42, -8.4) ft Right Coordinate: (310, -2.3) ft

Slip Surface Block

Left Grid Upper Left: (175, 7.22983) ft Lower Left: (175, -27.7702) ft Lower Right: (225, -27.7702) ft X Increments: 10 Y Increments: 10 Starting Angle: 135 ° Ending Angle: 180° Angle Increments: 5 Right Grid Upper Left: (230.015, 7.22983) ft Lower Left: (230.015, -27,7702) ft Lower Right: (290, -27.7702) ft X Increments: 10 Y Increments: 10 Starting Angle: 20 ° Ending Angle: 45 ° Angle Increments: 5

Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1
Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 $^{\circ}$

Materials

EMBANKMENT FILL, EL. +9.9 TO +6.0 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: FILL 1 Phi: 0 ° Phi-B: 0 ° MARSH 1, EL. -2.8 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Phi-B: 0° BEACH SAND, EL. -13/-15 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Phi: 30 ⁴ Phi-B: 0 ° MARSH 2, EL. -7 TO -13/-15 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Fn: MARSH 2 Phi: 0 Phi-B: 0° EMBANKMENT FILL 2, EL. +6 TO -2.8 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: FILL 2

Cohesion Functions

```
FILL 2
     Model: Spline Data Point Function
     Function: Cohesion vs. X
           Curve Fit to Data: 100 %
           Segment Curvature: 0 %
      Y-Intercept: 650
     Data Points: X (ft), Cohesion (psf)
           Data Point: (180.5, 650)
           Data Point: (200, 300)
           Data Point: (234, 650)
MARSH 2
     Model: Spline Data Point Function
     Function: Cohesion vs. X
Curve Fit to Data: 100 %
           Segment Curvature: 0 %
      Y-Intercept: 330
     Data Points: X (ft), Cohesion (psf)
           Data Point: (42, 330)
           Data Point: (156.8, 330)
           Data Point: (200, 350)
           Data Point: (248, 330)
           Data Point: (310, 330)
MARSH 1
     Model: Spline Data Point Function
     Function: Cohesion vs. X
Curve Fit to Data: 100 %
           Segment Curvature: 0 %
     Y-Intercept: 215
     Data Points: X (ft), Cohesion (psf)
           Data Point: (42, 215)
Data Point: (156.8, 215)
           Data Point: (200, 230)
           Data Point: (248, 215)
           Data Point: (310, 215)
FILL 1
     Model: Spline Data Point Function
     Function: Cohesion vs. X
Curve Fit to Data: 100 %
           Segment Curvature: 0 %
     Y-Intercept: 650
Data Points: X (ft), Cohesion (psf)
```

Data Point: (156.8, 650)

Data Point: (200, 700) Data Point: (248, 650)

Spatial Functions

Bay Sound Cohesion

y Sound Cohesion
Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (156.8, -46, 780)
Data Point: (156.8, -70, 1015)
Data Point: (200, -46, 800)
Data Point: (200, -70, 1035)
Data Point: (200, -70, 1035)
Data Point: (248, -70, 1015)
Data Point: (42, -46, 780)
Data Point: (42, -46, 780)
Data Point: (310, -46, 780)
Data Point: (310, -46, 780)
Data Point: (310, -70, 1015)

Regions

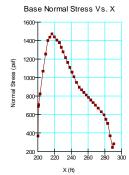
	Points	Area (ft²)	Material
Region 1	17,18,47,19,20,21,46,8	2.7706535	
Region 2	24,16,36,31,15,14,27,25,35	8752.8	BEACH SAND, EL13/-15 TO -46
Region 3	12,43,26,28,13	285.275	MARSH 1, EL2.8 TO -7
Region 4	30,37,38,34,29,26,43	363.12	MARSH 1, EL2.8 TO -7
Region 5	20,21,7,6,39,32	46.120367	
Region 6	42,41,38,34	31.90707	MARSH 1, EL2.8 TO -7
Region 7	41,38,40	0.731952	MARSH 1, EL2.8 TO -7
Region 8	40,38,37,30	25.92	
Region 9	10,11,12,43	107.85	EMBANKMENT FILL EL. +2.0 TO -2.3

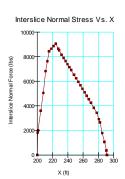
Point 24	42	-13
Point 25	200	-15
Point 26	248	-7
Point 27	248	-13
Point 28	310	-7
Point 29	200	-7
Point 30	200	-2.8
Point 31	248	-46
Point 32	200	6
Point 33	227.5	6
Point 34	156.8	-7
Point 35	156.8	-13
Point 36	156.8	-46
Point 37	200	-3.4
Point 38	156.8	-3.4
Point 39	181.14853	6
Point 40	156.8	-2.8
Point 41	154.36016	-3.4
Point 42	141.51369	-7
Point 43	248	-2.55
Point 44	310	-70
Point 45	42	-70
Point 46	200	10
Point 47	200.95711	10

Region 10	16,36,31,15,44,45	6432	Bay Sound, El46 to -70
Region 11	24,1,22,23,2,3,42,34,29,26,28,14,27,25,35	1596.2586	MARSH 2, EL7 TO -13/- 15
Region 12	40,4,5,39,32,30	274.51963	
Region 13	32,33,10,43,30	375.4	EMBANKMENT FILL 2, EL. +6 TO -2.8
Region 14	32,20,19,9,33	67.345	EMBANKMENT FILL, EL. +9.9 TO +6.0

Points

	X (ft)	Y (ft)
Point 1	42	-8.4
Point 2	132.9	-7.9
Point 3	140.8	-7.2
Point 4	165.8	-0.3
Point 5	170.7	3.1
Point 6	195.2	9.9
Point 7	199	9.9
Point 8	200	10.4
Point 9	213.2	9.1
Point 10	248	2
Point 11	280.5	-1
Point 12	297	-2.3
Point 13	310	-2.3
Point 14	310	-13
Point 15	310	-46
Point 16	42	-46
Point 17	200	13.4
Point 18	200.5	13.4
Point 19	201	9.7
Point 20	200	9.7
Point 21	200	9.9
Point 22	61.3	-8.2
Point 23	97.4	-8





R35 Slope Stability Gap Block Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

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File Information
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Created By: USACE St. Louis District Revision Number: 717 Last Edited By: Goltz, Amanda MVS Date: 2/25/2013 Time: 12:46:54 PM File Name: 17thReach35.gsz Directory: Y\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case
_LWL_and_HIgh_water_analyses\High water cases\
Last Solved Date: 2/25/2013 Last Solved Time: 12:51:56 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

```
Slope Stability Gap Block
    Kind: SLOPE/W
     Parent: Seepage Analysis (Gap)
     Method: Spencer
          PWP Conditions Source: Parent Analysis
          Direction of movement: Left to Right
          Use Passive Mode: No
          Slip Surface Option: Block
          Critical slip surfaces saved: 1
          Optimize Critical Slip Surface Location: Yes
          Tension Crack
               Tension Crack Option: (none)
    FOS Distribution
          FOS Calculation Option: Constant
```

Restrict Block Crossing: Yes Advanced Number of Slices: 30 Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000
Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: Driving Side Maximum Convex Angle: 5 Resisting Side Maximum Convex Angle: 1 ° Materials EMBANKMENT FILL, EL. +8.5 TO +5.5 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 700 psf Phi-B: 0 ° EMBANKMENT FILL 3, EL. -1 TO -4 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Embankment Fill 3

Phi-B: 0 ° BEACH SAND, EL. -20 TO -44

Model: Shear/Normal Fn Unit Weight: 122 pcf Strength Function: Sand

Phi-B: 0 °

BAY SOUND CLAY, EL. -44 TO -70

Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi-B: 0 °

MARSH1, EL. -4 TO -20 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Spatial Fn: Marsh 1

Phi: 0° Phi-B: 0 ° EMBANKMENT FILL2, EL. +5.5 TO -1 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Fn: FILL 2 Phi: 0 ° Phi-B: 0°

Slip Surface Limits

Left Coordinate: (42, -9.2) ft Right Coordinate: (310, -2.1) ft

Slip Surface Block

Left Grid Upper Left: (196, 3) ft Lower Left: (196, -27) ft Lower Right: (226, -27) ft X Increments: 10 Y Increments: 10 Starting Angle: 135 ° Ending Angle: 180 ° Angle Increments: 5 Right Grid Upper Left: (231, 3) ft Lower Left: (231, -27) ft Lower Right: (301, -27) ft X Increments: 15 Y Increments: 10 Starting Angle: 0 Ending Angle: 45 Angle Increments: 5

Cohesion Functions

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 425 Data Points: X (ft), Cohesion (psf)

Data Point: (180.5, 425) Data Point: (200, 400) Data Point: (234, 425)

Shear/Normal Strength Functions

Sand

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0
Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0)

Data Point: (0, 0) Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf Num. Points: 20

Unit Weight Functions

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 105 Data Points: X (ft), Unit Weight (pcf)
Data Point: (160, 105) Data Point: (200, 106) Data Point: (291.3, 105)

Spatial Functions

Bay Sound Cohesion Model: Linear Interpolation Limit Range By: Data Values Data Points: X (ft), Y (ft), Cohesion (psf)

Data Point: (154.7, -44, 700)
Data Point: (154.7, -70, 970)
Data Point: (200, -44, 735)
Data Point: (200, -70, 1010)
Data Point: (291.3, -44, 700)
Data Point: (291.3, -70, 970)
Data Point: (42, -44, 700)
Data Point: (42, -44, 700)
Data Point: (310, -44, 700)
Data Point: (310, -44, 700)
Data Point: (310, -70, 970) Data Point: (310, -70, 970)

Marsh 1

arsh 1

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (154.7, -4, 400)
Data Point: (200, -4, 450)
Data Point: (200, -20, 450)
Data Point: (201.3, -4, 400)
Data Point: (291.3, -4, 400)
Data Point: (291.3, -20, 400)
Data Point: (310, -4, 400)
Data Point: (310, -4, 400)

Embankment Fill 3

hbankment Fill 3

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (154.7, -4, 425)
Data Point: (104.7, -4, 425)
Data Point: (200, -1, 400)
Data Point: (200, -4, 400)
Data Point: (291.3, -2.1, 425)
Data Point: (291.3, -4, 425)
Data Point: (310, -2.1, 425)
Data Point: (310, -2.1, 425)
Data Point: (310, -4, 425)
Data Point: (310, -4, 425)
Data Point: (142.99231, -4, 425)

Regions

	Points	Area (ft²)	Material
Regio n 1	21,22,58,23,25,9,57	3.900006	
Regio n 2	25,23,10,40,36	44.558481	EMBANKMEN T FILL, EL. +8.5 TO +5.5

Point 10	214	7.6
Point 11	237.8	3
Point 12	261.9	0.3
Point 13	263.5	-0.6
Point 14	281.7	-1.3
Point 15	291.3	-2.1
Point 16	310	-2.1
Point 17	310	-20
Point 18	310	-44
Point 19	90.9	-44
Point 20	90.9	-20
Point 21	200	13.3
Point 22	200.5	13.3
Point 23	201	8.1
Point 24	194.9	8.5
Point 25	200	8.1
Point 26	110.2	-8.5
Point 27	90.9	-70
Point 28	291.3	-70
Point 29	310	-70
Point 30	291.3	-44
Point 31	291.3	-4
Point 32	291.3	-20
Point 33	310	-4
Point 34	200	-4.5
Point 35	200	-1
Point 36	200	5.5
Point 37	200	-4
Point 38	200	-20
Point 39	273.9	-1
Point 40	224.86522	5.5
Point 41	154.7	-4
Point 42	154.7	-4.5
Point 43	154.7	-20
Point 44	154.7	-44
Point 45	154.7	-70

Regio n 3	36,35,39,13,12,11,40	296.83653	EMBANKMEN T FILL2, EL. +5.5 TO -1
Regio n 4	25,9,8,24,7,46,36	39.338512	
Regio n 5	46,6,5,47,48,35,36	229.03649	
Regio n 6	48,41,37,35	135.9	
Regio n 7	41,42,34,37	22.65	
Regio n 8	48,51,49,41	17.026922	
Regio n 9	49,50,42,41	6.4307675	
Regio n 10	55,27,45,28,29,18,30,44,19,54	6968	BAY SOUND CLAY, EL44 TO -70
Regio n 11	54,19,44,30,18,17,32,38,43,20,53	6432	BEACH SAND, EL20 TO -44
Regio n 12	53,20,43,38,32,17,56,33,31,59,37,34,42,50,4,3,2,26,1, 52	3821.1173	MARSH1, EL 4 TO -20
Regio n 13	59,31,33,16,15,14,39,35,37	301.54	EMBANKMEN T FILL 3, EL1 TO -4

Points

5

	X (ft)	Y (ft)
Point 1	90.9	-9.2
Point 2	124	-7.3
Point 3	130	-6.7
Point 4	133.3	-6.1
Point 5	161.6	1.5
Point 6	166.4	3.3
Point 7	187	7
Point 8	199	8.5
Point 9	200	8.5

6

Point 46	178.64865	5.5
Point 47	157.3	-0.3
Point 48	154.7	-1
Point 49	142.99231	-4
Point 50	140.68462	-4.5
Point 51	145.3	-3.5
Point 52	42	-9.2
Point 53	42	-20
Point 54	42	-44
Point 55	42	-70
Point 56	310	-4.1
Point 57	200	10
Point 58	200.81731	10
Point 59	250	-4

Critical Slip Surfaces

	Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)
1	Optimized	2.68	(247.441, -1.087)	36.59366	(200, 8.1)	(291.793, -2.1)
2	49678	2.82	(247.441, -1.087)	37.388	(200, 8.1)	(294.872, -2.1)

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	- 1.658728 5	462.39924	366.87015	0	400.07
2	Optimize d	200.65865	-1.97767	430.27267	925.7856	0	400.18
3	Optimize d	200.90865	- 2.172786 5	443.20304	945.17763	0	400.25
4	Optimize d	202.1249	-3.122039	482.87495	1034.8822	0	400.58
5	Optimize	204.7335	-5.15798	478.96044	1219.3048	0	447.41

	d						
6	Optimize d	207.47515	- 7.285972 5	497.61235	1430.545	0	445.91
7	Optimize d	209.991	9.225997 5	539.69646	1621.0094	0	444.53
8	Optimize d	212.62445	- 11.09477 5	596.5127	1836.5519	0	443.09
9	Optimize d	215.7849	- 13.15978 5	673.45263	2009.2892	0	441.36
10	Optimize d	218.83275	- 14.91591 5	748.82158	2186.0238	0	439.69
11	Optimize d	221.35865	-16.09569	803.59503	2257.6203	0	438.3
12	Optimize d	223.7434	- 16.99204 5	847.79868	2364.145	0	437
13	Optimize d	226.6234	- 17.77883 5	887.6828	2389.1281	0	435.42
14	Optimize d	229.6442	- 18.44836 5	923.22514	2440.5508	0	433.77
15	Optimize d	232.16945	- 18.82677 5	943.62899	2430.2118	0	432.38
16	Optimize d	235.52685	-19.15781	961.54899	2425.0077	0	430.54
17	Optimize d	237.7108	-19.29932	969.10145	2419.3056	0	429.35
18	Optimize d	239.28405	-19.29368	968.17655	2399.1992	0	428.49
19	Optimize d	242.2522	- 19.28303 5	966.42462	2362.7793	0	426.86

20	Optimize d	245.22035	-19.27239	964.77376	2326.3594	0	425.24
21	Optimize d	248.1885	- 19.26174 5	963.12291	2289.9732	0	423.61
22	Optimize d	249.8363	19.23600 5	961.01047	2306.4312	0	422.71
23	Optimize d	251.62005	-19.01357	946.73733	2260.5869	0	421.73
24	Optimize d	254.86015	- 18.60953 5	920.73598	2177.3458	0	419.96
25	Optimize d	257.83515	-18.18001	893.18175	2107.7823	0	418.33
26	Optimize d	260.54505	- 17.72498 5	864.06773	2025.0257	0	416.84
27	Optimize d	262.11405	-17.46153	847.21457	1966.8592	0	415.98
28	Optimize d	262.91405	-17.22926	832.48849	1942.6619	0	415.55
29	Optimize d	265.2283	-16.45384	783.57072	1813.144	0	414.28
30	Optimize d	268.63065	- 15.20017 5	704.45985	1677.722	0	412.41
31	Optimize d	271.97875	- 13.85102 5	619.38391	1512.0857	0	410.58
32	Optimize d	273.7764	-13.11863	573.16062	1439.2415	0	409.6
33	Optimize d	276.1681	- 11.99965 5	502.65846	1302.8506	0	408.29
34	Optimize d	280.0681	- 10.00273 5	376.95308	1085.9661	0	406.15
35	Optimize	283.7875	-7.869925	242.81301	817.28622	0	404.11
							40

9		

	d						
36	Optimize d	287.60465	-5.33644	83.629089	533.1729	0	402.02
37	Optimize d	290.31715	-3.240561	-47.93965	277.25211	0	424.73
38	Optimize d	291.5466	-2.290561	-107.58584	162.75363	0	425

Slices	of	Slip	Surface:	49678
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	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	49678	200.25	- 1.471157 5	448.9397	371.48442	0	400.07
2	49678	200.65865	- 1.768062 5	414.43926	920.43506	0	400.18
3	49678	200.90865	-1.949698	426.10553	938.54634	0	400.25
4	49678	202.36535	-3.008032	464.76241	1038.4049	0	400.65
5	49678	205.44225	5.243519 5	454.52784	1243.2631	0	447.02
6	49678	208.86535	- 7.730558 5	486.97723	1487.1654	0	445.14
7	49678	212.28845	- 10.21759 9	557.17002	1731.0439	0	443.27
8	49678	215.5	-12.55093	643.95055	1935.1147	0	441.51
9	49678	218.5	- 14.73055 5	740.33144	2099.3991	0	439.87
10	49678	221.5	- 16.91018 5	847.79586	2263.6834	0	438.23
11	49678	223.9326	-18	903.53953	2559.5908	0	436.89
12	49678	226.48205	-18	900.45598	2506.1424	0	435.5

13	49678	229.71575	-18	897.11615	2439.8405	0	433.73
14	49678	232.94945	-18	894.30203	2373.5696	0	431.96
15	49678	236.18315	-18	891.95178	2307.3295	0	430.18
16	49678	239.325	-18	890	2256.1311	0	428.46
17	49678	242.375	-18	888.32787	2219.9016	0	426.79
18	49678	245.425	-18	886.81967	2183.6721	0	425.12
19	49678	248.475	-18	885.5082	2147.5082	0	423.45
20	49678	251.4875	-18	884.30252	2111.7647	0	421.8
21	49678	254.4625	-18	883.19328	2076.5378	0	420.17
22	49678	257.4375	-18	882.15126	2041.2773	0	418.54
23	49678	260.4125	-18	881.17647	2006.084	0	416.92
24	49678	262.7	-18	880.4375	1941.0625	0	415.66
25	49678	265.2889	- 17.13097 5	825.64863	1929.7818	0	414.24
26	49678	268.78335	- 15.39292 5	716.41287	1725.0904	0	412.33
27	49678	272.19445	-13.65488	607.09768	1513.7477	0	410.46
28	49678	275.85	- 11.79228 5	489.84801	1287.2989	0	408.46
29	49678	279.75	-9.805134	364.74154	1045.7219	0	406.33
30	49678	283.27385	- 8.009631 5	251.67934	819.74893	0	404.4
31	49678	286.4216	-6.405779	150.68831	609.3769	0	402.67
32	49678	289.64775	-4.761983	47.172177	393.93284	0	400.9
33	49678	293.0861	3.010056 5	-63.170592	189.84851	0	425

R35 Slope Stability Gap Entry/Exit

File Information

Created By: USACE St. Louis District Revision Number: 717 Last Edited By: Goltz, Amanda MVS Date: 2/25/2013 Time: 12:46:54 PM File Name: 17thReach35.gsz Directory: Y\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case
_LWL_and_HIgh_water_analyses\High water cases\
Last Solved Date: 2/25/2013 Last Solved Time: 12:53:44 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Strength Units: psf Unit Weight of Water: 62.4 pcf

Analysis Settings

Slope Stability Gap Entry/Exit Kind: SLOPE/W Parent: Seepage Analysis (Gap) Method: Spencer PWP Conditions Source: Parent Analysis Direction of movement: Left to Right Use Passive Mode: No Slip Surface Option: Entry and Exit Critical slip surfaces saved: 1 Optimize Critical Slip Surface Location: Yes Tension Crack Tension Crack Option: (none) FOS Distribution FOS Calculation Option: Constant

Optimization Tolerance: 0.01 Minimum Slip Surface Depth: 0.1 ft Optimization Maximum Iterations: 2000 Optimization Convergence Tolerance: 1e-007 Starting Optimization Points: 8 Ending Optimization Points: 16 Complete Passes per Insertion: 1 Driving Side Maximum Convex Angle: 5 ° Resisting Side Maximum Convex Angle: 1 °

Number of Slices: 30

Materials

EMBANKMENT FILL, EL. +8.5 TO +5.5 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 700 psf Phi-B: 0° EMBANKMENT FILL 3, EL. -1 TO -4 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Embankment Fill 3 Phi-B: 0° BEACH SAND, EL. -20 TO -44 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand BAY SOUND CLAY, EL. -44 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi-B: 0° MARSH1, EL. -4 TO -20 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Spatial Fn: Marsh 1

Phi-B: 0 °

EMBANKMENT FILL2, EL. +5.5 TO -1

Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Fn: FILL 2 Phi-R·∩°

Slip Surface Entry and Exit

Left Projection: Range Left-Zone Left Coordinate: (190, -4.5) ft Left-Zone Right Coordinate: (200, 8.1) ft Left-Zone Increment: 20 Right Projection: Range Right-Zone Left Coordinate: (225, 5.47395) ft Right-Zone Right Coordinate: (310, -2.1) ft Right-Zone Increment: 20 Radius Increments: 20

Slip Surface Limits

Left Coordinate: (42, -9.2) f Right Coordinate: (310, -2.1) ft

Cohesion Functions

Model: Spline Data Point Function Function: Cohesion vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 425 Data Points: X (ft), Cohesion (psf) Data Point: (180.5, 425) Data Point: (200, 400) Data Point: (234, 425)

Shear/Normal Strength Functions

Model: Spline Data Point Function Function: Shear Stress vs. Normal Stress

Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 0 Data Points: Normal Stress (psf), Shear Stress (psf) Data Point: (-10000, 0) Data Point: (0, 0) Data Point: (10000, 5773) Estimation Properties Intact Rock Param.: 10 Geological Strength: 100 Disturbance Factor: 0 SigmaC: 600000 psf Sigma3: 300000 psf

Unit Weight Functions

Num. Points: 20

FILL 2

Model: Spline Data Point Function Function: Unit Weight vs. X Curve Fit to Data: 100 % Segment Curvature: 0 % Y-Intercept: 105 Data Points: X (ft), Unit Weight (pcf) Data Point: (160, 105)
Data Point: (200, 106) Data Point: (291.3, 105)

Spatial Functions

Bay Sound Cohesion Model: Linear Interpolation

Data Point: (154.7, -70, 970)

Data Point: (154.7, -44, 700)

Data Point: (154.7, -70, 970) Data Point: (200, -44, 735) Data Point: (200, -70, 1010) Data Point: (291.3, -44, 700) Data Point: (291.3, -70, 970) Data Point: (42, -44, 700) Data Point: (42, -70, 970) Data Point: (310, -44, 700) Data Point: (310, -70, 970)

Marsh 1

Model: Linear Interpolation Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (154.7, -4, 400)
Data Point: (154.7, -20, 400)
Data Point: (200, -4, 450)
Data Point: (200, -20, 450)
Data Point: (291.3, -4, 400)
Data Point: (291.3, -20, 400)
Data Point: (310, -4, 400)
Data Point: (310, -4, 400)
Data Point: (310, -20, 400)

Embankment Fill 3

Model: Linear Interpolation
Limit Range By: Data Values
Data Points: X (ft), Y (ft), Cohesion (psf)
Data Point: (154.7, -1, 425)
Data Point: (154.7, -4, 425)
Data Point: (200, -1, 400)
Data Point: (200, -1, 400)
Data Point: (200, -4, 400)
Data Point: (291.3, -2.1, 425)
Data Point: (291.3, -4, 425)
Data Point: (310, -2.1, 425)
Data Point: (310, -4, 425)
Data Point: (310, -4, 425)
Data Point: (142.99231, -4, 425)

Regions

	Points	Area (ft²)	Material
Regio n 1	21,22,58,23,25,9,57	3.900006	
Regio n 2	25,23,10,40,36	44.558481	EMBANKMEN T FILL, EL. +8.5 TO +5.5
Regio n 3	36,35,39,13,12,11,40	296.83653	EMBANKMEN T FILL2, EL. +5.5 TO -1
Regio n 4	25,9,8,24,7,46,36	39.338512	
Regio n 5	46,6,5,47,48,35,36	229.03649	
Regio	48,41,37,35	135.9	

Point 17	310	-20
Point 18	310	-44
Point 19	90.9	-44
Point 20	90.9	-20
Point 21	200	13.3
Point 22	200.5	13.3
Point 23	201	8.1
Point 24	194.9	8.5
Point 25	200	8.1
Point 26	110.2	-8.5
Point 27	90.9	-70
Point 28	291.3	-70
Point 29	310	-70
Point 30	291.3	-44
Point 31	291.3	-4
Point 32	291.3	-20
Point 33	310	-4
Point 34	200	-4.5
Point 35	200	-1
Point 36	200	5.5
Point 37	200	-4
Point 38	200	-20
Point 39	273.9	-1
Point 40	224.86522	5.5
Point 41	154.7	-4
Point 42	154.7	-4.5
Point 43	154.7	-20
Point 44	154.7	-44
Point 45	154.7	-70
Point 46	178.64865	5.5
Point 47	157.3	-0.3
Point 48	154.7	-1
Point 49	142.99231	-4
Point 50	140.68462	-4.5
Point 51	145.3	-3.5
Point 52	42	-9.2

n 6			
Regio n 7	41,42,34,37	22.65	
Regio n 8	48,51,49,41	17.026922	
Regio n 9	49,50,42,41	6.4307675	
Regio n 10	55,27,45,28,29,18,30,44,19,54	6968	BAY SOUND CLAY, EL44 TO -70
Regio n 11	54,19,44,30,18,17,32,38,43,20,53	6432	BEACH SAND, EL20 TO -44
Regio n 12	53,20,43,38,32,17,56,33,31,59,37,34,42,50,4,3,2,26,1, 52	3821.1173	MARSH1, EL 4 TO -20
Regio n 13	59,31,33,16,15,14,39,35,37	301.54	EMBANKMEN T FILL 3, EL1 TO -4

Points

5

	X (ft)	Y (ft)
Point 1	90.9	-9.2
Point 2	124	-7.3
Point 3	130	-6.7
Point 4	133.3	-6.1
Point 5	161.6	1.5
Point 6	166.4	3.3
Point 7	187	7
Point 8	199	8.5
Point 9	200	8.5
Point 10	214	7.6
Point 11	237.8	3
Point 12	261.9	0.3
Point 13	263.5	-0.6
Point 14	281.7	-1.3
Point 15	291.3	-2.1
Point 16	310	-2.1

6

Point 53	42	-20
Point 54	42	-44
Point 55	42	-70
Point 56	310	-4.1
Point 57	200	10
Point 58	200.81731	10
Point 59	250	-4

Critical Slip Surfaces

ı,	recei one our reces							
		Slip Surface	FOS	Center (ft)	Radius (ft)	Entry (ft)	Exit (ft)	
	1	Optimized	2.64	(244.777, 44.2)	36.59765	(200, 8.1)	(291.402, -2.1)	
	2	5616	2.71	(244.777, 44.2)	63.581	(200, 8.1)	(288.592, - 1.87432)	

Slices of Slip Surface: Optimized

	Slip Surface	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strengt h (psf)
1	Optimize d	200.25	-1.970137	484.74397	379.80266	0	400.07
2	Optimize d	200.65865	-2.288195	456.29054	956.67565	0	400.18
3	Optimize d	200.90865	-2.482771	470.92486	976.0611	0	400.25
4	Optimize d	201.92905	3.276932 5	504.98937	1051.2613	0	400.53
5	Optimize d	203.31065	-4.352225	506.43407	1141.8198	0	448.19
6	Optimize d	205.02535	5.783677 5	494.68552	1264.3837	0	447.25
7	Optimize d	207.54965	- 7.942132 5	524.67376	1476.5294	0	445.87

8	Optimize d	210.0393	-9.961615	574.20065	1698.5112	0	444.5
9	Optimize d	212.4943	- 11.84212 5	634.02332	1883.3471	0	443.16
10	Optimize d	213.8609	-12.86993	672.86005	2024.0864	0	442.41
11	Optimize d	215.96015	-14.19117	725.1788	2120.9607	0	441.26
12	Optimize d	219.21975	- 16.03449 5	806.82833	2295.8833	0	439.47
13	Optimize d	221.8187	- 17.25376 5	865.87219	2370.1497	0	438.05
14	Optimize d	223.9917	-18.10764	909.44972	2476.4286	0	436.86
15	Optimize d	226.8157	-18.89723	951.23096	2503.1224	0	435.31
16	Optimize d	230.7893	-19.72004	996.70556	2558.9137	0	433.14
17	Optimize d	234.0593	- 19.99724 5	1012.0359	2568.9063	0	431.35
18	Optimize d	236.5531	- 19.99673 5	1011.3542	2517.7792	0	429.98
19	Optimize d	239.325	- 19.99616 5	1010.5902	2474.0656	0	428.46
20	Optimize d	242.375	- 19.99553 5	1009.7377	2437.7705	0	426.79
21	Optimize d	245.425	-19.99491	1008.8852	2401.5082	0	425.12
22	Optimize d	248.475	- 19.99428 5	1008.0656	2365.2459	0	423.45
23	Optimize	250.88225	-19.99379	1007.3904	2336.6356	0	422.13

	d						
24	Optimize d	253.25675	-19.84385	997.5123	2324.1393	0	420.83
25	Optimize d	256.2413	- 19.54432 5	978.14281	2255.596	0	419.2
26	Optimize d	259.8168	- 18.94760 5	940.13048	2182.8506	0	417.24
27	Optimize d	262.43695	- 18.38544 5	904.46487	2063.2251	0	415.81
28	Optimize d	263.23695	-18.16029	890.23847	2051.8468	0	415.37
29	Optimize d	264.9389	-17.44891	845.50573	1949.7095	0	414.44
30	Optimize d	267.8167	-16.24605	769.81033	1802.4225	0	412.86
31	Optimize d	271.3298	- 14.70884 5	672.9911	1624.0074	0	410.94
32	Optimize d	273.652	- 13.64448 5	605.96504	1512.3441	0	409.66
33	Optimize d	276.16515	- 12.34143 5	523.95952	1354.2055	0	408.29
34	Optimize d	280.06515	-10.16375	386.99523	1113.9863	0	406.15
35	Optimize d	283.72575	-7.917425	245.7967	832.39333	0	404.15
36	Optimize d	287.4032	-5.33716	83.736822	543.40704	0	402.13
37	Optimize d	290.17745	- 3.091219 5	-57.211145	270.24529	0	424.69
38	Optimize d	291.3509	- 2.141219 5	-116.83944	154.31538	0	425

lices	O†	Slip	Surface:	5616
		1		

	Slip Surfac e	X (ft)	Y (ft)	PWP (psf)	Base Normal Stress (psf)	Frictiona I Strength (psf)	Cohesiv e Strength (psf)
1	5616	200.0303	-0.97	651.56472	-3078.8893	0	400.02
2	5616	200.2803	-1.215274	397.96711	812.12403	0	400.08
3	5616	200.65865	-1.583434	400.51187	851.3572	0	400.18
4	5616	200.90865	- 1.823388 5	416.42382	876.94656	0	400.25
5	5616	202.1559	- 2.955228 5	469.45027	993.51838	0	400.59
6	5616	204.64785	-5.087771	479.43884	1205.3592	0	447.45
7	5616	207.3199	-7.150104	495.34333	1428.4924	0	445.99
8	5616	209.99195	-8.998264	528.78979	1629.3441	0	444.53
9	5616	212.664	- 10.65401 1	574.628	1810.0201	0	443.06
10	5616	215.35815	- 12.14527 5	624.09787	1950.7464	0	441.59
11	5616	218.07445	-13.48311	676.39238	2052.296	0	440.1
12	5616	220.79075	- 14.66524 5	727.57832	2136.9822	0	438.61
13	5616	223.50705	-15.70092	776.24479	2205.7148	0	437.13
14	5616	226.48205	- 16.66914 5	824.64609	2264.8226	0	435.5
15	5616	229.71575	- 17.54947 5	870.90438	2312.0066	0	433.73
16	5616	232.94945	- 18.25005 5	909.09671	2339.5264	0	431.96
17	5616	236.18315	-	938.45445	2347.9745	0	430.18

			18.77690				
			5				
18	5616	239.325	-19.12883	958.19333	2351.5312	0	428.46
19	5616	242.375	- 19.31778 5	968.4881	2351.5979	0	426.79
20	5616	245.425	-19.3599	970.04779	2335.5176	0	425.12
21	5616	248.475	- 19.25547 5	962.66171	2303.305	0	423.45
22	5616	251.4875	-19.00868	946.47926	2255.5594	0	421.8
23	5616	254.4625	-18.62142	921.6149	2192.4814	0	420.17
24	5616	257.4375	-18.08974	887.73087	2113.2606	0	418.54
25	5616	260.4125	-17.40989	844.58694	2017.456	0	416.92
26	5616	262.7	- 16.79731 5	805.74848	1894.8911	0	415.66
27	5616	264.8	-16.13079	763.61848	1777.5785	0	414.51
28	5616	267.4	- 15.20424 5	705.13431	1676.7517	0	413.09
29	5616	270	- 14.14717 5	638.47176	1561.1756	0	411.66
30	5616	272.6	- 12.95231 5	563.1915	1429.9033	0	410.24
31	5616	275.2	-11.61079	478.75764	1281.8764	0	408.82
32	5616	277.8	- 10.11169 3	384.4694	1115.6481	0	407.39
33	5616	280.4	- 8.441515 5	279.51379	929.5466	0	405.97
34	5616	282.8355	-6.712965	170.95726	730.27068	0	404.64
35	5616	285.1065	-4.932073	59.180922	518.25851	0	403.39
36	5616	287.4169	- 2.937160	-65.961991	293.38427	0	423.94

R1 High Flood Seepage Analysis (Gap)

File Information

Created By: USACE St. Louis District Revision Number: 554 Last Edited By: Goltz, Amanda MVS Date: 11/26/2012

Time: 1:36:33 PM File Name: 17thReach1.gsz

Directory: Y\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case
_LWL_and_HIgh_water_analyses\High water cases\
Last Solved Date: 11/26/2012

Last Solved Time: 1:36:48 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Mass(M) Units: lbs Mass Flux Units: lbs/sec Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Seepage Analysis (Gap)

Kind: SEEP/W Method: Steady-State Settings

Include Air Flow: No Control

Apply Runoff: No

Convergence

Convergence Type: Head Vector Norm Maximum Number of Iterations: 500

Tolerance: 0.001 Maximum Change in K: 0.1

Rate of Change in K: 1.02 Minimum Change in K: 1e-005 Equation Solver: Parallel Direct Starting Time: 0 sec

Potential Seepage Max # of Reviews: 10

Duration: 0 sec Ending Time: 0 sec

Materials

Time

EMBANKMENT FILL, EL. +9.6 TO +4.5

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sed

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0

MARSH, EL. -3.0 TO -7.0 Model: Saturated Only

Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BEACH SAND, EL. -12 TO -46

Model: Saturated Only Hydraulic

K-Sat: 0.00049 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BAY SOUND CLAY, EL. -46 TO -70

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

Sheet Pile

Model: Saturated Only

Hydraulic

K-Sat: 1e-010 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

EMBANKMENT FILL 2, EL. +4.5 TO -3.0 Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0

MARSH, EL. -7.0 TO -12.0

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

Boundary Conditions

Drainage

Type: Total Flux (Q) 0

Canal Water

Type: Head (H) 10

Curb

Type: Head (H) -3.4

No-Flow

Type: Total Flux (Q) 0

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	12,47,13,14,15,25	2.725
Region 2	EMBANKMENT FILL, EL. +9.6 TO +4.5	4,5,38,12,43,45	63.226664

Region 3	BEACH SAND, EL12 TO -46	22,21,30,27,18,19,34,36	8544.2
Region 4	EMBANKMENT FILL, EL. +9.6 TO +4.5	44,7,6,15,25,12,43	84.332835
Region 5	MARSH, EL7.0 TO -12.0	21,1,2,40,33,32,17,18,27,30	1141.5954
Region 6	BAY SOUND CLAY, EL46 TO -70	22,23,37,35,20,19,34,36	6031.2
Region 7	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	41,42,31,16,28,29	22.277108
Region 8	MARSH, EL3.0 TO -7.0	40,41,29,28,26,24,46,17,32,33	644.89156
Region 9	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	42,3,48,49,16,31	114.63223
Region 10	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	48,39,45,43,49	112.79536
Region 11	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	43,49,50,44	117.80335
Region 12	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	49,16,28,26,24,11,10,9,8,50	245.83789

	Start Point	End Point	Hydraulic Boundary	Left Side Material
Line 1	13	14		
Line 2	22	21	No-Flow	
Line 3	18	19	Curb	
Line 4	5	4	Canal Water	
Line 5	15	14		
Line 6	15	25		
Line 7	25	12		Sheet Pile
Line 8	18	27		
Line 9	7	6	Drainage	
Line 10	6	15	Drainage	
Line 11	27	30		
Line 12	30	21		
Line 13	29	28		
Line 14	28	26		
Line 15	24	26		
Line 16	17	32		
Line 17	32	33		
Line 18	19	34		

1: 10	34	20		
Line 19		36		
Line 20	36	22		
Line 21	5	38	Canal Water	
Line 22	38	12	Canal Water	
Line 23	40	33		
Line 24	29	41		
Line 25	12	43	Canal Water	Sheet Pile
Line 26	44	7	Drainage	
Line 27	45	4	Canal Water	
Line 28	43	45		
Line 29	43	44		
Line 30	21	1	No-Flow	
Line 31	1	2	Canal Water	
Line 32	2	40	Canal Water	
Line 33	17	18	Curb	
Line 34	22	23	No-Flow	
Line 35	23	37	No-Flow	
Line 36	37	35	No-Flow	
Line 37	35	20	No-Flow	
Line 38	20	19	Curb	
Line 39	16	31		
Line 40	31	42		
Line 41	41	42	Canal Water	
Line 42	16	28		
Line 43	40	41	Canal Water	
Line 44	24	46	Curb	
Line 45	46	17	Curb	
Line 46	12	47	Canal Water	
Line 47	47	13		
Line 48	43	49	Canal Water	
Line 49	49	16	Canal Water	
Line 50	42	3	Canal Water	
Line 51	3	48	Canal Water	
Line 52	48	49		
Line 53	48	39	Canal Water	
Line 54	39	45	Canal Water	

Line 55	49	50		
Line 56	50	44	Drainage	
Line 57	24	11		
Line 58	11	10	Drainage	
Line 59	10	9	Drainage	
Line 60	9	8	Drainage	
Line 61	8	50	Drainage	

	X (ft)	Y (ft)
Point 1	58.7	-8.4
Point 2	138.7	-8.4
Point 3	163.3	-0.1
Point 4	185	6.1
Point 5	196.6	9.9
Point 6	208	10
Point 7	220	5.5
Point 8	239.2	-1.2
Point 9	250.6	-1.3
Point 10	274.1	-1.4
Point 11	310	-1.4
Point 12	200	9.9
Point 13	200	13.5
Point 14	200.5	13.5
Point 15	201	10
Point 16	200	-2.5
Point 17	310	-7
Point 18	310	-12
Point 19	310	-46
Point 20	310	-70
Point 21	58.7	-12
Point 22	58.7	-46
Point 23	58.7	-70
Point 24	310	-3
Point 25	201	9.9

Point 26	239.2	-3
Point 27	239.2	-12
Point 28	200	-3
Point 29	177	-3
Point 30	177	-12
Point 31	177	-2.5
Point 32	239.2	-7
Point 33	177	-7
Point 34	239.2	-46
Point 35	239.2	-70
Point 36	177	-46
Point 37	177	-70
Point 38	199	9.9
Point 39	177	3.7
Point 40	142.8494	-7
Point 41	154.70482	-3
Point 42	156.18675	-2.5
Point 43	200	4.5
Point 44	222.86567	4.5
Point 45	179.66667	4.5
Point 46	310	-3.4
Point 47	200	10
Point 48	165.10004	0.40634
Point 49	200	0.4
Point 50	234.61639	0.40305

R10 High Flood Seepage Analysis (Gap)

File Information

Created By: USACE St. Louis District Revision Number: 609 Last Edited By: Goltz, Amanda MVS Date: 11/26/2012

Time: 9:13:19 AM File Name: 17thReach10.gsz

Directory: Y\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case
_LWL_and_Hlgh_water_analyses\High water cases\
Last Solved Date: 11/26/2012

Last Solved Time: 9:13:42 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Mass(M) Units: lbs Mass Flux Units: lbs/sec Unit Weight of Water: 62.4 pcf

Analysis Settings

Seepage Analysis (Gap)

Kind: SEEP/W Method: Steady-State Settings Include Air Flow: No

Apply Runoff: No Convergence

Convergence Type: Head Vector Norm Maximum Number of Iterations: 500

Tolerance: 0.001 Maximum Change in K: 0.1

Rate of Change in K: 1.02 Minimum Change in K: 1e-005 Equation Solver: Parallel Direct

Potential Seepage Max # of Reviews: 10

Starting Time: 0 sec Duration: 0 sec Ending Time: 0 sec

Materials

Time

EMBANKMENT FILL 1, EL. +2.5 TO -1.5

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

MARSH 2, EL. -9 TO -13

Model: Saturated Only Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BEACH SAND, EL. -29.0/-31.0 TO -48.0

Model: Saturated Only Hydraulic

K-Sat: 0.00049 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Direction: 0 °

BAY SOUND CLAY, EL. -48 TO -70

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

Marsh 1. EL -1.5 TO -9

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Direction: 0 °

Sheet Pile

Model: Saturated Only Hydraulic

K-Sat: 1e-010 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0

Lacustrine 1, EL. -13 to -18

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0

Lacustrine 2 El. -18 to -29

Model: Saturated Only Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0 °

Boundary Conditions

Drainage

Review: true Type: Total Flux (Q) 0

Canal Water (Gap) Type: Head (H) 8

Type: Head (H) -4.9

No Flow

Type: Total Flux (Q) 0

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL29.0/-31.0 TO -48.0	13,14,46,44,15,16,42,30,37	4606.7
Region 2		4,32,22,21,18	8.175
Region 3	MARSH 2, EL9 TO -13	19,34,10,11,35,20,40,43,1,29,23,53,39	688.3599
Region 4	Lacustrine 1, EL13 to -18	11,12,36,31,41,17,43,40,20,35	1560.3251
Region 5	Lacustrine 2 El18 to -29	31,36,12,13,37,30,42,16,17,41	2942.5
Region 6	BAY SOUND CLAY, EL48 TO - 70	15,28,45,47,26,14,46,44	5885
Region 7	Marsh 1, EL -1.5 TO -9	53,2,50,49,48,25,33,9,10,34,19,39	1022.162
Region 8	Marsh 1, EL -1.5 TO -9	48,49,50,51,38,25	107.61989
Region 9 EMBANKMENT FILL 1, EL. +2.5 TO -1.5		51,38,25,4,27,3,24,52	112.16306
Region 10	EMBANKMENT FILL 1, EL. +2.5 TO -1.5	25,4,32,22,5,6,7,8,9,33	312

	Start Point	End Point	Hydraulic Boundary	Right Side Material	Left Side Material
Line 1	13	14	Curb		
Line 2	15	16	No Flow		
Line 3	4	32		Sheet Pile	
Line 4	32	22			
Line 5	22	21	Drainage		
Line 6	21	18			
Line 7	18	4	Canal Water (Gap)		
Line 8	12	36			
Line 9	30	37			
Line 10	37	13			
Line 11	4	25	Canal Water (Gap)		Sheet Pile
Line 12	11	35			
Line 13	10	34			

Line 14	9	33	1		1
Line 14	41	17	-		
			-		
Line 16	16	42			
Line 17	42	30			
Line 18	40	43			
Line 19	44	15			
Line 20	14	46			
Line 21	46	44			
Line 22	25	48	Canal Water (Gap)	Sheet Pile	
Line 23	49	50			
Line 24	38	51			
Line 25	39	53			
Line 26	36	31			
Line 27	31	41			
Line 28	20	40			
Line 29	35	20			
Line 30	34	19			
Line 31	19	39			
Line 32	33	25			
Line 33	48	49			
Line 34	25	38			
Line 35	10	11	Curb		
Line 36	43	1	No Flow		
Line 37	1	29	Canal Water (Gap)		
Line 38	29	23	Canal Water (Gap)		
Line 39	23	53	Canal Water (Gap)		
Line 40	11	12	Curb		
Line 41	17	43	No Flow		
Line 42	12	13	Curb		
Line 43	16	17	No Flow		
Line 44	15	28	No Flow		
Line 45	28	45	No Flow		
Line 46	45	47	No Flow		
Line 47	47	26	No Flow		
Line 48	26	14	Curb		1
Line 49	53	2	Canal Water (Gap)	<u> </u>	

Line 50	2	50	Canal Water (Gap)	
Line 51	9	10	Curb	
Line 52	50	51	Canal Water (Gap)	
Line 53	4	27	Canal Water (Gap)	
Line 54	27	3	Canal Water (Gap)	
Line 55	3	24	Canal Water (Gap)	
Line 56	24	52	Canal Water (Gap)	
Line 57	52	51	Canal Water (Gap)	
Line 58	22	5	Drainage	
Line 59	5	6	Drainage	
Line 60	6	7	Drainage	
Line 61	7	8	Drainage	
Line 62	8	9	Curb	

	X (ft)	Y (ft)
Point 1	42.5	-13.1
Point 2	143.1	-9.4
Point 3	187.6	2.4
Point 4	200	2.5
Point 5	213	5
Point 6	235	-1
Point 7	260	-2.9
Point 8	310	-2.9
Point 9	310	-4
Point 10	310	-11
Point 11	310	-14
Point 12	310	-20
Point 13	310	-31
Point 14	310	-48
Point 15	42.5	-48
Point 16	42.5	-31
Point 17	42.5	-20
Point 18	200	12.4
Point 19	200	-9

Point 20	200	-13
Point 21	200.5	12.4
Point 22	201	5.5
Point 23	123.3	-13
Point 24	181.6	-0.1
Point 25	200	-1.5
Point 26	310	-70
Point 27	199	2.5
Point 28	42.5	-70
Point 29	90	-12.6
Point 30	200	-29
Point 31	200	-18
Point 32	201	2.5
Point 33	235	-4
Point 34	235	-11
Point 35	235	-14
Point 36	235	-20
Point 37	235	-31
Point 38	175.8	-4
Point 39	175.8	-11
Point 40	175.8	-14
Point 41	175.8	-20
Point 42	175.8	-31
Point 43	42.5	-14.22618
Point 44	175.8	-48
Point 45	175.8	-70
Point 46	235	-48
Point 47	235	-70
Point 48	200	-6
Point 49	175.8	-6
Point 50	157.17527	-6
Point 51	165.45484	-4
Point 52	175.8043	-1.5
Point 53	134.3	-11

R11 High Flood Seepage Analysis (Gap)

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File Information

Created By: USACE St. Louis District Revision Number: 571 Last Edited By: Goltz, Amanda MVS Date: 2/21/2013

Time: 11:42:50 AM File Name: 17thReach11.gsz

Directory: Y\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case
_LWL_and_HIgh_water_analyses\High water cases\
Last Solved Date: 2/21/2013

Last Solved Time: 11:43:14 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Mass(M) Units: lbs Mass Flux Units: lbs/sec Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Seepage Analysis (Gap)

Kind: SEEP/W Method: Steady-State Settings

Include Air Flow: No Control

Apply Runoff: No Convergence

Convergence Type: Head Vector Norm Maximum Number of Iterations: 500

Tolerance: 0.001 Maximum Change in K: 0.1

Rate of Change in K: 1.02 Minimum Change in K: 1e-005 Equation Solver: Parallel Direct Materials

Time

EMBANKMENT FILL, EL. +2.5 TO 0.0

Starting Time: 0 sec

Duration: 0 sec Ending Time: 0 sec

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sed

Volumetric Water Content: 0 ft³/ft³

Potential Seepage Max # of Reviews: 10

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

MARSH 1, EL. -6.0 TO -16.0

Model: Saturated Only Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BEACH SAND, EL. -27.0/-28.0 TO -42.0

Model: Saturated Only Hydraulic

K-Sat: 0.00049 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BAY SOUND CLAY, EL. -42 TO -70

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

EMBANKMENT FILL 2. EL 0.0 TO -6.0

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft3/ft3

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

Sheet Pile

Model: Saturated Only

K-Sat: 1e-010 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0

LACUSTRINE, EL. -16.0 TO -27.0

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

Boundary Conditions

Drainage

Type: Total Flux (Q) 0

Canal Water (Gap) Type: Head (H) 8

Curb

Type: Head (H) -5.6

No Flow

Type: Total Flux (Q) 0

Regions

	Material	Points	Area (ft²)
Region	EMBANKMENT FILL, EL.	46,22,8,26,19,6	109.66442
1	+2.5 TO 0.0	40,22,8,20,13,0	103.00442

Region 2	EMBANKMENT FILL, EL. +2.5 TO 0.0	6,42,31,5,43,19	34.363658
Region 3	BEACH SAND, EL27.0/- 28.0 TO -42.0	17,16,40,41,15,14,29,30,34	3526.8
Region 4	MARSH 1, EL6.0 TO -16.0	1,45,2,3,23,44,32,20,27,12,13,28,35,33,24	1721.2756
Region 5	LACUSTRINE, EL16.0 TO - 27.0	17,24,33,35,28,13,14,29,30,34	3196.4
Region 6	BAY SOUND CLAY, EL42 TO -70	36,37,38,39,15,41,40,16	7000
Region 7	EMBANKMENT FILL 2, EL 0.0 TO -6.0	20,19,26,9,10,25,11,12,27	439.7656
Region 8	EMBANKMENT FILL 2, EL 0.0 TO -6.0	43,19,20,32,44,4	204.04076
Region 9	Sheet Pile	18,21,48,22,46,6,7,47	8.325

	Start Point	End Point	Right Side Material	Hydraulic Boundary
Line 1	19	6	Sheet Pile	Canal Water (Gap)
Line 2	17	16		No Flow
Line 3	15	14		Curb
Line 4	8	26		Drainage
Line 5	26	19		
Line 6	27	12		
Line 7	29	14		
Line 8	30	29		
Line 9	17	34		
Line 10	34	30		
Line 11	20	19	Sheet Pile	Canal Water (Gap)
Line 12	27	20		
Line 13	20	32		
Line 14	28	35		
Line 15	35	33		
Line 16	13	28		
Line 17	33	24		

Line 18	16	40		
Line 19	40	41		
Line 20	41	15		
Line 21	8	22		Drainage
Line 22	6	42		Canal Water (Gap)
Line 23	31	42		Canal Water (Gap)
Line 24	43	19		
Line 25	31	5		Canal Water (Gap)
Line 26	5	43		Canal Water (Gap)
Line 27	44	32		
Line 28	46	22		
Line 29	6	46	Sheet Pile	
Line 30	1	45		Canal Water (Gap)
Line 31	45	2		Canal Water (Gap)
Line 32	2	3		Canal Water (Gap)
Line 33	3	23		Canal Water (Gap)
Line 34	23	44		Canal Water (Gap)
Line 35	12	13		Curb
Line 36	24	1		No Flow
Line 37	17	24		No Flow
Line 38	13	14		Curb
Line 39	36	37		No Flow
Line 40	37	38		No Flow
Line 41	38	39		No Flow
Line 42	39	15		Curb
Line 43	16	36		No Flow
Line 44	26	9		Drainage
Line 45	9	10		Drainage
Line 46	10	25		Drainage
Line 47	25	11		Drainage
Line 48	11	12		Curb
Line 49	44	4		Canal Water (Gap)
Line 50	4	43		Canal Water (Gap)
Line 51	18	21		
Line 52	21	48		
Line 53	48	22		Drainage

Line 54	6	7	Canal Water (Gap)
Line 55	7	47	Canal Water (Gap)
Line 56	47	18	Canal Water (Gap)

	X (ft)	Y (ft)
Point 1	60	-13.1
Point 2	95.6	-12.9
Point 3	122.5	-12.8
Point 4	160.8	-3.8
Point 5	183	0.3
Point 6	200	2.5
Point 7	200	5.5
Point 8	213	4.9
Point 9	235	-1
Point 10	262.6	-3
Point 11	310	-3.6
Point 12	310	-6
Point 13	310	-15
Point 14	310	-28
Point 15	310	-42
Point 16	60	-42
Point 17	60	-28
Point 18	200	12.5
Point 19	200	0
Point 20	200	-6
Point 21	200.5	12.5
Point 22	201	5.5
Point 23	140.8	-9.9
Point 24	60	-15
Point 25	287.5	-3.6
Point 26	231.27119	0
Point 27	235	-6
Point 28	235	-15
Point 29	235	-28

Point 30	200	-27
Point 31	184.8	1.7
Point 32	181.4	-6
Point 33	181.4	-15
Point 34	181.4	-28
Point 35	200	-16
Point 36	60	-70
Point 37	181.4	-70
Point 38	235	-70
Point 39	310	-70
Point 40	181.4	-42
Point 41	235	-42
Point 42	199	2.5
Point 43	181.37561	0
Point 44	153.58689	-6
Point 45	70	-13
Point 46	201	2.5
Point 47	200	10
Point 48	200.7	10

R12 High Flood Seepage Analysis (Gap) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 763 Last Edited By: Redell, Chris MVS Date: 2/26/2013

Time: 4:03:48 PM File Name: 17thReach12.gsz

Directory: Y\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case LIWL and High, water_analyses\High water cases\
Last Solved Date: 2/26/2013
Last Solved Time: 4:03:54 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Mass(M) Units: lbs Mass Flux Units: lbs/sec Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Seepage Analysis (Gap)

Kind: SEEP/W Method: Steady-State Settings

Include Air Flow: No Control

Apply Runoff: No

Convergence

Convergence Type: Head Vector Norm Maximum Number of Iterations: 500

Tolerance: 0.001 Maximum Change in K: 0.1 Rate of Change in K: 1.02 Minimum Change in K: 1e-005 Equation Solver: Parallel Direct

Potential Seepage Max # of Reviews: 10

Starting Time: 0 sec

Duration: 0 sec Ending Time: 0 sec

Materials

Time

EMBANKMENT FILL, EL. +2.4 TO -3

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sed Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1

K-Direction: 0

MARSH 1b, EL. -5 TO -8

Model: Saturated Only Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BEACH SAND, EL. -25 TO -42

Model: Saturated Only Hydraulic

K-Sat: 0.00049 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BAY SOUND CLAY, EL. -42 TO -70

Model: Saturated Only Hydraulic

Sheet Pile

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1

K-Direction: 0 °

Model: Saturated Only

Hydraulic

K-Sat: 1e-010 ft/sec

Volumetric Water Content: 0 ft3/ft3

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

MARSH 2, EL. -8 TO -15

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0

Lacustrine 1, EL. -15 TO -19

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0

Lacustrine 2, EL. -19 TO -25

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

MARSH 1a, EL. -0.4 TO -5

Model: Saturated Only Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

Boundary Conditions

Drainage

Review: true

Type: Total Flux (Q) 0

Canal Water (Gap)

Type: Head (H) 8

Curb

Type: Head (H) -3.8

No Flow

Type: Total Flux (Q) 0

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL25 TO -42	15,14,33,35,13,12,32	4590
Region 2	Sheet Pile	16,17,6,21,5	8.275
Region 3	Lacustrine 1, EL15 TO -19	24,37,31,38,25,30	1080
Region 4	Lacustrine 2, EL19 TO -25	15,32,12,38,31,37	1620
Region 5	BAY SOUND CLAY, EL42 TO -70	22,34,36,23,13,35,33,14	7560
Region 6	MARSH 2, EL8 TO -15	24,1,18,45,42,49,11,25,30	1489.9512
Region 7	MARSH 1a, EL0.4 TO -5	27,29,28,26	155
Region 8	MARSH 1a, EL0.4 TO -5	27,40,39	31.102
Region 9	EMBANKMENT FILL, EL. +2.4 TO -3	5,46,44,8,7,6,21	109.67894
Region 10	EMBANKMENT FILL, EL. +2.4 TO -3	5,46,43,4,20	27.4692
Region 11	MARSH 1a, EL0.4 TO -5	46,27,29,28,10,9,19,44	331.06608
Region 12	MARSH 1a, EL0.4 TO -5	46,27,39,3,43	92.535792
Region 13	MARSH 1b, EL5 TO -8	47,48,26,27	110
Region 14	MARSH 1b, EL5 TO -8	41,47,27,40	32.692
Region 15	MARSH 1b, EL5 TO -8	41,2,42,49,11,48,47	297.52797

	Start Point	End Point	Hydraulic Boundary	Left Side Material
Line 1	15	14	No Flow	
Line 2	13	12	Curb	

Line 3	16	17		
Line 4	17	6	Drainage	
Line 5	6	21		
Line 6	21	5		Sheet Pile
Line 7	5	16	Canal Water (Gap)	
Line 8	28	29		
Line 9	30	24		
Line 10	32	15		
Line 11	14	33		
Line 12	33	35		
Line 13	35	13		
Line 14	31	37		
Line 15	39	40	Canal Water (Gap)	
Line 16	27	29		
Line 17	27	39		
Line 18	24	37	No Flow	
Line 19	38	25	Curb	
Line 20	12	38	Curb	
Line 21	37	15	No Flow	
Line 22	22	34	No Flow	
Line 23	34	36	No Flow	
Line 24	36	23	No Flow	
Line 25	23	13	Curb	
Line 26	14	22	No Flow	
Line 27	24	1	No Flow	
Line 28	1	18	Canal Water (Gap)	
Line 29	11	25	Curb	
Line 30	28	26	Curb	
Line 31	18	45	Canal Water (Gap)	
Line 32	45	42	Canal Water (Gap)	
Line 33	27	40		
Line 34	27	26		
Line 35	30	25		
Line 36	38	31		
Line 37	32	12		
Line 38	43	46		

Line 39	46	44		
Line 40	5	46	Canal Water (Gap)	Sheet Pile
Line 41	44	8	Drainage	
Line 42	8	7	Drainage	
Line 43	7	6	Drainage	
Line 44	43	4	Canal Water (Gap)	
Line 45	4	20	Canal Water (Gap)	
Line 46	20	5		
Line 47	46	27	Canal Water (Gap)	Sheet Pile
Line 48	28	10	Curb	
Line 49	10	9	Drainage	
Line 50	9	19	Drainage	
Line 51	19	44	Drainage	
Line 52	39	3	Canal Water (Gap)	
Line 53	3	43	Canal Water (Gap)	
Line 54	47	48		
Line 55	48	26	Curb	
Line 56	27	47	Canal Water (Gap)	Sheet Pile
Line 57	11	49		
Line 58	49	42		
Line 59	41	47		
Line 60	40	41	Canal Water (Gap)	
Line 61	41	2	Canal Water (Gap)	
Line 62	2	42	Canal Water (Gap)	
Line 63	11	48	Curb	

/11163		
	X (ft)	Y (ft)
Point 1	40	-12
Point 2	165.4	-6.1
Point 3	181.3	-1.1
Point 4	187.8	2.4
Point 5	200	2.4
Point 6	201	5.5
Point 7	211.5	5

Point 8	225	2
Point 9	284.9	-1.8
Point 10	310	-1.8
Point 11	310	-8
Point 12	310	-25
Point 13	310	-42
Point 14	40	-42
Point 15	40	-25
Point 16	200	12.4
Point 17	200.5	12.4
Point 18	140.9	-11.4
Point 19	265	-1.2
Point 20	199	2.4
Point 21	201	2.4
Point 22	40	-70
Point 23	310	-70
Point 24	40	-15
Point 25	310	-15
Point 26	310	-5
Point 27	200	-5
Point 28	310	-3
Point 29	265	-3
Point 30	175.3	-15
Point 31	175.3	-19
Point 32	175.3	-25
Point 33	175.3	-42
Point 34	175.3	-70
Point 35	265	-42
Point 36	265	-70
Point 37	40	-19
Point 38	310	-19
Point 39	175.3	-3
Point 40	168.898	-5
Point 41	165.718	-6
Point 42	156.61698	-8
Point 43	184.16903	0.44486

Point 44	244.84451	0.41244
Point 45	149	-9.64775
Point 46	200	0.4364
Point 47	200	-6
Point 48	310	-6
Point 49	200	-8

R1 High Flood Seepage Analysis (Gap)

File Information

Created By: USACE St. Louis District Revision Number: 556 Last Edited By: Brandt, Ryan A MVS Date: 3/1/2013 Time: 2:54:52 PM

File Name: 17thReach13.gsz Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_ analyses\High water cases\

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Mass(M) Units: lbs
Mass Flux Units: lbs/sec Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Seepage Analysis (Gap) Kind: SEEP/W Method: Steady-State Include Air Flow: No Control Apply Runoff: No Convergence Convergence Type: Head Vector Norm Maximum Number of Iterations: 500 Tolerance: 0.001 Maximum Change in K: 0.1 Rate of Change in K: 1.02 Minimum Change in K: 1e-005 Equation Solver: Parallel Direct Potential Seepage Max # of Reviews: 10 Starting Time: 0 sec Duration: 0 sec Ending Time: 0 sec

Materials

EMBANKMENT FILL, EL. +3.0 TO 2.0

Model: Saturated Only

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0

BEACH SAND, EL. -21.0 TO -42.0

Model: Saturated Only Hydraulic

K-Sat: 0.00049 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0 °

Sheet Pile

Model: Saturated Only Hydraulic

K-Sat: 1e-010 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0

EMBANKMENT FILL , EL -1.6 TO -7.0

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1

K-Direction: 0 °

MARSH 1, EL. -7.0 TO -15.0

Model: Saturated Only Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Direction: 0

Lacustrine, EL. -15.0 TO -21.0

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0

BAY SOUND CLAY, EL. -42 TO -70

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Direction: 0 °

Boundary Conditions

Drainage

Review: true Type: Total Flux (Q) 0 Canal Water (Global) Type: Head (H) 8

Type: Head (H) -3.9

No Flow

Type: Total Flux (Q) 0

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	8,7,34,22,21,19	7.425
Region 2	BEACH SAND, EL21.0 TO -42.0	18,17,16,15	5321.4
Region 3	MARSH 1, EL7.0 TO -15.0	23,1,2,3,4,33,29,28,25,13,14	1558.5203

Region 4	BAY SOUND CLAY, EL42 TO -70	17,10,27,20	7095.2
Region 5	Lacustrine, EL15.0 TO -21.0	23,14,15,18	1520.4
Region 6	EMBANKMENT FILL , EL -1.6 TO -7.0	33,32,35,28,29	51.522975
Region 7	EMBANKMENT FILL , EL -1.6 TO -7.0	32,31,20,35	125.83784
Region 8	EMBANKMENT FILL , EL -1.6 TO -7.0	28,35,20,10,11,12,13,25	589.875
Region 9	EMBANKMENT FILL, EL. +3.0 TO 2.0	20,31,5,36,6,30,7	99.583923
Region 10	EMBANKMENT FILL, EL. +3.0 TO 2.0	22,9,24,37,10,20,7,34	182.65003

	Start Point	End Point	Hydraulic Boundary	Right Side Material	Left Side Material
Line 1	22	21			
Line 2	21	19			
Line 3	19	8	Canal Water (Global)		
Line 4	18	17	No Flow		
Line 5	16	15	Curb		
Line 6	25	13			
Line 7	29	28			
Line 8	28	25			
Line 9	20	10			
Line 10	33	29			
Line 11	31	20			
Line 12	34	22			
Line 13	7	34		Sheet Pile	
Line 14	8	7	Canal Water (Global)		
Line 15	23	1	No Flow		
Line 16	1	2	Canal Water (Global)		
Line 17	2	3	Canal Water (Global)		
Line 18	3	4	Canal Water (Global)		
Line 19	4	33	Canal Water (Global)		
Line 20	13	14	Curb		
Line 21	16	17			
Line 22	16	27	Curb		
Line 23	27	26	No Flow		
Line 24	26	17	No Flow		
Line 25	23	14			

Line 26	18	15		
Line 27	14	15	Curb	
Line 28	18	23	No Flow	
Line 29	33	32	Canal Water (Global)	
Line 30	32	35		
Line 31	35	28		
Line 32	32	31	Canal Water (Global)	
Line 33	20	35	Canal Water (Global)	Sheet Pile
Line 34	10	11	Drainage	
Line 35	11	12	Drainage	
Line 36	12	13	Curb	
Line 37	31	5	Canal Water (Global)	
Line 38	5	36	Canal Water (Global)	
Line 39	36	6	Canal Water (Global)	
Line 40	6	30	Canal Water (Global)	
Line 41	30	7		
Line 42	7	20	Canal Water (Global)	Sheet Pile
Line 43	22	9	Drainage	
Line 44	9	24	Drainage	
Line 45	24	37	Drainage	
Line 46	37	10	Drainage	

	X (ft)	Y (ft)
Point 1	56.6	-11.8
Point 2	97	-11.5
Point 3	138.4	-11.8
Point 4	157.5	-7.8
Point 5	179	-0.4
Point 6	184.1	2.7
Point 7	200	3.3
Point 8	200	6
Point 9	210	5.5
Point 10	242.2	-1.6
Point 11	265.9	-1.9

Point 12	310	-1.9
Point 13	310	-7
Point 14	310	-15
Point 15	310	-21
Point 16	310	-42
Point 17	56.6	-42
Point 18	56.6	-21
Point 19	200	12.3
Point 20	200	-2
Point 21	200.5	12.3
Point 22	201	6
Point 23	56.6	-15
Point 24	225	1.5
Point 25	242.2	-7
Point 26	56.6	-70
Point 27	310	-70
Point 28	200	-8
Point 29	174.4	-7
Point 30	199	3.3
Point 31	174.35135	-2
Point 32	162.72973	-6
Point 33	159.82432	-7
Point 34	201	3.3
Point 35	200	-6
Point 36	180.3182	0.40126
Point 37	231.10097	0.40041

R14 High Flood Seepage Analysis (Gap) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 504 Last Edited By: Redell, Chris MVS Date: 2/26/2013

Time: 4:17:51 PM File Name: 17thReach14.gsz

Directory: Y\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case
_LWL_and_HIgh_water_analyses\High water cases\
Last Solved Date: 2/26/2013

Last Solved Time: 4:18:08 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Mass(M) Units: lbs Mass Flux Units: lbs/sec Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Seepage Analysis (Gap)

Kind: SEEP/W Method: Steady-State Settings

Include Air Flow: No Control

Apply Runoff: No

Convergence

Convergence Type: Head Vector Norm Maximum Number of Iterations: 500

Tolerance: 0.001 Maximum Change in K: 0.1

Rate of Change in K: 1.02 Minimum Change in K: 1e-005 Equation Solver: Parallel Direct

Potential Seepage Max # of Reviews: 10

Starting Time: 0 sec

Duration: 0 sec Ending Time: 0 sec

Materials

Time

EMBANKMENT FILL, EL. +4.2 TO +2

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0 °

BEACH SAND, EL. -19 TO -46

Model: Saturated Only

Hydraulic

K-Sat: 0.00049 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

Sheet Pile

Model: Saturated Only Hydraulic

K-Sat: 1e-010 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

Fill 2, EL. -3.3 TO -7

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

MARSH 1. EL. -7 TO -16

Model: Saturated Only

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BAY SOUND CLAY, EL. -46 TO -70

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0

Silty Sand El. -16 to -19

Model: Saturated Only

Hydraulic

K-Sat: 2.3e-005 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0

Boundary Conditions

Drainage

Type: Total Flux (Q) 0

Curb

Type: Head (H) -5.7

Canal Water (Seepage)

Type: Head (H) 8

No Flow

Type: Total Flux (Q) 0

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	8,9,10,22,17	6.675

Region 2	BEACH SAND, EL19 TO -46	25,23,42,32,24,26,31,41	6893.1
Region 3	Silty Sand El16 to - 19	28,25,41,31,26,27,30,40	765.9
Region 4	EMBANKMENT FILL, EL. +4.2 TO +2	45,11,16,19,17,35	27.803888
Region 5	EMBANKMENT FILL, EL. +4.2 TO +2	17,35,50,4,3,10,22	55
Region 6	MARSH 1, EL7 TO - 16	28,40,30,27,29,34,36,39,49,15,13,2,1	1813.045
Region 7	BAY SOUND CLAY, EL46 TO -70	23,42,32,24,21,33,43,20	6127.2
Region 8	Fill 2, EL3.3 TO -7	35,53,51,12,45	31.903683
Region 9	Fill 2, EL3.3 TO -7	53,37,38,48,47,46,51	150.77277
Region 10	Fill 2, EL3.3 TO -7	35,53,37,38,48,49,39,36,34,29,7,18,6,14,5,52,50	670.08058

Lines

	Start Point	End Point	Hydraulic Boundary	Left Side Material
Line 1	8	9		
Line 2	9	10	Drainage	
Line 3	10	22		
Line 4	22	17		Sheet Pile
Line 5	17	8	Canal Water (Seepage)	
Line 6	25	23	No Flow	
Line 7	24	26	Curb	
Line 8	28	25	No Flow	
Line 9	26	27	Curb	
Line 10	27	30		
Line 11	26	31		
Line 12	24	32		
Line 13	29	34		
Line 14	34	36		
Line 15	36	39		

Line 16	30	40		
Line 17	31	41		
Line 18	32	42		
Line 19	23	42		
Line 20	25	41		
Line 21	28	40		
Line 22	16	19	Canal Water (Seepage)	
Line 23	19	17	Canal Water (Seepage)	
Line 24	17	35	Canal Water (Seepage)	Sheet Pile
Line 25	4	3	Drainage	
Line 26	3	10	Drainage	
Line 27	35	45		
Line 28	45	11	Canal Water (Seepage)	
Line 29	11	16	Canal Water (Seepage)	
Line 30	39	49		
Line 31	4	5	Drainage	
Line 32	35	50		
Line 33	50	4		
Line 34	27	29	Curb	
Line 35	49	15	Canal Water (Seepage)	
Line 36	15	13	Canal Water (Seepage)	
Line 37	13	2	Canal Water (Seepage)	
Line 38	2	1	Canal Water (Seepage)	
Line 39	1	28	No Flow	
Line 40	24	21	Curb	
Line 41	21	33	No Flow	
Line 42	33	43	No Flow	
Line 43	43	20	No Flow	
Line 44	20	23	No Flow	
Line 45	35	53	Canal Water (Seepage)	Sheet Pile
Line 46	53	51		
Line 47	51	12	Canal Water (Seepage)	
Line 48	12	45	Canal Water (Seepage)	
Line 49	53	37	Canal Water (Seepage)	Sheet Pile
Line 50	37	38		
Line 51	38	48	1	

Line 52	48	47	Canal Water (Seepage)
Line 53	47	46	Canal Water (Seepage)
Line 54	46	51	Canal Water (Seepage)
Line 55	48	49	Canal Water (Seepage)
Line 56	29	7	Curb
Line 57	7	18	Drainage
Line 58	18	6	Drainage
Line 59	6	14	Drainage
Line 60	14	5	Drainage
Line 61	5	52	
Line 62	52	50	

	X (ft)	Y (ft)
Point 1	54.7	-12.6
Point 2	111	-12.5
Point 3	210	5.2
Point 4	219	3
Point 5	230.2	-0.6
Point 6	245.3	-3.5
Point 7	310	-3.7
Point 8	200	12.5
Point 9	200.5	12.5
Point 10	201	6
Point 11	182.4	2.7
Point 12	179.8	0.9
Point 13	134.7	-12
Point 14	242.5	-1.7
Point 15	152.3	-7.4
Point 16	193	3.8
Point 17	200	4.2
Point 18	290.7	-3.7
Point 19	199	4.2
Point 20	54.7	-70
Point 21	310	-70

Point 22	201	4.2
Point 23	54.7	-46
Point 24	310	-46
Point 25	54.7	-19
Point 26	310	-19
Point 27	310	-16
Point 28	54.7	-16
Point 29	310	-7
Point 30	245.3	-16
Point 31	245.3	-19
Point 32	245.3	-46
Point 33	245.3	-70
Point 34	245.3	-7
Point 35	200	2
Point 36	200	-7
Point 37	200	-4.5
Point 38	181.4	-4.5
Point 39	181.4	-7
Point 40	181.4	-16
Point 41	181.4	-19
Point 42	181.4	-46
Point 43	181.4	-70
Point 44	181.4	-3.3
Point 45	181.38889	2
Point 46	167	-2.6
Point 47	164.76472	-3.33
Point 48	161.1815	-4.5
Point 49	153.52503	-7
Point 50	222	2
Point 51	177.96971	0.4
Point 52	227.04519	0.4
Point 53	200	0.4

R15A High Flood Seepage Analysis (Gap)

File Information

Created By: USACE St. Louis District Revision Number: 620 Last Edited By: Redell, Chris MVS Date: 2/27/2013

Time: 7:52:37 AM File Name: 17thReach15A.gsz

Directory: Y\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case
_LWL_and_HIgh_water_analyses\High water cases\
Last Solved Date: 2/27/2013

Last Solved Time: 7:52:44 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Mass(M) Units: lbs Mass Flux Units: lbs/sec Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Seepage Analysis (Gap)

Kind: SEEP/W Method: Steady-State Settings

Include Air Flow: No Control

Apply Runoff: No

Convergence

Convergence Type: Head Vector Norm Maximum Number of Iterations: 500

Tolerance: 0.001

Maximum Change in K: 0.1 Rate of Change in K: 1.02 Minimum Change in K: 1e-005 Equation Solver: Parallel Direct

Potential Seepage Max # of Reviews: 10 Time

Starting Time: 0 sec Duration: 0 sec Ending Time: 0 sec

Materials

EMBANKMENT FILL 1, EL. +5.9 TO +2.0

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sed

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

MARSH, EL. -5.0 TO -13.0

Model: Saturated Only Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BEACH SAND, EL. -13 TO -46 Model: Saturated Only

Hydraulic

K-Sat: 0.00049 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

Sheet Pile

Model: Saturated Only

Hydraulic

K-Sat: 1e-010 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

EMBANKMENT FILL 2, EL. +2.0 TO -3.0

Model: Saturated Only

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

EMBANKMENT FILL 3, EL. -3.0 TO -5.0

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0 °

Boundary Conditions

Drainage

Type: Total Flux (Q) 0

Canal Water Type: Head (H) 8

Curb

Type: Head (H) -5.2

No Flow

Type: Total Flux (Q) 0

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	3,6,7,8,39,20	7.775
Region 2	EMBANKMENT FILL 1, EL. +5.9 TO	10,20,39,8,4,22	58.84

	+2.0		
Region 3	EMBANKMENT FILL 3, EL3.0 TO - 5.0	23,24,25,5,13,26	102.66
Region 4	BEACH SAND, EL13 TO -46	17,16,1,29,32,27,14,15,28,33	8037.6009
Region 5	EMBANKMENT FILL 1, EL. +5.9 TO +2.0	18,19,38,20,10,40	19.57
Region 6	EMBANKMENT FILL 3, EL3.0 TO - 5.0	42,30,31,41	3.4
Region 7	EMBANKMENT FILL 3, EL3.0 TO - 5.0	31,30,9,11,23,26,21	176.45
Region 8	MARSH, EL5.0 TO -13.0	1,2,12,41,31,21,26,13,14,27,32,29	1379.1041
Region 9	BAY SOUND CLAY, EL46 TO -70	17,33,28,15,37,36,35,34	5829.6
Region 10	EMBANKMENT FILL 2, EL. +2.0 TO - 3.0	11,44,46,45,23	163.39
Region 11	EMBANKMENT FILL 2, EL. +2.0 TO - 3.0	44,10,22,46	34.495
Region 12	EMBANKMENT FILL 2, EL. +2.0 TO - 3.0	11,43,47,44	72.2
Region 13	EMBANKMENT FILL 2, EL. +2.0 TO - 3.0	47,48,40,10,44	28.71125
Region 14	EMBANKMENT FILL 3, EL3.0 TO - 5.0	42,30,9,11,43	66.975

	Start Point	End Point	Hydraulic Boundary	Right Side Material	Left Side Material
Line 1	3	6	Canal Water		
Line 2	6	7			
Line 3	7	8	Drainage		
Line 4	17	16	No Flow		
Line 5	14	15	Curb		
Line 6	20	10	Canal Water	Sheet Pile	
Line 7	4	8	Drainage		
Line 8	22	10			
Line 9	15	28			
Line 10	23	11			
Line 11	23	24	Drainage		

Line 12	24	25	Drainage		
Line 13	25	5	Drainage		
Line 14	13	5	Curb		
Line 15	13	26			
Line 16	27	14			
Line 17	16	1	No Flow		
Line 18	26	23			
Line 19	11	9	Canal Water	Sheet Pile	
Line 20	9	30			
Line 21	30	31			
Line 22	26	21			
Line 23	21	31			
Line 24	29	32			
Line 25	32	27			
Line 26	28	33			
Line 27	33	17			
Line 28	19	38	Canal Water		
Line 29	38	20	Canal Water		
Line 30	18	19	Canal Water		
Line 31	1	29			
Line 32	20	39		Sheet Pile	
Line 33	39	8			
Line 34	20	3	Canal Water		
Line 35	10	40			
Line 36	40	18	Canal Water		
Line 37	41	31			
Line 38	42	30			
Line 39	43	11			
Line 40	41	42	Canal Water		
Line 41	22	4	Drainage		
Line 42	1	2	Canal Water		
Line 43	2	12	Canal Water		
Line 44	12	41	Canal Water		
Line 45	13	14	Curb		
Line 46	15	37	Curb		
Line 47	37	36	No Flow		

	X (ft)	Y (ft)		
ints				
Line 61	43	42	Canal Water	
Line 60	48	40	Canal Water	
Line 59	47	48	Canal Water	
Line 58	47	44		
Line 57	43	47	Canal Water	
Line 56	22	46	Drainage	
Line 55	44	10	Canal Water	Sheet Pile
Line 54	45	23	Drainage	
Line 53	46	45		
Line 52	44	46		
Line 51	11	44	Canal Water	Sheet Pile
Line 50	34	17	No Flow	
Line 49	35	34	No Flow	
Line 48	36	35	NO Flow	

Р

	X (ft)	Y (ft)
Point 1	67.1	-12.2
Point 2	131.7	-11.2
Point 3	200	6.5
Point 4	207.9	6.4
Point 5	310	-3.2
Point 6	200	13
Point 7	200.5	13
Point 8	201	6.5
Point 9	200	-4.5
Point 10	200	2
Point 11	200	-3
Point 12	151.6	-8.3
Point 13	310	-5
Point 14	310	-13
Point 15	310	-46
Point 16	67.1	-18
Point 17	67.1	-46
Point 18	184.6	2.5

Point 19	190.3	3.3
Point 20	200	3.6
Point 21	200	-5
Point 22	220.5	2.3
Point 23	264.2	-2
Point 24	275.1	-2.4
Point 25	298.4	-3.2
Point 26	264.2	-5
Point 27	264.2	-13
Point 28	264.2	-46
Point 29	121.85217	-13
Point 30	168.1	-4.5
Point 31	168.1	-5
Point 32	168.1	-13
Point 33	168.1	-46
Point 34	67.1	-70
Point 35	168.1	-70
Point 36	264.2	-70
Point 37	310	-70
Point 38	199	3.6
Point 39	201	3.6
Point 40	183.7	2
Point 41	160.6	-5
Point 42	162	-4.5
Point 43	171.5	-2.1
Point 44	200	0.4
Point 45	235	0.4
Point 46	226.6	1.1
Point 47	181	0.4
Point 48	182.9	1.875

R15B High Flood Seepage Analysis (Gap) Report generated using GeoStudio 2007, version 7.17. Copyright © 1991-2010 GEO-SLOPE International Ltd.

File Information

Created By: USACE St. Louis District Revision Number: 700 Last Edited By: Redell, Chris MVS Date: 2/27/2013

Time: 7:40:46 AM

File Name: 17thReach15B.gsz

Directory: Y\OfficePrivateShare\ED-G\PRO Work\17th Street Canal\New S-case LWL and High, water_analyses\High water cases\
Last Solved Date: 2/27/2013
Last Solved Time: 7-40:56 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Mass(M) Units: lbs Mass Flux Units: lbs/sec Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Seepage Analysis (Gap)

Kind: SEEP/W Method: Steady-State Settings

Include Air Flow: No Control

Apply Runoff: No

Convergence Convergence Type: Head Vector Norm Maximum Number of Iterations: 500

Tolerance: 0.001

Maximum Change in K: 0.1

Rate of Change in K: 1.02 Minimum Change in K: 1e-005 Equation Solver: Parallel Direct

Potential Seepage Max # of Reviews: 10 Time

Starting Time: 0 sec

Duration: 0 sec Ending Time: 0 sec

Materials

FILL top, EL. +6.5 to 2

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0

MARSH, EL. -5 to -13

Model: Saturated Only Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BEACH SAND, EL. -13 to -46

Model: Saturated Only Hydraulic

K-Sat: 0.00049 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BAY SOUND CLAY, EL. -46 to -70

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0 °

Sheet Pile

Model: Saturated Only

Hydraulic

K-Sat: 1e-010 ft/sec

Volumetric Water Content: 0 ft3/ft3

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

FILL middle, EL. 2 to -3

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0

FILL bottom, EL. -3 to -5

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0

Boundary Conditions

Drainage

Type: Total Flux (Q) 0

Canal Water Type: Head (H) 8.1

Curb Type: Head (H) -5.1

No Flow

Type: Total Flux (Q) 0

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	7,8,9,35,4,21	4.275
Region 2	FILL top, EL. +6.5 to 2	11,4,35,9,5,40,23	97.81

BEACH SAND, EL13 to -46	18,17,1,2,3,39,31,28,15,16	7921.135
FILL top, EL. +6.5 to 2	19,20,34,21,4,11,36	82.845
BAY SOUND CLAY, EL46 to -70	16,33,32,18	5829.6
MARSH, EL5 to -13	13,39,31,28,15,14,27,22,30,37	1436.19
FILL bottom, EL3 to -5	12,10,29,38,37,30,22,27,14,6,26,25,24	267.885
FILL bottom, EL3 to -5	42,12,10,29,38	89.578
FILL middle, EL. 2 to -3	42,43,41,12	92.934
FILL middle, EL. 2 to -3	43,36,11,41	36
FILL middle, EL. 2 to -3	41,11,23,45,44	47.86
FILL middle, EL. 2 to -3	12,41,44,46,47,48,24	146.875
	FILL top, EL. +6.5 to 2 BAY SOUND CLAY, EL46 to -70 MARSH, EL5 to -13 FILL bottom, EL3 to -5 FILL bottom, EL3 to -5 FILL middle, EL. 2 to -3 FILL middle, EL. 2 to -3 FILL middle, EL. 2 to -3	FILL top, EL. +6.5 to 2 19,20,34,21,4,11,36 BAY SOUND CLAY, EL46 to -70 16,33,32,18 MARSH, EL5 to -13 13,39,31,28,15,14,27,22,30,37 FILL bottom, EL3 to -5 12,10,29,38,37,30,22,27,14,6,26,25,24 FILL middle, EL. 2 to -3 42,43,41,12 FILL middle, EL. 2 to -3 43,36,11,41 FILL middle, EL. 2 to -3 41,11,23,45,44

	Start Point	End Point	Hydraulic Boundary	Left Side Material	Right Side Material
Line 1	7	8			
Line 2	8	9			
Line 3	18	17	No Flow		
Line 4	15	16	Curb		
Line 5	5	9	Drainage		
Line 6	23	11			
Line 7	24	12			
Line 8	14	27			
Line 9	28	15			
Line	17	1	No Flow		
10			Notiow		
Line	27	22			
11					
Line	22	30			
12					
Line 13	31	28			
Line 14	20	34	Canal Water		
Line					
15	34	21	Canal Water		
Line	19	20	Canal Water		
16	1 2		Canal Water		

Line 17	35	9			
Line 18	11	36			
Line 19	36	19	Canal Water		
Line 20	37	30			
Line 21	31	39			
Line 22	1	2	Canal Water		
Line 23	2	3	Canal Water		
Line 24	3	39			
Line 25	21	7			
Line 26	35	4		Sheet Pile	
Line 27	4	21			
Line 28	11	4		Sheet Pile	FILL top, EL. +6.5 to
Line 29	5	40	Drainage		
Line 30	40	23	Drainage		
Line 31	16	33	Curb		
Line 32	33	32	No Flow		
Line 33	32	18	No Flow		
Line 34	18	16			
Line 35	13	39	Canal Water		

Line 36	15	14	Curb	
Line 37	37	13	Canal Water	
Line 38	12	10		Sheet Pile
Line 39	10	29		
Line 40	29	38		
Line 41	38	37	Canal Water	
Line 42	14	6	Curb	
Line 43	6	26	Drainage	
Line 44	26	25	Drainage	
Line 45	25	24	Drainage	
Line 46	42	12		
Line 47	42	43	Canal Water	
Line 48	43	41		
Line 49	41	12		Sheet Pile
Line 50	43	36	Canal Water	
Line 51	11	41		Sheet Pile
Line 52	23	45	Drainage	
Line 53	45	44	Drainage	
Line 54	44	41		

Line 55	44	46	Drainage	
Line 56	46	47	Drainage	
Line 57	47	48	Drainage	
Line 58	48	24	Drainage	
Line 59	42	38	Canal Water	

Points

	X (ft)	Y (ft)
Point 1	67.1	-15.6
Point 2	101.1	-14.9
Point 3	117.4	-13.3
Point 4	200	7.3
Point 5	207.9	7.3
Point 6	310	-3
Point 7	200	13
Point 8	200.5	13
Point 9	201	7.3
Point 10	200	-4.5
Point 11	200	2
Point 12	200	-3
Point 13	138.2	-6.3
Point 14	310	-5
Point 15	310	-13
Point 16	310	-46
Point 17	67.1	-18
Point 18	67.1	-46
Point 19	179.1	3.1
Point 20	190.3	6.7
Point 21	200	7.5
Point 22	200	-5
Point 23	227	2

Point 24	264.2	-2.6
Point 25	275.1	-2.6
Point 26	296.4	-3
Point 27	264.2	-5
Point 28	264.2	-13
Point 29	160.3	-4.5
Point 30	160.3	-5
Point 31	160.3	-13
Point 32	67.1	-70
Point 33	310	-70
Point 34	199	7.5
Point 35	200.9	7.3
Point 36	178.2	2
Point 37	145.7	-5
Point 38	148.6	-4.5
Point 39	118.3	-13
Point 40	220	4.5
Point 41	200	0.4
Point 42	162.46	-2.11
Point 43	176.8	0.4
Point 44	233.6	0.4
Point 45	228.7	1.4
Point 46	235.6	0
Point 47	245.2	-1.7
Point 48	254.5	-1.9

R16 High Flood Seepage Analysis (Global)

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```
File Information
```

Created By: USACE St. Louis District
Revision Number: 629
Last Edited By: Redell, Chris MVS
Date: 2/27/2013
Time: 8:40:53 AM
File Name: 17thReach16.gsz
Directory: Yt\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case
LWL_and_High_water_analyses\High water cases\
Last Solved Date: 2/27/2013
Last Solved Time: 8:41:00 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: Ibf Pressure(p) Units: psf Mass(M) Units: Ibs Mass Flux Units: Ibs/sec Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

```
Seepage Analysis (Global)
Kind: SEEP/W
Method: Steady-State
Settings
Include Air Flow: No
Control
Apply Runoff: No
Convergence
Convergence Type: Head Vector Norm
Maximum Number of Iterations: 500
Tolerance: 0.001
Maximum Change in K: 0.1
```

1

```
Sheet Pile
     Model: Saturated Only
     Hydraulic
           K-Sat: 1e-010 ft/sec
           Volumetric Water Content: 0 ft³/ft³
           Mv: 0 /psf
           K-Ratio: 1
           K-Direction: 0
Fill (protected), EL. -3.1 TO -4
     Model: Saturated Only
     Hydraulic
           K-Sat: 3.28e-007 ft/sec
           Volumetric Water Content: 0 ft<sup>3</sup>/ft<sup>3</sup>
Mv: 0 /psf
           K-Ratio: 1
           K-Direction: 0 °
FILL bottom, EL. 4 TO -4
     Model: Saturated Only
     Hydraulic
           K-Sat: 3.28e-008 ft/sec
           Volumetric Water Content: 0 ft³/ft³
Mv: 0 /psf
           K-Ratio: 1
```

Boundary Conditions

K-Direction: 0 °

```
Drainage
Review: true
Type: Total Flux (Q) 0

Curb
Type: Head (H) -5.1

Canal Water (Global)
Type: Head (H) 10

No Flow
Type: Total Flux (Q) 0
```

Regions

	Material	Points	Area (ft²)

```
Rate of Change in K: 1.02
Minimum Change in K: 1.00
Equation Solver: Parallel Direct
Potential Seepage Max # of Reviews: 10
Time
Starting Time: 0 sec
Duration: 0 sec
Ending Time: 0 sec
```

Materials

```
FILL top, EL. +10.2 TO 4
     Model: Saturated Only
     Hydraulic
           K-Sat: 3.28e-008 ft/sec
           Volumetric Water Content: 0 ft<sup>3</sup>/ft<sup>3</sup>
Mv: 0 /psf
           K-Ratio: 1
           K-Direction: 0
MARSH, EL. -4 TO -9
     Model: Saturated Only
     Hydraulic
           K-Sat: 3.28e-007 ft/sec
           Volumetric Water Content: 0 ft<sup>3</sup>/ft<sup>3</sup>
Mv: 0 /psf
           K-Ratio: 1
           K-Direction: 0
BEACH SAND, EL. -9 TO -46
     Hydraulic
           K-Sat: 0.00049 ft/sec
           Volumetric Water Content: 0 ft³/ft³
Mv: 0 /psf
           K-Ratio: 1
           K-Direction: 0 °
BAY SOUND CLAY, EL. -46 TO -70
     Model: Saturated Only
     Hydraulic
           K-Sat: 3.28e-008 ft/sec
           Volumetric Water Content: 0 ft³/ft³
Mv: 0 /psf
           K-Ratio: 1
           K-Direction: 0 °
```

Region 1	Sheet Pile	3,10,11,12,20,34	2.625
Region 2	BEACH SAND, EL9 TO -46	15,14,13,19,29,1	9764
Region 3	Fill (protected), EL3.1 TO -4	7,21,22,8	59.4
Region 4	FILL top, EL. +10.2 TO 4	20,23,25,5,4,12	88.179645
Region 5	BAY SOUND CLAY, EL46 TO -70	32,13,14,33	6355.2
Region 6	MARSH, EL4 TO -9	28,24,21,22,19,29	840.75
Region 7	FILL bottom, EL. 4 TO -4	27,26,23,9	172.05221
Region 8	FILL top, EL. +10.2 TO 4	26,30,2,18,31,17,3,34,20,23	75.42177
Region 9	FILL bottom, EL. 4 TO -4	7,6,16,25,23,9,36	244.73286
Region 10	Fill (protected), EL3.1 TO -4	36,24,21,7	39.6
Region 11	Fill (protected), EL3.1 TO -4	35,36,24,28	41.535
Region 12	FILL bottom, EL. 4 TO -4	35,36,9,27	67.84

	Start Point	End Point	Left Side Material	Hydraulic Boundary
Line 1	3	10		
Line 2	10	11		
Line 3	11	12		
Line 4	12	20	Sheet Pile	
Line 5	15	14		No Flow
Line 6	13	19		Curb
Line 7	7	21		
Line 8	21	22		
Line 9	22	8		Curb
Line 10	8	7		Drainage
Line 11	24	21		
Line 12	23	20	Sheet Pile	
Line 13	23	25		
Line 14	25	5		Drainage
Line 15	5	4		Drainage
Line 16	4	12		Drainage
Line 17	9	23	Sheet Pile	
Line 18	29	1		Canal Water (Global
Line 19	13	14		
Line 20	32	13		Curb

Line 21	14	33	No Flow
Line 22	33	32	No Flow
Line 23	29	19	
Line 24	15	1	Canal Water (Global)
Line 25	22	19	Curb
Line 26	29	28	Canal Water (Global)
Line 27	24	28	
Line 28	27	9	
Line 29	20	34	
Line 30	34	3	
Line 31	27	26	Canal Water (Global)
Line 32	26	23	
Line 33	26	30	Canal Water (Global)
Line 34	30	2	Canal Water (Global)
Line 35	2	18	Canal Water (Global)
Line 36	18	31	Canal Water (Global)
Line 37	31	17	Canal Water (Global)
Line 38	17	3	Canal Water (Global)
Line 39	24	36	
Line 40	36	9	
Line 41	7	6	Drainage
Line 42	6	16	Drainage
Line 43	16	25	Drainage
Line 44	36	7	
Line 45	35	36	
Line 46	28	35	Canal Water (Global)
Line 47	27	35	Canal Water (Global)

	X (ft)	Y (ft)
Point 1	127.2	-9.4
Point 2	192.2	8.4
Point 3	200	10.2
Point 4	206.8	9.9
Point 5	219	5.5

Point 6	236.8	0
Point 7	244	-3.1
Point 8	310	-3.1
Point 9	200	-1.5
Point 10	200	13.4
Point 11	200.5	13.4
Point 12	201	9.9
Point 13	310	-46
Point 14	45.2	-46
Point 15	45.2	-9.4
Point 16	229.9	2
Point 17	199	10.2
Point 18	195.2	9.4
Point 19	310	-9
Point 20	200	9.9
Point 21	244	-4
Point 22	310	-4
Point 23	200	4
Point 24	200	-4
Point 25	222.89286	4
Point 26	177.43556	4
Point 27	160	-1.5
Point 28	152.5	-4
Point 29	131.2	-9
Point 30	189.18	7.5
Point 31	198.05	10
Point 32	310	-70
Point 33	45.2	-70
Point 34	200	10
Point 35	155.2	-3.1
Point 36	200	-3.1

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File Information

Created By: USACE St. Louis District Revision Number: 561 Last Edited By: Redell, Chris MVS Date: 2/27/2013

Time: 9:36:37 AM File Name: 17thReach17.gsz

Directory: Y\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/27/2013

Last Solved Time: 9:36:44 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Mass(M) Units: lbs Mass Flux Units: lbs/sec Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Seepage Analysis (Gap)

Kind: SEEP/W Method: Steady-State Settings

Include Air Flow: No

Apply Runoff: No Convergence

Convergence Type: Head Vector Norm Maximum Number of Iterations: 500

Tolerance: 0.001 Maximum Change in K: 0.1

Rate of Change in K: 1.02 Minimum Change in K: 1e-005 Equation Solver: Parallel Direct

Potential Seepage Max # of Reviews: 10 Time

Starting Time: 0 sec Duration: 0 sec Ending Time: 0 sec

Materials

EMBANKMENT FILL, EL. +9.6 TO +4.5

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sed

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0

MARSH, EL. -3.0 TO -7.0 Model: Saturated Only

Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BEACH SAND, EL. -12 TO -46

Model: Saturated Only Hydraulic

K-Sat: 0.00049 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Direction: 0 °

BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

Sheet Pile Model: Saturated Only

Hydraulic

K-Sat: 1e-010 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

EMBANKMENT FILL 2, EL. +4.5 TO -3.0

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Direction: 0 °

EMBANKMENT FILL 3, EL. +1.2 TO -3.0

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0

MARSH, EL. -7.0 TO -12.0

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

Boundary Conditions

Drainage

Review: true Type: Total Flux (Q) 0

Canal Water

Type: Head (H) 10

Type: Head (H) -3.4

No-Flow

Type: Total Flux (Q) 0

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	12,47,13,14,15,25	2.725
Region 2 EMBANKMENT FILL, EL. +9.6 TO +4.		4,5,38,12,43,45	63.226664
Region 3	BEACH SAND, EL12 TO -46	22,21,30,27,18,19,34,36	8544.2
Region 4	EMBANKMENT FILL, EL. +9.6 TO +4.5	44,7,6,15,25,12,43	84.332835
Region 5	MARSH, EL7.0 TO -12.0	21,1,2,40,33,32,17,18,27,30	1141.5954
Region 6	BAY SOUND CLAY, EL46 TO -70	22,23,37,35,20,19,34,36	6031.2
Region 7	MARSH, EL3.0 TO -7.0	40,41,29,28,26,24,46,17,32,33	644.89156
Region 8	EMBANKMENT FILL 3, EL. +1.2 TO - 3.0	41,42,51,52,16,28,29	76.72322
Region 9	EMBANKMENT FILL 3, EL. +1.2 TO - 3.0	52,8,9,10,11,24,26,28,16	186.725
Region 10	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	51,3,48,39,45,43,49,52	172.96918
Region 11	EMBANKMENT FILL 2, EL. +4.5 TO - 3.0	8,50,44,43,49,52	176.91624

	Start Point	End Point	Hydraulic Boundary	Left Side Material	Right Side Material
Line 1	13	14			
Line 2	22	21	No-Flow		
Line 3	18	19	Curb		
Line 4	5	4	Canal Water		
Line 5	15	14			
Line 6	15	25			
Line 7	25	12		Sheet Pile	
Line 8	18	27			
Line 9	7	6	Drainage		
Line 10	6	15	Drainage		
Line	27	30			

				I	
11					
Line 12	30	21			
Line 13	29	28			
Line 14	28	26			
Line 15	24	26			
Line 16	17	32			
Line 17	32	33			
Line 18	19	34			
Line 19	34	36			
Line 20	36	22			
Line 21	5	38	Canal Water		
Line 22	38	12	Canal Water		
Line 23	40	33			
Line 24	29	41			
Line 25	12	43	Canal Water	EMBANKMENT FILL, EL. +9.6 TO +4.5	Sheet Pile
Line 26	44	7	Drainage		
Line 27	45	4	Canal Water		
Line 28	43	45			
Line 29	43	44			
Line	21	1	No-Flow		

30				
Line 31	1	2	Canal Water	
Line 32	2	40	Canal Water	
Line 33	17	18	Curb	
Line 34	22	23	No-Flow	
Line 35	23	37	No-Flow	
Line 36	37	35	No-Flow	
Line 37	35	20	No-Flow	
Line 38	20	19	Curb	
Line 39	40	41	Canal Water	
Line 40	24	46	Curb	
Line 41	46	17	Curb	
Line 42	12	47	Canal Water	
Line 43	47	13		
Line 44	43	49	Canal Water	Sheet Pile
Line 45	52	51		
Line 46	49	52	Canal Water	Sheet Pile
Line 47	41	42	Canal Water	
Line 48	42	51	Canal Water	
Line	52	16	Canal Water	Sheet Pile

49				
Line 50	16	28		
Line 51	8	9	Drainage	
Line 52	9	10	Drainage	
Line 53	10	11	Drainage	
Line 54	11	24	Curb	
Line 55	8	52		
Line 56	51	3	Canal Water	
Line 57	3	48	Canal Water	
Line 58	48	39	Canal Water	
Line 59	39	45	Canal Water	
Line 60	8	50	Drainage	
Line 61	50	44	Drainage	

	X (ft)	Y (ft)
Point 1	58.7	-8.4
Point 2	138.7	-8.4
Point 3	163.3	-0.1
Point 4	185	6.1
Point 5	196.6	9.9
Point 6	208	10
Point 7	220	5.5
Point 8	239.2	-1.2
Point 9	250.6	-1.3

Point 10	274.1	-1.4
Point 11	310	-1.4
Point 12	200	9.9
Point 13	200	13.5
Point 14	200.5	13.5
Point 15	201	10
Point 16	200	-2.5
Point 17	310	-7
Point 18	310	-12
Point 19	310	-46
Point 20	310	-70
Point 21	58.7	-12
Point 22	58.7	-46
Point 23	58.7	-70
Point 24	310	-3
Point 25	201	9.9
Point 26	239.2	-3
Point 27	239.2	-12
Point 28	200	-3
Point 29	177	-3
Point 30	177	-12
Point 31	177	-2.5
Point 32	239.2	-7
Point 33	177	-7
Point 34	239.2	-46
Point 35	239.2	-70
Point 36	177	-46
Point 37	177	-70
Point 38	199	9.9
Point 39	177	3.7
Point 40	142.8494	-7
Point 41	154.70482	-3
Point 42	156.18675	-2.5
Point 43	200	4.5
Point 44	222.86567	4.5
Point 45	179.66667	4.5

Point 46	310	-3.4
Point 47	200	10
Point 48	165.10004	0.40634
Point 49	200	0.4
Point 50	234.61639	0.40305
Point 51	160.05	-1.2
Point 52	200	-1 2

R18 High Flood Seepage Analysis (Gap)

File Information

Created By: USACE St. Louis District Revision Number: 720 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 10:21:28 AM

File Name: 17thReach18.gsz

Directory: Y\0fficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case _LWL_and_HIgh_water_analyses\High water cases\ Last Solved Date: 2/27/2013

Last Solved Time: 10:21:34 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Mass(M) Units: lbs Mass Flux Units: lbs/sec Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Seepage Analysis (Gap)

Kind: SEEP/W Method: Steady-State Settings Include Air Flow: No Apply Runoff: Yes Convergence

Convergence Type: Head Vector Norm Maximum Number of Iterations: 500 Tolerance: 0.001 Maximum Change in K: 0.1 Rate of Change in K: 1.02 Minimum Change in K: 1e-005 Equation Solver: Parallel Direct

No Flow

Type: Total Flux (Q) 0

Regions

	Material	Points	Area (ft²)
Region 1	BEACH SAND, EL17 TO -46	20,19,33,44,26,16,17,36,34	7792.5
Region 2	Fill 2, El -1.3 to -3 (Protected)	7,27,22,9,8	111.3
Region 3	Sheet Pile	11,10,24,13,12	3.6
Region 4	MARSH 1, EL3 TO -7/-8	15,22,27,28,31,41,2,43,32,30,25	799.65271
Region 5	MARSH 2, EL7/-8 TO -17	1,19,33,44,26,16,15,25,30,32,43	1744.5767
Region 6	BAY SOUND CLAY, EL46 TO -70	20,21,35,37,18,17,36,34	6012
Region 7	EMBANKMENT FILL, EL. +8.6 TO 0	45,42,39,3,23,10,24,29,46	193.86675
Region 8	Fill 2, El. 0 to -3	29,14,28,27,7	110
Region 9	EMBANKMENT FILL, EL. +8.6 TO 0	7,6,5,4,13,24,29	211.6
Region 10	Fill 2, El. 0 to -3	40,38,14,28,31,41	22.875
Region 11	Fill 2, El. 0 to -3	40,38,14,29,46,45	81.911745

Lines

	Start Point	End Point	Hydraulic Boundary	Right Side Material
Line 1	20	19	No Flow	
Line 2	16	17	Curb	
Line 3	16	26		
Line 4	15	25		
Line 5	22	27		
Line 6	7	27		
Line 7	22	9	Curb	
Line 8	9	8	Drainage	
Line 9	8	7	Drainage	
Line 10	11	10	Canal Water (Seepage)	
Line 11	10	24		
Line 12	24	13		Sheet Pile
Line 13	13	12	Drainage	
Line 14	12	11		
Line 15	24	29	Canal Water (Seepage)	Sheet Pile
Line 16	28	27		

Hydraulic K-Sat: 1e-010 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

MARSH 2, EL. -7/-8 TO -17

Model: Saturated Only Hydraulic K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1

K-Direction: 0

Fill 2, El. 0 to -3 Model: Saturated Only

Hydraulic K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1

K-Direction: 0

Fill 2, El -1.3 to -3 (Protected)

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1

Boundary Conditions

K-Direction: 0 °

Drainage

Type: Total Flux (Q) 0

Curb

Type: Head (H) -3.4

Canal Water (Seepage) Type: Head (H) 10

Potential Seepage Max # of Reviews: 10

Starting Time: 0 sec

Duration: 0 sec Ending Time: 0 sec

Materials

Time

EMBANKMENT FILL, EL. +8.6 TO 0

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sed

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

MARSH 1, EL. -3 TO -7/-8

Model: Saturated Only Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BEACH SAND, EL. -17 TO -46

Model: Saturated Only Hydraulic

K-Sat: 0.00049 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BAY SOUND CLAY, EL. -46 TO -70

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

Sheet Pile

Model: Saturated Only

Region 1	BEACH SAND, EL17 TO -46	20,19,33,44,26,16,17,36,34	7792.5
Region 2	Fill 2, El -1.3 to -3 (Protected)	7,27,22,9,8	111.3
Region 3	Sheet Pile	11,10,24,13,12	3.6
Region 4	MARSH 1, EL3 TO -7/-8	15,22,27,28,31,41,2,43,32,30,25	799.65271
Region 5	MARSH 2, EL7/-8 TO -17	1,19,33,44,26,16,15,25,30,32,43	1744.5767
Region 6	BAY SOUND CLAY, EL46 TO -70	20,21,35,37,18,17,36,34	6012
Region 7	EMBANKMENT FILL, EL. +8.6 TO 0	45,42,39,3,23,10,24,29,46	193.86675
Region 8	Fill 2, El. 0 to -3	29,14,28,27,7	110
Region 9	EMBANKMENT FILL, EL. +8.6 TO 0	7,6,5,4,13,24,29	211.6
Region 10	Fill 2, El. 0 to -3	40,38,14,28,31,41	22.875
Region 11	Fill 2, El. 0 to -3	40,38,14,29,46,45	81.911745

Line 17	30	25		
Line 18	32	30		
Line 19	33	19		
Line 20	34	20		
Line 21	17	36		
Line 22	36	34		
Line 23	31	28		
Line 24	31	41		
Line 25	43	32		
Line 26	33	44		
Line 27	44	26		
Line 28	15	22	Curb	
Line 29	41	2	Canal Water (Seepage)	
Line 30	2	43	Canal Water (Seepage)	
Line 31	1	19	No Flow	
Line 32	16	15	Curb	
Line 33	43	1	Canal Water (Seepage)	
Line 34	20	21	No Flow	
Line 35	21	35	No Flow	
Line 36	35	37	No Flow	
Line 37	37	18	No Flow	
Line 38	18	17	Curb	
Line 39	45	46		
Line 40	46	29		
Line 41	29	14	Canal Water (Seepage)	Sheet Pile
Line 42	14	28		
Line 43	45	42	Canal Water (Seepage)	
Line 44	42	39	Canal Water (Seepage)	
Line 45	39	3	Canal Water (Seepage)	
Line 46	3	23	Canal Water (Seepage)	
Line 47	23	10	Canal Water (Seepage)	
Line 48	7	29		
Line 49	7	6	Drainage	
Line 50	6	5	Drainage	
Line 51	5	4	Drainage	
Line 52	4	13	Drainage	

	Line 53	40	38		
ı	Line 54	38	14		
ı	Line 55	41	40	Canal Water (Seepage)	
1	Line 56	45	40	Canal Water (Seenage)	

	X (ft)	Y (ft)
Point 1	59.5	-8.9
Point 2	140.4	-6.9
Point 3	196.9	8.6
Point 4	212	8.3
Point 5	220	5.5
Point 6	234	0
Point 7	244	-1
Point 8	272.5	-1.4
Point 9	310	-1.4
Point 10	200	8.6
Point 11	200	13.3
Point 12	200.5	13.3
Point 13	201	8.5
Point 14	200	-2.5
Point 15	310	-8
Point 16	310	-11
Point 17	310	-46
Point 18	310	-70
Point 19	59.5	-17
Point 20	59.5	-46
Point 21	59.5	-70
Point 22	310	-3
Point 23	199	8.6
Point 24	200	8.5
Point 25	244	-8
Point 26	244	-11
Point 27	244	-3
Point 28	200	-3

Point 29	200	0
Point 30	200	-7
Point 31	163.4	-3
Point 32	163.4	-8
Point 33	163.4	-17
Point 34	163.4	-46
Point 35	163.4	-70
Point 36	244	-46
Point 37	244	-70
Point 38	163.4	-2.5
Point 39	168.1	1.4
Point 40	155.08434	-2.5
Point 41	153.41566	-3
Point 42	163.42771	0
Point 43	108.885	-8
Point 44	200	-17
Point 45	160.1	-1
Point 46	163.4	-1

R19 High Flood Seepage Analysis (Gap)

File Information

Created By: USACE St. Louis District Revision Number: 946 Last Edited By: Redell, Chris MVS Date: 2/27/2013 Time: 10:36:05 AM File Name: 17thReach19.gsz

Directory: Y\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case
_LWL_and_HIgh_water_analyses\High water cases\
Last Solved Date: 2/27/2013

Last Solved Time: 10:36:12 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Mass(M) Units: lbs Mass Flux Units: lbs/sec Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Seepage Analysis (Gap)

Kind: SEEP/W Method: Steady-State Settings Include Air Flow: No Apply Runoff: No Convergence Convergence Type: Head Vector Norm Maximum Number of Iterations: 500

Tolerance: 0.001 Maximum Change in K: 0.1 Rate of Change in K: 1.02 Minimum Change in K: 1e-005 Equation Solver: Parallel Direct

Potential Seepage Max # of Reviews: 10

Starting Time: 0 sec Duration: 0 sec Ending Time: 0 sec

Materials

Time

EMBANKMENT FILL 2, EL. +2.0 TO -5.0

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

MARSH 1, EL. -5.0 TO -13.0

Model: Saturated Only Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BEACH SAND, EL. -36 TO -40 Model: Saturated Only

Hydraulic

K-Sat: 2.3e-005 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Direction: 0 °

BAY SOUND CLAY 1, EL. -40 TO -60

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0 °

Sheet Pile

Model: Saturated Only

Hydraulic

K-Sat: 1e-010 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

Lacustrine 1, EL. -13.0 TO -36.0

Model: Saturated Only Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0

Pleistocene, EL. -60 TO -70

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0 °

EMBANKMENT FILL, EL. +7.2 TO 0.0

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

MARSH 2, EL. -13.0 TO -16.0

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BAY SOUND CLAY 2, EL. -50 TO -60

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft3/ft3

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

Rip Rap

Model: Saturated Only

Hydraulic

K-Sat: 0.00023 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0 °

Boundary Conditions

Zero Pressure

Type: Total Flux (Q) 0

Drainage Review: true

Type: Total Flux (Q) 0

Canal Water

Type: Head (H) 8

Curb

Type: Head (H) -2.5

	Material	Points	Area (ft²)
Regio n 1	Sheet Pile	7,8,9,10,52,6	6.275
Regio n 2	Lacustrine 1, EL13.0 TO -36.0	16,14,44,20,38	2446.4
Regio n 3	Lacustrine 1, EL13.0 TO -36.0	44,14,16,31,26,27,21	2762.1
Regio n 4	MARSH 2, EL13.0 TO -16.0	31,16,57	42.9
Regio	MARSH 1,	15,57,31,26,25,74	908.6

n 5	EL5.0 TO - 13.0		
Regio n 6	BEACH SAND, EL 36 TO -40	21,27,28,33,18,40,22	992
Regio n 7	Pleistocene, EL60 TO - 70	23,41,19,34,29,30,35,42,24	2480
Regio n 8	BAY SOUND CLAY 2, EL 50 TO -60	41,56,55,23	1280
Regio n 9	BAY SOUND CLAY 1, EL 40 TO -60	22,40,18,33,28,29,34,19,41,56,55	3680
Regio n 10	MARSH 2, EL13.0 TO -16.0	61,37,57,16,38,20,58,59,60	264.03029
Regio n 11	MARSH 1, EL5.0 TO - 13.0	63,64,47,48,15,57,37,61,62	301.62504
Regio n 12	EMBANKME NT FILL, EL. +7.2 TO 0.0	6,67,45,12,11,10,52	140.32
Regio n 13	Rip Rap	6,67,66,68,65,70,69,73,64,63,62,61,60,59,58,1,2,54,51,3,50, 36,4,53,5,49	135.30281
Regio n 14	EMBANKME NT FILL, EL. +7.2 TO 0.0	68,66,67,45	17.775
Regio n 15	EMBANKME NT FILL 2, EL. +2.0 TO - 5.0	65,68,45,71	7.0102262
Regio n 16	EMBANKME NT FILL 2, EL. +2.0 TO - 5.0	71,15,48,47,64,73,69,70,65	97.436825
Regio n 17	EMBANKME NT FILL 2, EL. +2.0 TO -	12,46,13,72,71,45	202.61875

	5.0		
	EMBANKME		
Regio	NT FILL 2,	71,15,74,25,72	368.15625
n 18	EL. +2.0 TO -	/ 1,13,74,23,72	500.15025
	5.0		

Lines

	Start Point	End Point	Hydraulic Boundary	Left Side Material	Right Side Materia
Line 1	7	8	Canal Water		
Line 2	8	9			
Line 3	9	10	Drainage		
Line 4	31	26			
Line 5	38	20			
Line 6	16	38			
Line 7	15	48			
Line 8	48	47			
Line 9	6	52			
Line 10	52	10			
Line 11	6	7	Canal Water		
Line 12	31	16			
Line 13	21	27			
Line 14	16	14	Canal Water	Sheet Pile	
Line 15	14	44			
Line 16	44	20	Zero Pressure		
Line 17	26	27	Curb		
Line 18	21	44	Zero Pressure		
Line 19	12	45			
Line 20	15	57	Canal Water	Sheet Pile	
Line 21	16	57	Canal Water		Sheet Pile
Line 22	57	31			
Line 23	26	25	Curb		
Line 24	27	28	Curb		
Line 25	28	33			
Line 26	33	18			
Line 27	18	40			

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Line 28	40	22			
Line 29	22	21	Zero Pressure		
Line 30	23	41			
Line 31	41	19			
Line 32	19	34			
Line 33	34	29			
Line 34	29	30	Curb		
Line 35	30	35	Zero Pressure		
Line 36	35	42	Zero Pressure		
Line 37	42	24	Zero Pressure		
Line 38	24	23	Zero Pressure		
Line 39	41	56			
Line 40	56	55			
Line 41	55	23	Zero Pressure		
Line 42	28	29	Curb		
Line 43	55	22	Zero Pressure		
Line 44	61	37			
Line 45	37	57			
Line 46	20	58	Zero Pressure		
Line 47	58	59			
Line 48	59	60			
Line 49	60	61			
Line 50	64	47			
Line 51	63	64			
Line 52	61	62			
Line 53	62	63			
Line 54	6	67	Canal Water	Sheet Pile	
Line 55	67	45	Canal Water	Sheet Pile	
Line 56	12	11	Drainage		
Line 57	11	10	Drainage		
Line 58	67	66			
Line 59	58	1	Zero Pressure		
Line 60	1	2	Canal Water		
Line 61	2	54	Canal Water		
Line 62	54	51	Canal Water		
Line 63	51	3	Canal Water		

Line 64	3	50	Canal Water		
Line 65	50	36	Canal Water		
Line 66	36	4	Canal Water		
Line 67	4	53	Canal Water		
Line 68	53	5	Canal Water		
Line 69	5	49	Canal Water		
Line 70	49	6	Canal Water		
Line 71	66	68			
Line 72	68	65			
Line 73	45	68			
Line 74	65	70			
Line 75	70	69			
Line 76	45	71	Canal Water	Sheet Pile	
Line 77	71	15	Canal Water	Sheet Pile	
Line 78	71	65			
Line 79	69	73			
Line 80	73	64			
Line 81	12	46	Drainage		
Line 82	46	13	Drainage		
Line 83	13	72	Curb		
Line 84	72	71			
Line 85	25	72	Curb		
Line 86	15	74			
Line 87	74	25			

Points

	X (ft)	Y (ft)
Point 1	62	-13.9
Point 2	135.6	-13.9
Point 3	166	-8.1
Point 4	181.9	-1
Point 5	190.8	2.3
Point 6	200	4.9
Point 7	200	7.2
Point 8	200	12.5

Point 9	200.5	12.5
Point 10	201	7.2
Point 11	219.5	6.4
Point 12	228.6	2
Point 13	310	-0.5
Point 14	200	-33.8
Point 15	200	-5
Point 16	200	-18
Point 17	200	-36
Point 18	200	-40
Point 19	200	-60
Point 20	62	-16
Point 21	62	-36
Point 22	62	-40
Point 23	62	-60
Point 24	62	-70
Point 25	310	-5
Point 26	310	-13
Point 27	310	-36
Point 28	310	-40
Point 29	310	-60
Point 30	310	-70
Point 31	228.6	-13
Point 32	228.6	-36
Point 33	228.6	-40
Point 34	228.6	-60
Point 35	228.6	-70
Point 36	176.2	-3.7
Point 37	190	-13
Point 38	190	-16
Point 39	190	-36
Point 40	190	-40
Point 41	190	-60
Point 42	190	-70
Point 43	190	-33.8
Point 44	62	-33.8

Point 45	200	0
Point 46	254.9	-0.5
Point 47	180.21184	-5
Point 48	190	-5
Point 49	199	4.9
Point 50	173.44082	-5
Point 51	145.7	-12.2
Point 52	201	4.9
Point 53	189.99091	2
Point 54	140.94706	-13
Point 55	62	-50
Point 56	190	-50
Point 57	200	-15
Point 58	62	-14.9
Point 59	135.6	-14.9
Point 60	140.94706	-14
Point 61	145.7	-13
Point 62	166	-9.1
Point 63	173.44082	-6
Point 64	175.41256	-5
Point 65	189.99091	1
Point 66	199	3.9
Point 67	200	3.9
Point 68	191.5	1.5
Point 69	181.9	-2
Point 70	188.475	0.43792
Point 71	200	-0.75
Point 72	310	-2.55625
Point 73	175.5775	-4.92373
Point 74	228.155	-5

R30 High Flood Steady-State Seepage Global

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File Information

Created By: USACE St. Louis District
Revision Number: 918
Last Edited By: Goltz, Amanda MVS
Date: 2/25/2013
Time: 11:01:34 AM
File Name: 17thReach30.gsz
Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case
_LWL_and_High_water_analyses\High water cases\
Last Solved Date: 2/25/2013

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Mass(M) Units: lbs Mass Flux Units: lbs/sec Unit Weight of Water: 62.4 pcf

Last Solved Time: 11:01:40 AM

Analysis Settings

```
Steady-State Seepage Global
Kind: SEEP/W
Method: Steady-State
Settings
Include Air Flow: No
Control
Apply Runoff: No
Convergence
Convergence Type: Head Vector Norm
Maximum Number of Iterations: 500
Tolerance: 0.001
Maximum Change in K: 0.1
```

Rate of Change in K: 1.02 Minimum Change in K: 1e-005 Equation Solver: Parallel Direct Potential Seepage Max # of Reviews: 10 Starting Time: 0 sec Duration: 0 sec Ending Time: 0 sec Materials EMBANKMENT FILL, EL. +8.2 TO +1.0 Model: Saturated Only Hvdraulic K-Sat: 3.28e-008 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 BEACH SAND, EL. -15 TO -46 Hydraulic K-Sat: 0.00049 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 BAY SOUND CLAY, EL. -46 TO -70 Hydraulic K-Sat: 3.28e-008 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

EMBANKMENT FILL 2, EL +1 TO -5 Model: Saturated Only

Hydraulic K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0 °

Sheet Pile Model: Saturated Only Hydraulic K-Sat: 1e-010 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 MARSH 1, EL. -7 TO -11 Model: Saturated Only Hydraulic K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° MARSH 2, EL. -11 TO -13 Model: Saturated Only Hydraulic K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1

K-Ratio: 1 K-Direction: 0 °

Embankment Fill 1, El. -3 to -5 Model: Saturated Only

Hydraulic
K-Sat: 3.28e-007 ft/sec
Volumetric Water Content: 0 ft³/ft³
Mv: 0 /psf
K-Ratio: 1
K-Direction: 0 °

Embankment Fill 2, El. -5 to -7 Model: Saturated Only

> K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

Hvdraulic

MARSH 3, EL. -13 TO -15

Model: Saturated Only

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

MARSH 1, EL. -7 TO -11 CL Model: Saturated Only Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf

K-Ratio: 1 K-Direction: 0 °

MARSH 2, EL. -11 TO -13 CL Model: Saturated Only

Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /nsf

K-Ratio: 1 K-Direction: 0 °

MARSH 3, EL. -13 TO -15 CL Model: Saturated Only

Hydraulic K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³ My: 0 /psf

K-Ratio: 1 K-Direction: 0 °

EMBANKMENT FILL 3, EL -5 TO -7 Model: Saturated Only

Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

Boundary Conditions

no flow Type: Total Flux (Q) 0

Drainage Review: true Type: Total Flux (Q) 0

Curb

Type: Head (H) -5.8

Canal Water (Global) Type: Head (H) 8

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	2,5,6,3	3.525
Region 2	Embankment Fill 2, El5 to -7	20,19,11,21	146.6
Region 3	Embankment Fill 1, El3 to -5	10,20,21,4,15	95.04
Region 4	Embankment Fill 2, El5 to -7	28,29,25,24	51.24255
Region 5	Embankment Fill 1, El3 to -5	27,39,28,24,23	35.173485
Region 6	BAY SOUND CLAY, EL46 TO -70	36,13,18,37	5976
Region 7	EMBANKMENT FILL, EL. +8.2 TO +1.0	2,7,22,31,14,3	89.05
Region 8	EMBANKMENT FILL, EL. +8.2 TO +1.0	2,16,34,33,17,26,7	79.944595
Region 9	MARSH 1, EL7 TO -11	46,30,1,9,43,29,25,57	154.62147
Region 10	MARSH 3, EL13 TO -15	35,54,47,53	240.2
Region 11	MARSH 1, EL7 TO -11	48,19,11,50	293.2
Region 12	MARSH 2, EL11 TO -13	49,48,50,42,51	146.6
Region 13	MARSH 3, EL13 TO -15	52,49,51,12	146.6
Region 14	MARSH 2, EL11 TO -13	30,46,56,47,54,38	240.2
Region	BEACH SAND, EL15 TO -46	36,35,53,55,52,12,13	7719

14	MARSH 2	BEACH SAND, EL15 TO -46		10,46,56,47,54,38
Region	BEACH S			36,35,53,55,52,12,13
Line 23	37	36	no flow	
Line 24	27	39	Canal Water (Glo	bal)
Line 25	39	28	Canal Water (Glo	
Line 26	28	24		
Line 27	19	41		
Line 28	41	25		
Line 29	2	7		Sheet Pile
Line 30	22	31	Drainage	
Line 31	31	14	Drainage	
Line 32	14	3	Drainage	
Line 33	2	16	Canal Water (Glo	bal)
Line 34	16	34	Canal Water (Glo	bal)
Line 35	34	33	Canal Water (Glo	bal)
Line 36	33	17	Canal Water (Glo	bal)
Line 37	17	26	Canal Water (Glo	bal)
Line 38	46	30		

Line 26	28	24		
Line 27	19	41		
Line 28	41	25		
Line 29	2	7		Sheet Pile
Line 30	22	31	Drainage	
Line 31	31	14	Drainage	
Line 32	14	3	Drainage	
Line 33	2	16	Canal Water (Global)	
Line 34	16	34	Canal Water (Global)	
Line 35	34	33	Canal Water (Global)	
Line 36	33	17	Canal Water (Global)	
Line 37	17	26	Canal Water (Global)	
Line 38	46	30		
Line 39	30	1	Canal Water (Global)	
Line 40	1	9	Canal Water (Global)	
Line 41	9	43		
Line 42	43	29	Canal Water (Global)	
Line 43	47	54		
Line 44	35	54		
Line 45	47	53		
Line 46	47	56		
Line 47	55	53		
Line 48	56	46		
Line 49	19	48		
Line 50	48	49		
Line 51	49	52		
Line 52	52	55		
Line 53	11	50	Curb	
Line 54	50	48		
Line 55	50	42	Curb	
Line 56	42	51		
Line 57	51	49		
Line 58	51	12	Curb	

15			
Region 16	MARSH 3, EL13 TO -15 CL	53,47,49,52,55	111.2
Region 17	MARSH 1, EL7 TO -11 CL	46,57,25,41,19,48	222.4
Region 18	MARSH 2, EL11 TO -13 CL	47,56,46,48,49	111.2
Region 19	EMBANKMENT FILL 3, EL -5 TO -7	25,24,20,19,41	111.2
Region 20	EMBANKMENT FILL 2, EL +1 TO -5	24,23,27,8,44,26,7,22,32,10,20	330.52795

Lines

	Start Point	End Point	Hydraulic Boundary	Left Side Material
Line 1	2	5	Canal Water (Global)	
Line 2	5	6		
Line 3	6	3	Drainage	
Line 4	3	2		Sheet Pile
Line 5	11	19		
Line 6	20	19		
Line 7	11	21	Curb	
Line 8	21	20		
Line 9	10	20		
Line 10	21	4	Curb	
Line 11	4	15	Drainage	
Line 12	15	10	Drainage	
Line 13	7	22		
Line 14	25	24		
Line 15	24	23		
Line 16	7	26		
Line 17	28	29	Canal Water (Global)	
Line 18	25	29		
Line 19	23	27		
Line 20	36	13		
Line 21	13	18	Curb	
Line 22	18	37	no flow	

Line 59	12	52		
Line 60	54	38	no flow	
Line 61	38	30	Canal Water (Global)	
Line 62	35	53		
Line 63	36	35	no flow	
Line 64	12	13	Curb	
Line 65	25	57		
Line 66	57	46		
Line 67	47	49		
Line 68	48	46		
Line 69	24	20		
Line 70	27	8	Canal Water (Global)	
Line 71	8	44	Canal Water (Global)	
Line 72	44	26	Canal Water (Global)	
Line 73	22	32	Drainage	
Line 74	32	10	Drainage	
Line 75	7	40		Sheet Pile

Points

	X (ft)	Y (ft)
Point 1	133.1	-10.6
Point 2	200	8.2
Point 3	201	8.2
Point 4	310	-3.8
Point 5	200	12.9
Point 6	200.5	12.9
Point 7	200	1
Point 8	178.4	-0.3
Point 9	140.6	-9.7
Point 10	236.7	-3
Point 11	310	-7
Point 12	310	-15
Point 13	310	-46
Point 14	203.5	7.7
Point 15	254.4	-3.8

Point 16 199 8.2 Point 17 191.5 6.1 Point 18 310 -70 Point 19 236.7 -7 Point 20 236.7 -5 Point 21 310 -5 Point 22 223.5 1 Point 23 181.1 -3 Point 24 181.1 -7 Point 25 181.1 -7 Point 26 181.06094 1 Point 27 167.54255 -3 Point 28 159.5 -5 Point 29 151.45745 -7 Point 30 128.58 -11 Point 31 212 4.6 Point 32 229.9 -1 Point 33 194.71429 7 Point 34 198.28572 8 Point 35 61 -15 Point 36 61 -46 Point 37 61 -70 Point 38 61 -11			
Point 18 310 -70 Point 19 236.7 -7 Point 20 236.7 -5 Point 21 310 -5 Point 22 223.5 1 Point 24 181.1 -3 Point 25 181.1 -7 Point 26 181.06094 1 Point 27 167.54255 -3 Point 28 159.5 -5 Point 30 128.58 -11 Point 31 212 4.6 Point 32 229.9 -1 Point 33 194.71429 7 Point 34 198.28572 8 Point 35 61 -15 Point 36 61 -46 Point 37 61 -70 Point 39 163.50524 -4 Point 40 200 -12.4 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575	Point 16	199	8.2
Point 19 236.7 -7 Point 20 236.7 -5 Point 21 310 -5 Point 22 233.5 1 Point 23 181.1 -3 Point 24 181.1 -7 Point 25 181.1 -7 Point 26 181.06094 1 Point 27 167.54255 -3 Point 28 159.5 -5 Point 29 151.45745 -7 Point 30 128.58 -11 Point 31 212 4.6 Point 32 229.9 -1 Point 33 194.71429 7 Point 34 198.28572 8 Point 35 61 -15 Point 36 61 -46 Point 37 61 -70 Point 38 61 -11 Point 39 163.50524 -4 Point 40 200 -12.4 Point 41 200 -7	Point 17	191.5	6.1
Point 20 236.7 -5 Point 21 310 -5 Point 22 223.5 1 Point 23 181.1 -3 Point 24 181.1 -5 Point 25 181.1 -7 Point 26 181.06094 1 Point 27 167.54255 -3 Point 28 159.5 -5 Point 29 151.45745 -7 Point 30 128.58 -11 Point 31 212 4.6 Point 32 229.9 -1 Point 33 194.71429 7 Point 34 198.28572 8 Point 35 61 -15 Point 36 61 -46 Point 37 61 -70 Point 38 61 -11 Point 39 163.50524 -4 Point 40 200 -7 Point 41 200 -7 Point 42 310 -12.4	Point 18	310	-70
Point 21 310 -5 Point 22 223.5 1 Point 24 181.1 -3 Point 24 181.1 -7 Point 25 181.1 -7 Point 26 181.06094 1 Point 27 167.54255 -3 Point 28 159.5 -5 Point 29 151.45745 -7 Point 30 128.58 -11 Point 31 212 4.6 Point 32 229.9 -1 Point 33 194.71429 7 Point 34 198.28572 8 Point 35 61 -15 Point 36 61 -46 Point 37 61 -70 Point 38 61 -11 Point 39 163.50524 -4 Point 40 200 -12.4 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575	Point 19	236.7	-7
Point 22 223.5 1 Point 23 181.1 -3 Point 24 181.1 -5 Point 25 181.1 -7 Point 26 181.06094 1 Point 27 167.54255 -3 Point 28 159.5 -5 Point 29 151.45745 -7 Point 30 128.58 -11 Point 31 212 4.6 Point 32 229.9 -1 Point 34 198.28572 8 Point 35 61 -15 Point 36 61 -46 Point 37 61 -70 Point 38 61 -11 Point 39 163.50524 -4 Point 40 200 -12.4 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 <td>Point 20</td> <td>236.7</td> <td>-5</td>	Point 20	236.7	-5
Point 23 181.1 -3 Point 24 181.1 -5 Point 25 181.1 -7 Point 26 181.06094 1 Point 27 167.54255 -3 Point 28 159.5 -5 Point 29 151.45745 -7 Point 31 212 4.6 Point 32 229.9 -1 Point 33 194.71429 7 Point 34 198.28572 8 Point 35 61 -15 Point 36 61 -46 Point 37 61 -70 Point 38 61 -11 Point 39 163.50524 -4 Point 40 200 -12.4 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 46 181.1 -11	Point 21	310	-5
Point 24 181.1 -5 Point 25 181.0 -7 Point 26 181.06094 1 Point 27 167.54255 -3 Point 28 159.5 -5 Point 29 151.45745 -7 Point 30 128.58 -11 Point 31 212 4.6 Point 32 229.9 -1 Point 34 198.28572 8 Point 36 61 -15 Point 36 61 -46 Point 37 61 -70 Point 38 61 -11 Point 39 163.50524 -4 Point 40 200 -12.4 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 46 181.1 -11 Point 47 181.1 -13	Point 22	223.5	1
Point 25 181.1 -7 Point 26 181.06094 1 Point 27 167.54255 -3 Point 28 159.5 -5 Point 29 151.45745 -7 Point 30 128.58 -11 Point 31 212 4.6 Point 32 229.9 -1 Point 33 194.71429 7 Point 34 198.28572 8 Point 35 61 -15 Point 36 61 -46 Point 37 61 -70 Point 38 61 -11 Point 39 163.50524 -4 Point 40 200 -12.4 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 46 181.1 -11 Point 47 181.1	Point 23	181.1	-3
Point 26 181.06094 1 Point 27 167.54255 -3 Point 28 159.5 -5 Point 29 151.45745 -7 Point 30 128.58 -11 Point 31 212 4.6 Point 32 229.9 -1 Point 33 194.71429 7 Point 34 198.28572 8 Point 35 61 -15 Point 36 61 -46 Point 37 61 -70 Point 39 163.50524 -4 Point 40 200 -12.4 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 46 181.1 -11 Point 47 181.1 -13 Point 48 236.7 -11 Point 49 236.7	Point 24	181.1	-5
Point 27 167.54255 -3 Point 28 159.5 -5 Point 29 151.45745 -7 Point 30 128.58 -11 Point 31 212 4.6 Point 32 229.9 -1 Point 33 194.71429 7 Point 34 198.28572 8 Point 35 61 -15 Point 36 61 -46 Point 37 61 -70 Point 38 61 -11 Point 39 163.50524 -4 Point 40 200 -12.4 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 46 181.1 -11 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 25	181.1	-7
Point 28 159.5 -5 Point 29 151.45745 -7 Point 30 128.58 -11 Point 31 212 4.6 Point 32 229.9 -1 Point 33 194.71429 7 Point 34 198.28572 8 Point 35 61 -45 Point 36 61 -46 Point 37 61 -70 Point 38 61 -11 Point 39 163.50524 -4 Point 40 200 -7 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 45 200 -3.74756 Point 47 181.1 -11 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11 <td>Point 26</td> <td>181.06094</td> <td>1</td>	Point 26	181.06094	1
Point 29 151.45745 -7 Point 30 128.58 -11 Point 31 212 4.6 Point 32 229.9 -1 Point 33 194.71429 7 Point 34 198.28572 8 Point 35 61 -15 Point 36 61 -46 Point 37 61 -70 Point 38 61 -11 Point 39 163.50524 -4 Point 40 200 -7 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 45 200 -3.74756 Point 47 181.1 -11 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 27	167.54255	-3
Point 30 128.58 -11 Point 31 212 4.6 Point 32 229.9 -1 Point 33 194.71429 7 Point 34 198.28572 8 Point 35 61 -15 Point 36 61 -46 Point 37 61 -70 Point 38 61 -11 Point 39 163.50524 -4 Point 40 200 -12.4 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 46 181.1 -11 Point 47 181.1 -13 Point 48 236.7 -11 Point 50 310 -11	Point 28	159.5	-5
Point 31 212 4.6 Point 32 229.9 -1 Point 33 194.71429 7 Point 34 198.28572 8 Point 35 61 -15 Point 36 61 -46 Point 37 61 -70 Point 39 163.50524 -4 Point 40 200 -12.4 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 46 181.1 -11 Point 47 181.1 -13 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 29	151.45745	-7
Point 32 229.9 -1 Point 33 194.71429 7 Point 34 198.28572 8 Point 35 61 -15 Point 36 61 -70 Point 37 61 -70 Point 38 61 -11 Point 39 163.50524 -4 Point 40 200 -12.4 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 46 181.1 -11 Point 47 181.1 -13 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 30	128.58	-11
Point 33 194.71429 7 Point 34 198.28572 8 Point 35 61 -15 Point 36 61 -46 Point 37 61 -70 Point 39 163.50524 -4 Point 40 200 -12.4 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 46 181.1 -11 Point 47 181.1 -13 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 31	212	4.6
Point 34 198.28572 8 Point 35 61 -15 Point 36 61 -46 Point 37 61 -70 Point 38 61 -11 Point 39 163.50524 -4 Point 40 200 -12.4 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 46 181.1 -11 Point 47 181.1 -13 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 32	229.9	-1
Point 35 61 -15 Point 36 61 -46 Point 37 61 -70 Point 38 61 -11 Point 39 163.50524 -4 Point 40 200 -12.4 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 46 181.1 -11 Point 47 181.1 -13 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 33	194.71429	7
Point 36 61 -46 Point 37 61 -70 Point 38 61 -11 Point 39 163.50524 -4 Point 40 200 -12.4 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 46 181.1 -11 Point 47 181.1 -13 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 34	198.28572	8
Point 37 61 -70 Point 38 61 -11 Point 39 163.50524 -4 Point 40 200 -12.4 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 46 181.1 -11 Point 47 181.1 -13 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 35	61	-15
Point 38 61 -11 Point 39 163.50524 -4 Point 40 200 -12.4 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 46 181.1 -11 Point 47 181.1 -13 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 36	61	-46
Point 39 163.50524 -4 Point 40 200 -12.4 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 46 181.1 -11 Point 47 181.1 -13 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 37	61	-70
Point 40 200 -12.4 Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 46 181.1 -11 Point 47 181.1 -13 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 38	61	-11
Point 41 200 -7 Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 46 181.1 -11 Point 47 181.1 -13 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 39	163.50524	-4
Point 42 310 -12.4 Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 46 181.1 -11 Point 47 181.1 -13 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 40	200	-12.4
Point 43 141.50175 -9.47575 Point 44 179.74326 0.35625 Point 45 200 -3.74756 Point 46 181.1 -11 Point 47 181.1 -13 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 41	200	-7
Point 44 179,74326 0.35625 Point 45 200 -3,74756 Point 46 181.1 -11 Point 47 181.1 -13 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 42	310	-12.4
Point 45 200 -3.74756 Point 46 181.1 -11 Point 47 181.1 -13 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 43	141.50175	-9.47575
Point 46 181.1 -11 Point 47 181.1 -13 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 44	179.74326	0.35625
Point 47 181.1 -13 Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 45	200	-3.74756
Point 48 236.7 -11 Point 49 236.7 -13 Point 50 310 -11	Point 46	181.1	-11
Point 49 236.7 -13 Point 50 310 -11	Point 47	181.1	-13
Point 50 310 -11	Point 48	236.7	-11
	Point 49	236.7	-13
Point 51 310 -13	Point 50	310	-11
	Point 51	310	-13

Point 52	236.7	-15
Point 53	181.1	-15
Point 54	61	-13
Point 55	200	-15
Point 56	181.1	-12.4
Point 57	181.1	-10.10499

R31 High Flood Seepage Analysis (Global)

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File Information

Created By: USACE St. Louis District Revision Number: 689 Last Edited By: Goltz, Amanda MVS Date: 2/25/2013 Time: 11:33:51 AM

File Name: 17thReach31.gsz
Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case

_LWL_and_HIgh_water_ analyses\High water cases\
Last Solved Date: 2/25/2013

Last Solved Time: 11:34:48 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Mass(M) Units: lbs Mass Flux Units: lbs/sec Unit Weight of Water: 62.4 pcf

Analysis Settings

Seepage Analysis (Global) Kind: SEEP/W Method: Steady-State Settings Include Air Flow: No Control Apply Runoff: No Convergence
Convergence Type: Head Vector Norm Maximum Number of Iterations: 500 Tolerance: 0.001 Maximum Change in K: 0.1

Rate of Change in K: 1.02 Minimum Change in K: 1e-005 Equation Solver: Parallel Direct Potential Seepage Max # of Reviews: 10 Starting Time: 0 sec Duration: 0 sec Ending Time: 0 sec

Materials

EMBANKMENT FILL, EL. +8.5 TO -3.0

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0

MARSH 1, EL. -3.0/-6.0 TO -10.0

Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0

BEACH SAND, EL. -10 TO -45

Hydraulic

K-Sat: 0.00049 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0 °

BAY SOUND CLAY, EL. -45 TO -70

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0 °

Model: Saturated Only Hydraulic K-Sat: 1e-010 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° EMBANKMENT FILL, EL. -1.0 TO -6.0 (protected) Model: Saturated Only Hydraulic K-Sat: 3.28e-008 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

Boundary Conditions

Sheet Pile

Type: Total Flux (Q) 0

Drainage Review: true Type: Total Flux (Q) 0

Canal Water Type: Head (H) 8.1

Type: Head (H) -3

Regions

Material Points Area (ft²) MARSH 1, EL. -3.0/-6.0 TO -10.0 22,12,13,18,23 101.82934 Region 1 Sheet Pile BEACH SAND, EL. -10 TO -45 Region 3 BAY SOUND CLAY, EL. -45 TO -70 6650 EMBANKMENT FILL, EL. +8.5 TO -3.0 29,4,21,5,6,14,30 EMBANKMENT FILL, EL. +8.5 TO -3.0 14,20,28,31,30 178.26606 Region 6 MARSH 1, EL. -3.0/-6.0 TO -10.0 64.08

Region 8	MARSH 1, EL3.0/-6.0 TO -10.0	13,17,9,10,24,23,18	698.18104
Region 9	EMBANKMENT FILL, EL1.0 TO -6.0 (protected)	7,34,35,8	83.485
Region 10	EMBANKMENT FILL, EL1.0 TO -6.0 (protected)	35,9,17,34	199.515
Region 11	EMBANKMENT FILL, EL. +8.5 TO -3.0	12,17,34,33	165.006
Region 12	EMBANKMENT FILL, EL. +8.5 TO -3.0	30,33,34,7,31	90.984
Region 13	EMBANKMENT FILL, EL. +8.5 TO -3.0	29,32,33,30	24.6205
Region 14	EMBANKMENT FILL, EL. +8.5 TO -3.0	32,3,2,22,12,33	76.831502

	Start Point	End Point	Left Side Material	Hydraulic Boundary	Right Side Material
Line 1	9	17			
Line 2	13	12	Sheet Pile		
Line 3	17	12			
Line 4	13	18			
Line 5	22	23		Canal Water	
Line 6	18	23			
Line 7	22	12			
Line 8	20	14	Sheet Pile		
Line 9	6	14			
Line 10	15	6			
Line 11	20	16		Drainage	
Line 12	16	15			
Line 13	26	25		no flow	
Line 14	25	1		Canal Water	
Line 15	1	24		Canal Water	
Line 16	10	11		Curb	
Line 17	27	26		no flow	
Line 18	11	19		Curb	
Line 19	26	11			
Line 20	10	24			

Line 21	27	19	no flow	
Line 22	29	30		
Line 23	31	30		
Line 24	29	4	Canal Water	
Line 25	4	21	Canal Water	
Line 26	21	5	Canal Water	
Line 27	5	6	Canal Water	
Line 28	14	30		Sheet Pile
Line 29	20	28	Drainage	
Line 30	28	31	Drainage	
Line 31	17	13		
Line 32	9	10	Curb	
Line 33	24	23	Canal Water	
Line 34	34	35		
Line 35	7	34		
Line 36	35	8	Curb	
Line 37	8	7	Drainage	
Line 38	35	9	Curb	
Line 39	17	34		
Line 40	34	33		
Line 41	33	12		Sheet Pile
Line 42	30	33		Sheet Pile
Line 43	7	31	Drainage	
Line 44	29	32	Canal Water	
Line 45	32	33		
Line 46	32	3	Canal Water	
Line 47	3	2	Canal Water	
Line 48	2	22	Canal Water	

	X (ft)	Y (ft)
Point 1	124.3	-15.6
Point 2	163.7	-2.1
Point 3	173.2	-1.5
Point 4	178	2.6

Point 5	199	8.5
Point 6	200	8.5
Point 7	253.4	-1
Point 8	310	-1
Point 9	310	-6
Point 10	310	-10
Point 11	310	-45
Point 12	200	-3
Point 13	200	-5.4
Point 14	200	8.1
Point 15	200	12.9
Point 16	200.5	12.9
Point 17	253.4	-6
Point 18	161.1	-5.4
Point 19	310	-70
Point 20	201	8.1
Point 21	197.9	8.2
Point 22	161.07333	-3
Point 23	154.06889	-5.4
Point 24	140.6437	-10
Point 25	44	-6
Point 26	44	-45
Point 27	44	-70
Point 28	204.3	7.52691
Point 29	175.45	0.4
Point 30	200	0.4
Point 31	245.3	0.4
Point 32	174.775	-0.27
Point 33	200	-0.9
Point 34	253.4	-1.92
Point 35	310	-3.03

R32 High Flood Seepage Analysis (Global)

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File Information

Created By: USACE St. Louis District Revision Number: 931 Last Edited By: Redell, Chris MVS Date: 2/22/2013 Time: 9:48:20 AM

File Name: 17thReach32.gsz Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case

_LWL_and_HIgh_water_ analyses\High water cases\
Last Solved Date: 2/22/2013

Last Solved Time: 9:48:24 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Mass(M) Units: lbs Mass Flux Units: lbs/sec Unit Weight of Water: 62.4 pcf

Analysis Settings

Seepage Analysis (Global) Kind: SEEP/W Method: Steady-State Settings Include Air Flow: No Control Apply Runoff: No Convergence
Convergence Type: Head Vector Norm Maximum Number of Iterations: 500 Tolerance: 0.001 Maximum Change in K: 0.1

Rate of Change in K: 1.02 Minimum Change in K: 1e-005 Equation Solver: Parallel Direct Potential Seepage Max # of Reviews: 10 Starting Time: 0 sec

Duration: 0 sec Ending Time: 0 sec

Materials

EMBANKMENT FILL, EL. +8.5 TO -4

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0

MARSH 1, EL. +-3.8/-4 TO -8

Model: Saturated Only Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0

BEACH SAND, EL. -8 TO -46

Hydraulic

K-Sat: 0.00049 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0 °

BAY SOUND CLAY, EL. -46 TO -70

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0 °

Sheet Pile

Model: Saturated Only Hydraulic K-Sat: 1e-010 ft/sec Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0

Boundary Conditions

Type: Total Flux (Q) 0

Canal Water (Gap) Type: Head (H) 8.1

Type: Head (H) -6.5

Regions

810113			
	Material	Points	Area (ft²)
Region 1	Sheet Pile	5,15,16,13	3.3
Region 2	BEACH SAND, EL8 TO -46	25,1,2,23,19,8,9,26	9161.454
Region 3	BAY SOUND CLAY, EL46 TO -70	26,27,28,9	6120
Region 4	MARSH 1, EL. +-3.8/-4 TO -8	22,12,21,10,24	62.131052
Region 5	MARSH 1, EL. +-3.8/-4 TO -8	23,22,24,10,6,17,7,8,19	563.85892
Region 6	EMBANKMENT FILL, EL. +8.5 TO -4	29,4,20,18,5,30	109.6
Region 7	EMBANKMENT FILL, EL. +8.5 TO -4	21,3,29,30,10	139.459
Region 8	EMBANKMENT FILL, EL. +8.5 TO -4	5,13,14,31,30	192.205
Region 9	EMBANKMENT FILL, EL. +8.5 TO -4	30,31,11,6,10	235.96

Lines

	Start Point	End Point	Hydraulic Boundary	Right Side Material
Line 1	5	15		
Line 2	15	16		
Line 3	16	13		

10 19 Line 7 Line 8 19 23 Canal Water (Gap) Line 9 Canal Water (Gap) Line 11 23 Canal Water (Gap) Line 12 9 Curb Line 14 26 25 Line 15 26 27 Line 16 28 Line 17 Line 18 Canal Water (Gap) Canal Water (Gap) Line 20 24 Line 21 24 22 Canal Water (Gap) Line 22 23 22 Line 24 Drainage Line 25 8 Curb Canal Water (Gap) Line 26 20 Canal Water (Gap) Line 28 18 Canal Water (Gap) Line 29 18 Canal Water (Gap) Line 31 29 Canal Water (Gap) Line 32 Line 33 Canal Water (Gap) Line 34 30 10 Sheet Pile Line 35 14 Drainage Line 36 31 Drainage Line 37 31 30 Line 38 31 Line 39 Drainage

	X (ft)	Y (ft)
Point 1	115.3	-16
Point 2	135.6	-11.2
Point 3	172.5	-1.1
Point 4	178.2	2.6
Point 5	200	8.5
Point 6	267.1	-3.8
Point 7	310	-4.5
Point 8	310	-8
Point 9	310	-46
Point 10	200	-4
Point 11	257.6	-2.4
Point 12	155.7	-4.6
Point 13	201	8.5
Point 14	206.3	8
Point 15	200	12.9
Point 16	200.5	12.9
Point 17	286.7	-4.5
Point 18	199	8.5
Point 19	200	-8
Point 20	199	7.6
Point 21	158.58	-4
Point 22	153.26237	-5.4
Point 23	145.4	-8
Point 24	200	-5.4
Point 25	55	-13.24
Point 26	55	-46
Point 27	55	-70
Point 28	310	-70
Point 29	174.8	0.4
Point 30	200	0.4
Point 31	243.8	0.4

R33 High Flood Seepage Analysis (Gap)

File Information

Created By: USACE St. Louis District Revision Number: 959 Last Edited By: Goltz, Amanda MVS Date: 2/22/2013

Time: 11:38:16 AM File Name: 17thReach33.gsz

Directory: Y\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case
_LWL_and_HIgh_water_analyses\High water cases\
Last Solved Date: 2/22/2013

Last Solved Time: 11:41:42 AM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Mass(M) Units: lbs Mass Flux Units: lbs/sec Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Seepage Analysis (Gap)

Kind: SEEP/W Method: Steady-State Settings

Include Air Flow: No Control

Apply Runoff: Yes

Convergence

Convergence Type: Head Vector Norm Maximum Number of Iterations: 500

Tolerance: 0.001 Maximum Change in K: 0.1

Rate of Change in K: 1.02 Minimum Change in K: 1e-005 Equation Solver: Parallel Direct Potential Seepage Max # of Reviews: 10

Time

Starting Time: 0 sec Duration: 0 sec Ending Time: 0 sec

Materials

EMBANKMENT FILL, EL. +9.3 TO +6

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

MARSH 1, EL. -2.8/-4 TO -9

Model: Saturated Only Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BEACH SAND, EL. -9 TO -46

Model: Saturated Only Hydraulic

K-Sat: 0.00049 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0 °

Sheet Pile

Model: Saturated Only Hydraulic

K-Sat: 1e-010 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

Bay Sound, EL. -46 TO -70

Model: Saturated Only

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

EMBANKMENT FILL 2, EL. +6 TO +1 Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

EMBANKMENT FILL, EL. -1.9 TO -4

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0

Boundary Conditions

Drainage

Type: Total Flux (Q) 0

Canal Water (Gap)

Type: Head (H) 10

Curb

Type: Head (H) -5.3

No Flow

Type: Total Flux (Q) 0

Regions

	Material	Points	Area (ft²)
Region 1	Sheet Pile	11,33,15,17,14,34,13	2.775001
Region 2	BEACH SAND, EL9 TO -46	30,32,27,18,10,28	9361

Region 3	Bay Sound, EL46 TO -70	30,28,29,31	6072
Region 4	EMBANKMENT FILL, EL. +9.3 TO +6	14,17,36,22,5	60.543036
Region 5	EMBANKMENT FILL, EL. +9.3 TO +6	17,15,4,3,2,36	43.89
Region 6	EMBANKMENT FILL 2, EL. +6 TO +1	36,22,23,37	170.85955
Region 7	EMBANKMENT FILL 2, EL. +6 TO +1	36,37,24,2	120.85715
Region 8	MARSH 1, EL2.8/-4 TO -9	21,35,19	17.22
Region 9	EMBANKMENT FILL, EL1.9 TO -4	37,23,6,7,8,9,20,19,21	292.55241
Region 10	EMBANKMENT FILL, EL1.9 TO -4	21,25,38	63.212443
Region 11	EMBANKMENT FILL, EL1.9 TO -4	21,37,24,38	69.298993
Region 12	MARSH 1, EL2.8/-4 TO -9	26,25,21,35	24.15
Region 13	MARSH 1, EL2.8/-4 TO -9	27,16,1,12,26,35,19,20,10,18	858.59091
-			

	Start Point	End Point	Hydraulic Boundary	Left Side Material	Right Side Material
Line 1	10	18			
Line 2	20	19			
Line 3	21	19			
Line 4	15	17	Canal Water (Gap)		
Line 5	14	17		Sheet Pile	
Line 6	13	11			
Line 7	21	25			
Line 8	30	32	No Flow		
Line 9	32	27	Canal Water (Gap)		
Line 10	10	28	Curb		
Line 11	28	30			
Line 12	28	29	Curb		
Line 13	29	31	No Flow		
Line 14	31	30	No Flow		
Line 15	11	33	Canal Water (Gap)		
Line 16	33	15	Canal Water (Gap)		
Line 17	14	34	Drainage		
Line 18	34	13	Drainage		
Line 19	18	27			
Line 20	2	36			
Line 21	36	22			

Line 22	24	37			
Line 23	37	23			
Line 24	17	36	Canal Water (Gap)	Sheet Pile	
Line 25	22	5	Drainage		
Line 26	5	14	Drainage		
Line 27	15	4	Canal Water (Gap)		
Line 28	4	3	Canal Water (Gap)		
Line 29	3	2	Canal Water (Gap)		
Line 30	22	23	Drainage		
Line 31	37	36	Canal Water (Gap)		Sheet Pile
Line 32	24	2	Canal Water (Gap)		
Line 33	21	35	Canal Water (Gap)	Sheet Pile	
Line 34	35	19			
Line 35	23	6	Drainage		
Line 36	6	7	Drainage		
Line 37	7	8	Drainage		
Line 38	8	9	Drainage		
Line 39	21	37	Canal Water (Gap)		Sheet Pile
Line 40	20	9	Curb		
Line 41	25	38	Canal Water (Gap)		
Line 42	38	21			
Line 43	24	38	Canal Water (Gap)		
Line 44	26	25	Canal Water (Gap)		
Line 45	35	26			
Line 46	27	16	Canal Water (Gap)		
Line 47	16	1	Canal Water (Gap)		
Line 48	1	12	Canal Water (Gap)		
Line 49	12	26	Canal Water (Gap)		
Line 50	20	10			

Points

	X (ft)	Y (ft)
Point 1	151.1	-5.5
Point 2	181.9	6
Point 3	195	9.8

Point 4	199	9.8
Point 5	213.3	8.9
Point 6	247.7	0
Point 7	257.4	-1.9
Point 8	284.2	-3.1
Point 9	310	-3.3
Point 10	310	-9
Point 11	200	13.4
Point 12	158.1	-3.8
Point 13	200.5	13.4
Point 14	201	9.7
Point 15	200	9.8
Point 16	140.1	-8.4
Point 17	200	9.7
Point 18	257.4	-9
Point 19	257.4	-4
Point 20	310	-4
Point 21	200	-2.8
Point 22	224.50899	6
Point 23	243.83483	1
Point 24	169.75714	1
Point 25	160.5	-2.8
Point 26	159	-3.4
Point 27	127.06364	-9
Point 28	310	-46
Point 29	310	-70
Point 30	57	-46
Point 31	57	-70
Point 32	57	-9
Point 33	200	10
Point 34	200.95946	10
Point 35	200	-3.4
Point 36	200	6
Point 37	200	1
Point 38	168.29702	0.40063

5

R34 High Flood Seepage Analysis (Full

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```
File Information
```

Created By: USACE St. Louis District Revision Number: 775 Last Edited By: Goltz, Amanda MVS Date: 11/27/2012 Time: 12:58:45 PM

File Name: 17thReach34.gsz
Directory: Y:\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case

_LWL_and_HIgh_water_ analyses\High water cases\
Last Solved Date: 11/27/2012

Last Solved Time: 12:59:02 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Mass(M) Units: lbs Mass Flux Units: lbs/sec Unit Weight of Water: 62.4 pcf

Analysis Settings

```
Seepage Analysis (Full Gap)
    Kind: SEEP/W
     Method: Steady-State
    Settings
          Include Air Flow: No
    Control
          Apply Runoff: No
    Convergence
Convergence Type: Head Vector Norm
          Maximum Number of Iterations: 500
Tolerance: 0.001
          Maximum Change in K: 0.1
```

```
MARSH 2, EL. -7 TO -13/-15
    Model: Saturated Only
```

Hydraulic K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

EMBANKMENT FILL 2, EL. +6 TO -2.8 Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Bay Sound, El. -46 to -70

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0 °

Boundary Conditions

Review: true Type: Total Flux (Q) 0

Canal Water (Gap)

Type: Head (H) -4.3

No Flow

Type: Total Flux (Q) 0

Regions

Material Points Area (ft²)

```
Rate of Change in K: 1.02
Minimum Change in K: 1e-005
Equation Solver: Parallel Direct
Potential Seepage Max # of Reviews: 10
```

Starting Time: 0 sec Duration: 0 sec Ending Time: 0 sec

Materials

EMBANKMENT FILL, EL. +9.9 TO +6.0

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0

MARSH 1, EL. -2.8 TO -7

Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0

BEACH SAND, EL. -13/-15 TO -46

Hydraulic

K-Sat: 0.00049 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0 °

Sheet Pile

Model: Saturated Only

Hydraulic

K-Sat: 1e-010 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0 °

Region 1	Sheet Pile	17,18,47,19,20,21,46,8	2.7706535
Region 2	BEACH SAND, EL13/-15 TO -46	24,16,36,31,15,14,27,25,35	8752.8
Region 3	MARSH 1, EL2.8 TO -7	12,43,26,28,13	285.275
Region 4	MARSH 1, EL2.8 TO -7	30,37,38,34,29,26,43	363.12
Region 5	EMBANKMENT FILL, EL. +9.9 TO +6.0	20,21,7,6,39,32	46.120367
Region 6	EMBANKMENT FILL, EL. +9.9 TO +6.0	19,20,32,43,10,33,9	231.545
Region 7	EMBANKMENT FILL 2, EL. +6 TO -2.8	32,30,43	211.2
Region 8	MARSH 1, EL2.8 TO -7	42,41,38,34	31.90707
Region 9	MARSH 1, EL2.8 TO -7	41,38,40	0.731952
Region 10	MARSH 1, EL2.8 TO -7	40,38,37,30	25.92
Region 11	EMBANKMENT FILL, EL. +9.9 TO +6.0	10,11,12,43	107.85
Region 12	Bay Sound, El46 to -70	16,36,31,15,44,45	6432
Region 13	MARSH 2, EL7 TO -13/- 15	24,1,22,23,2,3,42,34,29,26,28,14,27,25,35	1596.2586
Region 14	EMBANKMENT FILL 2, EL. +6 TO -2.8	40,4,5,39,32,30	274.51963

Lines

	Start Point	End Point	Hydraulic Boundary	Right Side Material	Left Side Material
Line 1	17	18			
Line 2	8	17			
Line 3	15	14	Curb		
Line 4	20	19			
Line 5	20	21	Canal Water (Gap)		
Line 6	14	27			

Line 7	27	25			
Line 8	28	26			
Line 9	28	13	Curb		
Line 10	13	12	Drainage		
Line 11	26	29			
Line 12	31	15			
Line 13	21	7	Canal Water (Gap)		
Line 14	7	6	Canal Water (Gap)		
Line 15	32	20	Canal Water (Gap)	Sheet Pile	
Line 16	33	9	Drainage		
Line 17	9	19	Drainage		
Line 18	30	32	Canal Water (Gap)	Sheet Pile	
Line 19	25	35			
Line 20	35	24			
Line 21	16	36			
Line 22	36	31			
Line 23	24	16	No Flow		
Line 24	30	37	Canal Water (Gap)		Sheet Pile
Line 25	38	34			
Line 26	38	37			
Line 27	6	39	Canal Water (Gap)		
Line 28	32	39			
Line 29	40	41	Canal Water (Gap)		
Line 30	40	30			
Line 31	38	40			
Line 32	41	38			
Line 33	41	42	Canal Water (Gap)		
Line 34	34	42			
Line 35	30	43			
Line 36	43	10			
Line 37	10	11	Drainage		
Line 38	11	12	Drainage		
Line 39	26	43			
Line 40	12	43			
Line 41	43	32			
Line 42	10	33	Drainage		

Line 43	29	34		
Line 44	15	44	Curb	
Line 45	44	45	No Flow	
Line 46	45	16	No Flow	
Line 47	24	1	No Flow	
Line 48	1	22	Canal Water (Gap)	
Line 49	22	23	Canal Water (Gap)	
Line 50	23	2	Canal Water (Gap)	
Line 51	2	3	Canal Water (Gap)	
Line 52	3	42	Canal Water (Gap)	
Line 53	28	14	Curb	
Line 54	21	46		
Line 55	46	8		
Line 56	18	47	Drainage	
Line 57	47	19		
Line 58	40	4	Canal Water (Gap)	
Line 59	4	5	Canal Water (Gap)	
Line 60	5	39	Canal Water (Gap)	

Points

	X (ft)	Y (ft)
Point 1	42	-8.4
Point 2	132.9	-7.9
Point 3	140.8	-7.2
Point 4	165.8	-0.3
Point 5	170.7	3.1
Point 6	195.2	9.9
Point 7	199	9.9
Point 8	200	10.4
Point 9	213.2	9.1
Point 10	248	2
Point 11	280.5	-1
Point 12	297	-2.3
Point 13	310	-2.3
Point 14	310	-13

Point 15	310	-46
Point 16	42	-46
Point 17	200	13.4
Point 18	200.5	13.4
Point 19	201	9.7
Point 20	200	9.7
Point 21	200	9.9
Point 22	61.3	-8.2
Point 23	97.4	-8
Point 24	42	-13
Point 25	200	-15
Point 26	248	-7
Point 27	248	-13
Point 28	310	-7
Point 29	200	-7
Point 30	200	-2.8
Point 31	248	-46
Point 32	200	6
Point 33	227.5	6
Point 34	156.8	-7
Point 35	156.8	-13
Point 36	156.8	-46
Point 37	200	-3.4
Point 38	156.8	-3.4
Point 39	181.14853	6
Point 40	156.8	-2.8
Point 41	154.36016	-3.4
Point 42	141.51369	-7
Point 43	248	-2.55
Point 44	310	-70
Point 45	42	-70
Point 46	200	10
Point 47	200.95711	10

R35 High Flood Seepage Analysis (Gap)

File Information

Created By: USACE St. Louis District Revision Number: 710 Last Edited By: Guerrero, Mario MVS Date: 9/12/2012

Time: 7:37:35 AM File Name: 17thReach35.gsz

Directory: Y\OfficePrivateShares\ED-G\PRO Work\17th Street Canal\New S-case
_LWL_and_HIgh_water_analyses\High water cases\
Last Solved Date: 11/27/2012

Last Solved Time: 1:12:40 PM

Project Settings

Length(L) Units: feet Time(t) Units: Seconds Force(F) Units: lbf Pressure(p) Units: psf Mass(M) Units: lbs Mass Flux Units: lbs/sec Unit Weight of Water: 62.4 pcf View: 2D

Analysis Settings

Seepage Analysis (Gap)

Kind: SEEP/W Method: Steady-State Settings

Include Air Flow: No Control

Apply Runoff: No Convergence

Convergence Type: Head Vector Norm Maximum Number of Iterations: 500

Tolerance: 0.001 Maximum Change in K: 0.1 Rate of Change in K: 1.02

Minimum Change in K: 1e-005 Equation Solver: Parallel Direct

Potential Seepage Max # of Reviews: 10

Starting Time: 0 sec Duration: 0 sec Ending Time: 0 sec

Materials

Time

EMBANKMENT FILL, EL. +8.5 TO +5.5

Model: Saturated Only

Hydraulic

K-Sat: 3.28e-008 ft/sed

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

EMBANKMENT FILL 3, EL. -1 TO -4

Model: Saturated Only Hydraulic

K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BEACH SAND, EL. -20 TO -44

Model: Saturated Only Hydraulic

K-Sat: 0.00049 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

BAY SOUND CLAY, EL. -44 TO -70

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

Sheet Pile

Model: Saturated Only

Hydraulic

K-Sat: 1e-010 ft/sec

Volumetric Water Content: 0 ft3/ft3

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

MARSH1, EL. -4 TO -20

Model: Saturated Only Hydraulic K-Sat: 3.28e-007 ft/sec

Volumetric Water Content: 0 ft³/ft³

Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

EMBANKMENT FILL2, EL. +5.5 TO -1

Model: Saturated Only Hydraulic

K-Sat: 3.28e-008 ft/sec

Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf

K-Ratio: 1 K-Direction: 0

Boundary Conditions

Drainage

Type: Total Flux (Q) 0

Curb

Type: Head (H) -4.1

Canal Water

Type: Head (H) 10

No-Flow

Type: Total Flux (Q) 0

Regions

	Material	Points	Area (ft²)
Regio n 1	Sheet Pile	21,22,58,23,25,9,57	3.900006

Regio n 2	EMBANKMEN T FILL, EL. +8.5 TO +5.5	25,23,10,40,36	44.558481
Regio n 3	EMBANKMEN T FILL2, EL. +5.5 TO -1	36,35,39,13,12,11,40	296.83653
Regio n 4	EMBANKMEN T FILL, EL. +8.5 TO +5.5	25,9,8,24,7,46,36	39.338512
Regio n 5	EMBANKMEN T FILL2, EL. +5.5 TO -1	46,6,5,47,48,35,36	229.03649
Regio n 6	EMBANKMEN T FILL 3, EL1 TO -4	48,41,37,35	135.9
Regio n 7	MARSH1, EL 4 TO -20	41,42,34,37	22.65
Regio n 8	EMBANKMEN T FILL 3, EL1 TO -4	48,51,49,41	17.026922
Regio n 9	MARSH1, EL 4 TO -20	49,50,42,41	6.4307675
Regio n 10	BAY SOUND CLAY, EL44 TO -70	55,27,45,28,29,18,30,44,19,54	6968
Regio n 11	BEACH SAND, EL20 TO -44	54,19,44,30,18,17,32,38,43,20,53	6432
Regio n 12	MARSH1, EL 4 TO -20	53,20,43,38,32,17,56,33,31,59,37,34,42,50,4,3,2,26,1, 52	3821.1173
Regio n 13	EMBANKMEN T FILL 3, EL1 TO -4	59,31,33,16,15,14,39,35,37	301.54

Lines

	Start Point	End Point	Left Side Material	Hydraulic Boundary	Right Side Material
Line 1	21	22			
Line 2	23	25	Sheet Pile		
Line 3	25	9		Canal Water	

Line 4	30	18			
Line 5	32	17			
Line 6	33	31			
Line 7	38	32			
Line 8	37	34	Sheet Pile	Canal Water	
Line 9	35	37	Sheet Pile	Canal Water	
Line 10	39	35			
Line 11	23	10		Drainage	
Line 12	10	40		Drainage	
Line 13	40	36			
Line 14	36	25		Canal Water	Sheet Pile
Line 15	36	35	Sheet Pile	Canal Water	
Line 16	39	13		Drainage	
Line 17	13	12		Drainage	
Line 18	12	11		Drainage	
Line 19	11	40		Drainage	
Line 20	9	8		Canal Water	
Line 21	8	24		Canal Water	
Line 22	24	7		Canal Water	
Line 23	6	5		Canal Water	
Line 24	20	43			
Line 25	43	38			
Line 26	19	44			
Line 27	44	30			
Line 28	41	37			
Line 29	41	42			
Line 30	42	34			
Line 31	7	46		Canal Water	
Line 32	46	6		Canal Water	
Line 33	36	46			
Line 34	5	47		Canal Water	
Line 35	47	48		Canal Water	
Line 36	41	48			
Line 37	35	48			
Line 38	42	50			
Line 39	49	50		Canal Water	

Line 40	41	49	
Line 41	48	51	Canal Water
Line 42	51	49	Canal Water
Line 43	20	53	
Line 44	19	54	
Line 45	55	27	No-Flow
Line 46	27	45	No-Flow
Line 47	45	28	No-Flow
Line 48	28	29	No-Flow
Line 49	29	18	Curb
Line 50	54	55	No-Flow
Line 51	18	17	Curb
Line 52	53	54	No-Flow
Line 53	50	4	Canal Water
Line 54	4	3	Canal Water
Line 55	3	2	Canal Water
Line 56	2	26	Canal Water
Line 57	26	1	Canal Water
Line 58	1	52	Canal Water
Line 59	52	53	No-Flow
Line 60	17	56	Curb
Line 61	56	33	
Line 62	9	57	Canal Water
Line 63	57	21	
Line 64	22	58	
Line 65	58	23	Drainage
Line 66	37	59	
Line 67	59	31	
Line 68	33	16	Curb
Line 69	16	15	Drainage
Line 70	15	14	Drainage
Line 71	14	39	Drainage

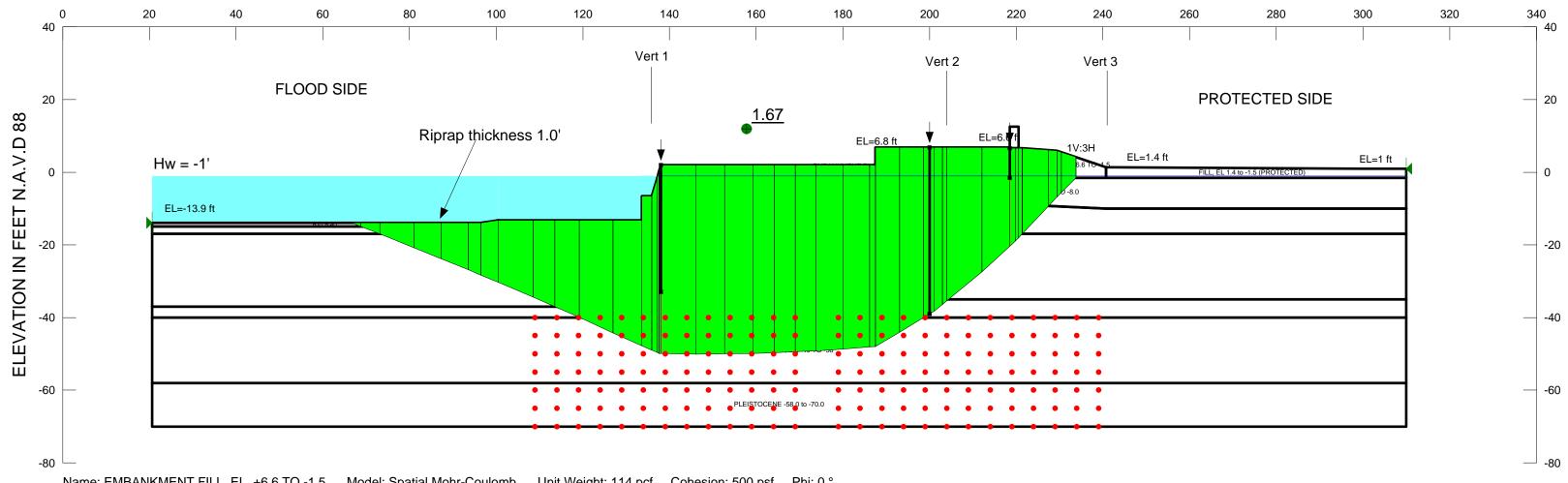
Points

X (ft) Y (ft)

Point 1	90.9	-9.2
Point 2	124	-7.3
Point 3	130	-6.7
Point 4	133.3	-6.1
Point 5	161.6	1.5
Point 6	166.4	3.3
Point 7	187	7
Point 8	199	8.5
Point 9	200	8.5
Point 10	214	7.6
Point 11	237.8	3
Point 12	261.9	0.3
Point 13	263.5	-0.6
Point 14	281.7	-1.3
Point 15	291.3	-2.1
Point 16	310	-2.1
Point 17	310	-20
Point 18	310	-44
Point 19	90.9	-44
Point 20	90.9	-20
Point 21	200	13.3
Point 22	200.5	13.3
Point 23	201	8.1
Point 24	194.9	8.5
Point 25	200	8.1
Point 26	110.2	-8.5
Point 27	90.9	-70
Point 28	291.3	-70
Point 29	310	-70
Point 30	291.3	-44
Point 31	291.3	-4
Point 32	291.3	-20
Point 33	310	-4
Point 34	200	-4.5
Point 35	200	-1
Point 36	200	5.5

Point 37	200	-4
Point 38	200	-20
Point 39	273.9	-1
Point 40	224.86522	5.5
Point 41	154.7	-4
Point 42	154.7	-4.5
Point 43	154.7	-20
Point 44	154.7	-44
Point 45	154.7	-70
Point 46	178.64865	5.5
Point 47	157.3	-0.3
Point 48	154.7	-1
Point 49	142.99231	-4
Point 50	140.68462	-4.5
Point 51	145.3	-3.5
Point 52	42	-9.2
Point 53	42	-20
Point 54	42	-44
Point 55	42	-70
Point 56	310	-4.1
Point 57	200	10
Point 58	200.81731	10
Point 59	250	-4

Appendix C –LWL Q-case Stability Analyses							



Name: EMBANKMENT FILL, EL. +6.6 TO -1.5 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 ° Name: MARSH 1, EL. -1.5 TO -8.0 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion Fn: MARSH Phi: 0 °

Name: BEACH SAND, EL. -35 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -40 TO -58 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Fn: Clay Phi: 0 ° Name: FILL, EL 1.4 to -1.5 (PROTECTED) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 °

Name: LACUSTRINE, EL. -17.0 TO -35.0 Model: Spatial Mohr-Coulomb Weight Fn: LACUSTRINE Cohesion Spatial Fn: LACUSTRINE Phi: 0 °

Name: PLEISTOCENE -58.0 to -70.0 Model: Spatial Mohr-Coulomb Weight Fn: Pleistocene Cohesion Fn: Pleistocene Phi: 0 °

Name: MARSH 2, EL. -8.0 TO -17.0 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: MARSH Phi: 0 °

Name: Rip Rap Model: Spatial Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 0 psf Phi: 40 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL (-1.0) TC=0.5 File Name: 17thReach01.gsz Last Edited By: Dieckmann, Timothy MVS

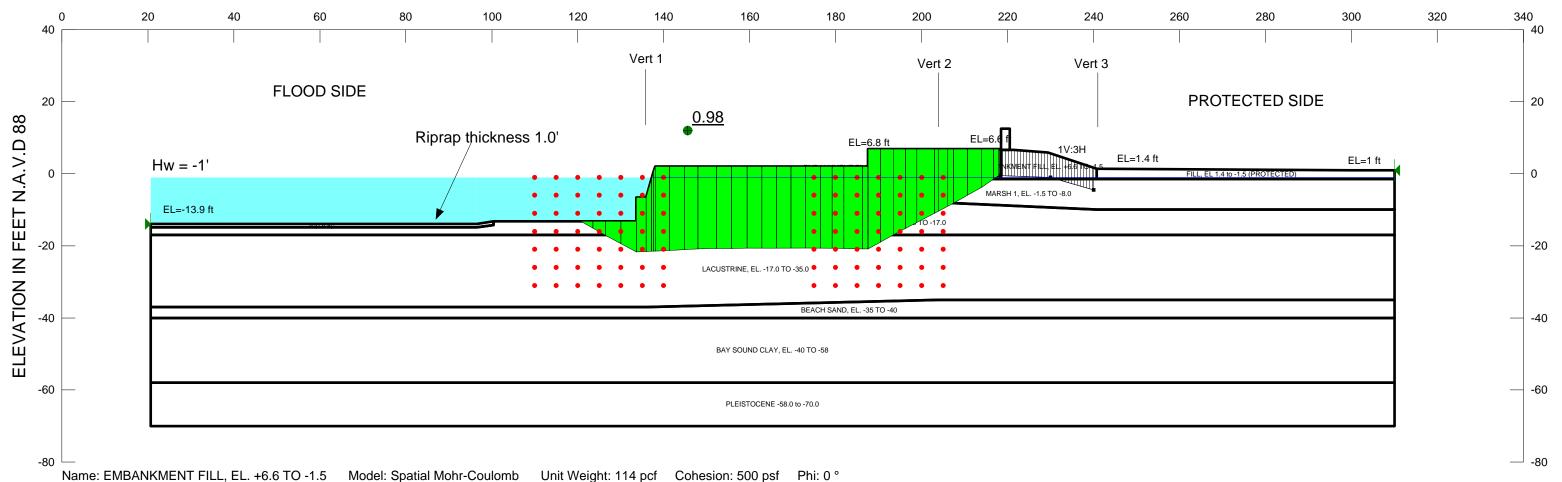




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17th STREET OUTFALL CANAL, REACH 01, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL (-1.0) TC=0.5 Closure to STA. 552+21.5 WEST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -1.5 TO -8.0 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion Fn: MARSH Phi: 0 ° Name: BEACH SAND, EL. -35 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: BAY SOUND CLAY, EL. -40 TO -58 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Fn: Clay Phi: 0 ° Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 ° Name: FILL, EL 1.4 to -1.5 (PROTECTED)

Model: Spatial Mohr-Coulomb Weight Fn: LACUSTRINE Cohesion Spatial Fn: LACUSTRINE Phi: 0 ° Name: LACUSTRINE, EL. -17.0 TO -35.0 Name: PLEISTOCENE -58.0 to -70.0 Model: Spatial Mohr-Coulomb Weight Fn: Pleistocene Cohesion Fn: Pleistocene Phi: 0 °

Name: MARSH 2, EL. -8.0 TO -17.0 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: MARSH Phi: 0 °

Name: Rip Rap Model: Spatial Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 0 psf Phi: 40 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

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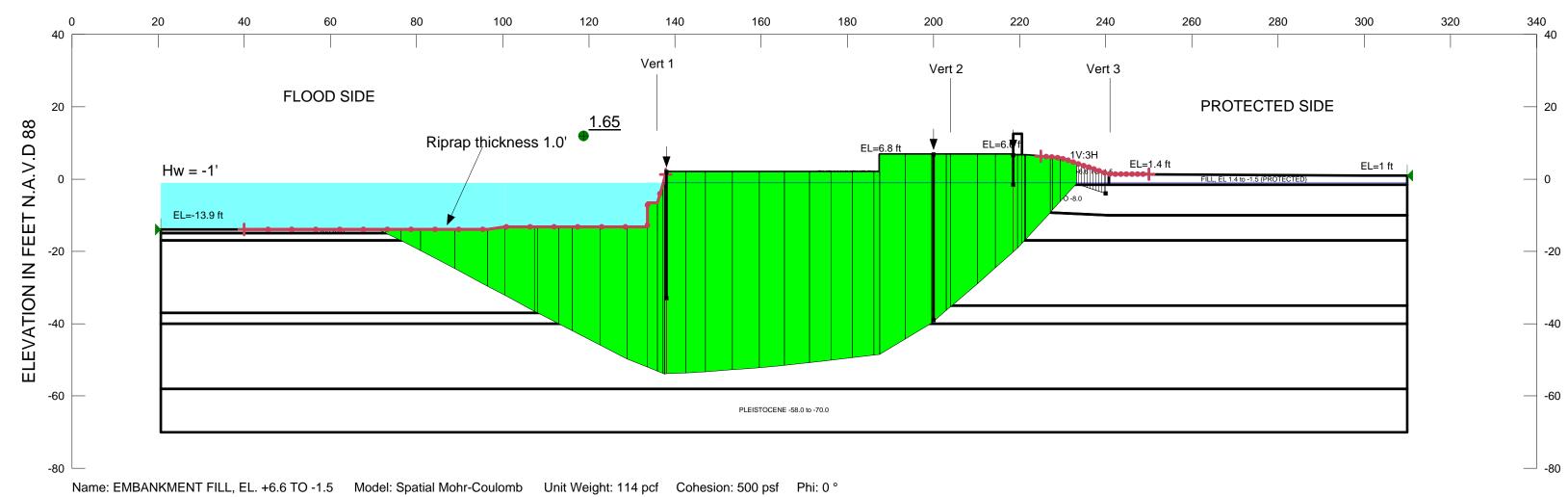




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17th STREET OUTFALL CANAL, REACH 01, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL (-1.0) Without Sheetpile TC=0.5 Closure to STA. 552+21.5 WEST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -1.5 TO -8.0 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion Fn: MARSH Phi: 0 ° Name: BEACH SAND, EL. -35 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: BAY SOUND CLAY, EL. -40 TO -58 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Fn: Clay Phi: 0 ° Name: FILL, EL 1.4 to -1.5 (PROTECTED) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 ° Name: LACUSTRINE, EL. -17.0 TO -35.0 Model: Spatial Mohr-Coulomb Weight Fn: LACUSTRINE Cohesion Spatial Fn: LACUSTRINE Phi: 0 ° Name: PLEISTOCENE -58.0 to -70.0 Model: Spatial Mohr-Coulomb Weight Fn: Pleistocene Cohesion Fn: Pleistocene Phi: 0 °

Name: MARSH 2, EL. -8.0 TO -17.0 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: MARSH Phi: 0 °

Name: Rip Rap Model: Spatial Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 0 psf Phi: 40 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

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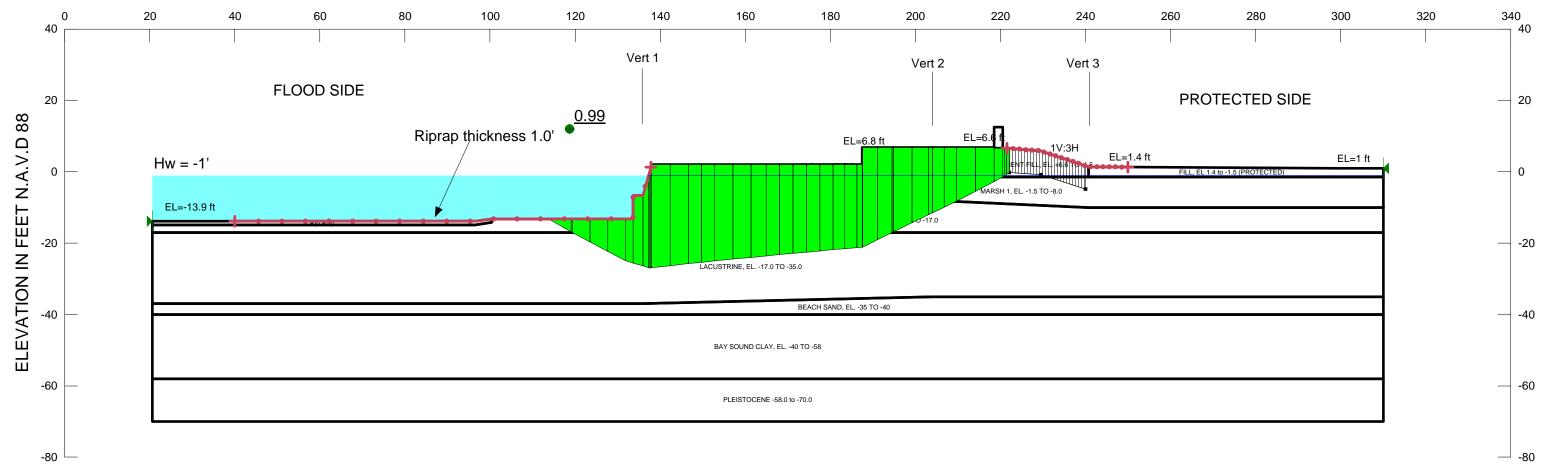




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17th STREET OUTFALL CANAL, REACH 01, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL (-1.0) TC=0.5 Closure to STA. 552+21.5 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +6.6 TO -1.5 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 ° Name: MARSH 1, EL. -1.5 TO -8.0 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion Fn: MARSH Phi: 0 °

Name: BEACH SAND, EL. -35 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -40 TO -58 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Fn: Clay Phi: 0 ° Name: FILL, EL 1.4 to -1.5 (PROTECTED) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 °

Name: LACUSTRINE, EL. -17.0 TO -35.0 Model: Spatial Mohr-Coulomb Weight Fn: LACUSTRINE Cohesion Spatial Fn: LACUSTRINE Phi: 0 °

Name: PLEISTOCENE -58.0 to -70.0 Model: Spatial Mohr-Coulomb Weight Fn: Pleistocene Cohesion Fn: Pleistocene Phi: 0 °

Name: MARSH 2, EL. -8.0 TO -17.0 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: MARSH Phi: 0 °

Name: Rip Rap Model: Spatial Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 0 psf Phi: 40 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

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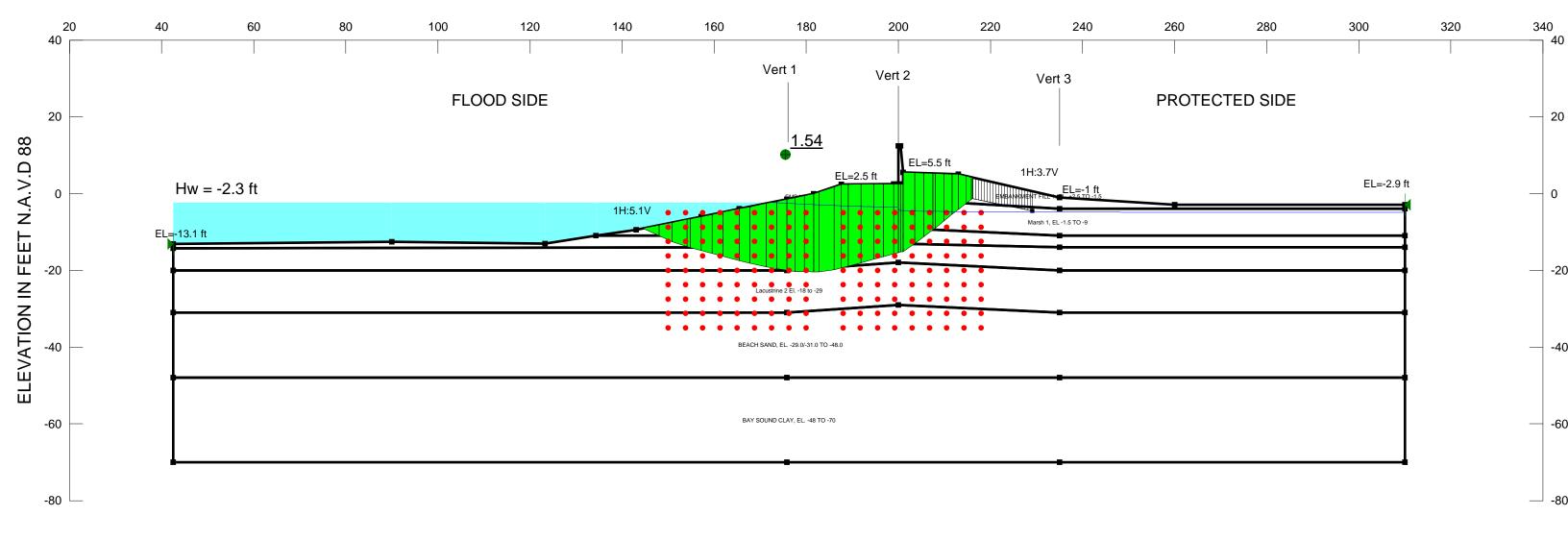




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17th STREET OUTFALL CANAL, REACH 01, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL (-1.0) Without Sheetpile TC=0.5 Closure to STA. 552+21.5 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 1, EL. +2.5 TO -1.5 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Fn: Fill Phi: 0 °

Name: MARSH 2, EL. -9 TO -13 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: Marsh 2 Phi: 0 ° Name: BEACH SAND, EL. -29.0/-31.0 TO -48.0 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: BAY SOUND CLAY, EL. -48 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Clay Phi: 0 ° Name: Marsh 1, EL -1.5 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion Fn: Marsh 1 Phi: 0 °

Name: Lacustrine 1, EL. -13 to -18 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1 Cohesion Phi: 0 ° Name: Lacustrine 2 El. -18 to -29 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion Spatial Fn: Lacustrine 2 Cohesion Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

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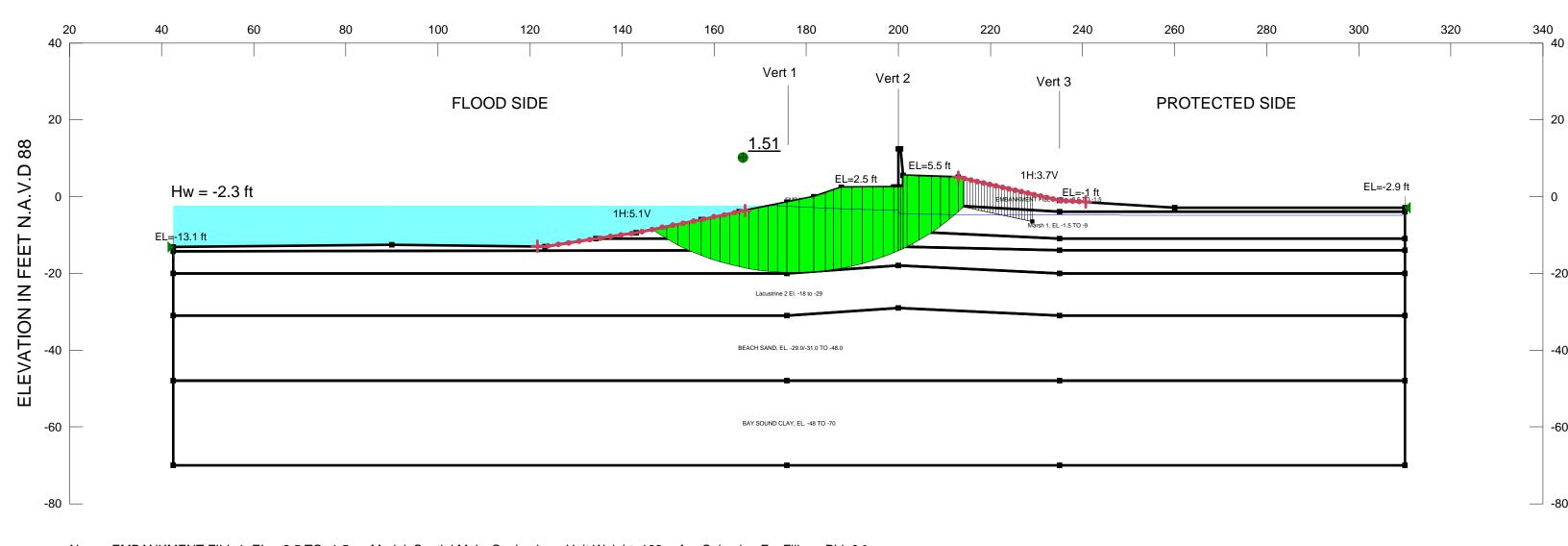
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17th STREET OUTFALL CANAL, REACH 10, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 593+00 - 596+05 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 1, EL. +2.5 TO -1.5 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Fn: Fill Phi: 0 °

Name: MARSH 2, EL. -9 TO -13 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: Marsh 2 Phi: 0 ° Name: BEACH SAND, EL. -29.0/-31.0 TO -48.0 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: BAY SOUND CLAY, EL. -48 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Clay Phi: 0 ° Name: Marsh 1, EL -1.5 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion Fn: Marsh 1 Phi: 0 °

Name: Lacustrine 1, EL. -13 to -18 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1 Cohesion Phi: 0 ° Name: Lacustrine 2 El. -18 to -29 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion Spatial Fn: Lacustrine 2 Cohesion Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Enty/Exit) LWL-Q (-2.3)

File Name: 17thReach10.gsz

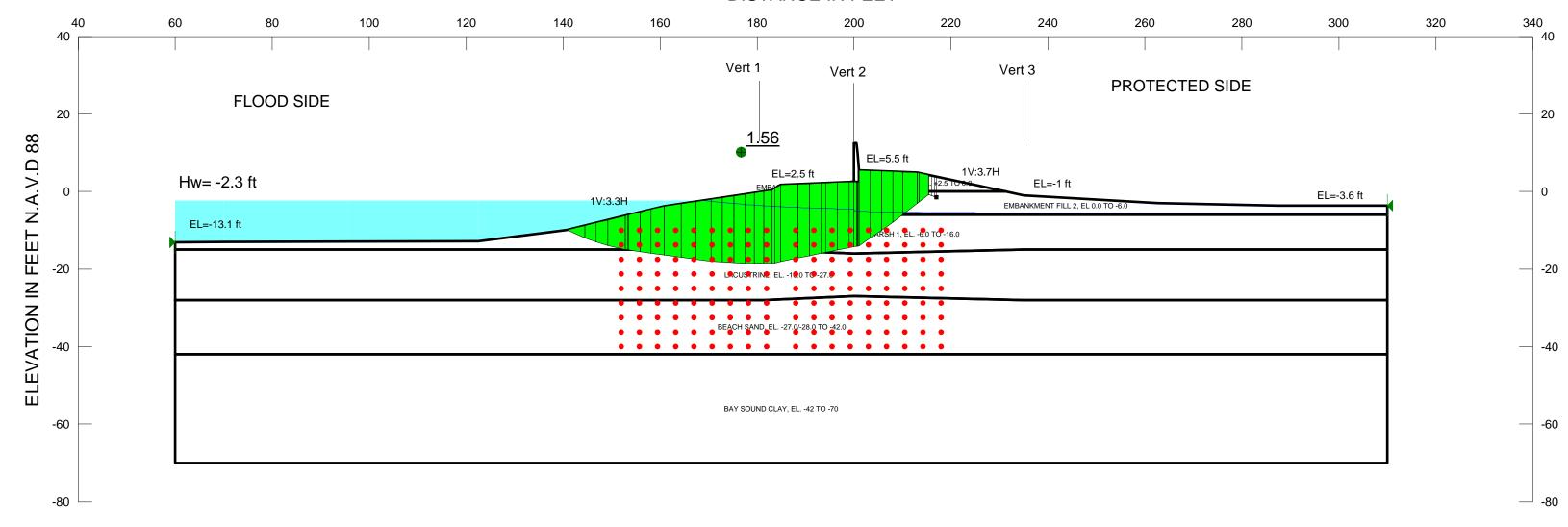
Last Edited By: Dieckmann, Timothy MVS





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17th STREET OUTFALL CANAL, REACH 10, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Enty/Exit) LWL-Q (-2.3) STA. 593+00 - 596+05 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.5 TO 0.0 Model: Undrained (Phi=0) Unit Weight: 118 pcf Cohesion: 800 psf

Name: MARSH 1, EL. -6.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi: 0 ° Name: BEACH SAND, EL. -27.0/-28.0 TO -42.0 Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi: 0 °

Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Spatial Fn: Fill 2 Phi: 0 °
Name: LACUSTRINE, EL. -16.0 TO -27.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-2.3)

File Name: 17thReach11.gsz Last Edited By: Dieckmann, Timothy MVS

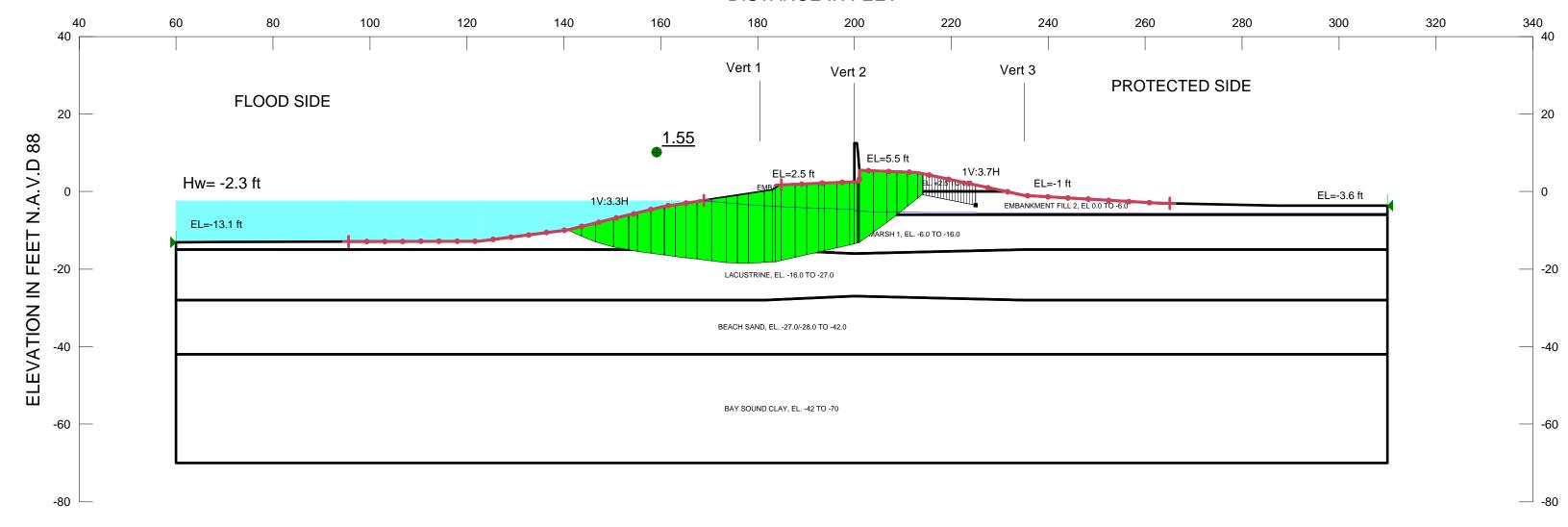


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17th STREET OUTFALL CANAL, REACH 11, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 596+05 to 609+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.5 TO 0.0 Model: Undrained (Phi=0) Unit Weight: 118 pcf Cohesion: 800 psf

Name: MARSH 1, EL. -6.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi: 0 ° Name: BEACH SAND, EL. -27.0/-28.0 TO -42.0 Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi: 0 °

Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Spatial Fn: Fill 2 Phi: 0 ° Name: LACUSTRINE, EL. -16.0 TO -27.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Phi: 0 °

GENERAL NOTES

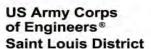
CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-Q (-2.3)

File Name: 17thReach11.gsz Last Edited By: Dieckmann, Timothy MVS

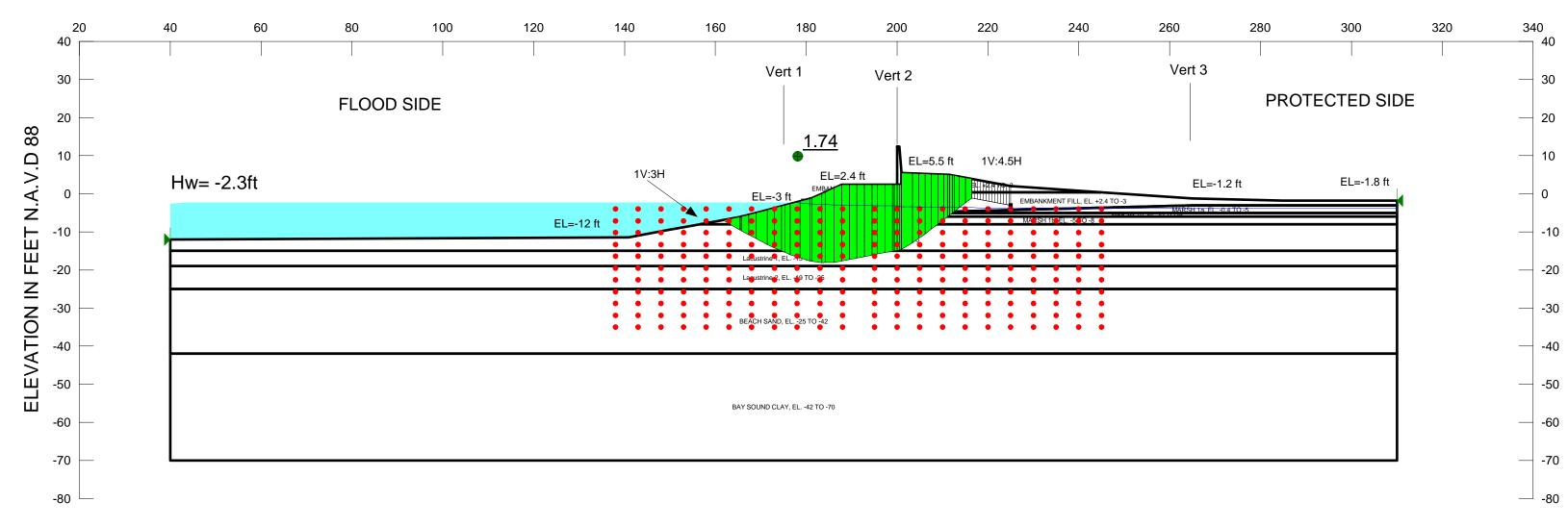






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17th STREET OUTFALL CANAL, REACH 11, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 596+05 to 609+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.4 TO -3 Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion Spatial Fn: Embankment Fill Phi: 0 °

Name: MARSH 1b, EL. -5 TO -8 Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion Spatial Fn: Marsh 1b Phi: 0 °

Name: BEACH SAND, EL. -25 TO -42 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi: 0 ° Name: MARSH 2, EL. -8 TO -15 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Marsh 2 Phi: 0 °

Name: Lacustrine 1, EL. -15 TO -19 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Lacustrine 1 Phi: 0 °

Name: Lacustrine 2, EL. -19 TO -25 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine 2 Phi: 0 ° Name: MARSH 1a, EL. -0.4 TO -5 Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh 1a unit wt Cohesion Spatial Fn: Marsh 1a

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-2.3) File Name: 17thReach12.gsz Last Edited By: Redell, Chris MVS

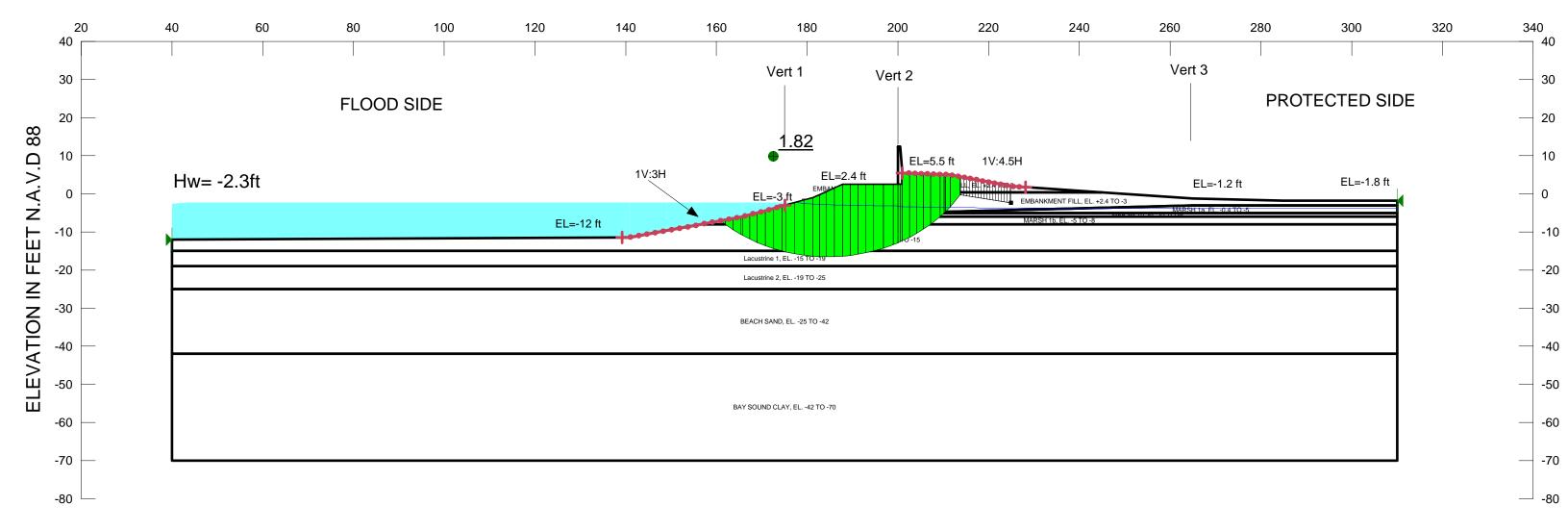


Phi: 0°



Saint Louis District New Orleans District

17th STREET OUTFALL CANAL, REACH 12, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 609+00 to 614+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.4 TO -3 Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion Spatial Fn: Embankment Fill Phi: 0°

Name: MARSH 1b, EL. -5 TO -8 Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion Spatial Fn: Marsh 1b Phi: 0 °

Name: BEACH SAND, EL. -25 TO -42 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 700 psf Phi: 0 ° Name: MARSH 2, EL. -8 TO -15 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Marsh 2 Phi: 0 °

Name: Lacustrine 1, EL. -15 TO -19 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Lacustrine 1

Name: Lacustrine 2, EL. -19 TO -25 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine 2 Phi: 0 ° Weight Spatial Fn: Marsh 1a unit wt Cohesion Spatial Fn: Marsh 1a Name: MARSH 1a, EL. -0.4 TO -5 Model: Spatial Mohr-Coulomb

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/ Exit) LWL-Q (-2.3) File Name: 17thReach12.gsz Last Edited By: Redell, Chris MVS



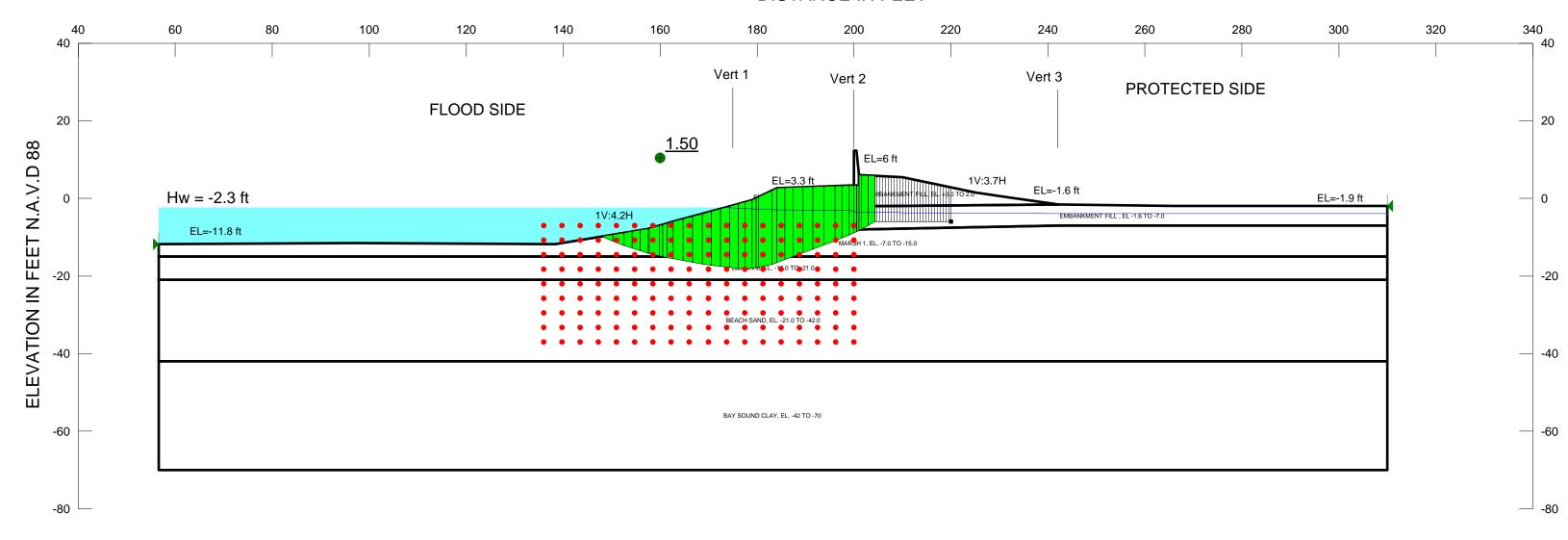
Phi: 0°



Saint Louis District

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17th STREET OUTFALL CANAL, REACH 12, FLOOD SIDE STABILITY ANALYSIS. CASE: Slope Stability (Entry/ Exit) LWL-Q (-2.3) STA. 609+00 to 614+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +3.0 TO 2.0 Model: Undrained (Phi=0) Unit Weight: 108 pcf Cohesion: 750 psf
Name: BEACH SAND, EL. -21.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand
Name: EMBANKMENT FILL, EL -1.6 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: FILL 2 Phi: 0 °
Name: MARSH 1, EL. -7.0 TO -15.0 Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion Fn: MARSH 1 Phi: 0 °
Name: Lacustrine, EL. -15.0 TO -21.0 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine Phi: 0 °
Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: Clay Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

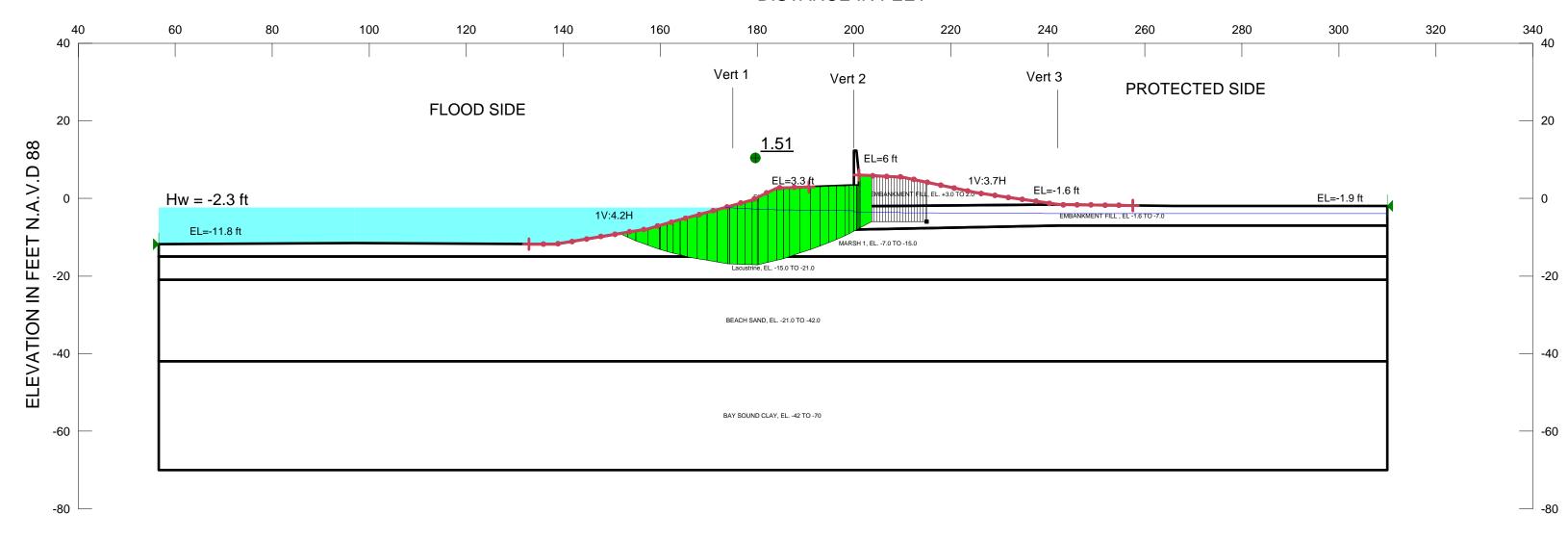
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17th STREET OUTFALL CANAL, REACH 13, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 614+00 to 617+00 WEST ORLEANS PARISH, LOUISIANA



Phi: 0°

Model: Undrained (Phi=0) Name: EMBANKMENT FILL, EL. +3.0 TO 2.0 Unit Weight: 108 pcf Cohesion: 750 psf Name: BEACH SAND, EL. -21.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: FILL 2 Phi: 0 ° Name: EMBANKMENT FILL, EL -1.6 TO -7.0 Name: MARSH 1, EL. -7.0 TO -15.0 Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: Lacustrine, EL. -15.0 TO -21.0 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine Phi: 0°

Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: Clay

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

Name: BAY SOUND CLAY, EL. -42 TO -70

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

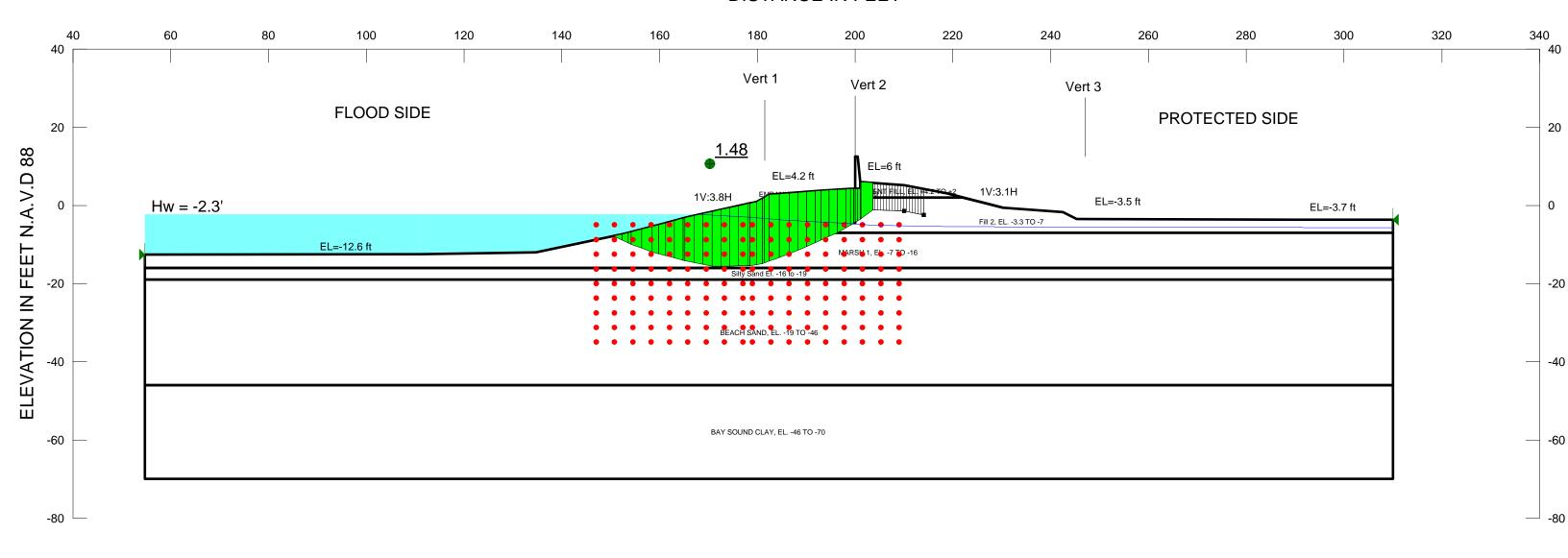
Name: Slope Stability (Entry/Exit) LWL-Q (-2.3) File Name: 17thReach13.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 13, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 614+00 to 617+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +4.2 TO +2 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 860 psf Phi: 0 °

Name: BEACH SAND, EL. -19 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: Fill 2, EL. -3.3 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Fill Phi: 0 °

Name: MARSH 1, EL. -7 TO -16 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Spatial Fn: Marsh 1 Cohesion

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0°

Name: Silty Sand El. -16 to -19 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-2.3) File Name: 17thReach14.gsz Last Edited By: Redell, Chris MVS

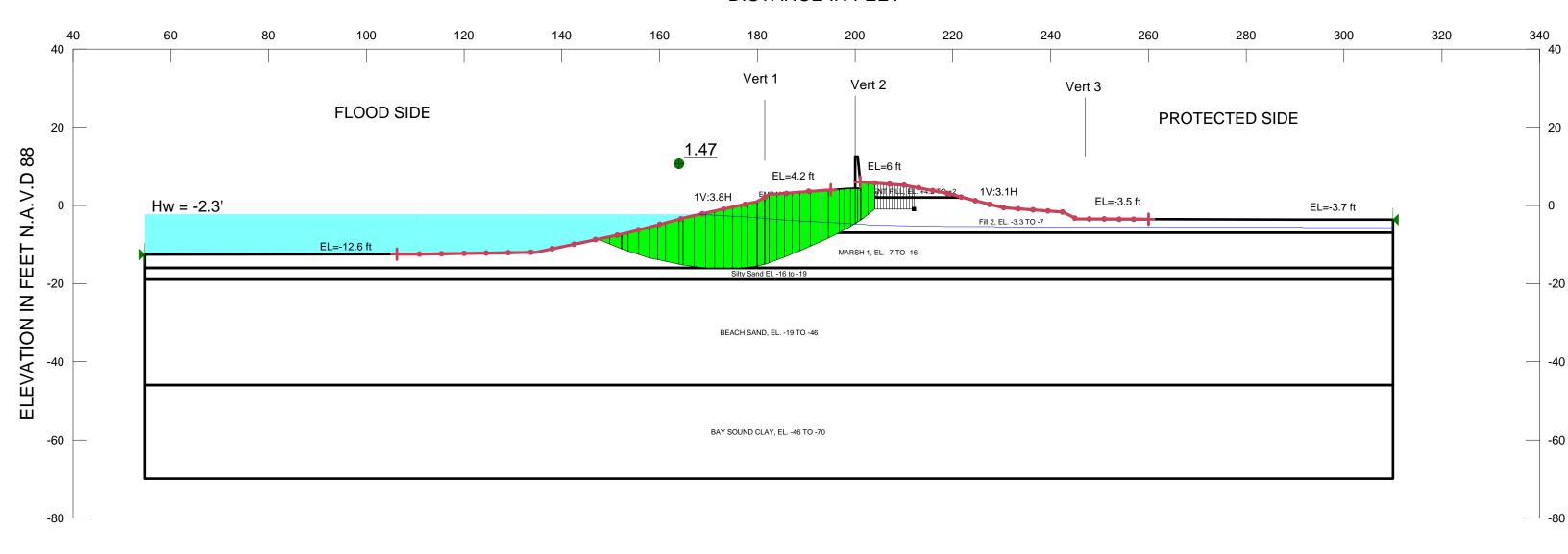




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17th STREET OUTFALL CANAL, REACH 14, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 617+00 to 625+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +4.2 TO +2 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 860 psf Phi: 0 °

Name: BEACH SAND, EL. -19 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: Fill 2, EL. -3.3 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Fill Phi: 0 °

Name: MARSH 1, EL. -7 TO -16 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Spatial Fn: Marsh 1 Cohesion Phi: 0 °

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

Name: Silty Sand El. -16 to -19 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

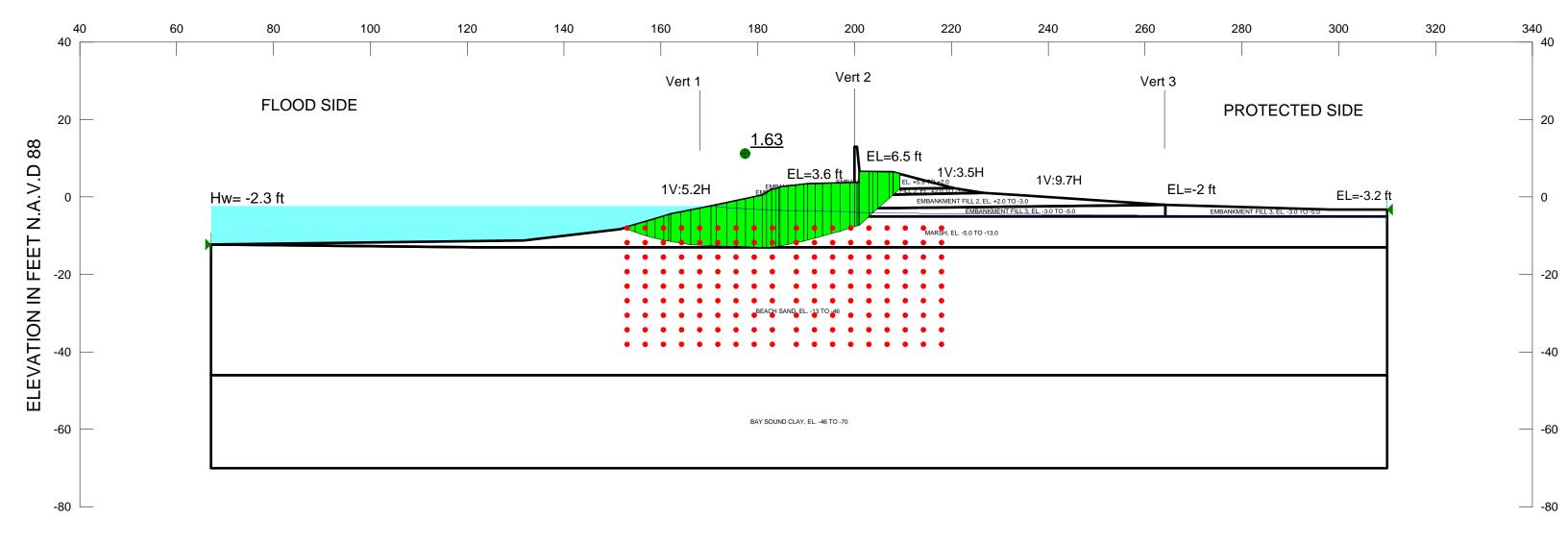
Name: Slope Stability (Entry/Exit) LWL-Q (-2.3) File Name: 17thReach14.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 14, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 617+00 to 625+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 1, EL. +5.9 TO +2.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0 °

Name: MARSH, EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0 °

Name: BEACH SAND, EL. -13 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi: 0°

Name: EMBANKMENT FILL 2, EL. +2.0 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi: 0° Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Name: EMBANKMENT FILL 3, EL. -3.0 TO -5.0 Phi: 0°

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-2.3) File Name: 17thReach15A.gsz Last Edited By: Redell, Chris MVS

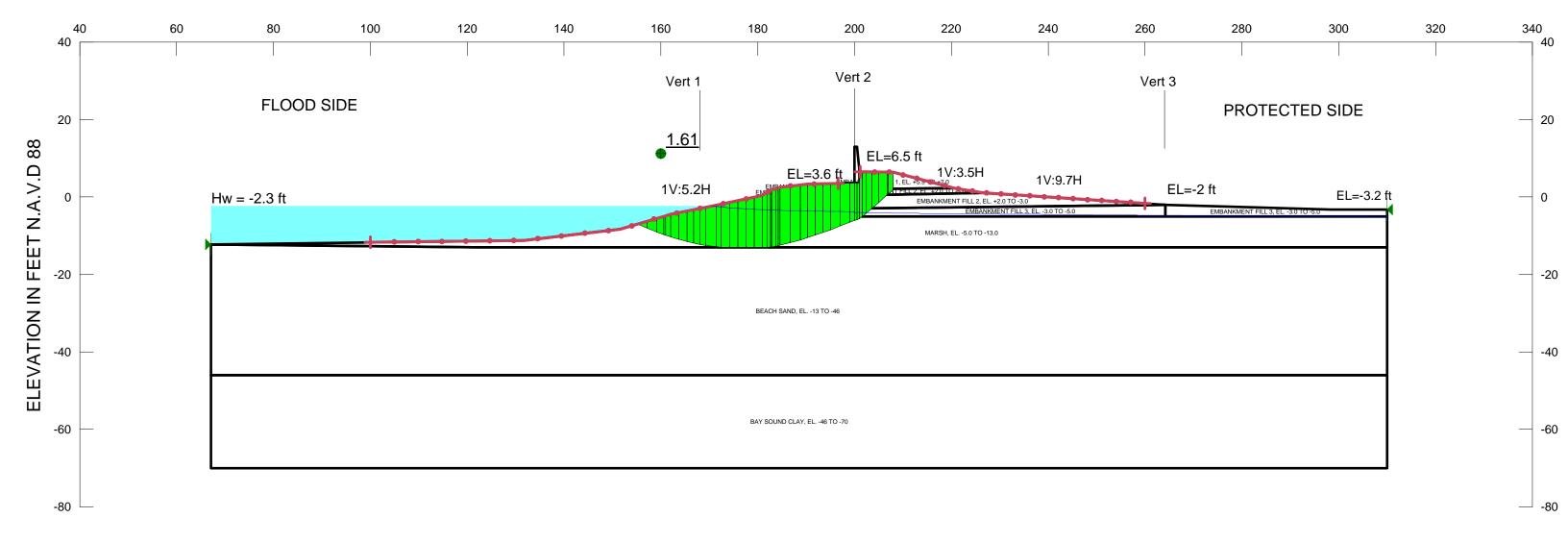




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17th STREET OUTFALL CANAL, REACH 15A, FLOOD SIDE STABILITY ANALYSIS. CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 626+56 to 635+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 1, EL. +5.9 TO +2.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0 °

Name: MARSH, EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0 °

Name: BEACH SAND, EL. -13 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi: 0°

Name: EMBANKMENT FILL 2, EL. +2.0 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi: 0° Name: EMBANKMENT FILL 3, EL. -3.0 TO -5.0 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0°

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-Q (-2.3) File Name: 17thReach15A.gsz Last Edited By: Redell, Chris MVS

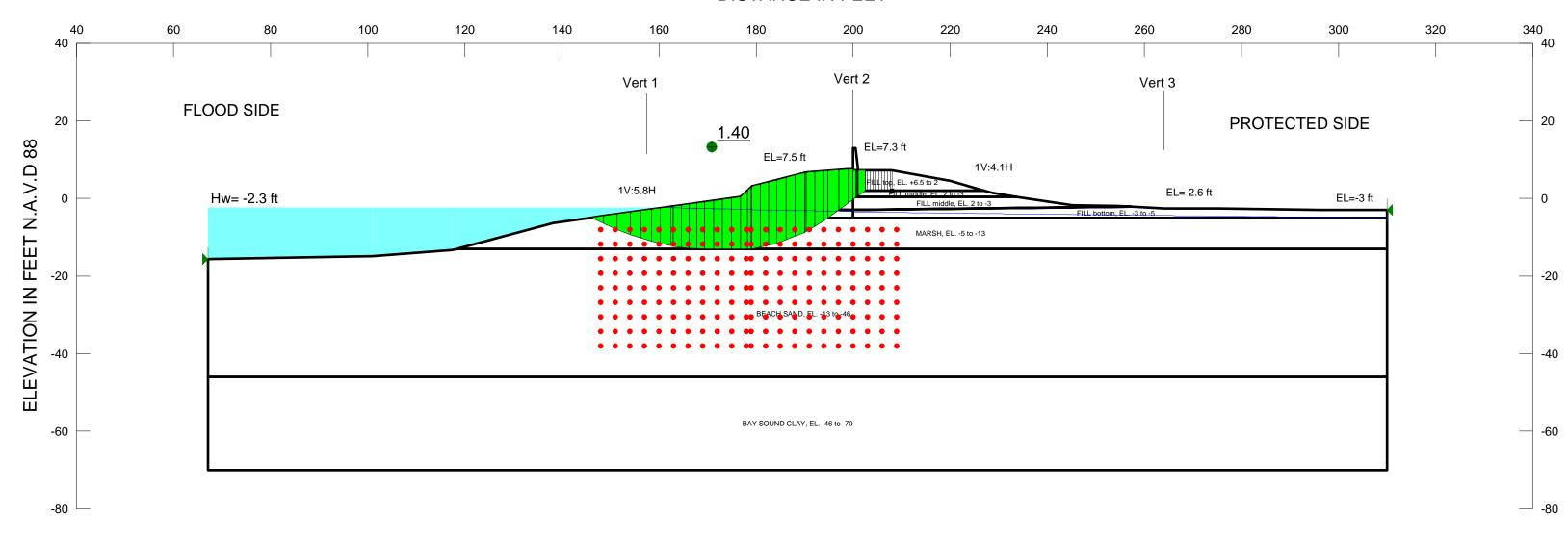




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17th STREET OUTFALL CANAL, REACH 15A, FLOOD SIDE STABILITY ANALYSIS. CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 626+56 to 635+00 WEST ORLEANS PARISH, LOUISIANA



Name: FILL top, EL. +6.5 to 2 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -5 to -13 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: BEACH SAND, EL. -13 to -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi: 0°

Name: FILL middle, EL. 2 to -3 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi: 0 ° Name: FILL bottom, EL. -3 to -5 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

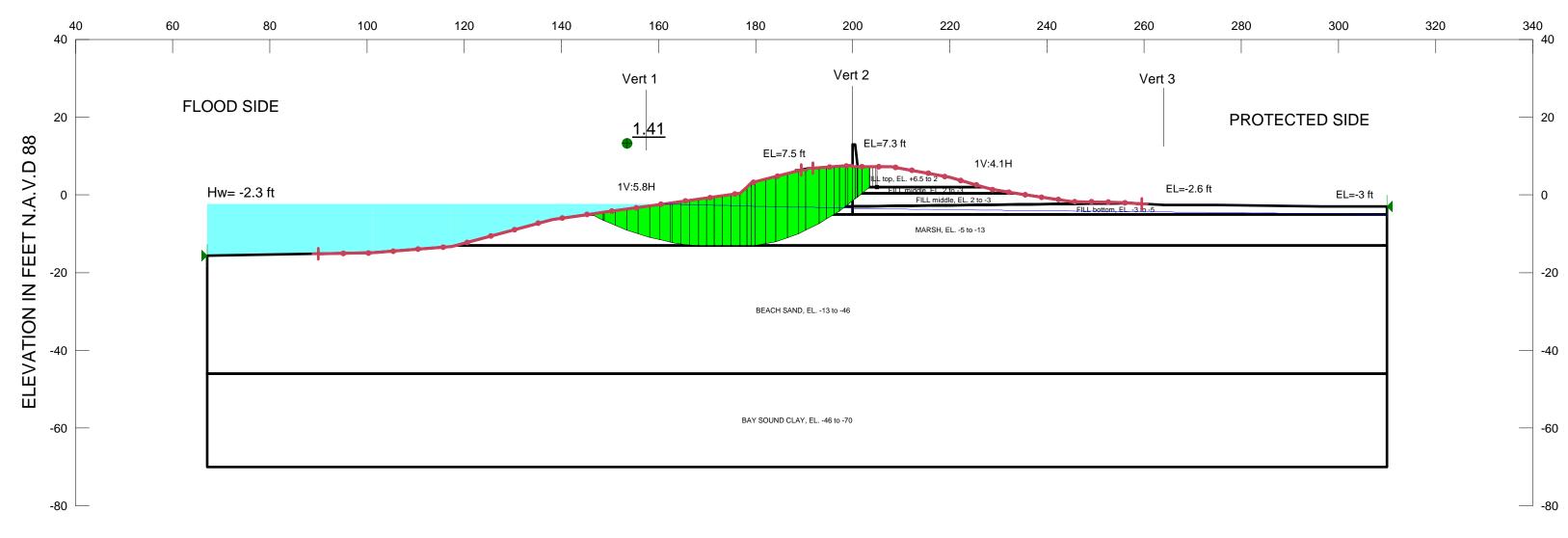
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17th STREET OUTFALL CANAL, REACH 15B, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 635+00 to 639+06 WEST ORLEANS PARISH, LOUISIANA



Name: FILL top, EL. +6.5 to 2 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -5 to -13 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: BEACH SAND, EL. -13 to -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 to -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi: 0°

Name: FILL middle, EL. 2 to -3 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 375 psf Phi: 0 ° Name: FILL bottom, EL. -3 to -5 Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 500 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

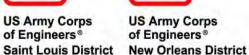
WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-Q (-2.3)

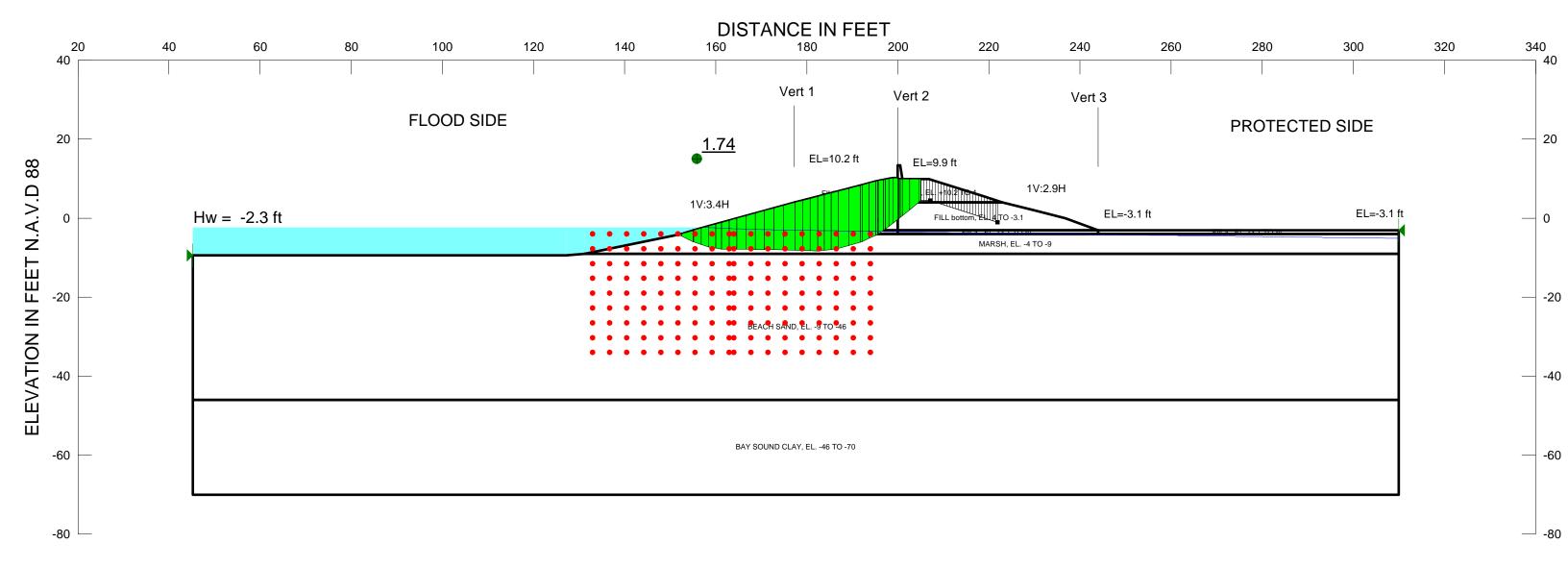
File Name: 17thReach15B.gsz Last Edited By: Redell, Chris MVS







17th STREET OUTFALL CANAL, REACH 15B, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 635+00 to 639+06 WEST ORLEANS PARISH, LOUISIANA



Name: FILL top, EL. +10.2 TO 4 Model: Spatial Mohr-Coulomb Unit Weight: 119 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -4 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion Fn: MARSH 1 Phi: 0 °

Name: BEACH SAND, EL. -9 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

Name: Fill a , EL. -3.1 TO -4 Model: Spatial Mohr-Coulomb Weight Spatial Fn: Fill Cohesion Spatial Fn: Fill Phi: 0 ° Name: FILL bottom, EL. 4 TO -3.1 Model: Spatial Mohr-Coulomb Unit Weight: 119 pcf Cohesion: 700 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-2.3)

File Name: 17thReach16.gsz
Last Edited By: Redell, Chris MVS

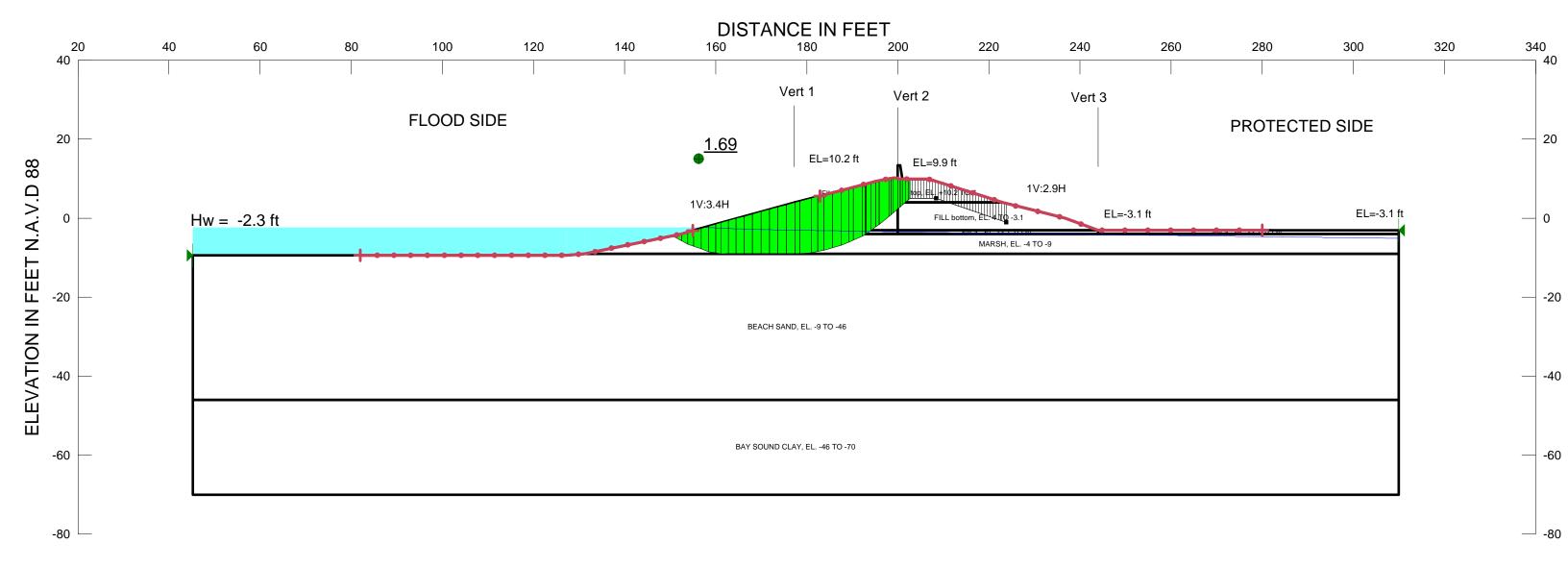






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17th STREET OUTFALL CANAL, REACH 16, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 641+85 - 658+00 WEST ORLEANS PARISH, LOUISIANA



Name: FILL top, EL. +10.2 TO 4 Model: Spatial Mohr-Coulomb Unit Weight: 119 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -4 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion Fn: MARSH 1 Phi: 0 °

Name: BEACH SAND, EL. -9 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

Name: Fill a , EL. -3.1 TO -4 Model: Spatial Mohr-Coulomb Weight Spatial Fn: Fill Cohesion Spatial Fn: Fill Phi: 0 ° Name: FILL bottom, EL. 4 TO -3.1 Model: Spatial Mohr-Coulomb Unit Weight: 119 pcf Cohesion: 700 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-Q (-2.3)

File Name: 17thReach16.gsz
Last Edited By: Redell, Chris MVS

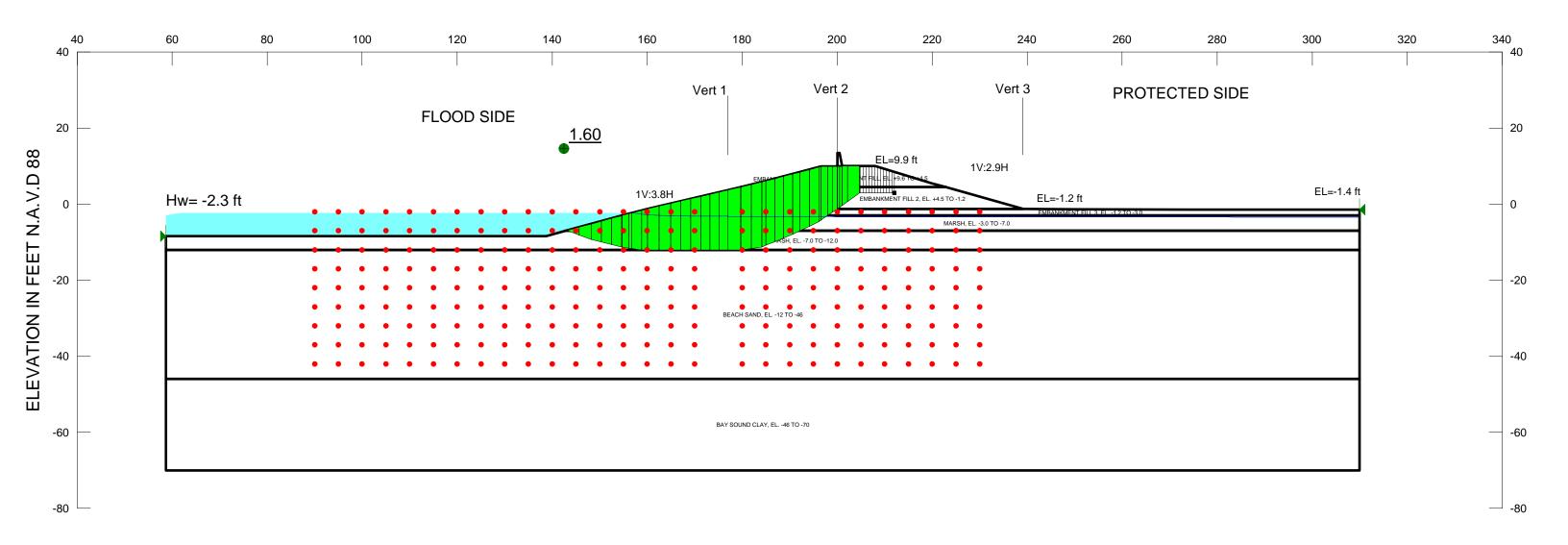


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17th STREET OUTFALL CANAL, REACH 16, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 641+85 - 658+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.6 TO +4.5 Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -3.0 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -12 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Clay Phi: 0°

Name: EMBANKMENT FILL 3, EL. -1.2 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion Fn: Fill Phi: 0 ° Name: MARSH, EL. -7.0 TO -12.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 2 Phi: 0 ° Name: EMBANKMENT FILL 2, EL. +4.5 TO -1.2 Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 650 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-2.3) File Name: 17thReach17.gsz Last Edited By: Redell, Chris MVS

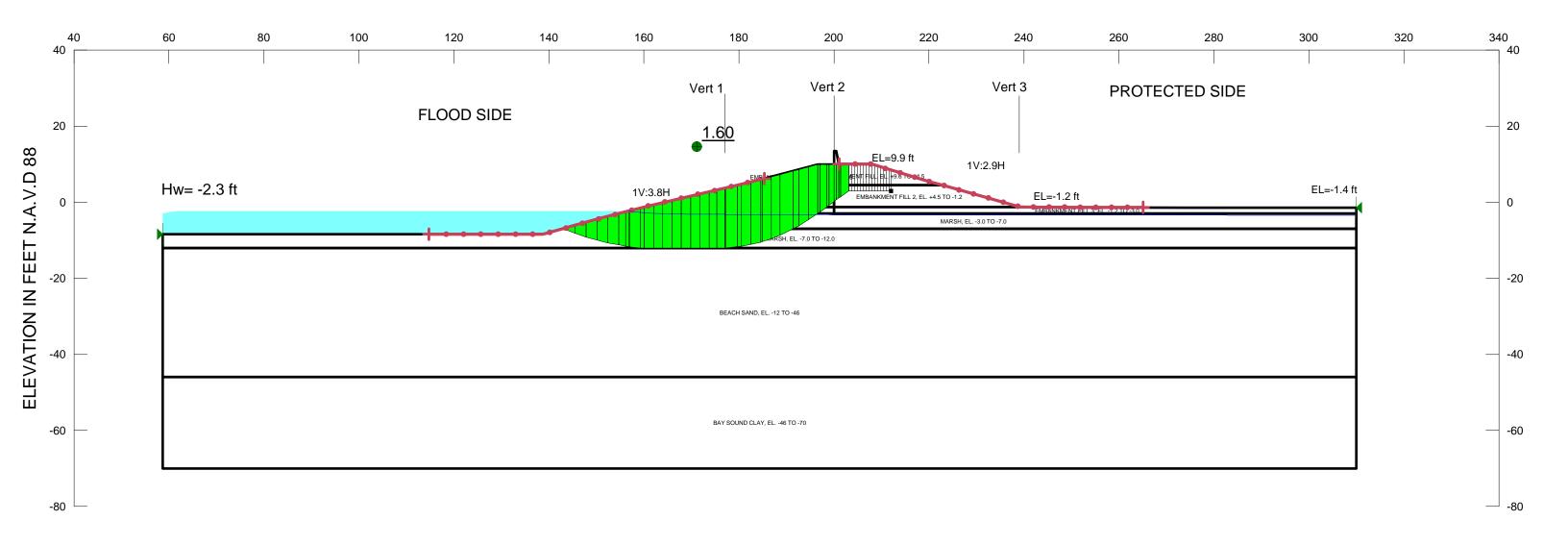




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17th STREET OUTFALL CANAL, REACH 17, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 658+00 - 663+00 WEST ORLEANS PARISH, LOUISIANAS



Name: EMBANKMENT FILL, EL. +9.6 TO +4.5 Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH, EL. -3.0 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 ° Name: BEACH SAND, EL. -12 TO -46 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Clay Phi: 0° Name: EMBANKMENT FILL 3, EL. -1.2 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion Fn: Fill

Name: MARSH, EL. -7.0 TO -12.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Marsh 2 Phi: 0 ° Name: EMBANKMENT FILL 2, EL. +4.5 TO -1.2 Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 650 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-Q (-2.3) File Name: 17thReach17.gsz Last Edited By: Redell, Chris MVS

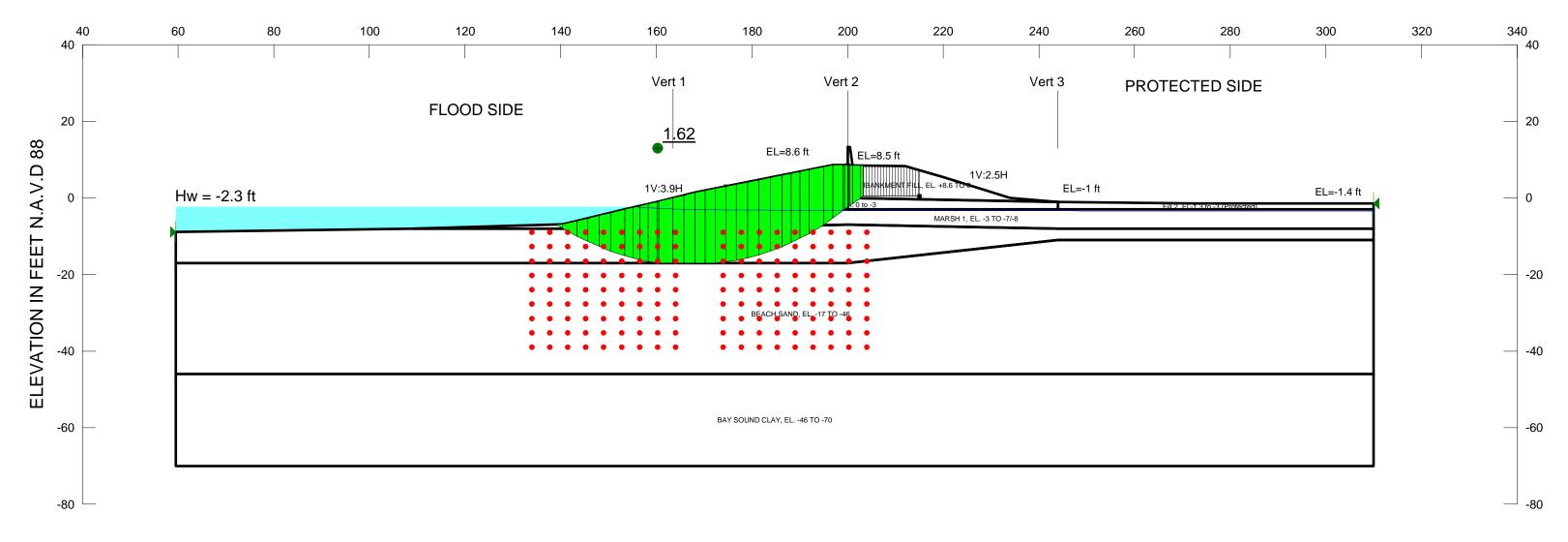




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17th STREET OUTFALL CANAL, REACH 17, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 658+00 - 663+00 WEST ORLEANS PARISH, LOUISIANAS



Name: EMBANKMENT FILL, EL. +8.6 TO 0 Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH 1, EL. -3 TO -7/-8 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -17 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

Name: MARSH 2, EL. -7/-8 TO -17 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: MARSH 2 Phi: 0 °

Name: Fill 2, El. 0 to -3 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion Fn: Fill Phi: 0 °

Name: Fill 2, El -1.3 to -3 (Protected) Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 800 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-2.3) File Name: 17thReach18.gsz Last Edited By: Redell, Chris MVS

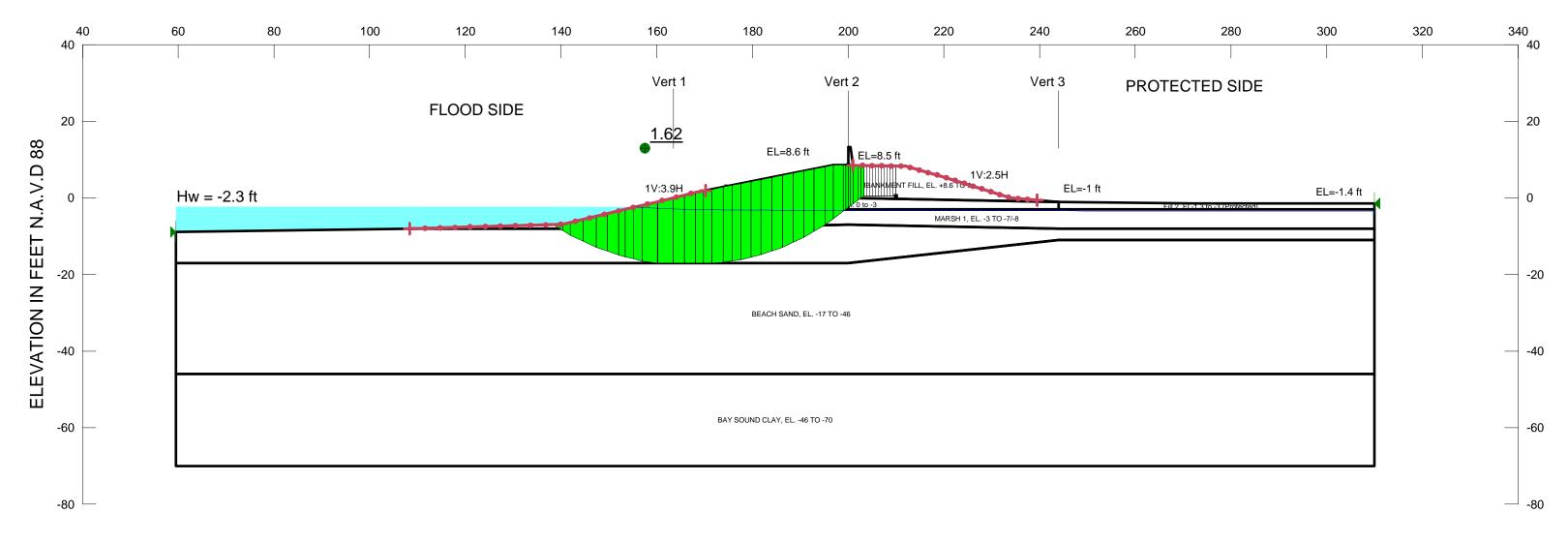




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17th STREET OUTFALL CANAL, REACH 18, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 663+00 to 669+36 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.6 TO 0 Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH 1, EL. -3 TO -7/-8 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -17 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

Name: MARSH 2, EL. -7/-8 TO -17 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: MARSH 2 Phi: 0 °

Name: Fill 2, El. 0 to -3 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion Fn: Fill Phi: 0 °

Name: Fill 2, El -1.3 to -3 (Protected) Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 800 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

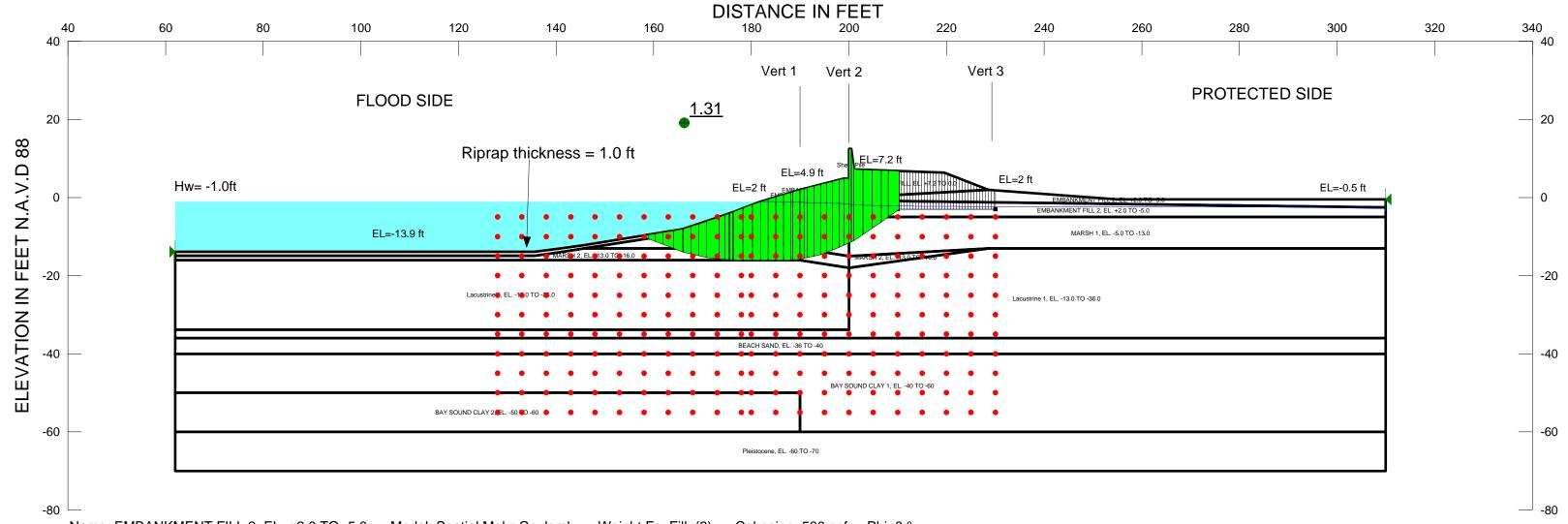
Name: Slope Stability (Entry/Exit) LWL-Q (-2.3) File Name: 17thReach18.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 18, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 663+00 to 669+36 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL. +2.0 TO -5.0 Model: Spatial Mohr-Coulomb Weight Fn: Fill (2) Cohesion: 500 psf Phi: 0 ° Name: MARSH 1, EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -36 TO -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY 1, EL. -40 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Bay Sound 1 Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Lacustrine 1, EL. -13.0 TO -36.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1 Phi: 0 °

Name: Pleistocene, EL. -60 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 124 pcf Cohesion: 1000 psf Phi: 0 °

Name: EMBANKMENT FILL, EL. +7.2 TO 0.0 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion Spatial Fn: Embankment Fill Phi: 0°

Name: MARSH 2, EL. -13.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion Fn: MARSH 2 Phi: 0 °

Name: BAY SOUND CLAY 2, EL. -50 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Bay Sound 2 Phi: 0°

Name: Rip Rap Model: Spatial Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 0 psf Phi: 40 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-1) File Name: 17thReach19.gsz Last Edited By: Redell, Chris MVS

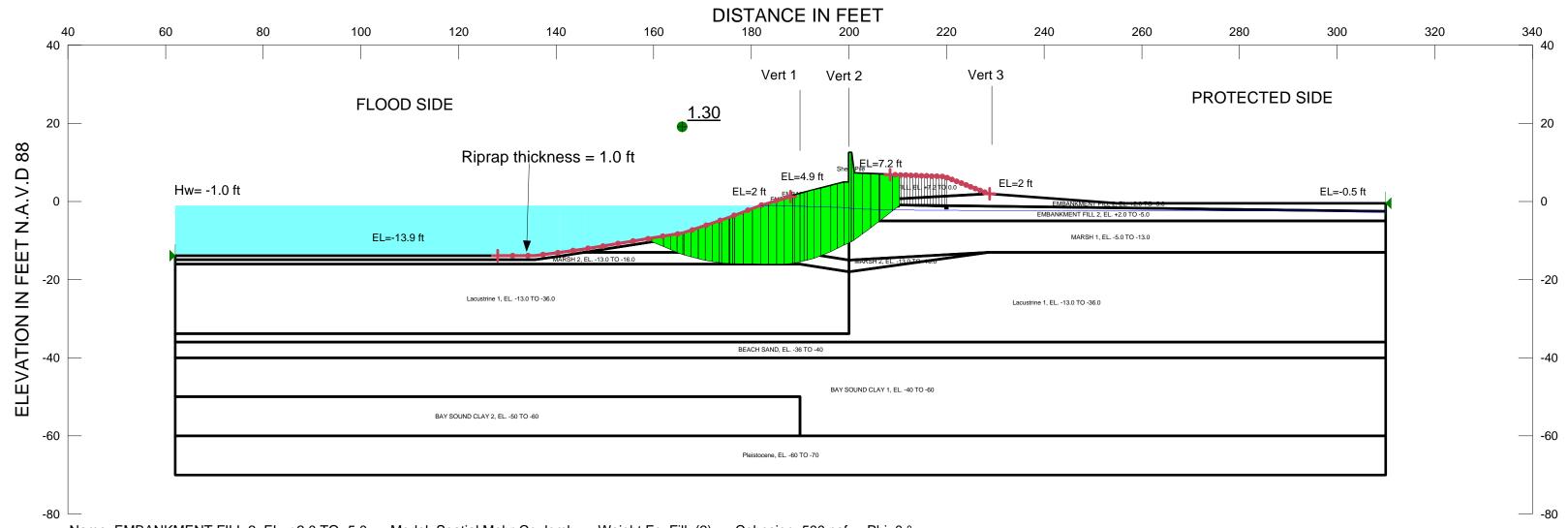




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17th STREET OUTFALL CANAL, REACH 19, FLOOD SIDE STABILITY ANALYSIS. CASE: Slope Stability (Block) LWL-Q (-1) STA. Closure to 552+17 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL. +2.0 TO -5.0 Model: Spatial Mohr-Coulomb Weight Fn: Fill (2) Cohesion: 500 psf Phi: 0 ° Name: MARSH 1, EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -36 TO -40 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY 1, EL. -40 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Bay Sound 1 Phi: 0 °

Name: Sheet Pile Model: Undrained (Phi=0) Unit Weight: 0.1 pcf Cohesion: 0.01 psf

Name: Lacustrine 1, EL. -13.0 TO -36.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1 Phi: 0 °

Name: Pleistocene, EL. -60 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 124 pcf Cohesion: 1000 psf Phi: 0 °

Name: EMBANKMENT FILL, EL. +7.2 TO 0.0 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion Spatial Fn: Embankment Fill Phi: 0°

Name: MARSH 2, EL. -13.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion Fn: MARSH 2 Phi: 0 °

Name: BAY SOUND CLAY 2, EL. -50 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion Fn: Bay Sound 2 Phi: 0°

Name: Rip Rap Model: Spatial Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 0 psf Phi: 40 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-Q (-1) File Name: 17thReach19.gsz Last Edited By: Redell, Chris MVS

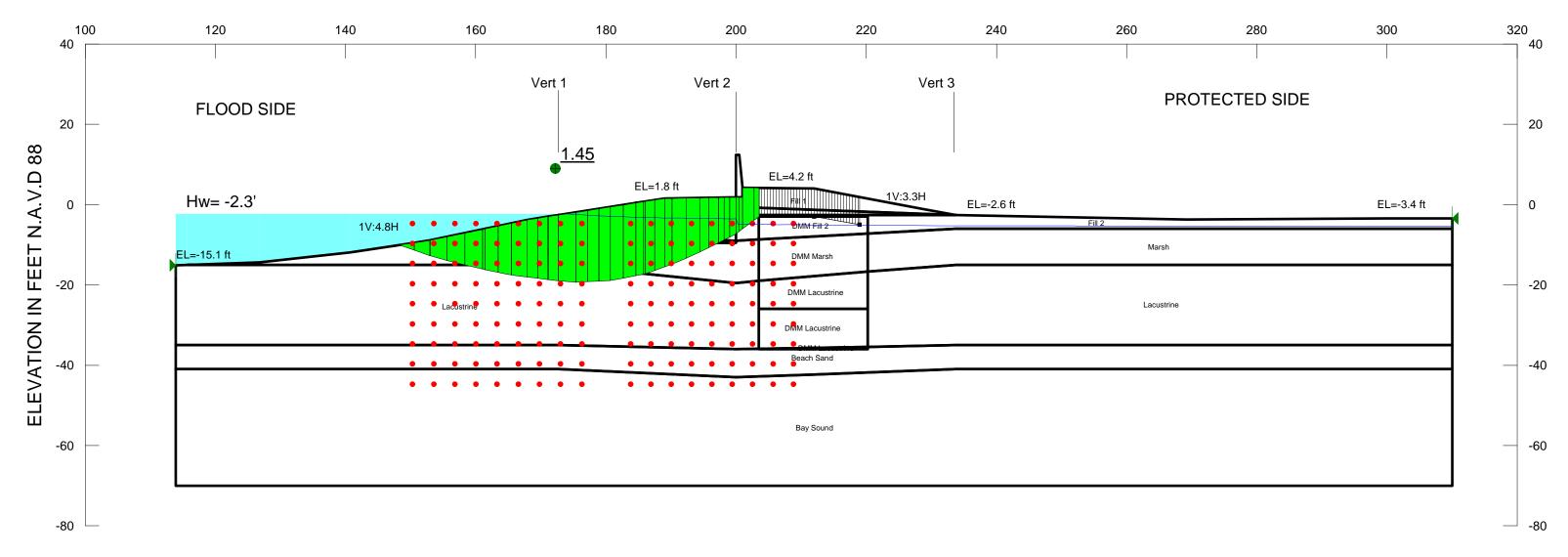




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17th STREET OUTFALL CANAL, REACH 19, FLOOD SIDE STABILITY ANALYSIS. CASE: Slope Stability (Entry/Exit) LWL-Q (-1) STA. Closure to 552+17 EAST ORLEANS PARISH, LOUISIANA



Name: Fill 1 Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0 $^{\circ}$

Name: Fill 2 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion Fn: Fill 2 Phi: 0 ° Name: Marsh Model: Spatial Mohr-Coulomb Weight Fn: Marsh Cohesion Fn: Marsh Phi: 0 °

Name: Lacustrine Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Phi: 0 °

Name: Beach Sand Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: Bay Sound Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Phi: 0 °

Name: DMM Fill 2 Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 1000 psf Phi: 0 °

Name: DMM Marsh Model: Spatial Mohr-Coulomb Unit Weight: 78 pcf Cohesion: 1000 psf Phi: 0 ° Name: DMM Lacustrine Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-2.3)

File Name: 17thReach02.gsz

Last Edited By: Dieckmann, Timothy MVS

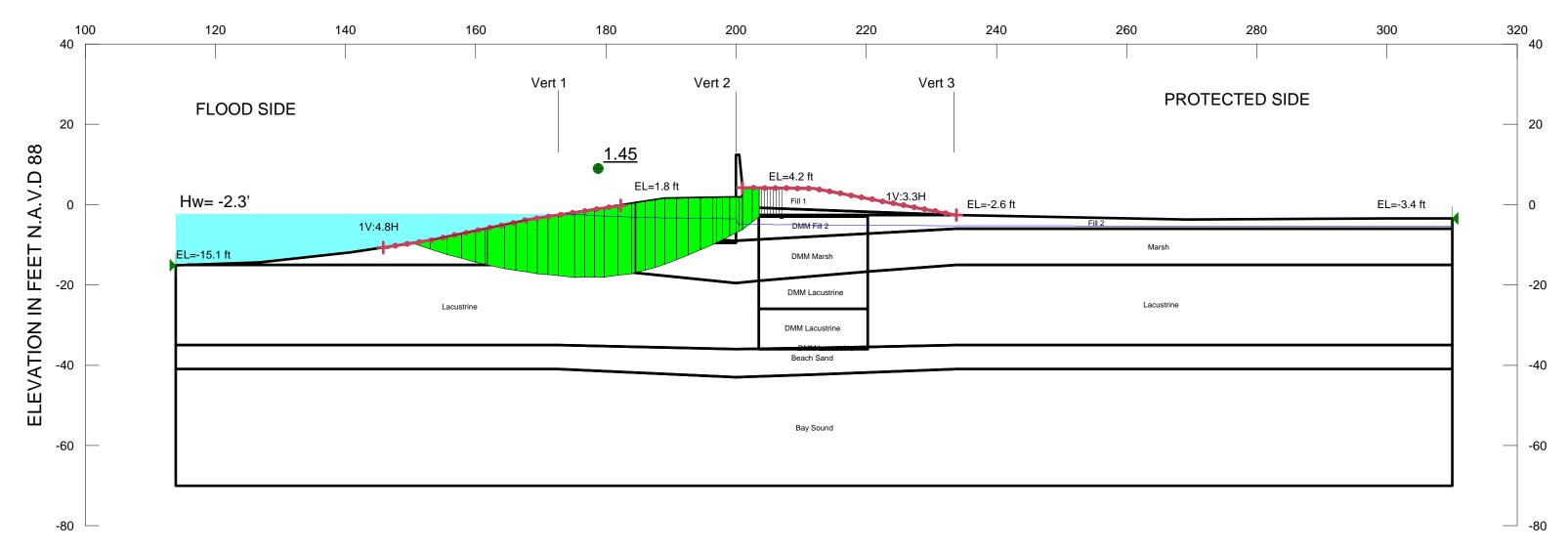




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17th STREET OUTFALL CANAL, REACH 2 FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 553+70 - 565+00 WEST ORLEANS PARISH, LOUISIANA



Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 800 psf Phi: 0 ° Name: Fill 1

Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion Fn: Fill 2 Phi: 0 ° Name: Fill 2 Model: Spatial Mohr-Coulomb Weight Fn: Marsh Cohesion Fn: Marsh Phi: 0 ° Name: Marsh

Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Name: Lacustrine Phi: 0°

Name: Beach Sand Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: Bay Sound Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Phi: 0 °

Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 1000 psf Phi: 0 ° Name: DMM Fill 2

Model: Spatial Mohr-Coulomb Unit Weight: 78 pcf Cohesion: 1000 psf Phi: 0 ° Name: DMM Marsh

Name: DMM Lacustrine Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-Q (-2.3)

File Name: 17thReach02.gsz

Last Edited By: Dieckmann, Timothy MVS

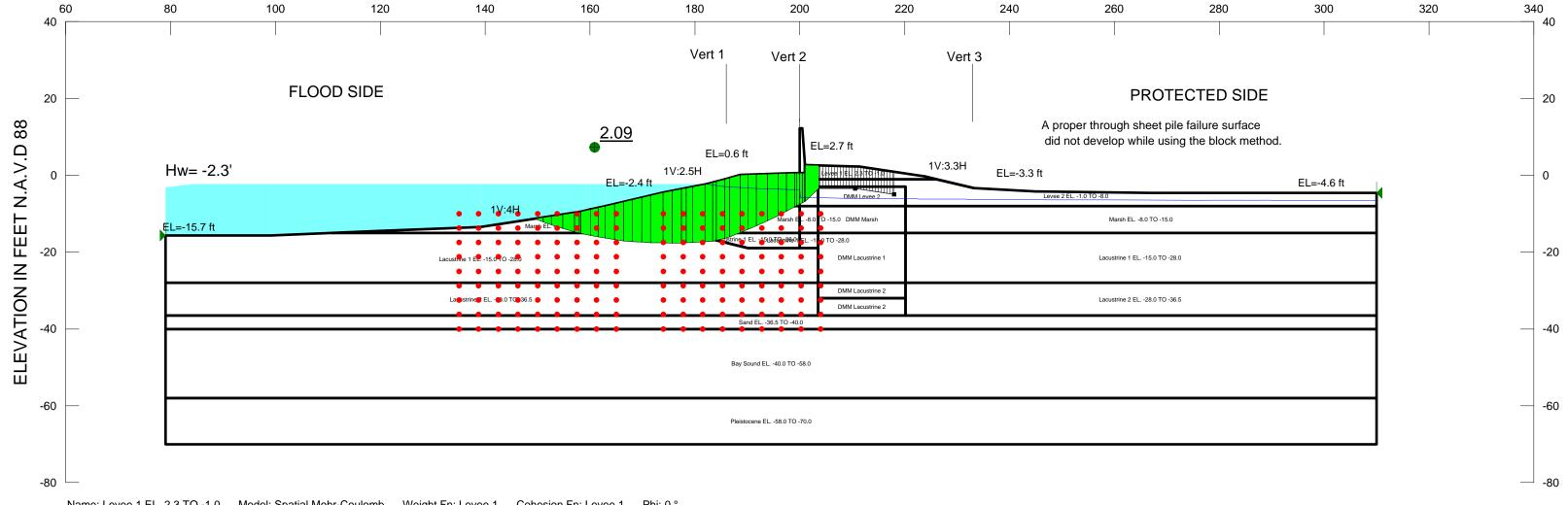




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17th STREET OUTFALL CANAL, REACH 2 FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 553+70 - 565+00 WEST ORLEANS PARISH, LOUISIANA



Cohesion Fn: Levee 1 Phi: 0 ° Name: Levee 1 EL. 2.3 TO -1.0 Model: Spatial Mohr-Coulomb Weight Fn: Levee 1 Name: Levee 2 EL. -1.0 TO -8.0 Model: Spatial Mohr-Coulomb Weight Fn: Levee 2 Cohesion Fn: Levee 2 Phi: 0 ° Name: Marsh EL. -8.0 TO -15.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh Cohesion Fn: Marsh Phi: 0 ° Name: Lacustrine 1 EL. -15.0 TO -28.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1 Phi: 0 ° Name: Lacustrine 2 EL. -28.0 TO -36.5 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion Spatial Fn: Lacustrine 2 Phi: 0 ° Name: Sand EL. -36.5 TO -40.0 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: Bay Sound EL. -40.0 TO -58.0 Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: Bay Sound Phi: 0 ° Name: Pleistocene EL. -58.0 TO -70.0 Model: Spatial Mohr-Coulomb Unit Weight: 123 pcf Cohesion Spatial Fn: Pleistocene Phi: 0 ° Name: DMM Levee 2 Model: Spatial Mohr-Coulomb Weight Fn: Levee 2 Cohesion: 1000 psf Phi: 0 ° Name: DMM Marsh Model: Spatial Mohr-Coulomb Weight Fn: Marsh Cohesion: 1000 psf Phi: 0 ° Name: DMM Lacustrine 1 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 1000 psf Phi: 0 ° Name: DMM Lacustrine 2 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

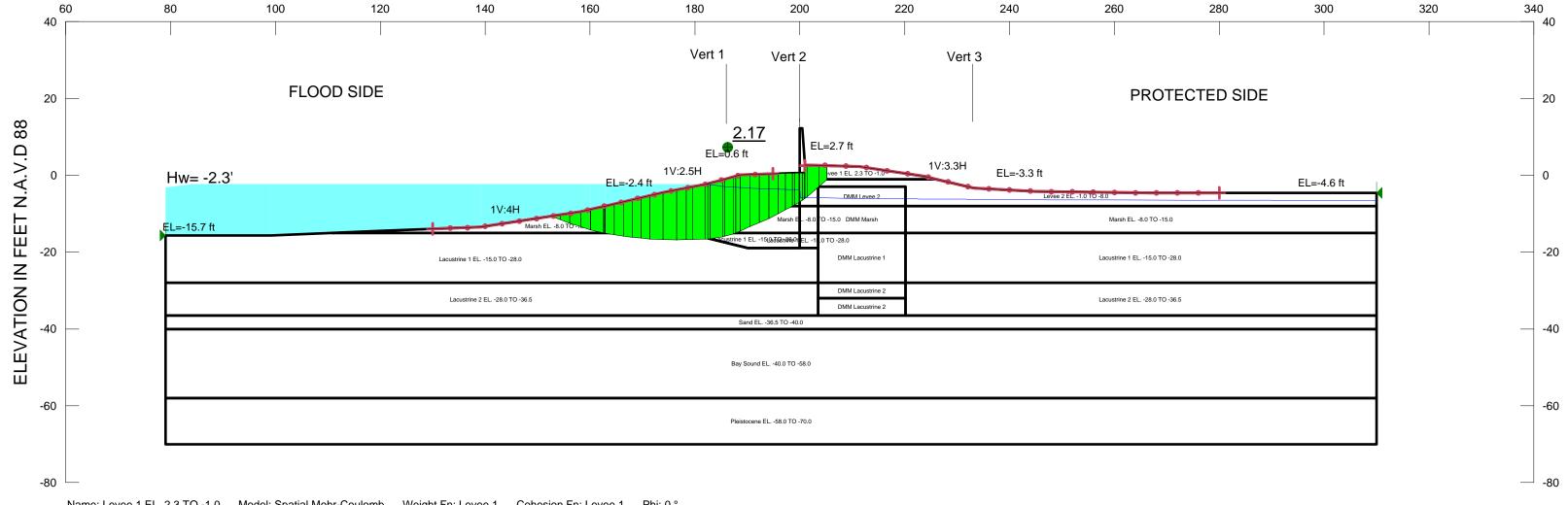
WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-2.3) File Name: 17thReach20.gsz Last Edited By: Goltz, Amanda MVS





17th STREET OUTFALL CANAL, REACH 20, FLOOD SIDE STABILITY ANALYSIS CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 553+58 to 560+10 EAST ORLEANS PARISH, LOUISIANA



Name: Levee 1 EL. 2.3 TO -1.0 Model: Spatial Mohr-Coulomb Weight Fn: Levee 1 Cohesion Fn: Levee 1 Phi: 0 ° Name: Levee 2 EL. -1.0 TO -8.0 Model: Spatial Mohr-Coulomb Weight Fn: Levee 2 Cohesion Fn: Levee 2 Phi: 0 ° Name: Marsh EL. -8.0 TO -15.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh Cohesion Fn: Marsh Phi: 0 ° Name: Lacustrine 1 EL. -15.0 TO -28.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1 Phi: 0 ° Name: Lacustrine 2 EL. -28.0 TO -36.5 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion Spatial Fn: Lacustrine 2 Phi: 0 ° Name: Sand EL. -36.5 TO -40.0 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: Bay Sound EL. -40.0 TO -58.0 Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: Bay Sound Phi: 0 ° Name: Pleistocene EL. -58.0 TO -70.0 Model: Spatial Mohr-Coulomb Unit Weight: 123 pcf Cohesion Spatial Fn: Pleistocene Phi: 0 ° Name: DMM Levee 2 Model: Spatial Mohr-Coulomb Weight Fn: Levee 2 Cohesion: 1000 psf Phi: 0 ° Name: DMM Marsh Model: Spatial Mohr-Coulomb Weight Fn: Marsh Cohesion: 1000 psf Phi: 0 ° Name: DMM Lacustrine 1 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 1000 psf Phi: 0 ° Name: DMM Lacustrine 2 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

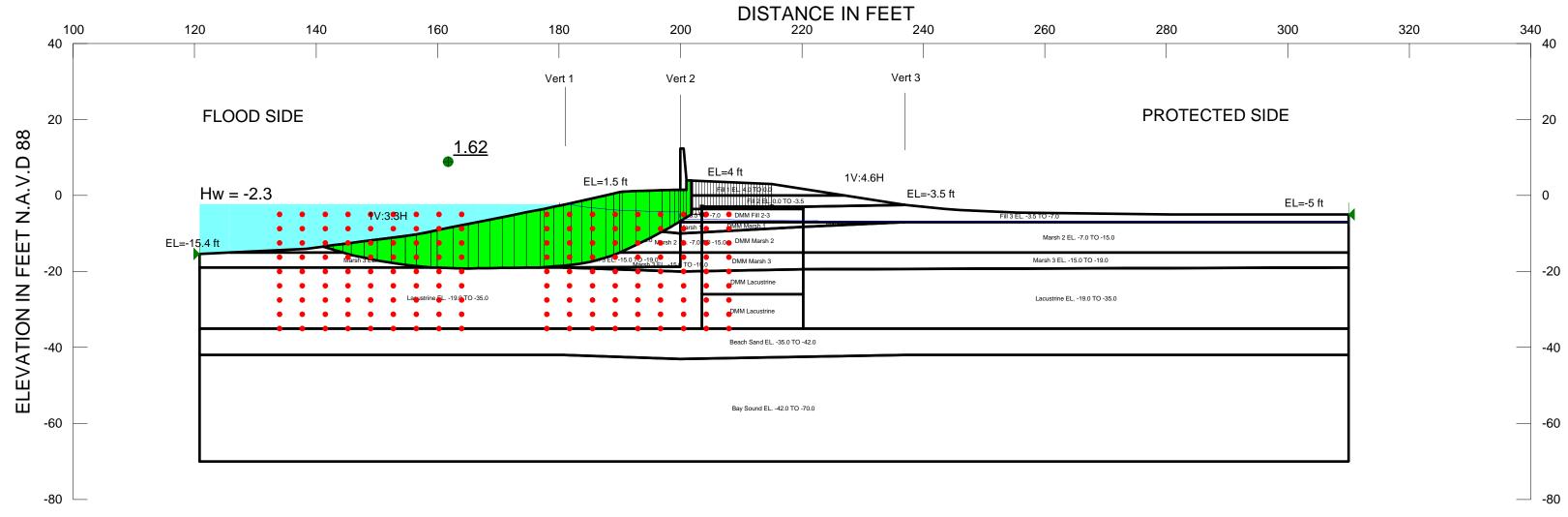
Name: Slope Stability (Entry/Exit) LWL-Q (-2.3)

File Name: 17thReach20.gsz Last Edited By: Redell, Chris MVS





17th STREET OUTFALL CANAL, REACH 20, FLOOD SIDE STABILITY ANALYSIS CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 553+58 to 560+10 EAST ORLEANS PARISH, LOUISIANA



Name: Beach Sand EL. -35.0 TO -42.0 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: Bay Sound EL. -42.0 TO -70.0 Model: Spatial Mohr-Coulomb Unit Weight: 102 pcf Cohesion Spatial Fn: Bay Sound Phi: 0 ° Name: Lacustrine EL. -19.0 TO -35.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Phi: 0 ° Name: Marsh 1 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Fn: Marsh 1 Phi: 0 ° Name: Marsh 2 EL. -7.0 TO -15.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion Fn: Marsh 2 Phi: 0 ° Name: Fill 1 EL. 4.0 TO 0.0 Model: Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 600 psf Phi: 0 ° Name: Fill 2 EL. 0.0 TO -3.5 Model: Mohr-Coulomb Unit Weight: 94 pcf Cohesion: 400 psf Phi: 0 ° Name: Fill 3 EL. -3.5 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: Fill 3 Phi: 0 ° Name: Marsh 3 EL. -15.0 TO -19.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 3 Cohesion Fn: Marsh 3 Phi: 0 ° Name: DMM Fill 2-3 Model: Mohr-Coulomb Unit Weight: 94 pcf Cohesion: 1000 psf Phi: 0 ° Name: DMM Marsh 1 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion: 1000 psf Phi: 0 ° Name: DMM Marsh 2 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 1000 psf Phi: 0 ° Name: DMM Marsh 3 Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 1000 psf Phi: 0 ° Name: DMM Lacustrine Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

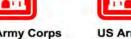
CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

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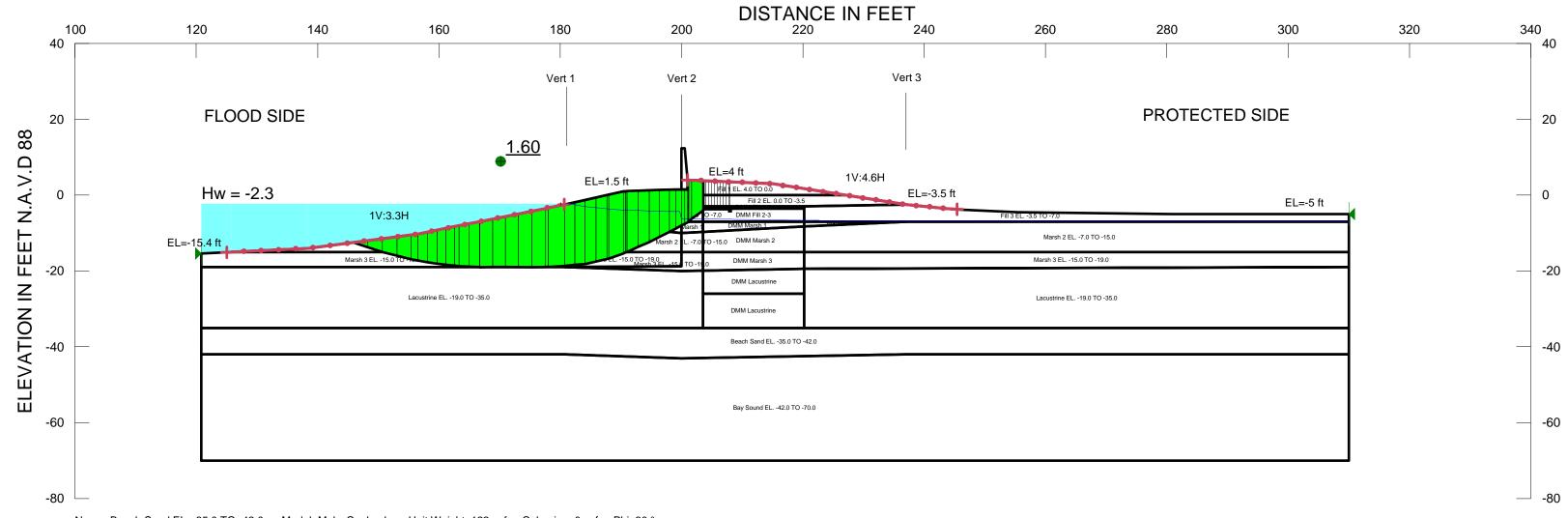
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17th STREET OUTFALL CANAL, REACH 21, FLOOD SIDE STABILITY ANALYSIS CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 566+00 to 570+73 EAST ORLEANS PARISH, LOUISIANA



Name: Beach Sand EL. -35.0 TO -42.0 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: Bay Sound EL. -42.0 TO -70.0 Model: Spatial Mohr-Coulomb Unit Weight: 102 pcf Cohesion Spatial Fn: Bay Sound Phi: 0 ° Name: Lacustrine EL. -19.0 TO -35.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Phi: 0 ° Name: Marsh 1 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion Fn: Marsh 1 Phi: 0 ° Name: Marsh 2 EL. -7.0 TO -15.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion Fn: Marsh 2 Phi: 0 ° Name: Fill 1 EL. 4.0 TO 0.0 Model: Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 600 psf Phi: 0 ° Name: Fill 2 EL. 0.0 TO -3.5 Model: Mohr-Coulomb Unit Weight: 94 pcf Cohesion: 400 psf Phi: 0 ° Name: Fill 3 EL. -3.5 TO -7.0 Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion Fn: Fill 3 Phi: 0 ° Name: Marsh 3 EL. -15.0 TO -19.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 3 Cohesion Fn: Marsh 3 Phi: 0 ° Name: DMM Fill 2-3 Model: Mohr-Coulomb Unit Weight: 94 pcf Cohesion: 1000 psf Phi: 0 ° Name: DMM Marsh 1 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion: 1000 psf Phi: 0 ° Name: DMM Marsh 2 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 1000 psf Phi: 0 ° Name: DMM Marsh 3 Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 1000 psf Phi: 0 ° Name: DMM Lacustrine Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-Q (-2.3)

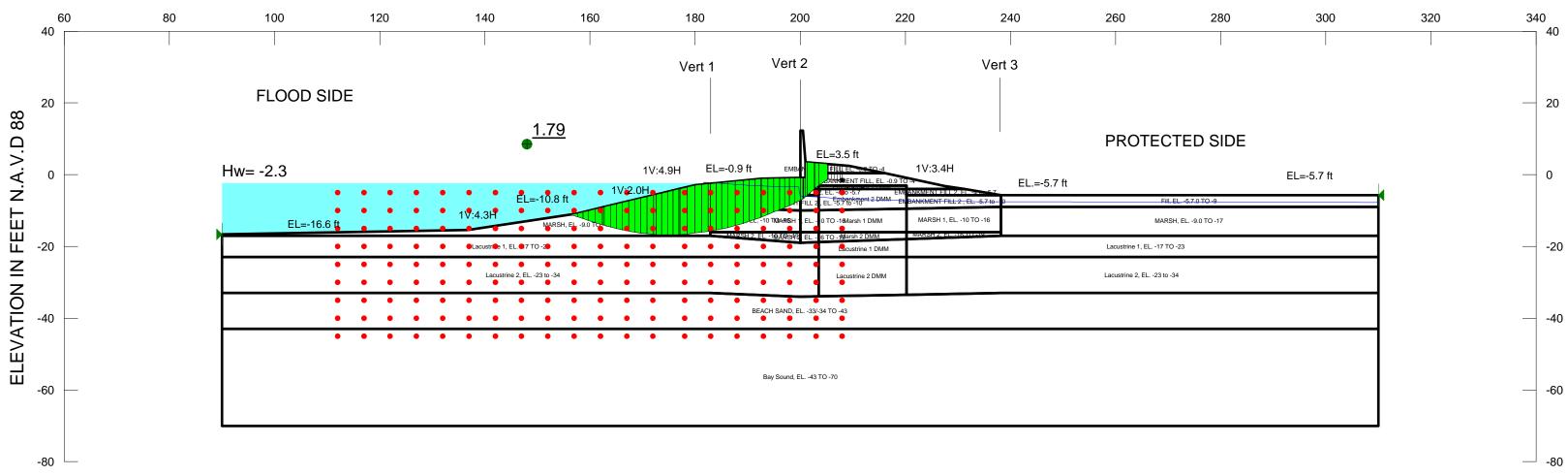
File Name: 17thReach21.gsz Last Edited By: Redell, Chris MVS



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17th STREET OUTFALL CANAL, REACH 21, FLOOD SIDE STABILITY ANALYSIS CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 566+00 to 570+73 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. -0.9 TO -4 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 400 psf Phi: 0 ° Name: MARSH 1, EL. -10 TO -16 Model: Spatial Mohr-Coulomb Unit Weight: 75 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: BEACH SAND, EL. -33/-34 TO -43 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: MARSH 2, EL. -16 TO -19 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: MARSH 2 Phi: 0 ° Name: MARSH, EL. -9.0 TO -17 Model: Spatial Mohr-Coulomb Unit Weight: 75 pcf Cohesion: 150 psf Phi: 0 ° Name: Lacustrine 1, EL. -17 TO -23 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1&2 Cohesion Phi: 0 ° Name: Lacustrine 2, EL. -23 to -34 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion Spatial Fn: Lacustrine 1&2 Cohesion Phi: 0 ° Name: Fill, EL. -5.7.0 TO -9 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 580 psf Phi: 0 ° Name: Bay Sound, EL. -43 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 ° Name: EMBANKMENT FILL 2, EL. -4 to -5.7 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 150 psf Phi: 0 ° Name: Embankment 1 DMM Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 1000 psf Phi: 0 ° Name: Marsh 1 DMM Model: Spatial Mohr-Coulomb Unit Weight: 75 pcf Cohesion: 1000 psf Phi: 0 ° Name: Marsh 2 DMM Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 1000 psf Phi: 0 ° Name: Lacustrine 1 DMM Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 1000 psf Phi: 0 ° Name: Lacustrine 2 DMM Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 1000 psf Phi: 0 ° Name: Embankment 2 DMM Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 1000 psf Phi: 0 ° Name: EMBANKMENT FILL 2, EL. -5.7 to -10 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion Fn: Fill Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-2.3) File Name: 17thReach22.gsz Last Edited By: Redell, Chris MVS

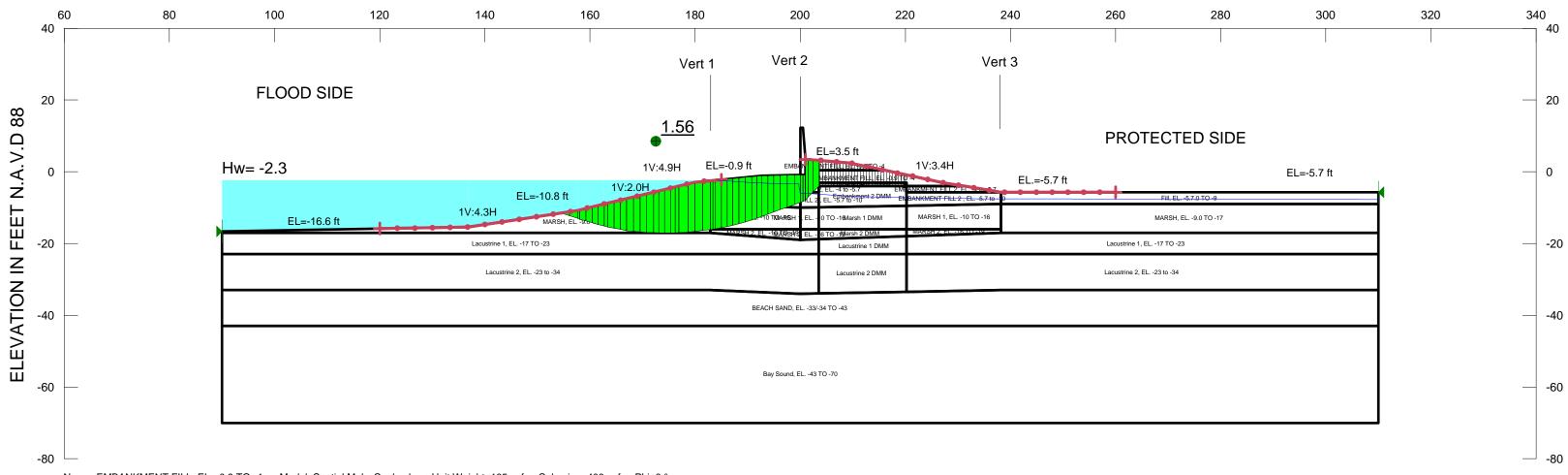




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17th STREET OUTFALL CANAL, REACH 22, FLOOD SIDE STABILITY ANALYSIS. CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 570+73 - 581+50 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. -0.9 TO -4 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 400 psf Phi: 0 ° Name: MARSH 1, EL. -10 TO -16 Model: Spatial Mohr-Coulomb Unit Weight: 75 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: BEACH SAND, EL. -33/-34 TO -43 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: MARSH 2, EL. -16 TO -19 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: MARSH 2 Phi: 0 ° Name: MARSH, EL. -9.0 TO -17 Model: Spatial Mohr-Coulomb Unit Weight: 75 pcf Cohesion: 150 psf Phi: 0 ° Name: Lacustrine 1, EL. -17 TO -23 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1&2 Cohesion Phi: 0 ° Name: Lacustrine 2, EL. -23 to -34 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion Spatial Fn: Lacustrine 1&2 Cohesion Phi: 0 ° Name: Fill, EL. -5.7.0 TO -9 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 580 psf Phi: 0 ° Name: Bay Sound, EL. -43 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 ° Name: EMBANKMENT FILL 2, EL. -4 to -5.7 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 150 psf Phi: 0 ° Name: Embankment 1 DMM Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 1000 psf Phi: 0 ° Name: Marsh 1 DMM Model: Spatial Mohr-Coulomb Unit Weight: 75 pcf Cohesion: 1000 psf Phi: 0 ° Name: Marsh 2 DMM Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 1000 psf Phi: 0 ° Name: Lacustrine 1 DMM Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 1000 psf Phi: 0 ° Name: Lacustrine 2 DMM Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 1000 psf Phi: 0 ° Name: Embankment 2 DMM Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 1000 psf Phi: 0 ° Name: EMBANKMENT FILL 2, EL. -5.7 to -10 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion Fn: Fill Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-Q (-2.3) File Name: 17thReach22.gsz Last Edited By: Redell, Chris MVS

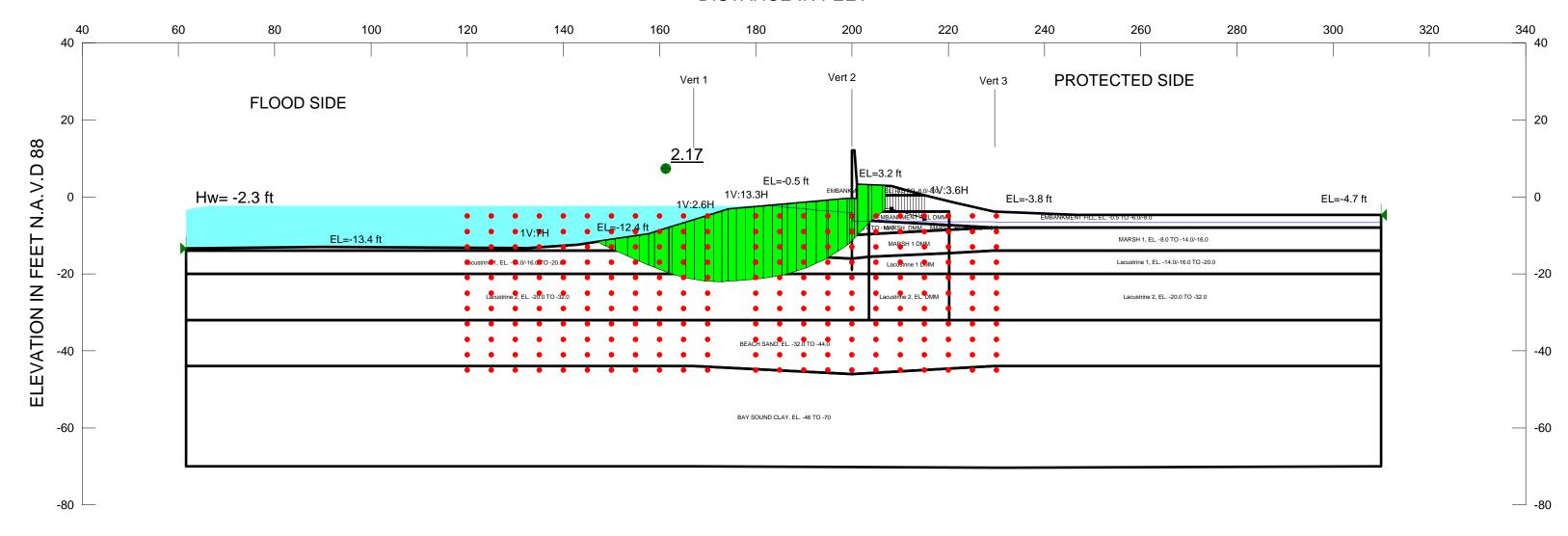




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17th STREET OUTFALL CANAL, REACH 22, FLOOD SIDE STABILITY ANALYSIS. CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 570+73 - 581+50 EAST

ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. -0.5 TO -6.0/-8.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Fn: FILL 1 Name: BEACH SAND, EL. -32.0 TO -44.0 Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Clay Phi: 0 ° Name: MARSH, EL -6.0 TO -10.0 Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion Fn: MARSH Name: Lacustrine 1, EL. -14.0/-16.0 TO -20.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1 Phi: 0 ° Name: MARSH 1, EL. -8.0 TO -14.0/-16.0 Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion Fn: MARSH 1 Phi: 0 ° Name: EMBANKMENT FILL, EL -3.8 TO -8.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 400 psf Phi: 0 ° Name: Lacustrine 2, EL. -20.0 TO -32.0 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine 2 Phi: 0 ° Name: Lacustrine 1 DMM Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 1000 psf Phi: 0 ° Name: MARSH 1 DMM Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 1000 psf Phi: 0 ° Name: MARSH DMM Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion: 1000 psf Phi: 0 ° Name: EMBANKMENT FILL DMM Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 1000 psf Phi: 0 ° Name: Lacustrine 2, EL. DMM Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability (Block) LWL-Q File Name: 17thReach23.gsz Last Edited By: Redell, Chris MVS

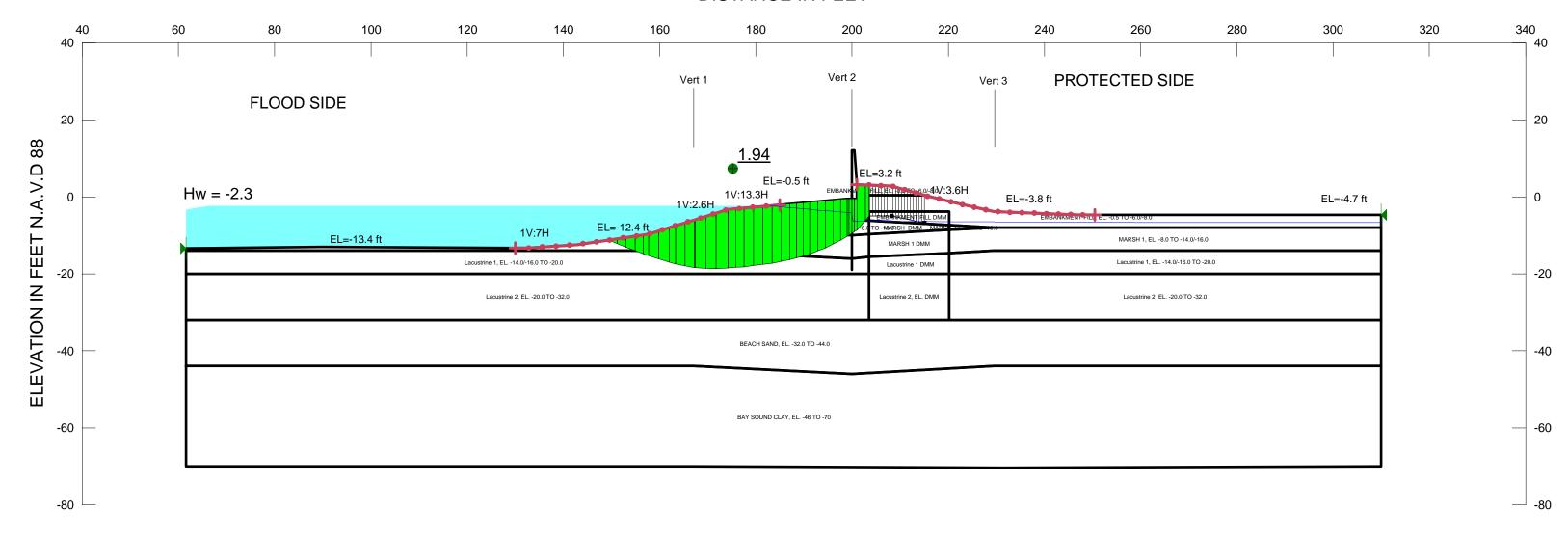




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17th STREET OUTFALL CANAL, REACH 23. FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q STA. 581+50 to 588+67 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. -0.5 TO -6.0/-8.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Fn: FILL 1 Name: BEACH SAND, EL. -32.0 TO -44.0 Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: Clay Phi: 0 ° Name: MARSH, EL -6.0 TO -10.0 Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion Fn: MARSH Name: Lacustrine 1, EL. -14.0/-16.0 TO -20.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1 Phi: 0 ° Name: MARSH 1, EL. -8.0 TO -14.0/-16.0 Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion Fn: MARSH 1 Phi: 0 ° Name: EMBANKMENT FILL, EL -3.8 TO -8.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 400 psf Phi: 0 ° Name: Lacustrine 2, EL. -20.0 TO -32.0 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine 2 Phi: 0 ° Name: Lacustrine 1 DMM Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 1000 psf Phi: 0 ° Name: MARSH 1 DMM Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 1000 psf Phi: 0 ° Name: MARSH DMM Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion: 1000 psf Phi: 0 ° Name: EMBANKMENT FILL DMM Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 1000 psf Phi: 0 ° Name: Lacustrine 2, EL. DMM Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

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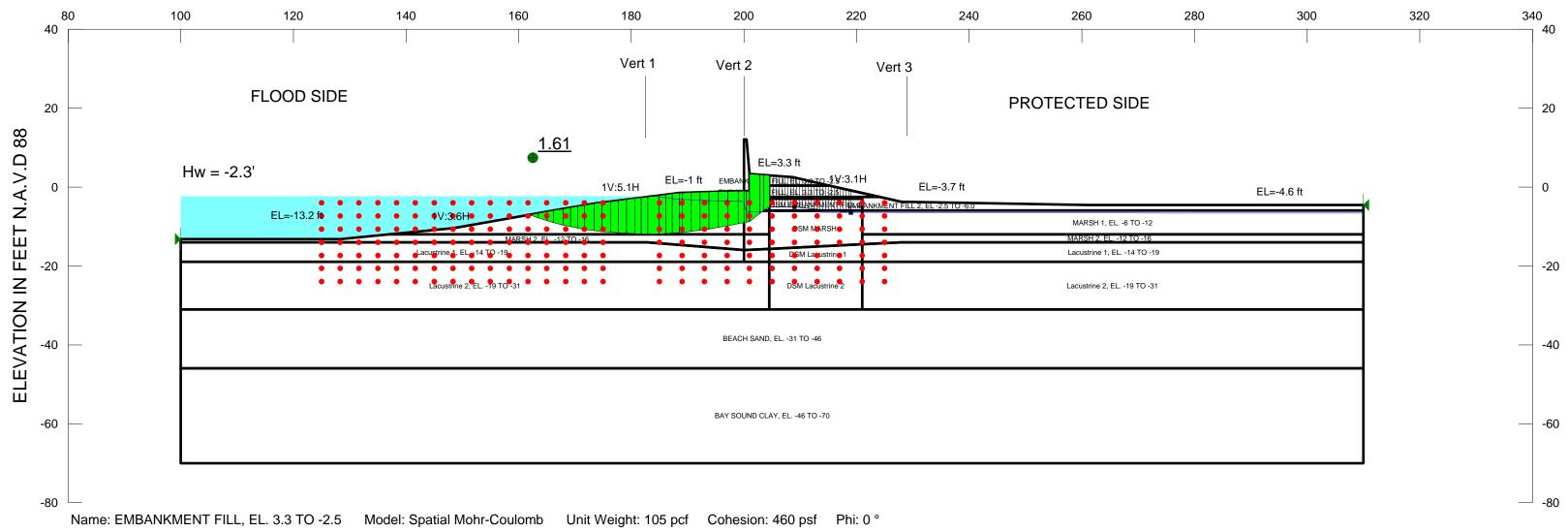
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17th STREET OUTFALL CANAL, REACH 23. FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q STA. 581+50 to 588+67 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -6 TO -12 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion Fn: MARSH 1 Phi: 0 °

Name: BEACH SAND, EL. -31 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Clay Cohesion Spatial Fn: Bay Sound Phi: 0 °

Name: EMBANKMENT FILL 2, EL -2.5 TO -6.0 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: FILL 2 Phi: 0 °

Name: Lacustrine 1, EL. -14 TO -19 Model: Spatial Mohr-Coulomb Weight Fn: lacustrine -14 to -19 Cohesion Spatial Fn: Lacustrine 1 Phi: 0 °

Name: Lacustrine 2, EL. -19 TO -31 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion Spatial Fn: Lacustrine 2 Phi: 0 °

Name: DSM EMBANKMENT FILL 2 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 1000 psf Phi: 0 °

Name: DSM MARSH Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh Cohesion: 1000 psf Phi: 0 °

Name: DSM Lacustrine 1 Model: Spatial Mohr-Coulomb Weight Fn: lacustrine -14 to -19 Cohesion: 1000 psf Phi: 0 °

Name: DSM Lacustrine 2 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 1000 psf Phi: 0 °

Name: MARSH 2, EL. -12 TO -16 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: MARSH 2 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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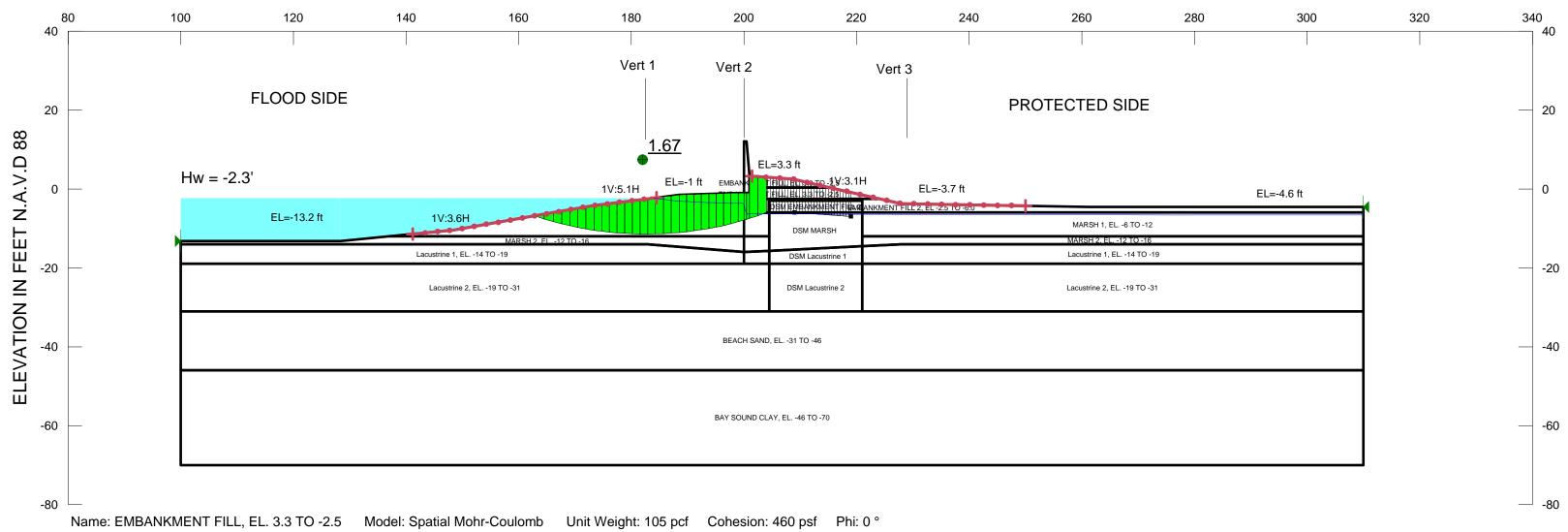
Name: Slope Stability (Block) LWL-Q File Name: 17thReach24.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 24, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q STA. 588+67 to 598+24 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -6 TO -12 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion Fn: MARSH 1 Phi: 0 °

Name: BEACH SAND, EL. -31 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Clay Cohesion Spatial Fn: Bay Sound Phi: 0 °

Name: EMBANKMENT FILL 2, EL -2.5 TO -6.0 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Fn: FILL 2 Phi: 0 °

Name: Lacustrine 1, EL. -14 TO -19 Model: Spatial Mohr-Coulomb Weight Fn: lacustrine -14 to -19 Cohesion Spatial Fn: Lacustrine 1 Phi: 0 °

Name: Lacustrine 2, EL. -19 TO -31 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion Spatial Fn: Lacustrine 2 Phi: 0 °

Name: DSM EMBANKMENT FILL 2 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 1000 psf Phi: 0 °

Name: DSM MARSH Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh Cohesion: 1000 psf Phi: 0 °

Name: DSM Lacustrine 1 Model: Spatial Mohr-Coulomb Weight Fn: lacustrine -14 to -19 Cohesion: 1000 psf Phi: 0 °

Name: DSM Lacustrine 2 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 1000 psf Phi: 0 °

Name: MARSH 2, EL. -12 TO -16 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: MARSH 2 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability (Entry/Exit) LWL-Q File Name: 17thReach24.gsz Last Edited By: Redell, Chris MVS

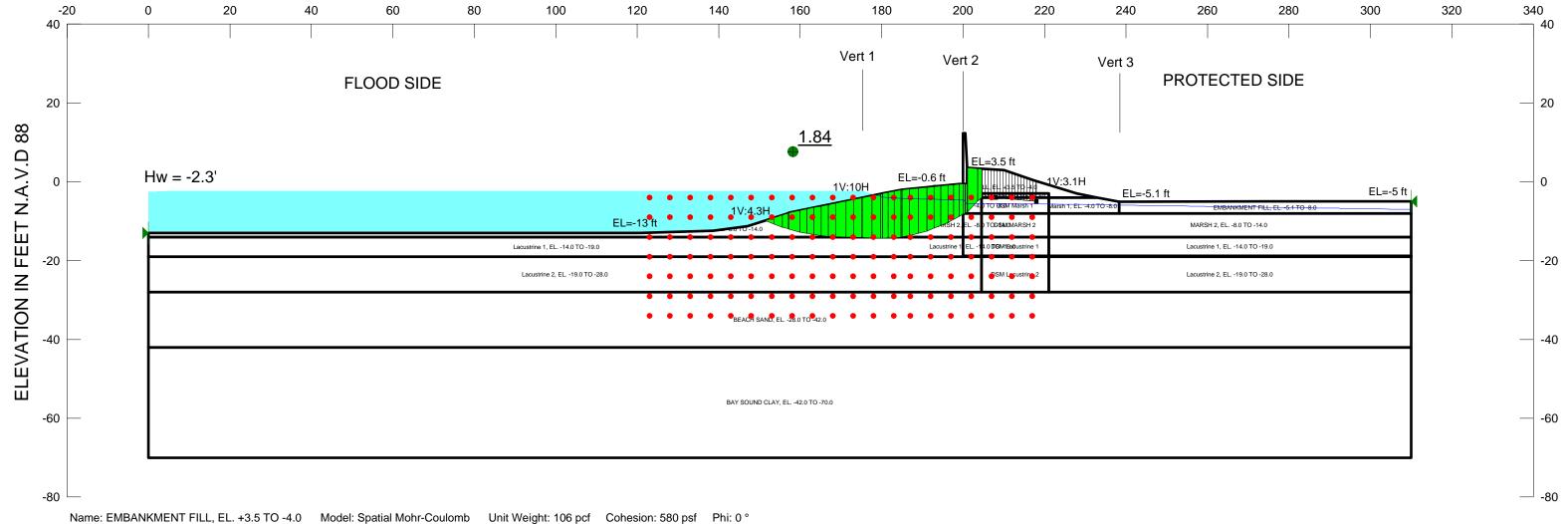




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17th STREET OUTFALL CANAL, REACH 24, FLOOD SIDE STABILITY ANALYSIS. CASE: Slope Stability (Entry/Exit) LWL-Q STA. 588+67 to 598+24 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 2, EL. -8.0 TO -14.0 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: MARSH 2 Phi: 0 ° Name: BEACH SAND, EL. -28.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: BAY SOUND CLAY, EL. -42.0 TO -70.0 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Clay Cohesion Spatial Fn: Bay Sound Clay Phi: 0 ° Name: Lacustrine 1, EL. -14.0 TO -19.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1&2 Phi: 0 ° Name: Marsh 1, EL. -4.0 TO -8.0 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 230 psf Phi: 0 ° Name: EMBANKMENT FILL, EL. -5.1 TO -8.0 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 230 psf Phi: 0 ° Name: Lacustrine 2, EL. -19.0 TO -28.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion Spatial Fn: Lacustrine 1&2 Phi: 0 ° Name: DSM EMBANKMENT FILL Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 1000 psf Phi: 0 ° Name: DSM Marsh 1 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 1000 psf Phi: 0 ° Name: DSM MARSH 2 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 1000 psf Phi: 0 ° Name: DSM Lacustrine 1 Model: Spatial Mohr-Coulomb Unit Weight: 102 pcf Cohesion: 1000 psf Phi: 23 ° Name: DSM Lacustrine 2 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 1000 psf Phi: 23 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q File Name: 17thReach25.gsz Last Edited By: Goltz, Amanda MVS

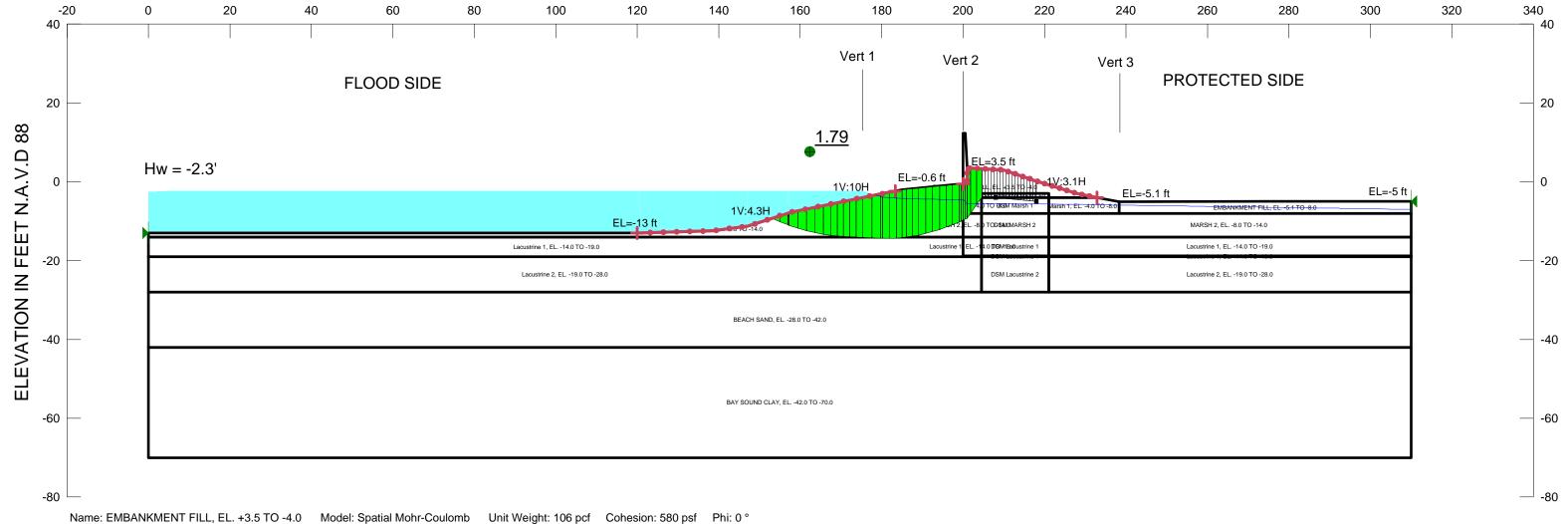




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17th STREET OUTFALL CANAL, REACH 25, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q STA. 598+24-608+00 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 2, EL. -8.0 TO -14.0 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: MARSH 2 Phi: 0 ° Name: BEACH SAND, EL. -28.0 TO -42.0 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: BAY SOUND CLAY, EL. -42.0 TO -70.0 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Clay Cohesion Spatial Fn: Bay Sound Clay Phi: 0 ° Name: Lacustrine 1, EL. -14.0 TO -19.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1&2 Phi: 0 ° Name: Marsh 1, EL. -4.0 TO -8.0 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 230 psf Phi: 0 ° Name: EMBANKMENT FILL, EL. -5.1 TO -8.0 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 230 psf Phi: 0 ° Name: Lacustrine 2, EL. -19.0 TO -28.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion Spatial Fn: Lacustrine 1&2 Phi: 0 ° Name: DSM EMBANKMENT FILL Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 1000 psf Phi: 0 ° Name: DSM Marsh 1 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 1000 psf Phi: 0 ° Name: DSM MARSH 2 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 1000 psf Phi: 0 ° Name: DSM Lacustrine 1 Model: Spatial Mohr-Coulomb Unit Weight: 102 pcf Cohesion: 1000 psf Phi: 23 ° Name: DSM Lacustrine 2 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 1000 psf Phi: 23 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability (Entry/Exit) LWL-Q File Name: 17thReach25.gsz Last Edited By: Goltz, Amanda MVS

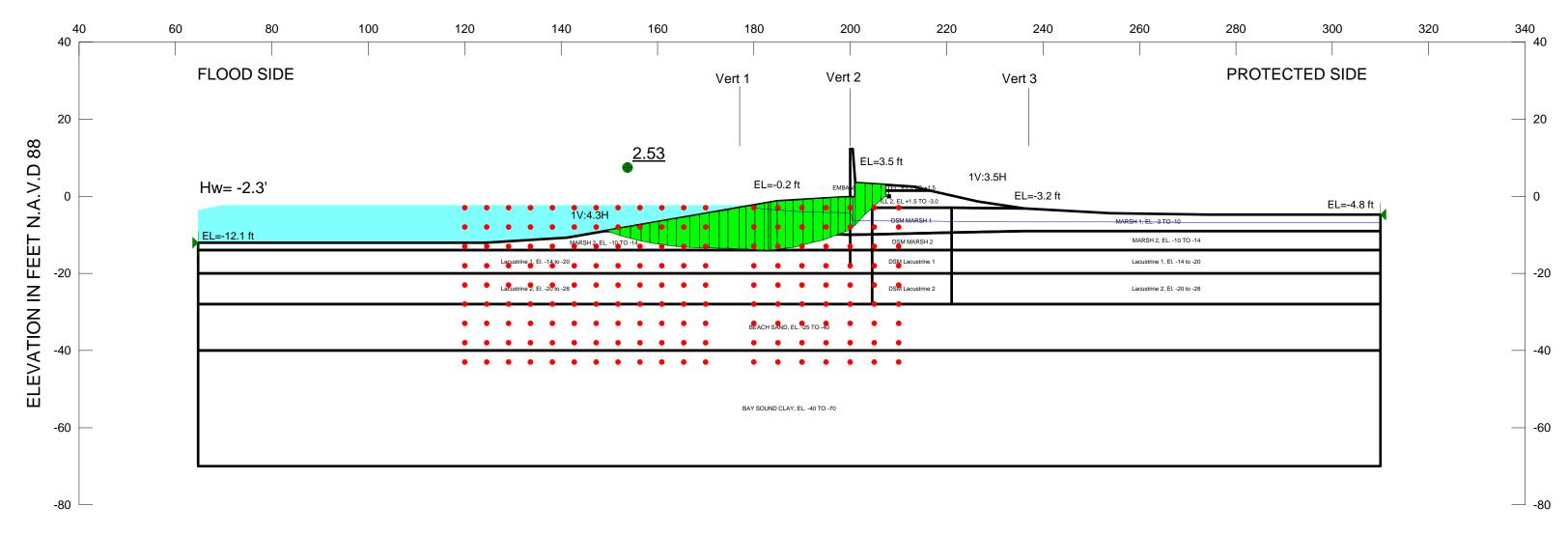




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17th STREET OUTFALL CANAL, REACH 25, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q STA. 598+24-608+00 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -3 TO -10 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion Fn: MARSH 1 (2) Phi: 0 °
Name: BEACH SAND, EL. -25 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °
Name: BAY SOUND CLAY, EL. -40 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °
Name: EMBANKMENT FILL 2, EL +1.5 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 400 psf Phi: 0 °
Name: MARSH 2, EL. -10 TO -14 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: MARSH 2 Phi: 0 °

Name: EMBANKMENT FILL, EL. +3.5 TO +1.5 Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 800 psf Phi: 0 °

Name: Lacustrine 1, El. -14 to -20 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1&2 Cohesion Phi: 0 °
Name: Lacustrine 2, El. -20 to -28 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion Spatial Fn: Lacustrine 1&2 Cohesion Phi: 0 °

Name: DSM MARSH 1 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 1000 psf Phi: 0 °

Name: DSM MARSH 2 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 1000 psf Phi: 0 °

Name: DSM Lacustrine 1 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 1000 psf Phi: 0 °

Name: DSM Lacustrine 2 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-2.3) File Name: 17thReach26.gsz Last Edited By: Goltz, Amanda MVS

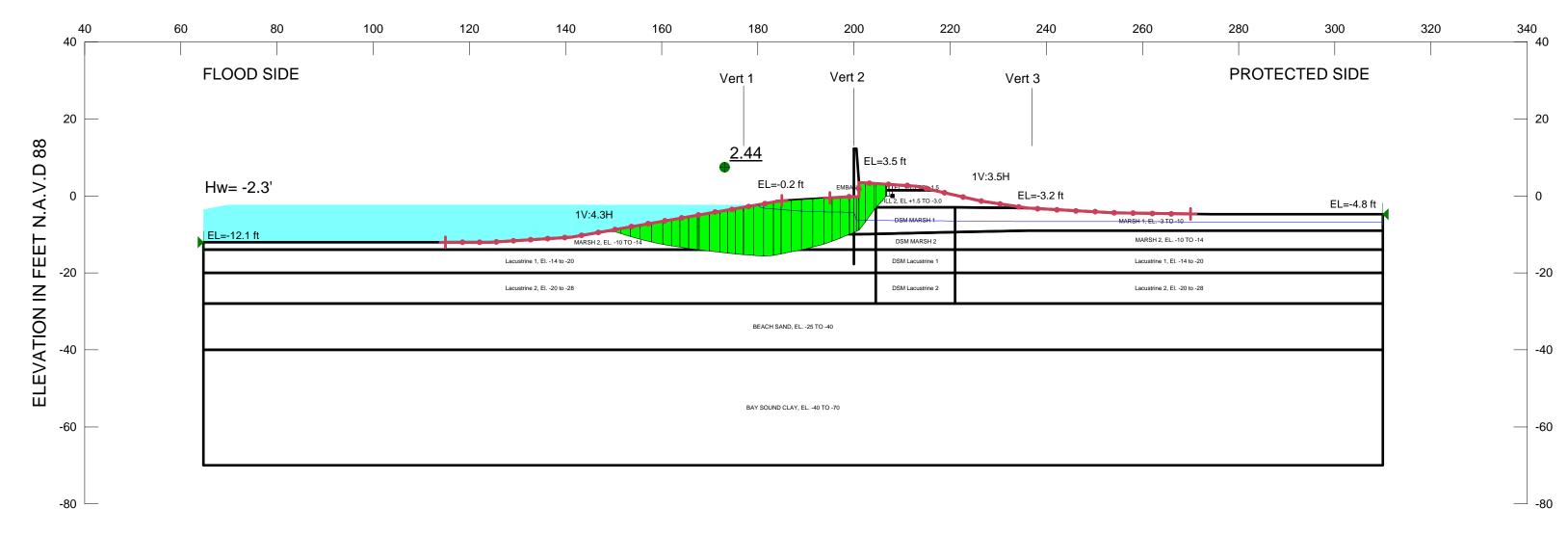




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17th STREET OUTFALL CANAL, REACH 26, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 608+00- 612+92 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +3.5 TO +1.5 Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH 1, EL. -3 TO -10 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion Fn: MARSH 1 (2) Phi: 0 °

Name: BEACH SAND, EL. -25 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -40 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

Name: EMBANKMENT FILL 2, EL +1.5 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 400 psf Phi: 0 °

Name: MARSH 2, EL. -10 TO -14 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: MARSH 2 Phi: 0 °

Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine 1&2 Cohesion Name: Lacustrine 1, El. -14 to -20 Model: Spatial Mohr-Coulomb Phi: 0° Weight Fn: Lacustrine 2 Cohesion Spatial Fn: Lacustrine 1&2 Cohesion Name: Lacustrine 2, El. -20 to -28 Model: Spatial Mohr-Coulomb Phi: 0°

Name: DSM MARSH 1 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 1000 psf Phi: 0 ° Name: DSM MARSH 2 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 1000 psf Phi: 0 ° Name: DSM Lacustrine 1 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 1000 psf Phi: 0 ° Name: DSM Lacustrine 2 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability (Entry/Exit) LWL -Q (-2.3) File Name: 17thReach26.gsz Last Edited By: Goltz, Amanda MVS

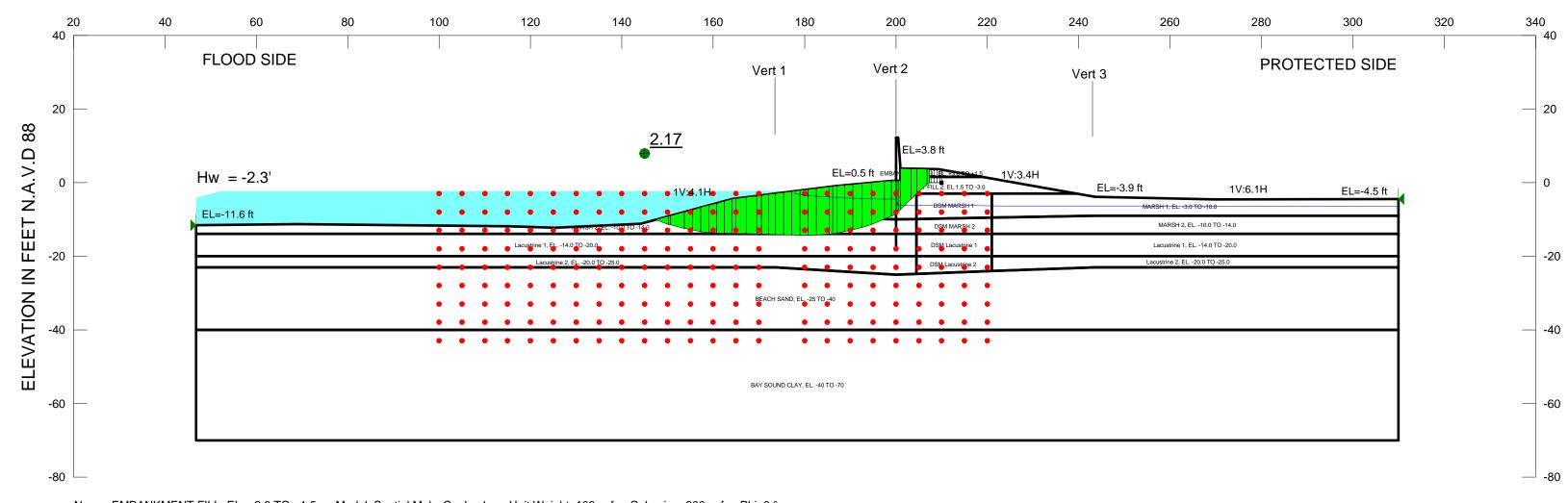




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17th STREET OUTFALL CANAL, REACH 26, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL -Q (-2.3) STA. 608+00-612+92 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +3.8 TO +1.5 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH 1, EL. -3.0 TO -10.0 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 250 psf Phi: 0 ° Name: BEACH SAND, EL. -25 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: BAY SOUND CLAY, EL. -40 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: Clay Phi: 0 ° Name: EMBANKMENT FILL 2, EL 1.5 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 400 psf Phi: 0 ° Name: MARSH 2, EL. -10.0 TO -14.0 Model: Spatial Mohr-Coulomb Unit Weight: 81 pcf Cohesion Fn: MARSH 2 Phi: 0 ° Name: Lacustrine 2, EL. -20.0 TO -25.0 Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion Spatial Fn: Lacustrine 2 Phi: 0 ° Name: Lacustrine 1, EL. -14.0 TO -20.0 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Lacustrine 1 Name: DSM MARSH 1 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 1000 psf Phi: 0 ° Name: DSM MARSH 2 Model: Spatial Mohr-Coulomb Unit Weight: 81 pcf Cohesion: 1000 psf Phi: 0 ° Name: DSM Lacustrine 1 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 1000 psf Phi: 0 ° Name: DSM Lacustrine 2 Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

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Name: Slope Stability (Block) LWL-Q (-2.3) File Name: 17thReach27.gsz Last Edited By: Goltz, Amanda MVS

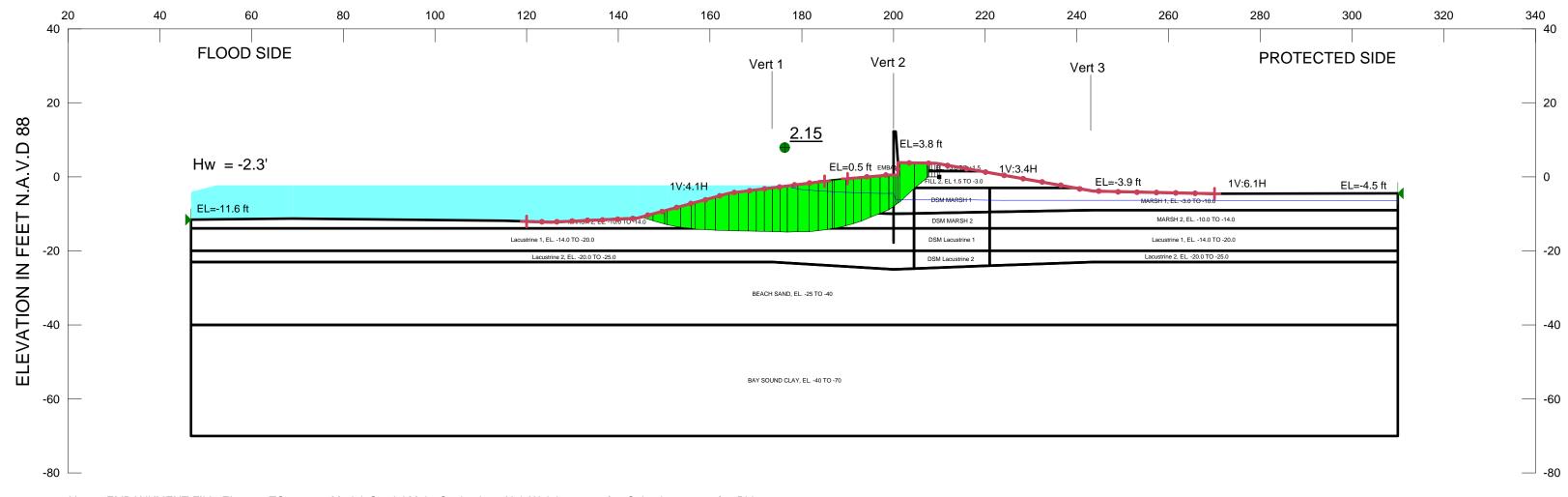




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17th STREET OUTFALL CANAL, REACH 27, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 614+30-617+81 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +3.8 TO +1.5 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH 1, EL. -3.0 TO -10.0 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 250 psf Phi: 0 ° Name: BEACH SAND, EL. -25 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: BAY SOUND CLAY, EL. -40 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: Clay Phi: 0 ° Name: EMBANKMENT FILL 2, EL 1.5 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 400 psf Phi: 0 ° Name: MARSH 2, EL. -10.0 TO -14.0 Model: Spatial Mohr-Coulomb Unit Weight: 81 pcf Cohesion Fn: MARSH 2 Phi: 0 ° Name: Lacustrine 2, EL. -20.0 TO -25.0 Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion Spatial Fn: Lacustrine 2 Phi: 0 ° Name: Lacustrine 1, EL. -14.0 TO -20.0 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Lacustrine 1 Name: DSM MARSH 1 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 1000 psf Phi: 0 ° Name: DSM MARSH 2 Model: Spatial Mohr-Coulomb Unit Weight: 81 pcf Cohesion: 1000 psf Phi: 0 ° Name: DSM Lacustrine 1 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 1000 psf Phi: 0 ° Name: DSM Lacustrine 2 Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

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Name: Slope Stability (Entry/Exit) LWL-Q (-2.3) File Name: 17thReach27.gsz Last Edited By: Goltz, Amanda MVS

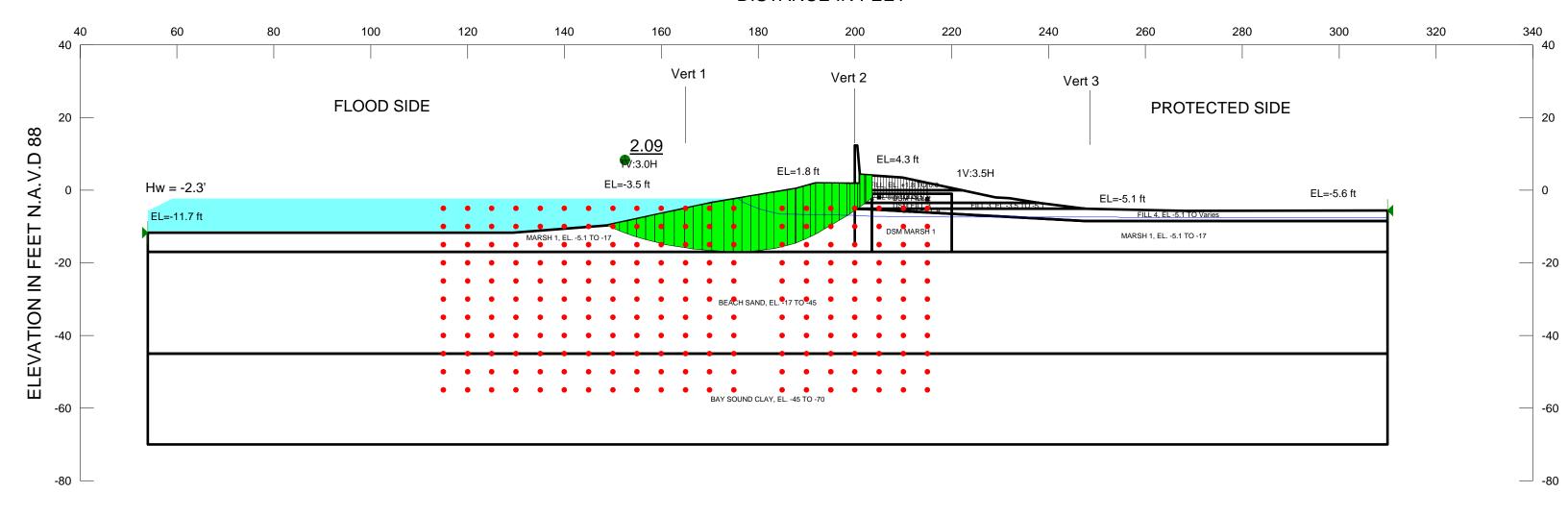




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17th STREET OUTFALL CANAL, REACH 27, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA, 614+30-617+81 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +1.8 TO 0.0 Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH 1, EL. -5.1 TO -17 Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion Spatial Fn: MARSH Name: BEACH SAND, EL. -17 TO -45 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay sound Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 ° Name: EMBANKMENT FILL 2, EL 0.0 TO -3.5 Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 490 psf Phi: 0 ° Name: FILL 3, EL -3.5 TO -5.1 Model: Spatial Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 330 psf Phi: 0 ° Name: FILL 4, EL -5.1 TO Varies Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion: 500 psf Phi: 0 ° Name: DSM FILL 2 Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 1000 psf Phi: 0 ° Name: DSM FILL 3 Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 1000 psf Phi: 0 ° Name: DSM FILL 4 Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 1000 psf Phi: 0 ° Name: DSM MARSH 1 Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability (Block) LWL-Q (-2.3) File Name: 17thReach28.gsz Last Edited By: Redell, Chris MVS

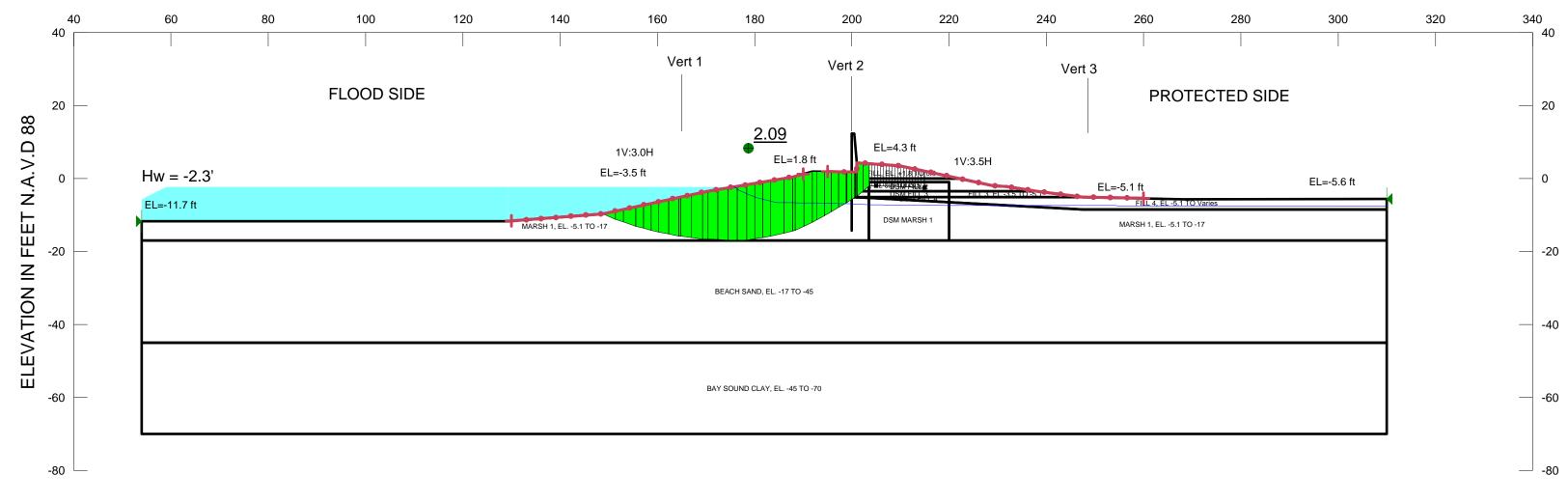




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17th STREET OUTFALL CANAL, REACH 28, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA, 615+03-620+30 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +1.8 TO 0.0 Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 800 psf Phi: 0 ° Name: MARSH 1, EL. -5.1 TO -17 Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion Spatial Fn: MARSH Name: BEACH SAND, EL. -17 TO -45 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay sound Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 ° Name: EMBANKMENT FILL 2, EL 0.0 TO -3.5 Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 490 psf Phi: 0 ° Name: FILL 3, EL -3.5 TO -5.1 Model: Spatial Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 330 psf Phi: 0 ° Name: FILL 4, EL -5.1 TO Varies Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion: 500 psf Phi: 0 ° Name: DSM FILL 2 Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 1000 psf Phi: 0 ° Name: DSM FILL 3 Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 1000 psf Phi: 0 ° Name: DSM FILL 4 Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 1000 psf Phi: 0 ° Name: DSM MARSH 1 Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

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Name: Slope Stability (Entry/Exit) LWL-Q (-2.3) File Name: 17thReach28.gsz Last Edited By: Redell, Chris MVS

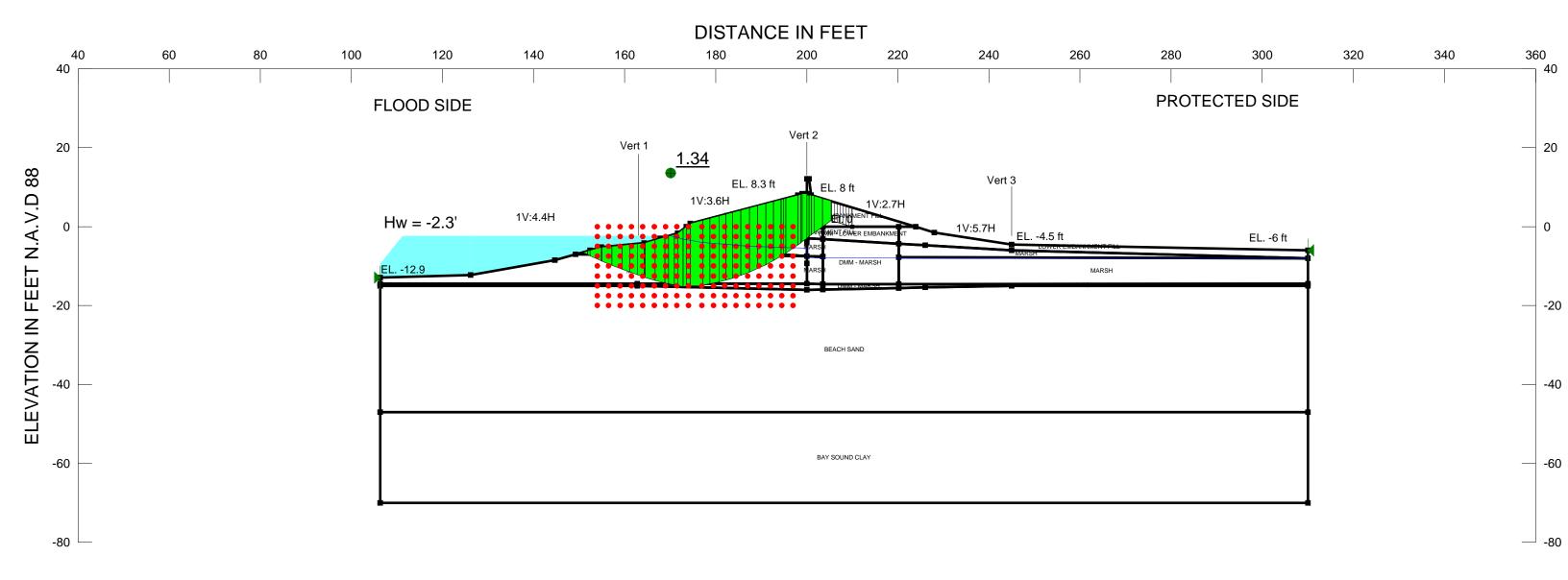




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17th STREET OUTFALL CANAL, REACH 28, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA, 615+03-620+30 EAST ORLEANS PARISH, LOUISIANA



Name: UPPER EMBANKMENT FILL Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 700 psf Phi: 0°

Name: MARSH Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion Fn: Marsh Phi: 0 ° Name: BEACH SAND Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Clay Cohesion Spatial Fn: Bay Sound Clay Phi: 0°

Name: LOWER EMBANKMENT FILL Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion Fn: Lower Fill Phi: 0 °

Name: DMM - MARSH Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 1000 psf Phi: 0 °

Name: DMM - LOWER EMBANKMENT Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

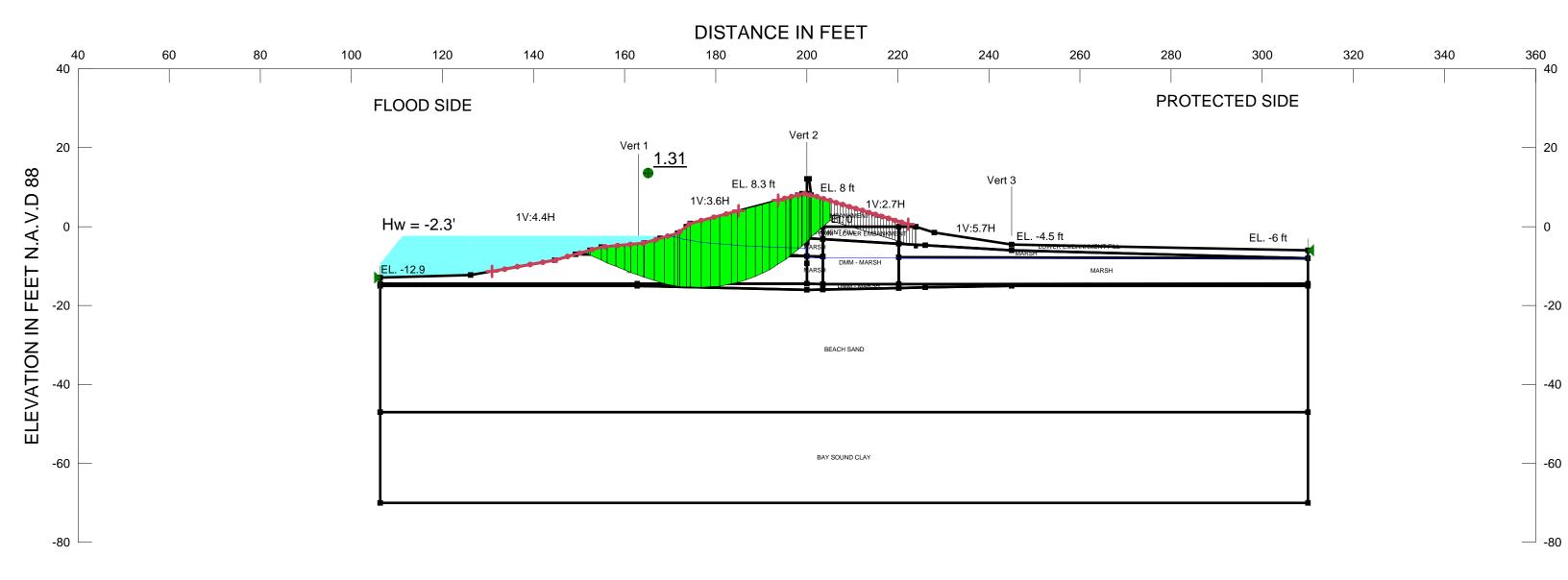
Name: Slope Stability (Block) LWL-Q (-2.3)

File Name: 17thReach29.gsz Last Edited By: Goltz, Amanda MVS





17th STREET OUTFALL CANAL, REACH 29, FLOOD SIDE STABILITY ANALYSIS CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 620+30 - 624+88 EAST ORLEANS PARISH, LOUISIANA



Name: UPPER EMBANKMENT FILL Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 700 psf Phi: 0 °

Name: MARSH Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion Fn: Marsh Phi: 0 ° Name: BEACH SAND Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Clay Cohesion Spatial Fn: Bay Sound Clay Phi: 0 °

Name: LOWER EMBANKMENT FILL Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion Fn: Lower Fill Phi: 0 °

Name: DMM - MARSH Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 1000 psf Phi: 0 °

Name: DMM - LOWER EMBANKMENT Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry & Exit) LWL-Q (-2.3)

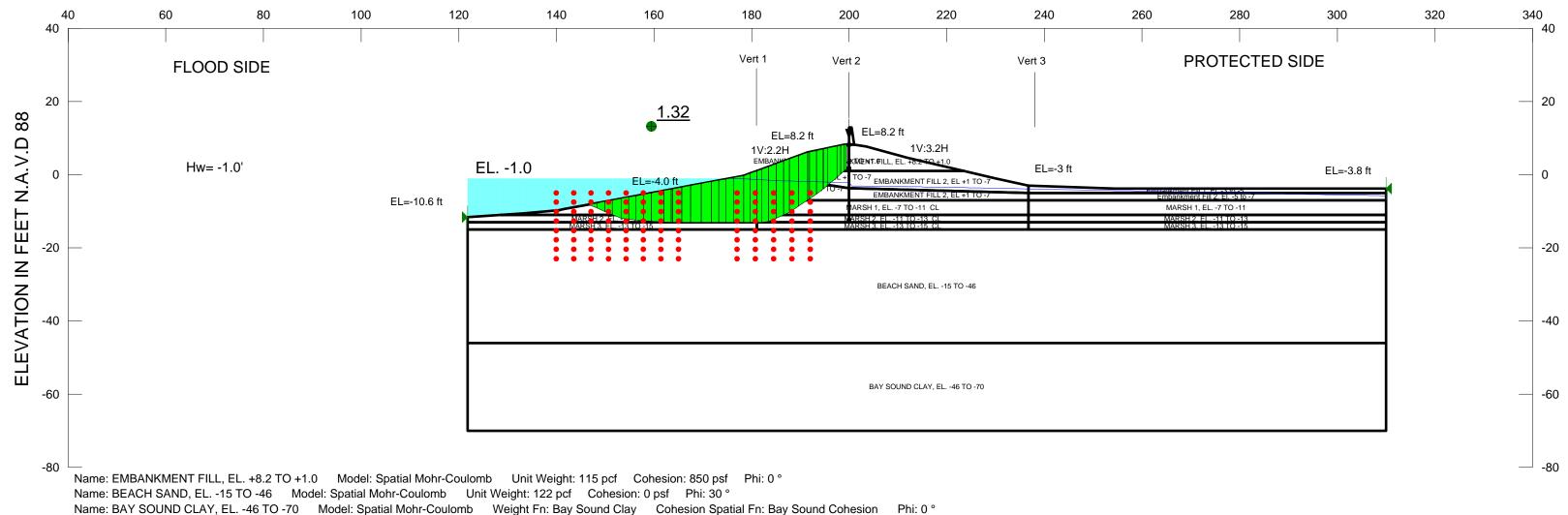
File Name: 17thReach29.gsz Last Edited By: Goltz, Amanda MVS





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17th STREET OUTFALL CANAL, REACH 29, FLOOD SIDE STABILITY ANALYSIS CASE: Slope Stability (Entry & Exit) LWL-Q (-2.3) STA. 620+30 - 624+88 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL +1 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 280 psf Phi: 0 ° Name: MARSH 1, EL. -7 TO -11 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: MARSH 2, EL. -11 TO -13 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Name: Embankment Fill 1, El. -3 to -5 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 800 psf Phi: 0° Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 500 psf Name: Embankment Fill 2, El. -5 to -7 Phi: 0° Name: MARSH 3, EL. -13 TO -15 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Name: MARSH 1, EL. -7 TO -11 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1 Phi: 0° Name: MARSH 2, EL. -11 TO -13 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Phi: 0 ° Name: MARSH 3, EL. -13 TO -15 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

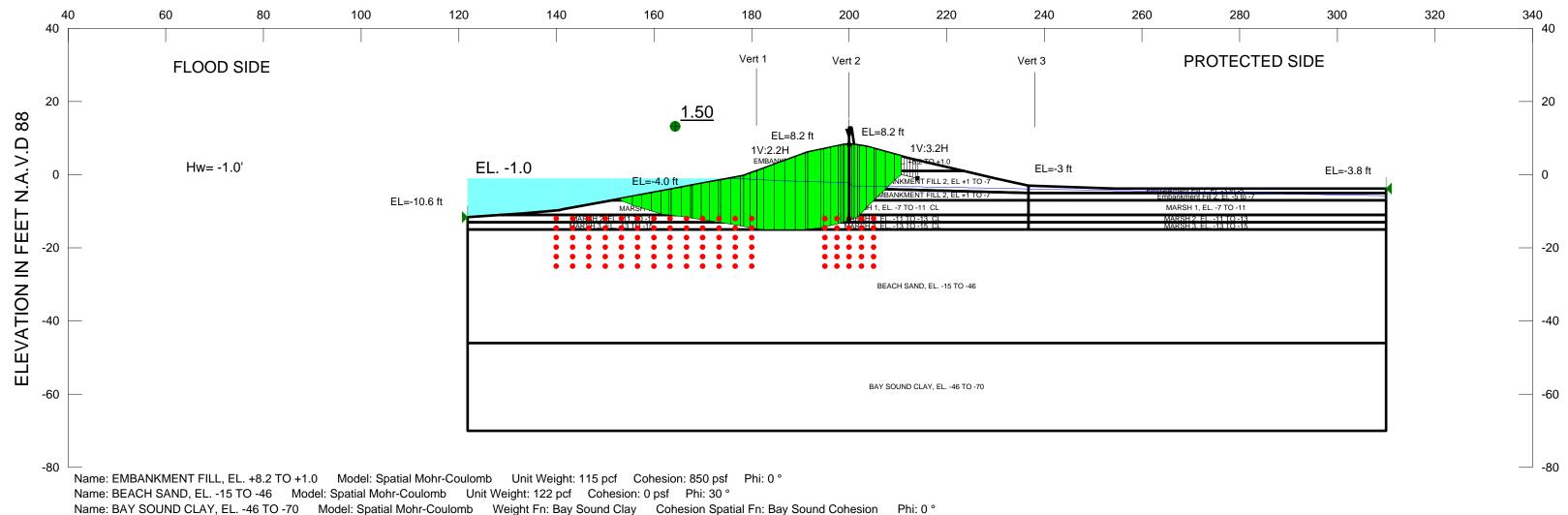
Name: Slope Stability (Block) LWL-Q (-1.0) (Local) File Name: 17thReach30.gsz Last Edited By: Goltz, Amanda MVS





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17th STREET OUTFALL CANAL, REACH 30, FLOOD SIDE STABILITY ANALYSIS. CASE: Slope Stability (Block) LWL-Q (-1.0) (Local) STA. 626+73 to 634+09 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL +1 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 280 psf Phi: 0 ° Name: MARSH 1, EL. -7 TO -11 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: MARSH 2, EL. -11 TO -13 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Name: Embankment Fill 1, El. -3 to -5 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 800 psf Phi: 0° Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 500 psf Name: Embankment Fill 2, El. -5 to -7 Phi: 0° Name: MARSH 3, EL. -13 TO -15 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Name: MARSH 1, EL. -7 TO -11 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1 Phi: 0° Name: MARSH 2, EL. -11 TO -13 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Phi: 0 ° Name: MARSH 3, EL. -13 TO -15 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-1.0) (Around) File Name: 17thReach30.gsz Last Edited By: Redell, Chris MVS

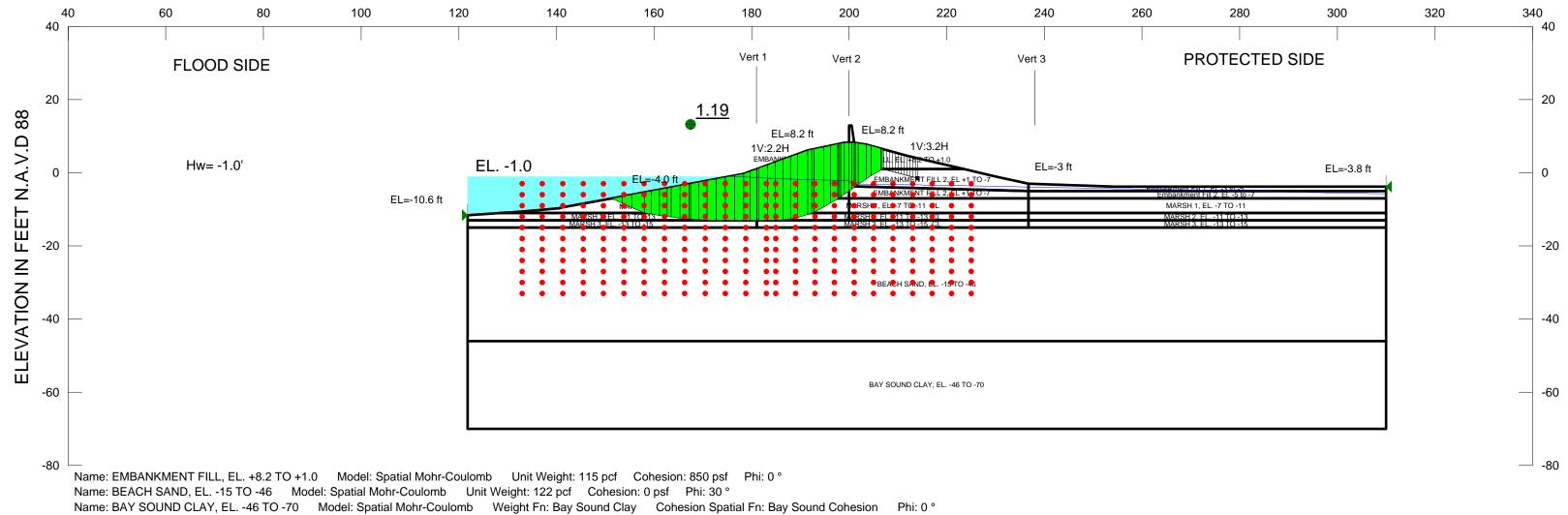




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17th STREET OUTFALL CANAL, REACH 30, FLOOD SIDE STABILITY ANALYSIS. CASE: Slope Stability (Block) LWL-Q (-1.0) (Around) STA. 626+73 to 634+09 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL +1 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 280 psf Phi: 0 ° Name: MARSH 1, EL. -7 TO -11 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: MARSH 2, EL. -11 TO -13 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Name: Embankment Fill 1, El. -3 to -5 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 800 psf Phi: 0° Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 500 psf Name: Embankment Fill 2, El. -5 to -7 Phi: 0° Name: MARSH 3, EL. -13 TO -15 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi: 0° Name: MARSH 1, EL. -7 TO -11 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1 Phi: 0° Name: MARSH 2, EL. -11 TO -13 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Phi: 0 ° Name: MARSH 3, EL. -13 TO -15 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-1.0) File Name: 17thReach30.gsz Last Edited By: Redell, Chris MVS

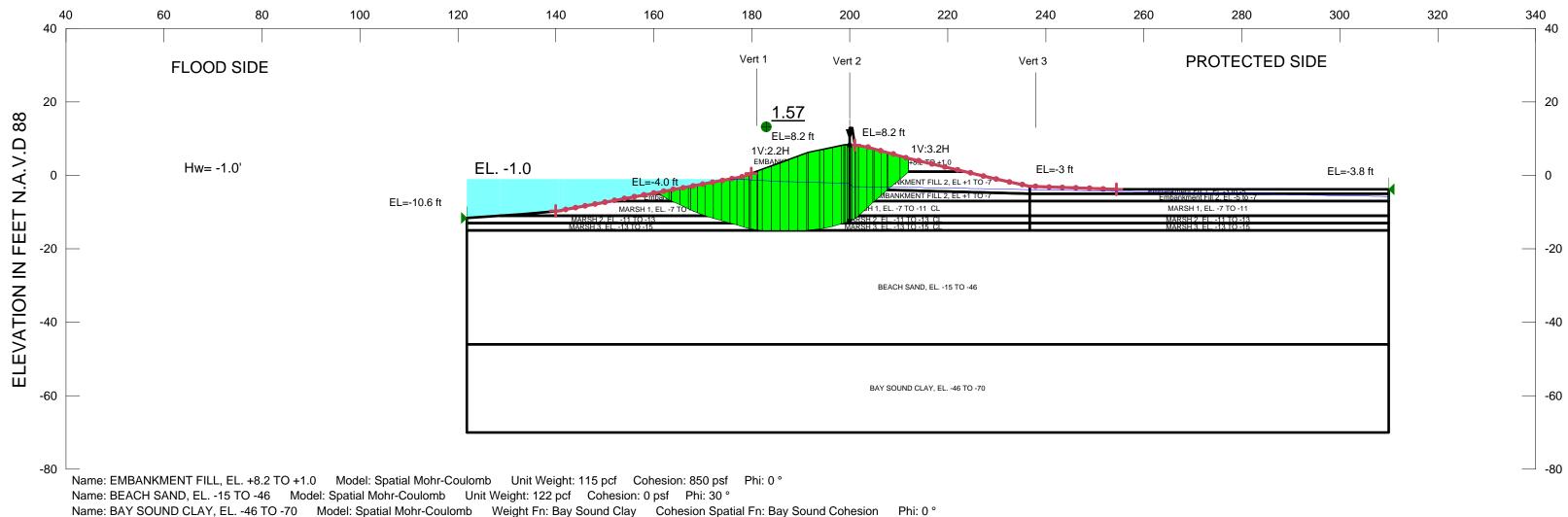


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17th STREET OUTFALL CANAL, REACH 30, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-1.0) STA. 626+73 to 634+09 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL +1 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 280 psf Phi: 0 ° Name: MARSH 1, EL. -7 TO -11 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: MARSH 2, EL. -11 TO -13 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 800 psf Name: Embankment Fill 1, El. -3 to -5 Phi: 0° Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 500 psf Name: Embankment Fill 2, El. -5 to -7 Phi: 0° Name: MARSH 3, EL. -13 TO -15 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi: 0° Name: MARSH 1, EL. -7 TO -11 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1 Phi: 0° Name: MARSH 2, EL. -11 TO -13 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Phi: 0° Name: MARSH 3, EL. -13 TO -15 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi: 0°

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-Q (-1.0) (Around) File Name: 17thReach30.gsz Last Edited By: Redell, Chris MVS

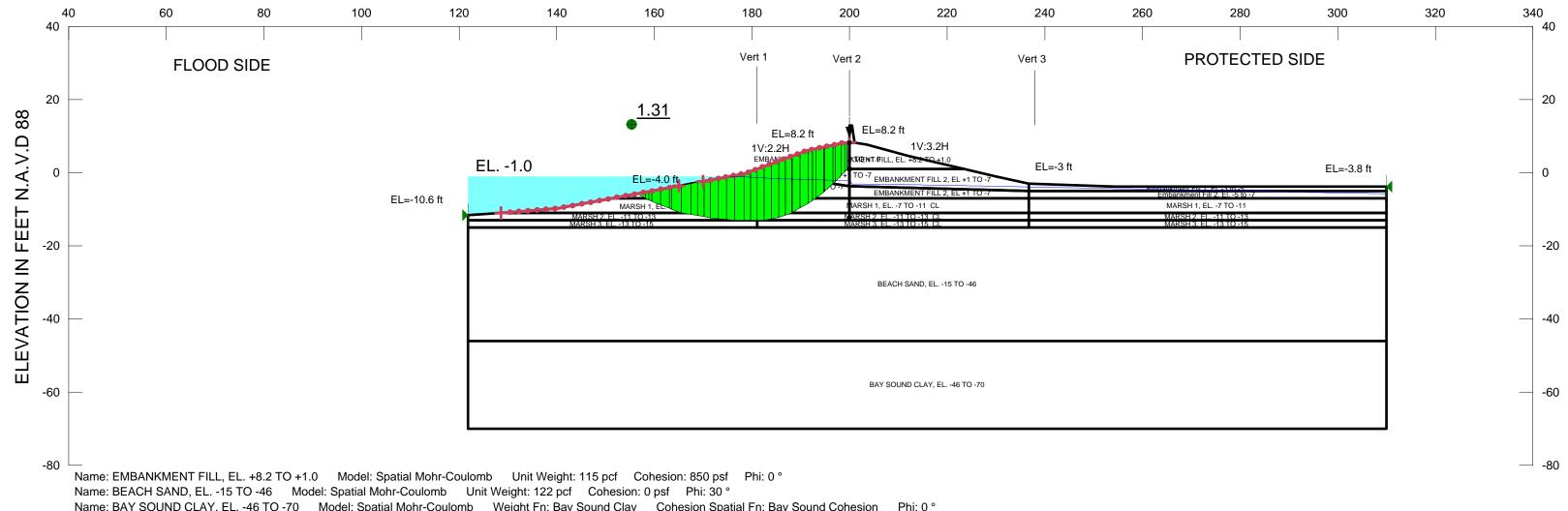




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17th STREET OUTFALL CANAL, REACH 30, FLOOD SIDE STABILITY ANALYSIS. CASE: Slope Stability (Entry/Exit) LWL-Q (-1.0) (Around) STA. 626+73 to 634+09 EAST ORLEANS PARISH, LOUISIANA



Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Clay Cohesion Spatial Fn: Bay Sound Cohesion Name: EMBANKMENT FILL 2, EL +1 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 280 psf Phi: 0 ° Name: MARSH 1, EL. -7 TO -11 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: MARSH 2, EL. -11 TO -13 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 800 psf Name: Embankment Fill 1, El. -3 to -5 Phi: 0° Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 500 psf Name: Embankment Fill 2, El. -5 to -7 Phi: 0° Name: MARSH 3, EL. -13 TO -15 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi: 0° Name: MARSH 1, EL. -7 TO -11 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1 Phi: 0° Name: MARSH 2, EL. -11 TO -13 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Phi: 0 ° Name: MARSH 3, EL. -13 TO -15 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi: 0°

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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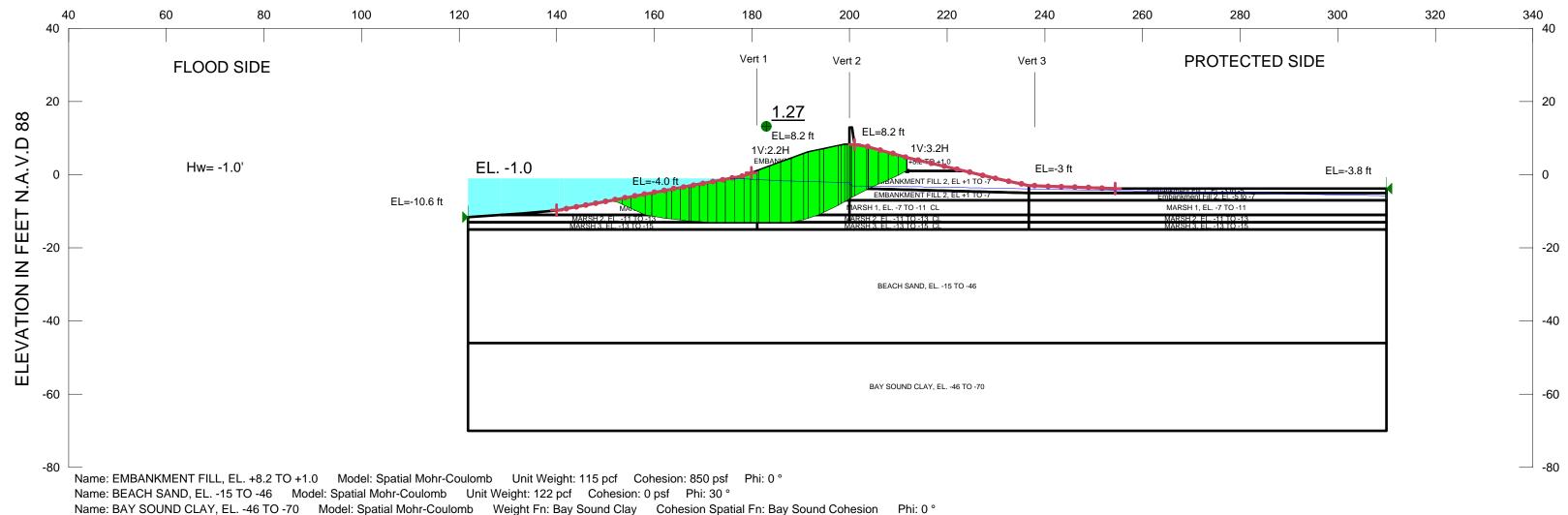
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17th STREET OUTFALL CANAL, REACH 30, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-1.0) (Local) STA. 626+73 to 634+09 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL +1 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 280 psf Phi: 0 ° Name: MARSH 1, EL. -7 TO -11 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: MARSH 2, EL. -11 TO -13 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 800 psf Name: Embankment Fill 1, El. -3 to -5 Phi: 0° Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 500 psf Name: Embankment Fill 2, El. -5 to -7 Phi: 0° Name: MARSH 3, EL. -13 TO -15 Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi: 0° Name: MARSH 1, EL. -7 TO -11 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 1 Phi: 0° Name: MARSH 2, EL. -11 TO -13 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: MARSH 2 Phi: 0° Name: MARSH 3, EL. -13 TO -15 CL Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion Fn: Marsh 3 Phi: 0°

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability (Entry/Exit) LWL-Q (-1.0) File Name: 17thReach30.gsz Last Edited By: Redell, Chris MVS

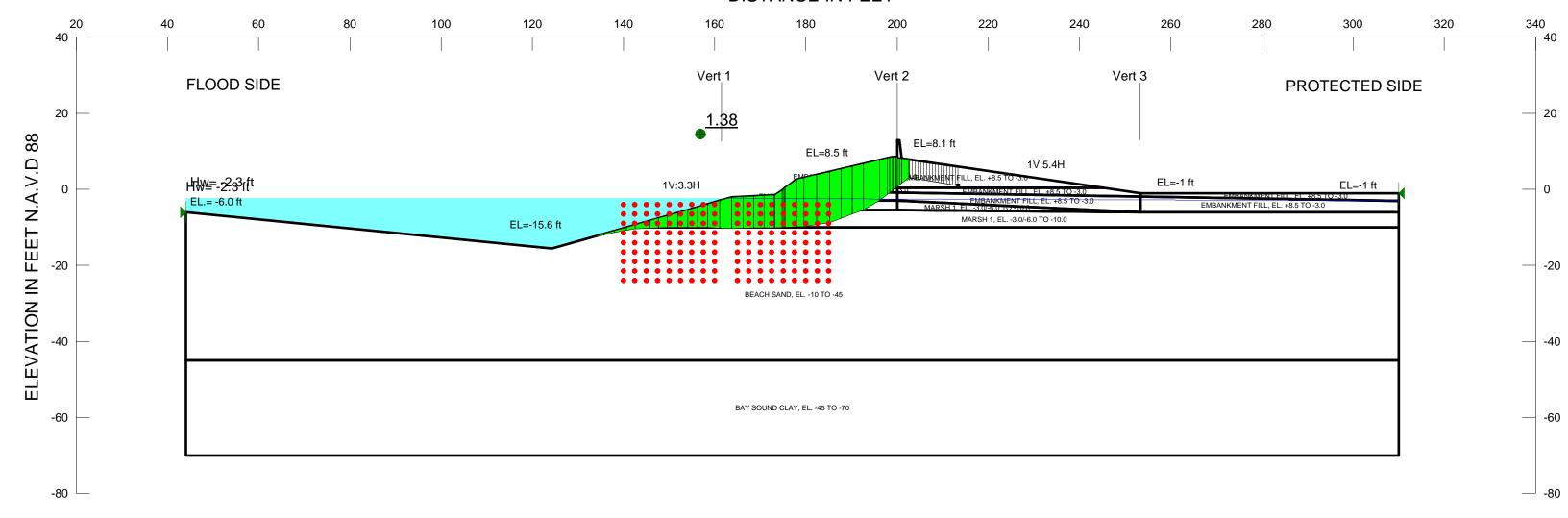






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17th STREET OUTFALL CANAL, REACH 30, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-1.0) STA. 626+73 to 634+09 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.5 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: FILL Phi: 0 ° Name: MARSH 1, EL. -3.0/-6.0 TO -10.0 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: -3.0/-6.0 to -10.0 Phi: 0 °

Name: BEACH SAND, EL. -10 TO -45 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: -45.0 to -70.0 Phi: 0 °

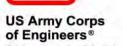
GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-2.3) File Name: 17thReach31.gsz Last Edited By: Goltz, Amanda MVS

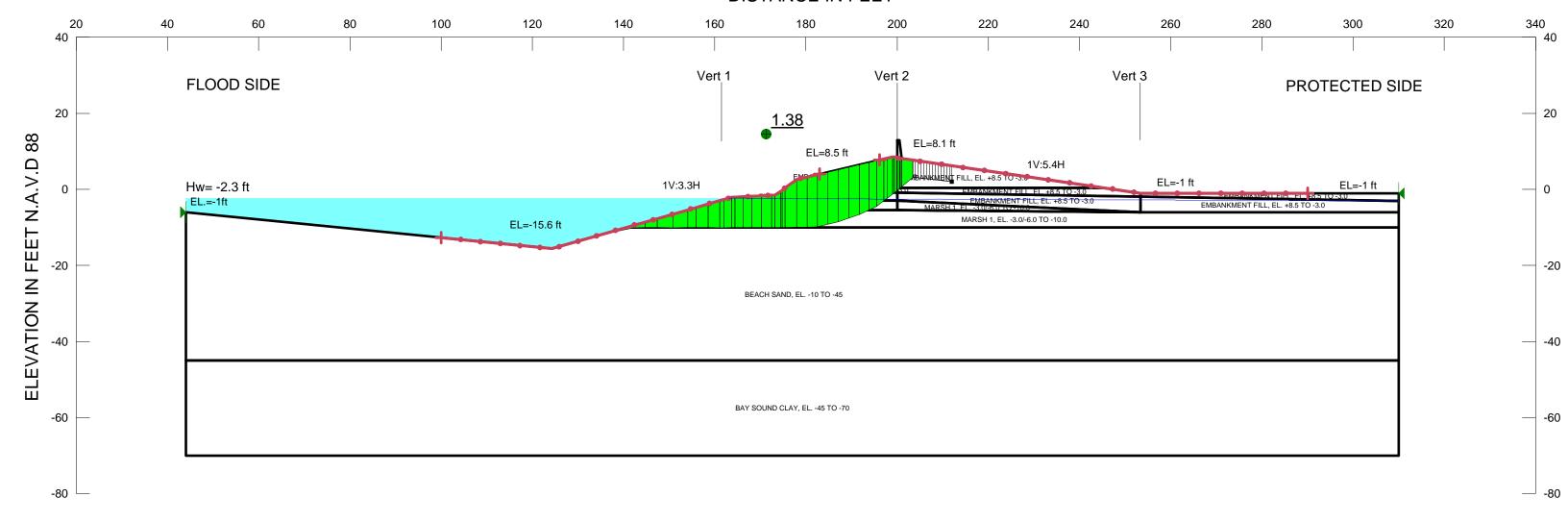






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17th STREET OUTFALL CANAL, REACH 31, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 634+09 to 637+00 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.5 TO -3.0 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: FILL Phi: 0 ° Name: MARSH 1, EL. -3.0/-6.0 TO -10.0 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: -3.0/-6.0 to -10.0 Phi: 0 °

Name: BEACH SAND, EL. -10 TO -45 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: -45.0 to -70.0 Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

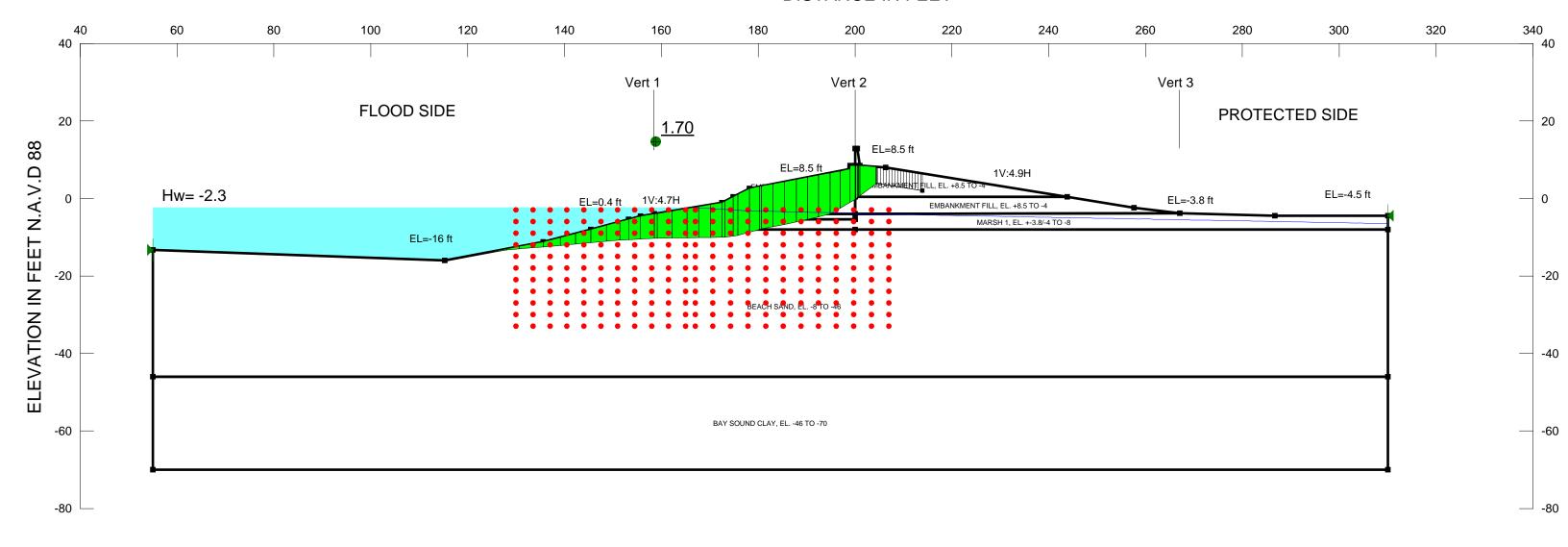
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17th STREET OUTFALL CANAL, REACH 31, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 634+09 to 637+00 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.5 TO -4 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 400 psf Phi: 0 ° Name: MARSH 1, EL. +-3.8/-4 TO -8 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -8 TO -46 Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-2.3) File Name: 17thReach32.gsz Last Edited By: Goltz, Amanda MVS

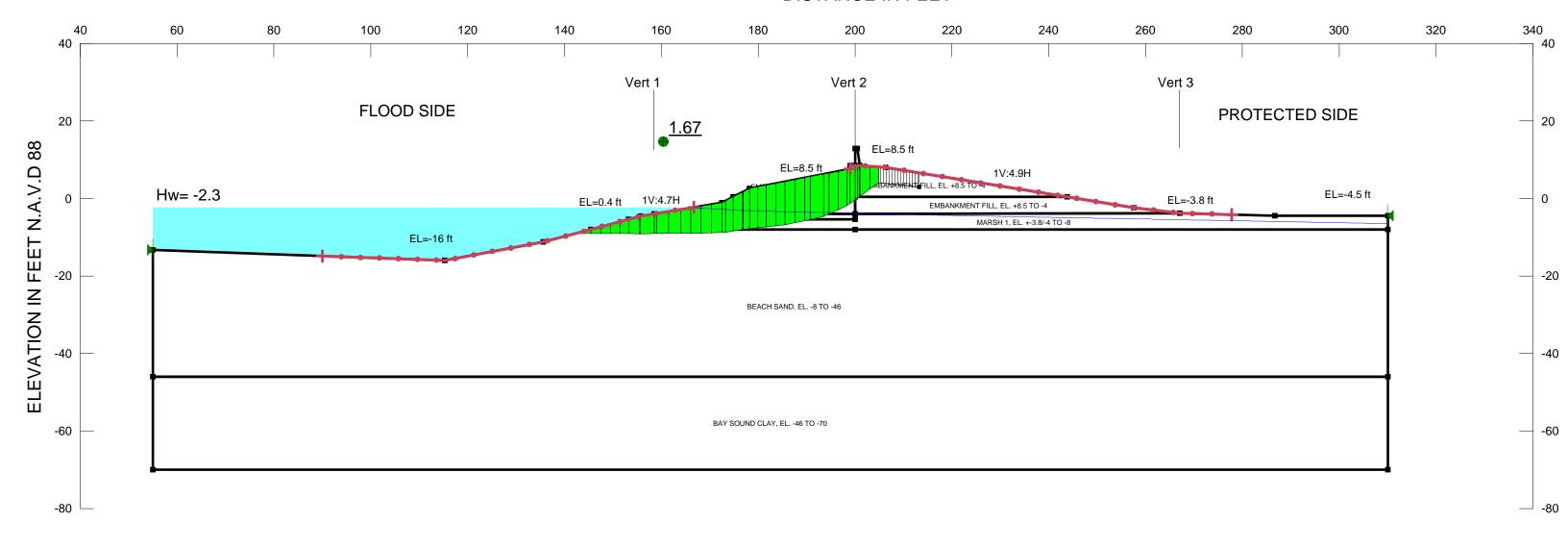




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17th STREET OUTFALL CANAL, REACH 32, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 637+00 to 638+44 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.5 TO -4 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 400 psf Phi: 0 °
Name: MARSH 1, EL. +-3.8/-4 TO -8 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 °

Name: BEACH SAND, EL. -8 TO -46 Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry & Exit) LWL-Q (-2.3) File Name: 17thReach32.gsz Last Edited By: Goltz, Amanda MVS

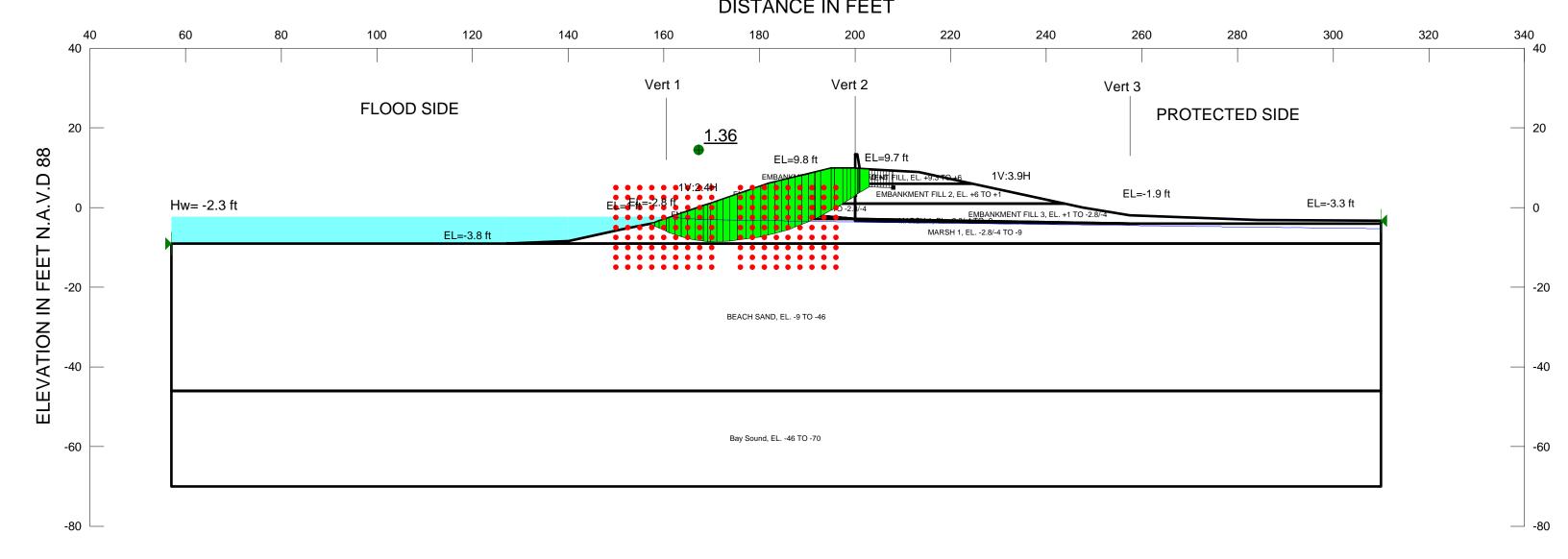




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17th STREET OUTFALL CANAL, REACH 32, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry & Exit) LWL-Q (-2.3) STA. 637+00 to 638+44 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.3 TO +6 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 750 psf Phi: 0 °

Name: MARSH 1, EL. -2.8/-4 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH -2.8 TO -9 Cohesion Fn: MARSH -2.8 to -9 Phi: 0°

Name: BEACH SAND, EL. -9 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: Bay Sound, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0°

Name: EMBANKMENT FILL 2, EL. +6 TO +1 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 325 psf Phi: 0 ° Name: EMBANKMENT FILL 3, EL. +1 TO -2.8/-4 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 300 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-2.3) File Name: 17thReach33.gsz Last Edited By: Goltz, Amanda MVS

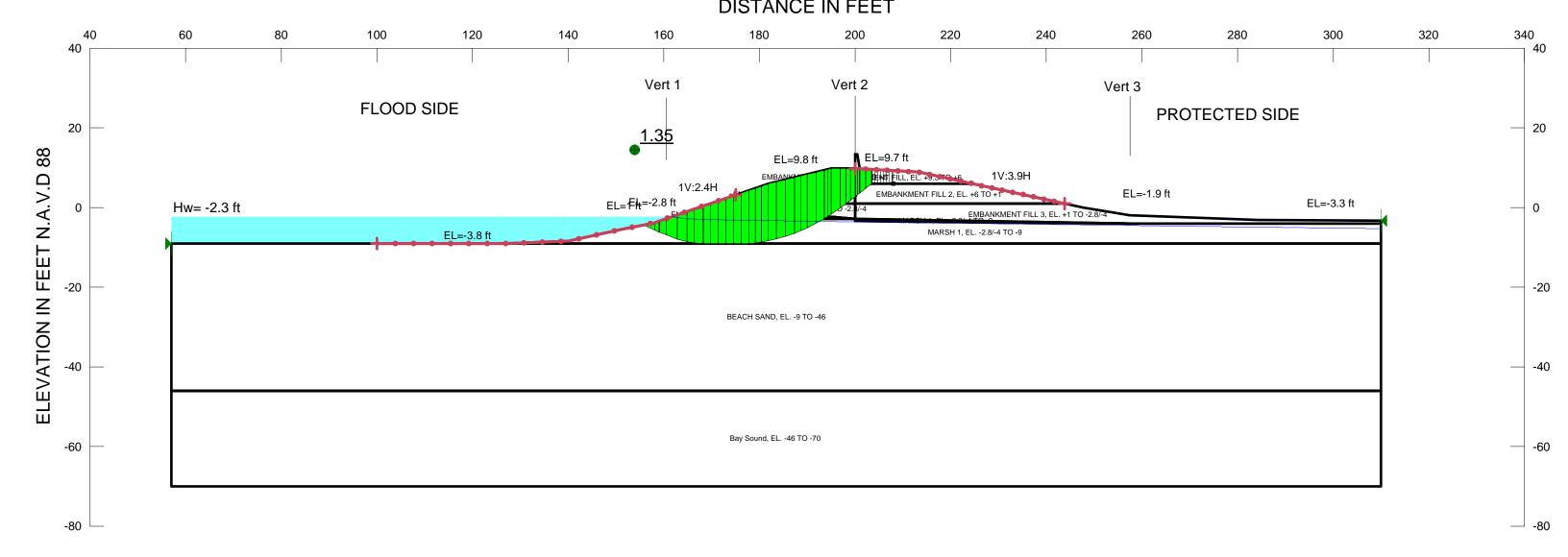




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17th STREET OUTFALL CANAL, REACH 33, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 643+40 to 658+00 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.3 TO +6 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 750 psf Phi: 0 °

Name: MARSH 1, EL. -2.8/-4 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH -2.8 TO -9 Cohesion Fn: MARSH -2.8 to -9 Phi: 0°

Name: BEACH SAND, EL. -9 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: Bay Sound, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0°

Name: EMBANKMENT FILL 2, EL. +6 TO +1 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 325 psf Phi: 0 ° Name: EMBANKMENT FILL 3, EL. +1 TO -2.8/-4 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 300 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-Q (-2.3)

File Name: 17thReach33.gsz Last Edited By: Goltz, Amanda MVS

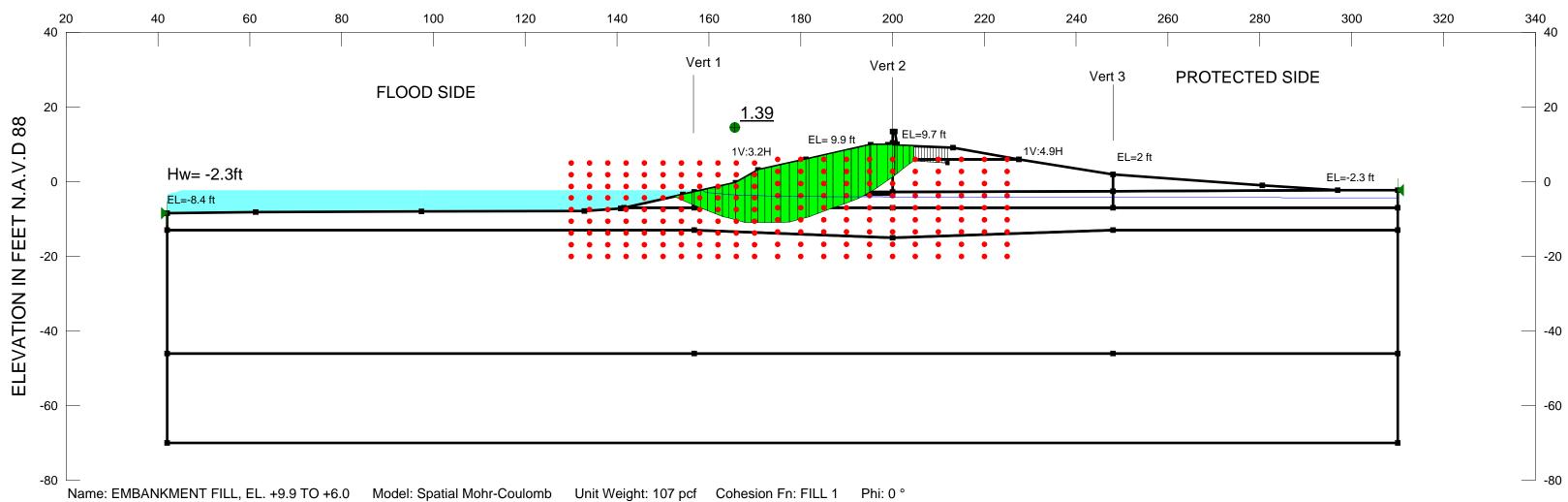




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17th STREET OUTFALL CANAL, REACH 33, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 643+40 to 658+00 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.9 TO +6.0 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: FILL 1 Phi: 0 °
Name: MARSH 1, EL. -2.8 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: MARSH 1 Phi: 0 °
Name: BEACH SAND, EL. -13/-15 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °
Name: MARSH 2, EL. -7 TO -13/-15 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Fn: MARSH 2 Phi: 0 °
Name: EMBANKMENT FILL 2, EL. +6 TO -2.8 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: FILL 2 Phi: 0 °
Name: Bay Sound, El. -46 to -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °
Name: EMBANKMENT FILLI EL. +2.0 TO -2.3 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 650 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
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BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-2.3)

File Name: 17thReach34.gsz Last Edited By: Goltz, Amanda MVS

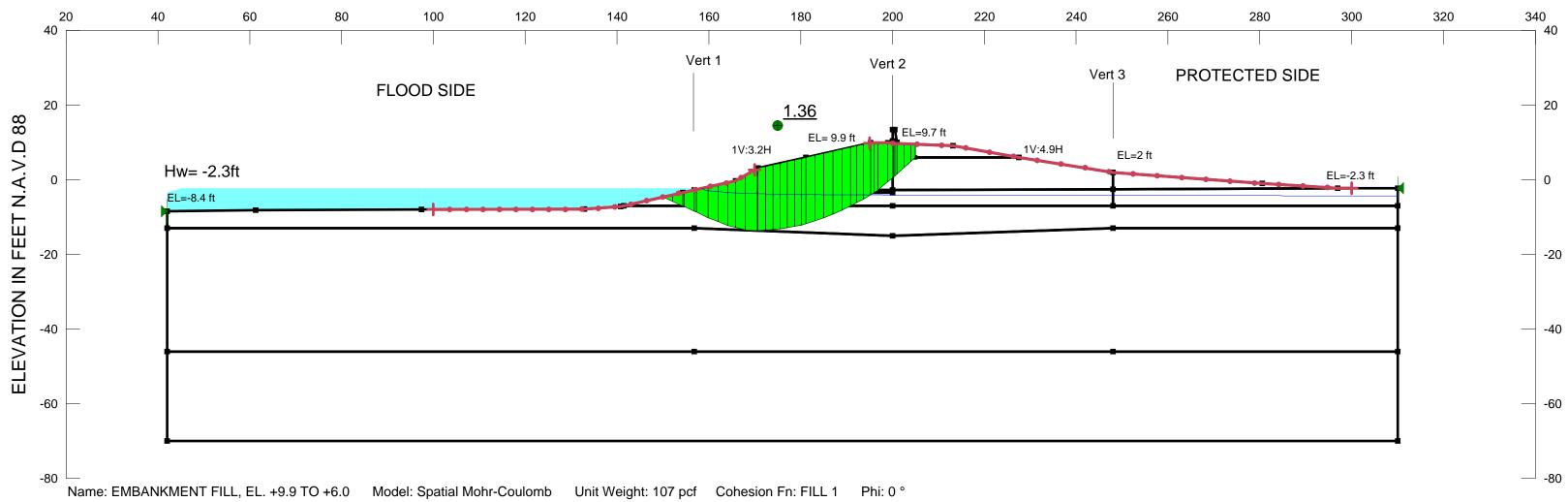




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17th STREET OUTFALL CANAL, REACH 34, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 658+00- 662+87 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.9 TO +6.0 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: FILL 1 Phi: 0°

Name: MARSH 1, EL. -2.8 TO -7 Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion Fn: MARSH 1 Phi: 0°

Name: BEACH SAND, EL. -13/-15 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30°

Name: MARSH 2, EL. -7 TO -13/-15 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Fn: MARSH 2 Phi: 0°

Name: EMBANKMENT FILL 2, EL. +6 TO -2.8 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Fn: FILL 2 Phi: 0°

Name: Bay Sound, El. -46 to -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0°

Name: EMBANKMENT FILLI EL. +2.0 TO -2.3 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 650 psf Phi: 0°

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry &Exit) LWL-Q (-2.3)

File Name: 17thReach34.gsz Last Edited By: Goltz, Amanda MVS

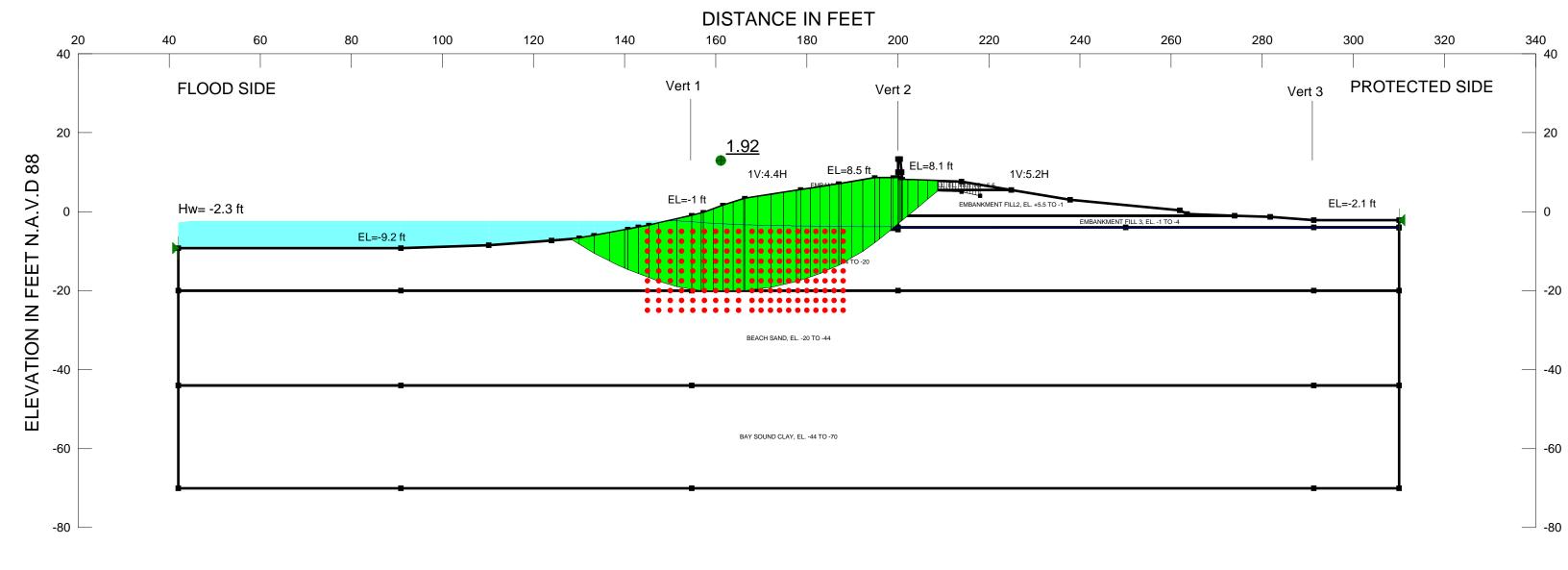




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17th STREET OUTFALL CANAL, REACH 34, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry &Exit) LWL-Q (-2.3) STA. 658+00- 662+87 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.5 TO +5.5 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 700 psf Phi: 0 °

Name: EMBANKMENT FILL 3, EL. -1 TO -4 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Embankment Fill 3 Phi: 0 °

Name: BEACH SAND, EL. -20 TO -44 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -44 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0 °

Name: MARSH1, EL. -4 TO -20 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 ° Name: EMBANKMENT FILL2, EL. +5.5 TO -1 Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 400 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-2.3)

File Name: 17thReach35.gsz
Last Edited By: Goltz, Amanda MVS

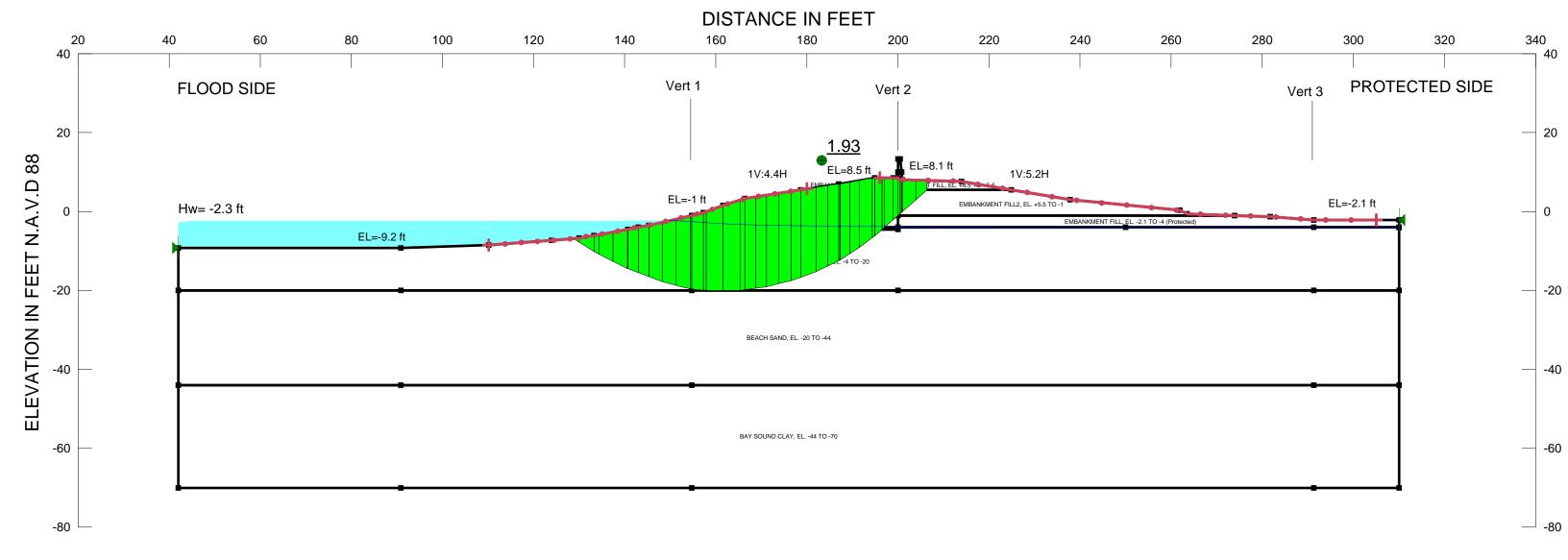




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17th STREET OUTFALL CANAL, REACH 35, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 662+87 to 670+63 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.5 TO +5.5 Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 700 psf Phi: 0 °

Name: EMBANKMENT FILL 3, EL. -1 TO -4 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion Spatial Fn: Embankment Fill 3

Name: BEACH SAND, EL. -20 TO -44 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand

Name: BAY SOUND CLAY, EL. -44 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion Spatial Fn: Bay Sound Cohesion Phi: 0°

Name: MARSH1, EL. -4 TO -20 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Spatial Fn: Marsh 1 Phi: 0 ° Name: EMBANKMENT FILL2, EL. +5.5 TO -1 Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 400 psf Phi: 0 °

Name: EMBANKMENT FILL, EL. -2.1 TO -4 (Protected) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 425 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-Q (-2.3)

File Name: 17thReach35.gsz Last Edited By: Goltz, Amanda MVS

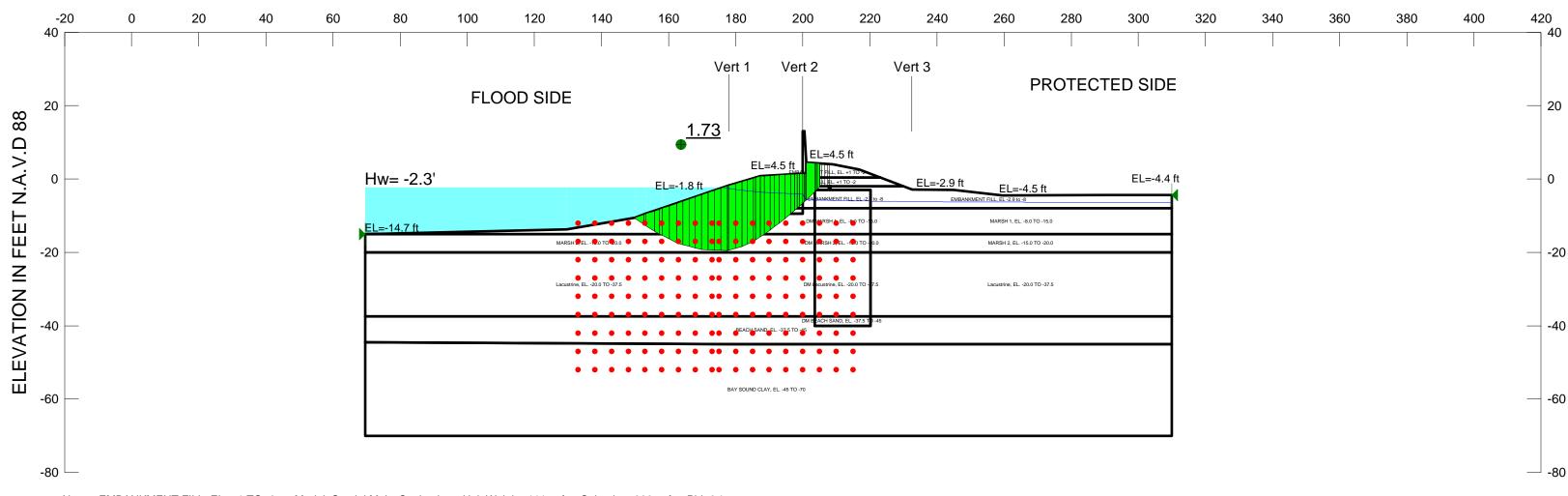




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17th STREET OUTFALL CANAL, REACH 35, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 662+87 to 670+63 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +1 TO -2 Model: Spatial Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 800 psf Phi: 0 ° Name: BEACH SAND, EL. -37.5 TO -45 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: EMBANKMENT FILL, EL -2.9 to -8 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Fn: Fill 2 Phi: 0 ° Name: MARSH 1, EL. -8.0 TO -15.0 Model: Spatial Mohr-Coulomb Unit Weight: 76 pcf Cohesion Fn: MARSH Phi: 0 ° Name: MARSH 2, EL. -15.0 TO -20.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Fn: MARSH 2 Phi: 0 ° Name: Lacustrine, EL. -20.0 TO -37.5 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Phi: 0 ° Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 1000 psf Phi: 0 ° Name: DM EMBANKMENT FILL, EL -2.9 to -8 Name: DM MARSH 1, EL. -8.0 TO -15.0 Model: Spatial Mohr-Coulomb Unit Weight: 76 pcf Cohesion: 1000 psf Phi: 0 ° Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 1000 psf Phi: 0 ° Name: DM MARSH 2, EL. -15.0 TO -20.0 Name: DM Lacustrine, EL, -20.0 TO -37.5 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 1000 psf Phi: 0 ° Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 1000 psf Phi: 30 ° Name: DM BEACH SAND, EL. -37.5 TO -45

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
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BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

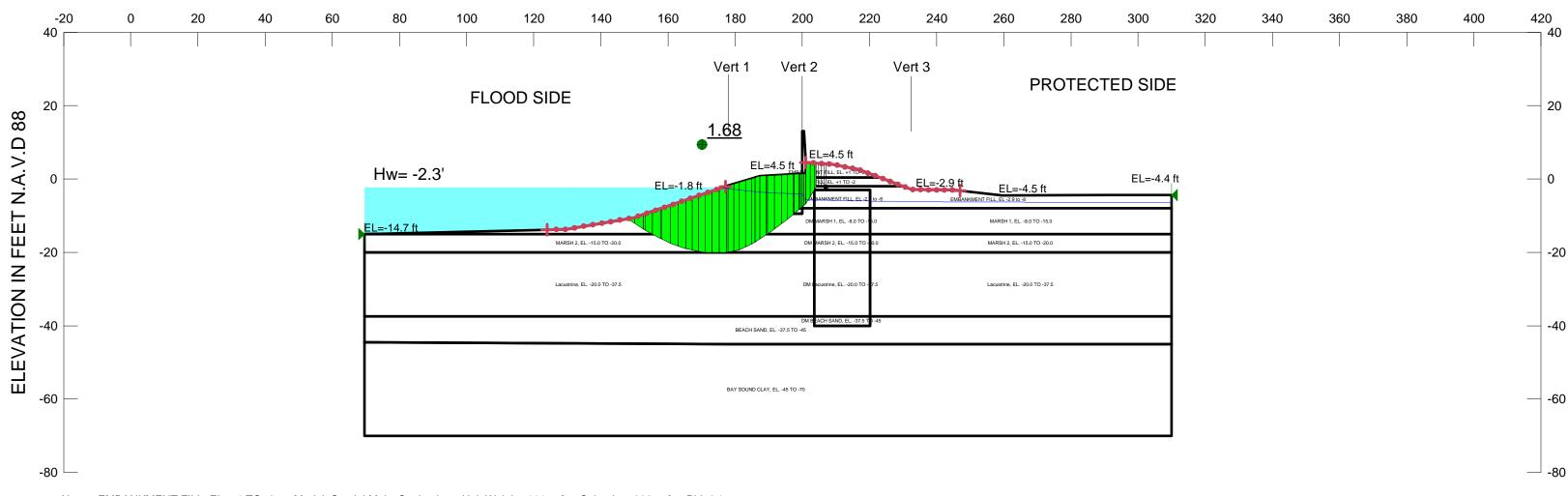
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17th STREET OUTFALL CANAL, REACH 03A, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 565+00 to 570+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +1 TO -2 Model: Spatial Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 800 psf Phi: 0 ° Name: BEACH SAND, EL. -37.5 TO -45 Model: Shear/Normal Fn. Unit Weight: 122 pcf Strength Function: Sand Name: EMBANKMENT FILL, EL -2.9 to -8 Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion Fn: Fill 2 Phi: 0 ° Name: MARSH 1, EL. -8.0 TO -15.0 Model: Spatial Mohr-Coulomb Unit Weight: 76 pcf Cohesion Fn: MARSH Phi: 0 ° Name: MARSH 2, EL. -15.0 TO -20.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Fn: MARSH 2 Phi: 0 ° Name: Lacustrine, EL. -20.0 TO -37.5 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Spatial Fn: Lacustrine Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound Phi: 0 ° Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 1000 psf Phi: 0 ° Name: DM EMBANKMENT FILL, EL -2.9 to -8 Name: DM MARSH 1, EL. -8.0 TO -15.0 Model: Spatial Mohr-Coulomb Unit Weight: 76 pcf Cohesion: 1000 psf Phi: 0 ° Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 1000 psf Phi: 0 ° Name: DM MARSH 2, EL. -15.0 TO -20.0 Name: DM Lacustrine, EL. -20.0 TO -37.5 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 1000 psf Phi: 0 ° Name: DM BEACH SAND, EL. -37.5 TO -45 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 1000 psf Phi: 30 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

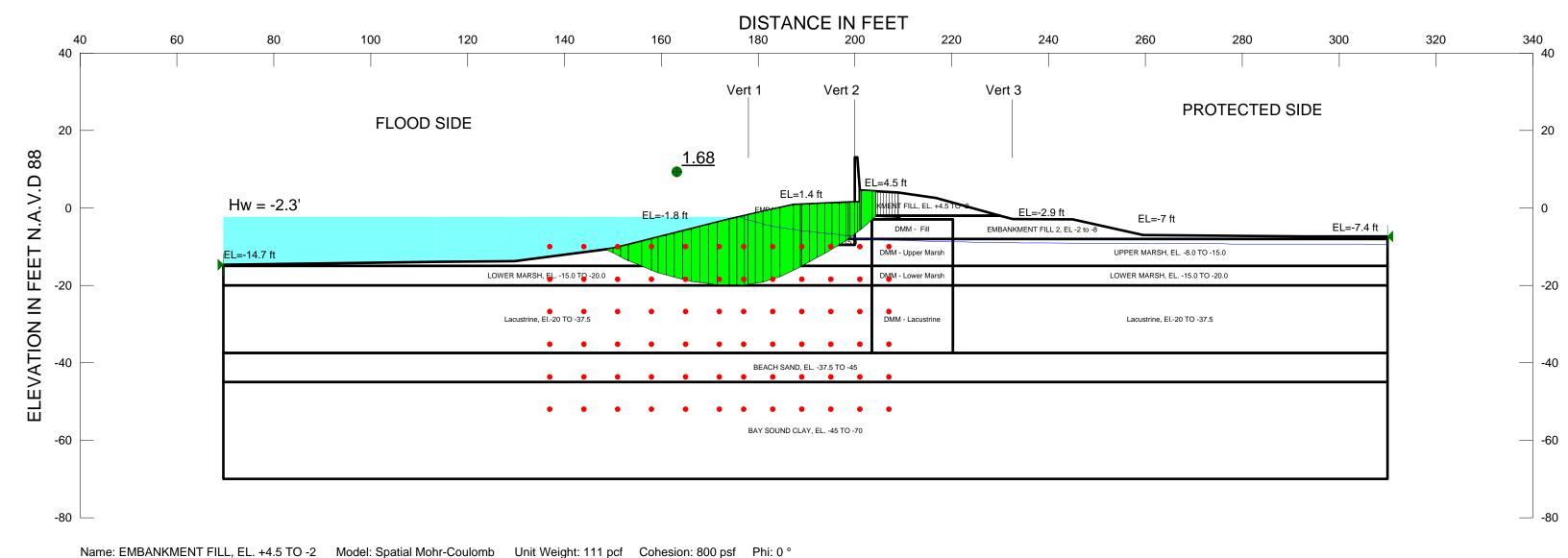
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17th STREET OUTFALL CANAL, REACH 03A, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 565+00 to 570+00 WEST ORLEANS PARISH, LOUISIANA



Name: UPPER MARSH, EL. -8.0 TO -15.0 Model: Spatial Mohr-Coulomb Unit Weight: 76 pcf Cohesion: 0 psf Phi: 0 °
Name: BEACH SAND, EL. -37.5 TO -45 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °
Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound - Full Layer Phi: 0 °
Name: EMBANKMENT FILL 2, EL -2 to -8 Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion Fn: Lower fill Phi: 0 °
Name: LOWER MARSH, EL. -15.0 TO -20.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Lacustrine - Full Layer Phi: 0 °
Name: DMM - Fill Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 1000 psf Phi: 0 °
Name: DMM - Lacustrine Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 1000 psf Phi: 0 °
Name: DMM - Upper Marsh Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 1000 psf Phi: 0 °
Name: DMM - Lower Marsh Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 1000 psf Phi: 0 °
Name: DMM - Lower Marsh Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

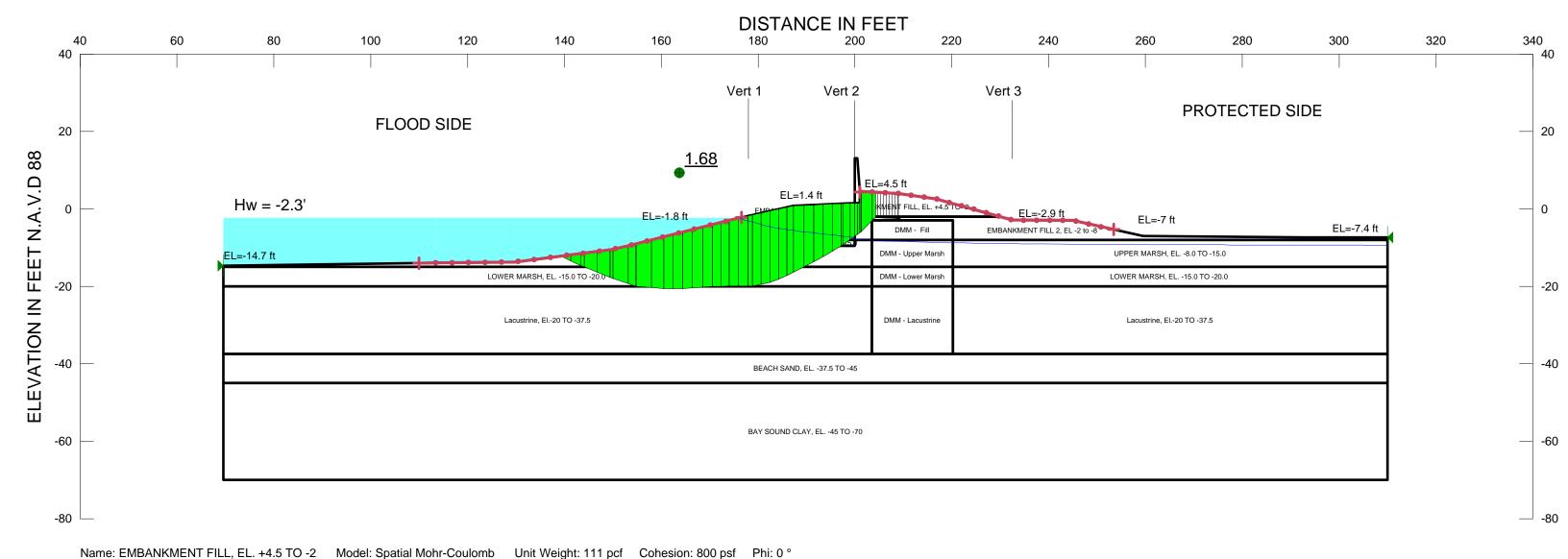
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17th STREET OUTFALL CANAL, REACH 3B FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 570+00 to 571+45 WEST ORLEANS PARISH, LOUISIANA



Name: UPPER MARSH, EL. -8.0 TO -15.0 Model: Spatial Mohr-Coulomb Unit Weight: 76 pcf Cohesion: 0 psf Phi: 0 °
Name: BEACH SAND, EL. -37.5 TO -45 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °
Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion Spatial Fn: Bay Sound - Full Layer Phi: 0 °
Name: EMBANKMENT FILL 2, EL -2 to -8 Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion Fn: Lower fill Phi: 0 °
Name: LOWER MARSH, EL. -15.0 TO -20.0 Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion Spatial Fn: Lacustrine - Full Layer Phi: 0 °
Name: DMM - Fill Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 1000 psf Phi: 0 °
Name: DMM - Lacustrine Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 1000 psf Phi: 0 °
Name: DMM - Lower Marsh Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 1000 psf Phi: 0 °
Name: DMM - Lower Marsh Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 1000 psf Phi: 0 °
Name: DMM - Lower Marsh Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-Q (-2.3) File Name: 17thReach03B.gsz Last Edited By: Dieckmann, Timothy MVS

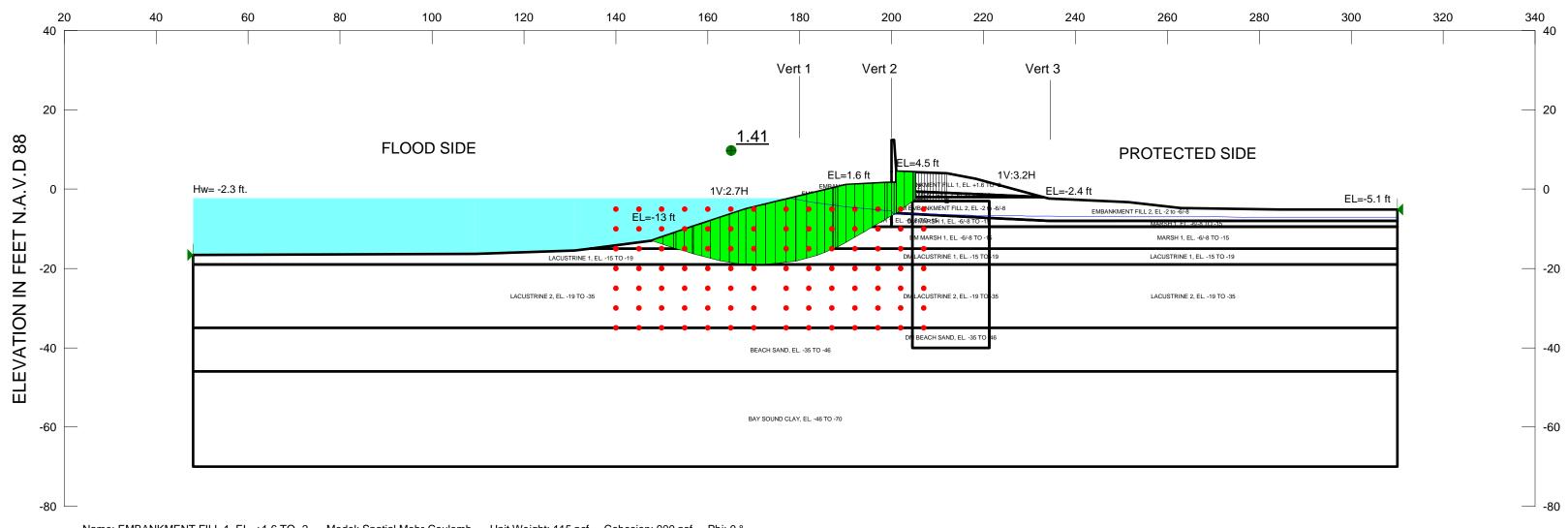




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17th STREET OUTFALL CANAL, REACH 3B FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 570+00 to 571+45 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 1, EL. +1.6 TO -2 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 900 psf Phi: 0°

Name: MARSH 1, EL. -6/-8 TO -15 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: Spatial Fn: Marsh Phi: 0°

Name: BEACH SAND, EL. -35 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30°

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: Spatial Fn: Clay Phi: 0°

Name: EMBANKMENT FILL 2, EL -2 to -6/-8 Model: Spatial Mohr-Coulomb Weight Fn: Fill 2 Cohesion: 400 psf Phi: 0°

Name: LACUSTRINE 1, EL. -15 TO -19 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion Spatial Fn: Lacustrine 1 Phi: 0°

Name: DM EMBANKMENT FILL 2, EL -2 to -6/-8 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 1000 psf Phi: 0°

Name: DM MARSH 1, EL. -6/-8 TO -15 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion: 1000 psf Phi: 0°

Name: DM LACUSTRINE 2, EL. -19 TO -35 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 1000 psf Phi: 0°

Name: DM LACUSTRINE 2, EL. -19 TO -35 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 1000 psf Phi: 0°

Name: DM BEACH SAND, EL. -35 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 1000 psf Phi: 0°

Name: DM BEACH SAND, EL. -35 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 1000 psf Phi: 0°

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

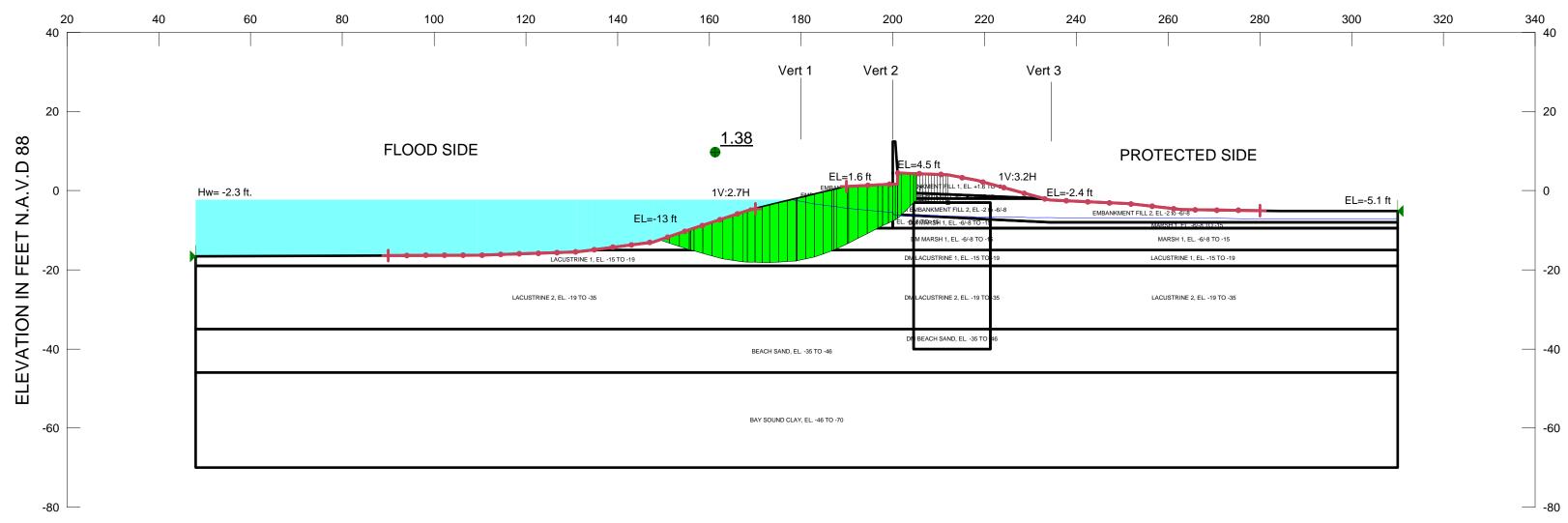
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17th STREET OUTFALL CANAL, REACH 04, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 571+45 - 575+45 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 1, EL. +1.6 TO -2 Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 900 psf Phi: 0 ° Name: MARSH 1, EL. -6/-8 TO -15 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion Spatial Fn: Marsh Phi: 0 ° Name: BEACH SAND, EL. -35 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Spatial Fn: Clay Phi: 0 ° Name: EMBANKMENT FILL 2, EL -2 to -6/-8 Model: Spatial Mohr-Coulomb Weight Fn: Fill 2 Cohesion: 400 psf Phi: 0 ° Name: LACUSTRINE 1, EL. -15 TO -19 Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: Lacustrine 1 Phi: 0 ° Name: LACUSTRINE 2, EL. -19 TO -35 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion Spatial Fn: Lacustrine 2 Phi: 0 ° Name: DM EMBANKMENT FILL 2, EL -2 to -6/-8 Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 1000 psf Phi: 0 ° Name: DM MARSH 1, EL. -6/-8 TO -15 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 1000 psf Phi: 0 ° Name: DM LACUSTRINE 1, EL. -15 TO -19 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 1000 psf Phi: 0 ° Name: DM LACUSTRINE 2, EL. -19 TO -35 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 1000 psf Phi: 0 ° Name: DM BEACH SAND, EL. -35 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 1000 psf Phi: 30 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-Q (-2.3)

File Name: 17thReach04.gsz Last Edited By: Dieckmann, Timothy MVS

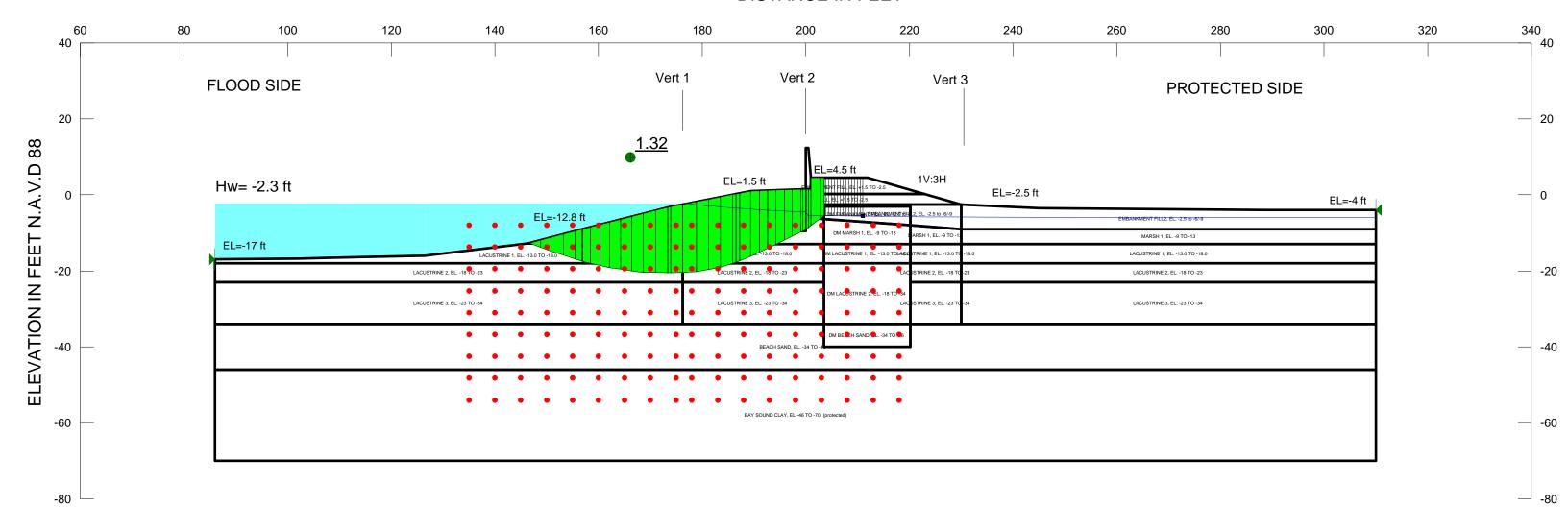




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17th STREET OUTFALL CANAL, REACH 04, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 571+45 - 575+45 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +1.5 TO -2.5 Model: Mohr-Coulomb Unit Weight: 120 pcf Cohesion: 550 psf Phi: 0 °
Name: MARSH 1, EL. -9 TO -13 Model: Spatial Mohr-Coulomb Unit Weight: 77 pcf Cohesion Fn: Marsh Phi: 0 °
Name: BEACH SAND, EL. -34 TO -46 Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °
Name: LACUSTRINE 1, EL. -13.0 TO -18.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Fn: Lacustrine 1 Phi: 0 °
Name: LACUSTRINE 3, EL. -23 TO -34 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2&3 Cohesion Spatial Fn: Lacustrine 3 Phi: 0 °
Name: EMBANKMENT FILL2, EL. -2.5 to -6/-9 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion Fn: Fill 2 Phi: 0 °
Name: BAY SOUND CLAY, EL -46 TO -70 (protected) Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion Fn: Bay Sound (protected) Phi: 0 °
Name: LACUSTRINE 2, EL. -18 TO -23 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 1000 psf Phi: 0 °
Name: DM EMBANKMENT FILL, EL. -2.5 to -9 Model: Mohr-Coulomb Unit Weight: 77 pcf Cohesion: 1000 psf Phi: 0 °
Name: DM LACUSTRINE 1, EL. -13.0 TO -18.0 Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 1000 psf Phi: 0 °
Name: DM LACUSTRINE 2, EL. -18 TO -34 Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 1000 psf Phi: 0 °
Name: DM BEACH SAND, EL. -34 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

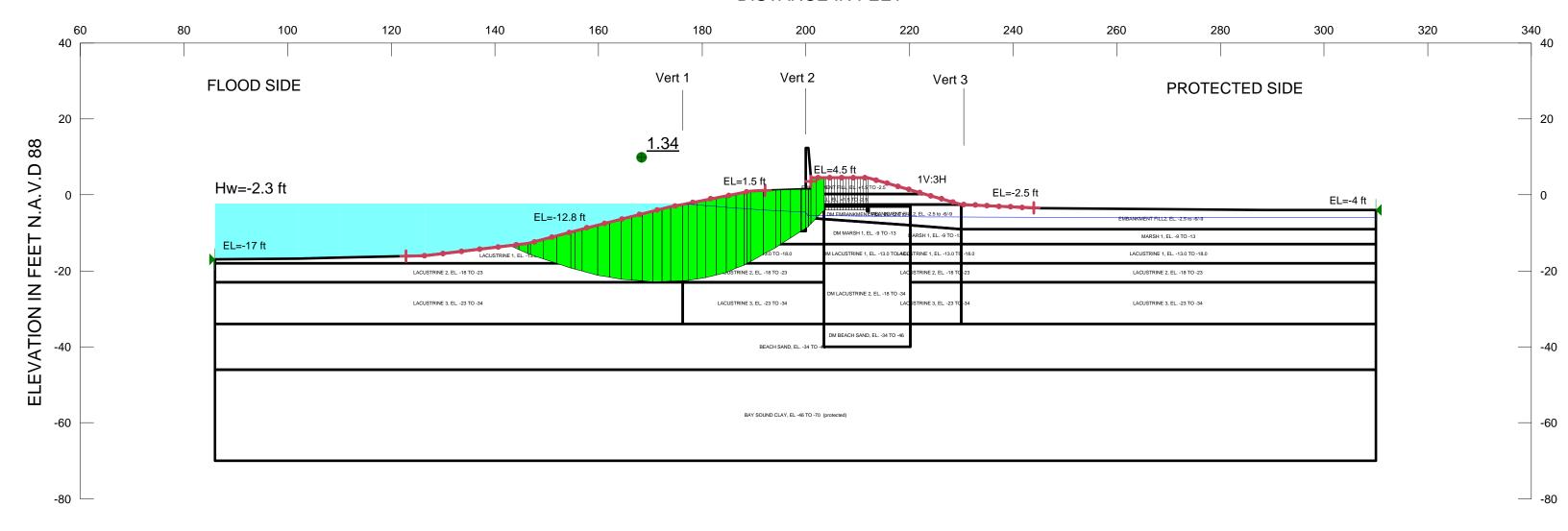
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17th STREET OUTFALL CANAL, REACH 05, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 575+45 TO 578+22.5 West ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +1.5 TO -2.5 Model: Mohr-Coulomb Unit Weight: 120 pcf Cohesion: 550 psf Phi: 0 ° Name: MARSH 1, EL. -9 TO -13 Model: Spatial Mohr-Coulomb Unit Weight: 77 pcf Cohesion Fn: Marsh Phi: 0 ° Name: BEACH SAND, EL. -34 TO -46 Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: LACUSTRINE 1, EL. -13.0 TO -18.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Fn: Lacustrine 1 Phi: 0 ° Name: LACUSTRINE 3, EL. -23 TO -34 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2&3 Cohesion Spatial Fn: Lacustrine 3 Phi: 0 ° Name: EMBANKMENT FILL2, EL. -2.5 to -6/-9 Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion Fn: Fill 2 Phi: 0 ° Name: BAY SOUND CLAY, EL -46 TO -70 (protected) Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion Fn: Bay Sound (protected) Phi: 0 ° Name: LACUSTRINE 2, EL. -18 TO -23 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2&3 Cohesion Fn: Lacustrine 2 Phi: 0 ° Name: DM EMBANKMENT FILL, EL. -2.5 to -9 Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 1000 psf Phi: 0 ° Name: DM MARSH 1, EL. -9 TO -13 Model: Mohr-Coulomb Unit Weight: 77 pcf Cohesion: 1000 psf Phi: 0 ° Name: DM LACUSTRINE 1, EL. -13.0 TO -18.0 Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 1000 psf Phi: 0 ° Name: DM LACUSTRINE 2, EL. -18 TO -34 Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 1000 psf Phi: 0 ° Name: DM BEACH SAND, EL. -34 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-Q (-2.3)

File Name: 17thReach05.gsz Last Edited By: Dieckmann, Timothy MVS

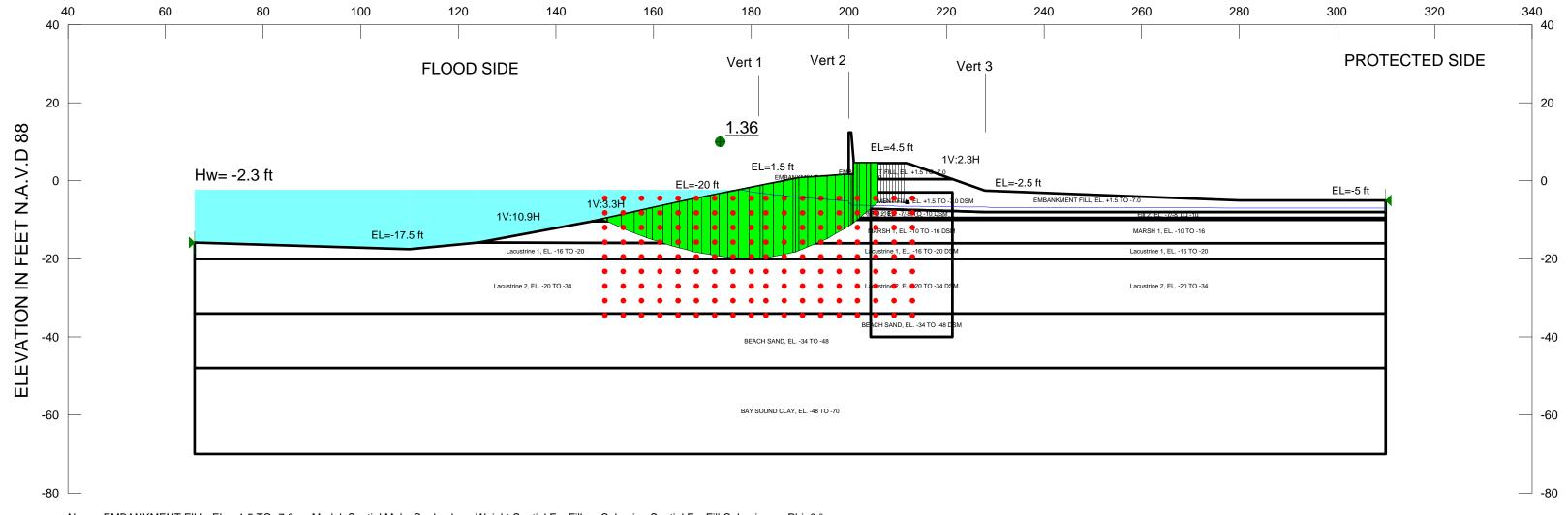




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17th STREET OUTFALL CANAL, REACH 05, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 575+45 TO 578+22.5 West ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +1.5 TO -7.0 Model: Spatial Mohr-Coulomb Weight Spatial Fn: Fill Cohesion Spatial Fn: Fill Cohesion Phi: 0 ° Name: MARSH 1, EL. -10 TO -16 Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh Cohesion Spatial Fn: Marsh Cohesion Name: BEACH SAND, EL. -34 TO -48 Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: BAY SOUND CLAY, EL. -48 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Fn: Clay Phi: 0 ° Name: Lacustrine 1, EL. -16 TO -20 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Fn: Lacustrine 1 Phi: 0 ° Name: Lacustrine 2, EL. -20 TO -34 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion Spatial Fn: Name: Fill 2, EL. -7/-8 TO -10 Model: Spatial Mohr-Coulomb Weight Spatial Fn: Fill 2 Cohesion Spatial Fn: Fill 2 Cohesion Phi: 0 ° Name: EMBANKMENT FILL, EL. +1.5 TO -7.0 DSM Model: Spatial Mohr-Coulomb Weight Spatial Fn: Fill Cohesion: 1000 psf Phi: 0 ° Name: MARSH 1, EL. -10 TO -16 DSM Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh Cohesion: 1000 psf Phi: 0 ° Name: Lacustrine 1, EL. -16 TO -20 DSM Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 1000 psf Phi: 0 ° Weight Fn: Lacustrine 2 Cohesion: 1000 psf Phi: 0 ° Name: Lacustrine 2, EL. -20 TO -34 DSM Model: Spatial Mohr-Coulomb Name: BEACH SAND, EL. -34 TO -48 DSM Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 1000 psf Phi: 30 ° Name: Fill 2, EL. -7/-8 TO -10 DSM Model: Spatial Mohr-Coulomb Weight Spatial Fn: Fill 2 Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-Q (-2.3) Last Edited By: Dieckmann, Timothy MVS

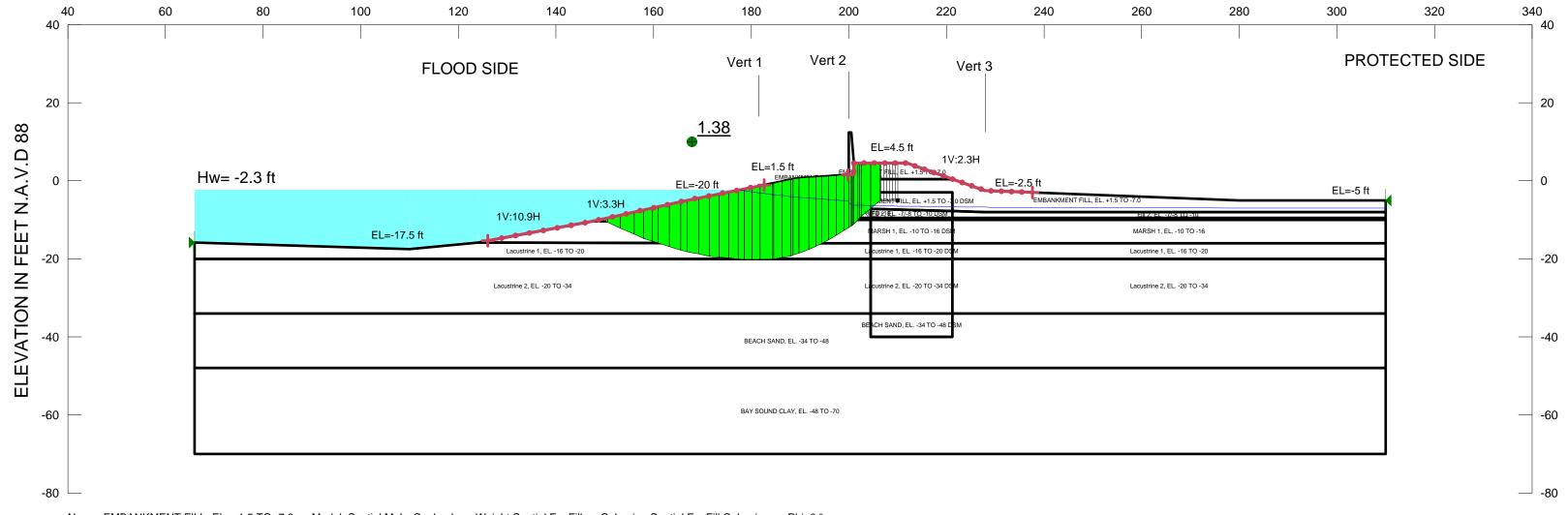
File Name: 17thReach06.gsz





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17th STREET OUTFALL CANAL, REACH 06, FLOOD SIDE STABILITY ANALYSIS. CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 578+22.5 TO 582+60 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +1.5 TO -7.0 Model: Spatial Mohr-Coulomb Weight Spatial Fn: Fill Cohesion Spatial Fn: Fill Cohesion Phi: 0 ° Name: MARSH 1, EL. -10 TO -16 Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh Cohesion Spatial Fn: Marsh Cohesion Name: BEACH SAND, EL. -34 TO -48 Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: BAY SOUND CLAY, EL. -48 TO -70 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion Fn: Clay Phi: 0 ° Name: Lacustrine 1, EL. -16 TO -20 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion Fn: Lacustrine 1 Phi: 0 ° Name: Lacustrine 2, EL. -20 TO -34 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion Spatial Fn: Name: Fill 2, EL. -7/-8 TO -10 Model: Spatial Mohr-Coulomb Weight Spatial Fn: Fill 2 Cohesion Spatial Fn: Fill 2 Cohesion Phi: 0 ° Name: EMBANKMENT FILL, EL. +1.5 TO -7.0 DSM Model: Spatial Mohr-Coulomb Weight Spatial Fn: Fill Cohesion: 1000 psf Phi: 0 ° Name: MARSH 1, EL. -10 TO -16 DSM Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh Cohesion: 1000 psf Phi: 0 ° Name: Lacustrine 1, EL. -16 TO -20 DSM Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 1000 psf Phi: 0 ° Weight Fn: Lacustrine 2 Cohesion: 1000 psf Phi: 0 ° Name: Lacustrine 2, EL. -20 TO -34 DSM Model: Spatial Mohr-Coulomb Name: BEACH SAND, EL. -34 TO -48 DSM Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 1000 psf Phi: 30 ° Name: Fill 2, EL. -7/-8 TO -10 DSM Model: Spatial Mohr-Coulomb Weight Spatial Fn: Fill 2 Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-Q (-2.3)

File Name: 17thReach06.gsz Last Edited By: Dieckmann, Timothy MVS

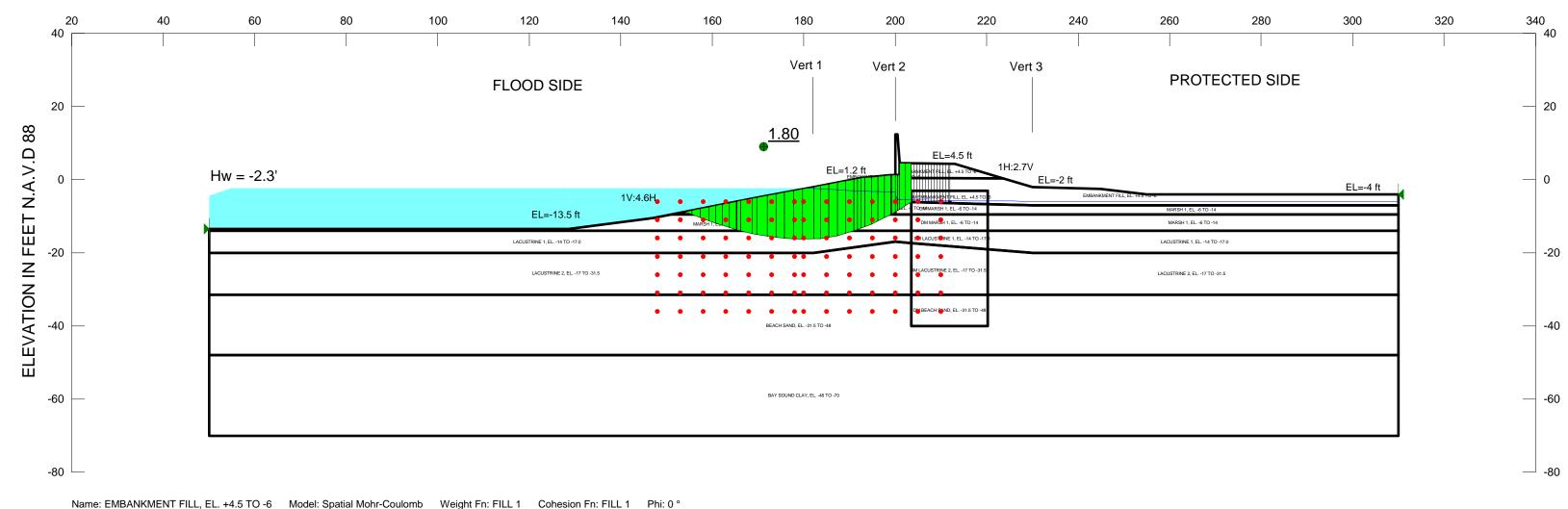




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17th STREET OUTFALL CANAL, REACH 06, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 578+22.5 TO 582+60 WEST ORLEANS PARISH, LOUISIANA



Name: BEACH SAND, EL. -31.5 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: BAY SOUND CLAY, EL. -48 TO -70 Model: Undrained (Phi=0) Unit Weight: 105 pcf Cohesion: 700 psf Name: LACUSTRINE 1, EL. -14 TO -17.0 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Spatial Fn: Lacustrine 1 Phi: 0 ° Name: LACUSTRINE 2, EL. -17 TO -31.5 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion Spatial Fn: Lacustrine 2 Phi: 0 ° Name: MARSH 1, EL. -6 TO -14 Model: Spatial Mohr-Coulomb Unit Weight: 78 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: DM EMBANKMENT FILL, EL. +4.5 TO -6 Model: Spatial Mohr-Coulomb Weight Fn: FILL 1 Cohesion: 1000 psf Phi: 0 ° Name: DM MARSH 1, EL. -6 TO -14 Model: Spatial Mohr-Coulomb Unit Weight: 78 pcf Cohesion: 1000 psf Phi: 0 ° Name: DM LACUSTRINE 1, EL. -14 TO -17.0 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 1000 psf Phi: 0 ° Name: DM LACUSTRINE 2, EL. -17 TO -31.5 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 1000 psf Phi: 0 ° Name: DM BEACH SAND, EL. -31.5 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

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Name: Slope Stability (Block) LWL-Q (-2.3) File Name: 17thReach07.gsz Last Edited By: Dieckmann, Timothy MVS

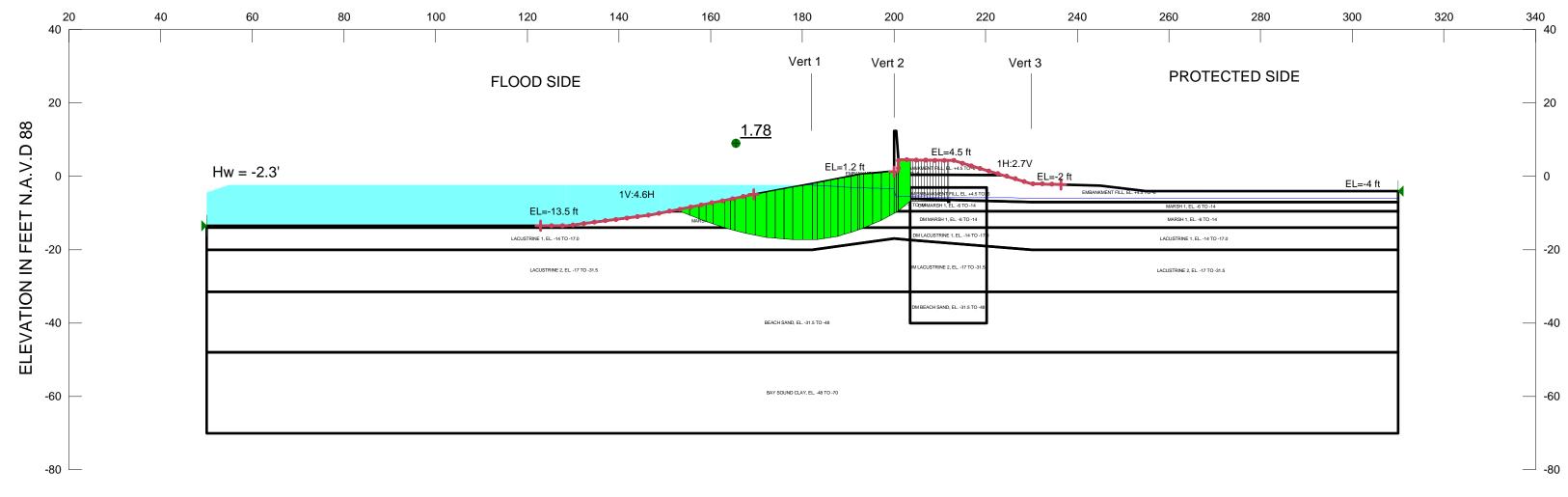






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17th STREET OUTFALL CANAL, REACH 7, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 582+60 to 585+55 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +4.5 TO -6 Model: Spatial Mohr-Coulomb Weight Fn: FILL 1 Cohesion Fn: FILL 1 Phi: 0 ° Name: BEACH SAND, EL. -31.5 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: BAY SOUND CLAY, EL. -48 TO -70 Model: Undrained (Phi=0) Unit Weight: 105 pcf Cohesion: 700 psf Name: LACUSTRINE 1, EL. -14 TO -17.0 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion Spatial Fn: Lacustrine 1 Phi: 0 ° Name: LACUSTRINE 2, EL. -17 TO -31.5 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion Spatial Fn: Lacustrine 2 Phi: 0 ° Name: MARSH 1, EL. -6 TO -14 Model: Spatial Mohr-Coulomb Unit Weight: 78 pcf Cohesion Fn: MARSH 1 Phi: 0 ° Name: DM EMBANKMENT FILL, EL. +4.5 TO -6 Model: Spatial Mohr-Coulomb Weight Fn: FILL 1 Cohesion: 1000 psf Phi: 0 ° Name: DM MARSH 1, EL. -6 TO -14 Model: Spatial Mohr-Coulomb Unit Weight: 78 pcf Cohesion: 1000 psf Phi: 0 ° Name: DM LACUSTRINE 1, EL. -14 TO -17.0 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 1000 psf Phi: 0 ° Name: DM LACUSTRINE 2, EL. -17 TO -31.5 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 1000 psf Phi: 0 ° Name: DM BEACH SAND, EL. -31.5 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 1000 psf Phi: 0 °

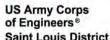
GENERAL NOTES

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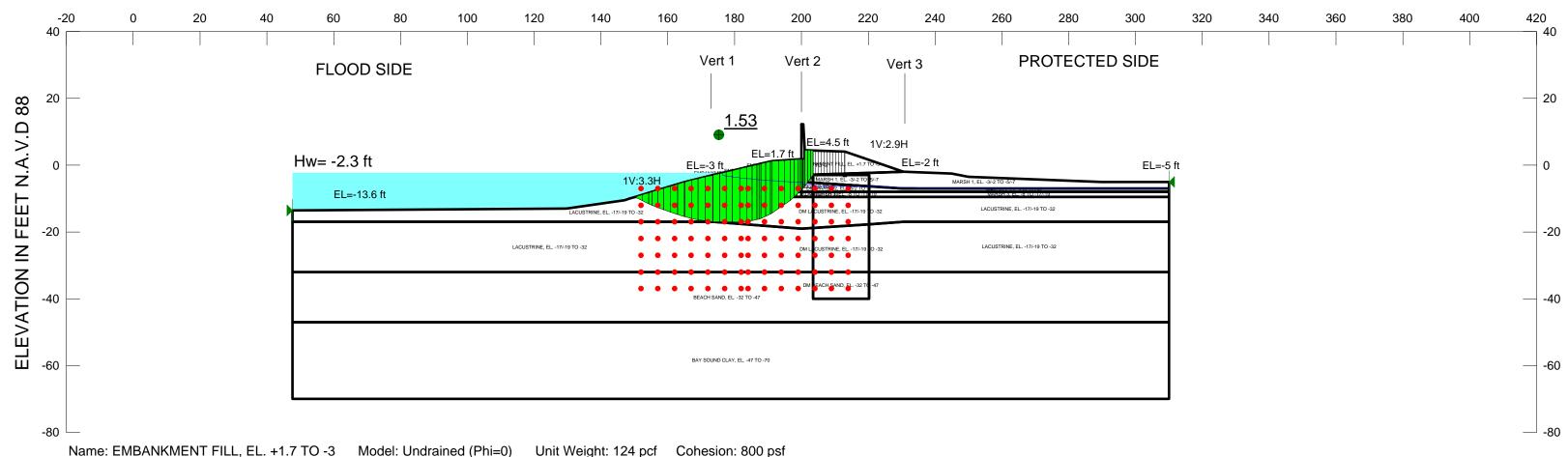
Name: Slope Stability (Entry/Exit) LWL-Q (-2.3) File Name: 17thReach07.gsz Last Edited By: Dieckmann, Timothy MVS





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17th STREET OUTFALL CANAL, REACH 7, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 582+60 to 585+55 WEST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -3/-2 TO -5/-7 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion Fn: MARSH 1 Phi: 0° Name: BEACH SAND, EL. -32 TO -47 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: BAY SOUND CLAY, EL. -47 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 750 psf Phi: 0° Name: MARSH 2, EL. -5/2 TO -8 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: MARSH 2 Phi: 0 ° Name: MARSH 3, EL. -8 TO -17/-19 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 3 Cohesion Fn: MARSH 3 Phi: 0 ° Name: LACUSTRINE, EL. -17/-19 TO -32 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine Cohesion Phi: 0° Name: DM MARSH 1, EL. -3/-2 TO -5/-7 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 1000 psf Phi: 0 ° Name: DM MARSH 2, EL. -5/2 TO -8 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 1000 psf Phi: 0 ° Name: DM MARSH 3, EL. -8 TO -17/-19 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 3 Cohesion: 1000 psf Phi: 0 ° Name: DM LACUSTRINE, EL. -17/-19 TO -32 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 1000 psf Name: DM BEACH SAND, EL. -32 TO -47 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

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Name: Slope Stability (Block) LWL-Q (-2.3) File Name: 17thReach08.gsz Last Edited By: Dieckmann, Timothy MVS

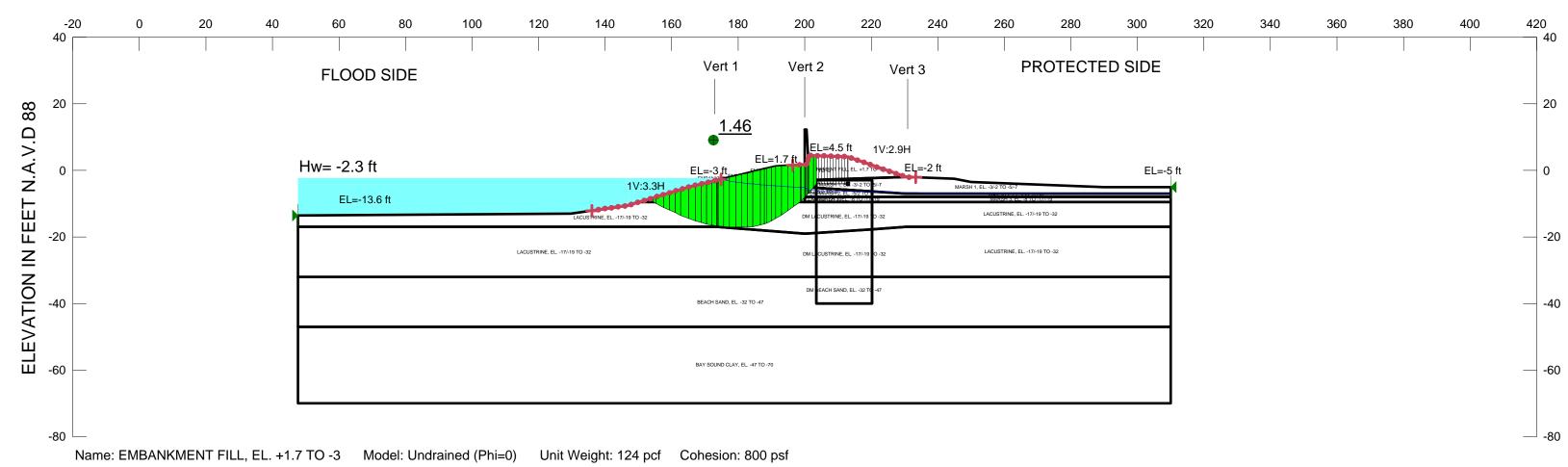




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17th STREET OUTFALL CANAL, REACH 08, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 585+55 TO 588+70 WEST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -3/-2 TO -5/-7 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion Fn: MARSH 1 Phi: 0° Name: BEACH SAND, EL. -32 TO -47 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 ° Name: BAY SOUND CLAY, EL. -47 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 750 psf Phi: 0° Name: MARSH 2, EL. -5/2 TO -8 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion Fn: MARSH 2 Phi: 0 ° Name: MARSH 3, EL. -8 TO -17/-19 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 3 Cohesion Fn: MARSH 3 Phi: 0 ° Name: LACUSTRINE, EL. -17/-19 TO -32 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion Spatial Fn: Lacustrine Cohesion Phi: 0° Name: DM MARSH 1, EL. -3/-2 TO -5/-7 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 1000 psf Phi: 0 ° Name: DM MARSH 2, EL. -5/2 TO -8 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 1000 psf Phi: 0 ° Name: DM MARSH 3, EL. -8 TO -17/-19 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 3 Cohesion: 1000 psf Phi: 0 ° Name: DM LACUSTRINE, EL. -17/-19 TO -32 Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 1000 psf Name: DM BEACH SAND, EL. -32 TO -47 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

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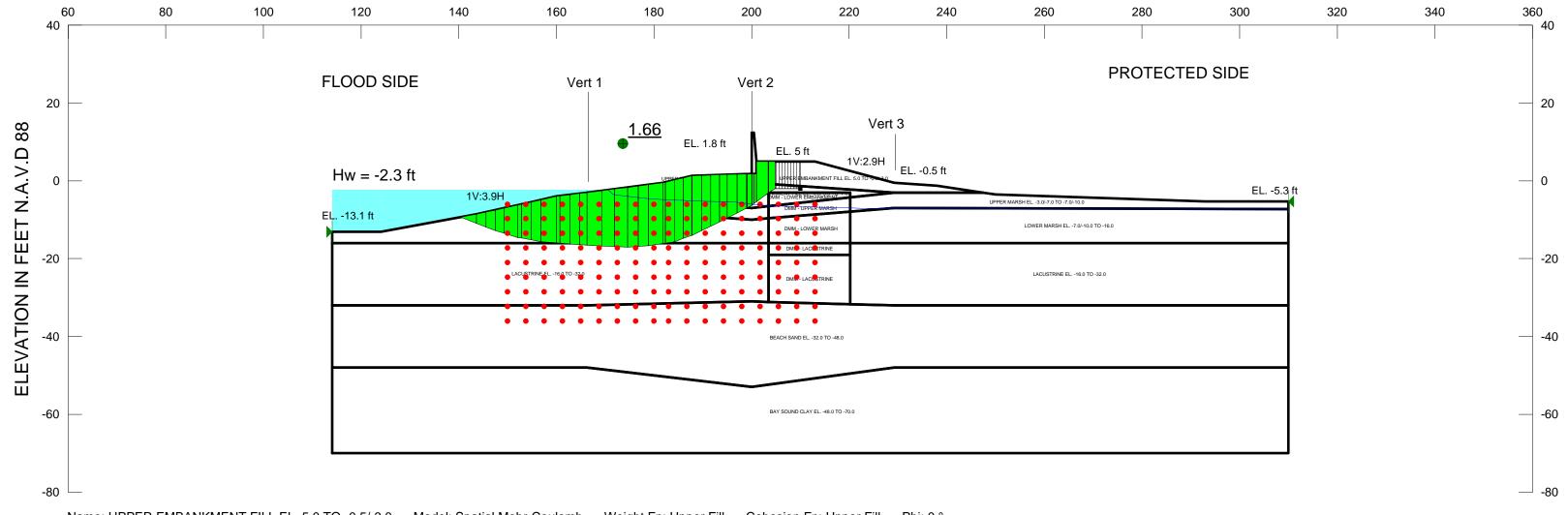




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17th STREET OUTFALL CANAL, REACH 08. FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 585+55 TO 588+70 WEST ORLEANS PARISH, LOUISIANA



Name: UPPER EMBANKMENT FILL EL. 5.0 TO -0.5/-3.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Fill Cohesion Fn: Upper Fill Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-

Name: BEACH SAND EL. -32.0 TO -48.0 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY EL. -48.0 TO -70.0 Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: Bay Sound Clay Phi: 0 °

Name: LOWER EMBANKMENT FILL EL. -0.5/-3.0 TO -7.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Fill Cohesion Fn: Lower enbankment fill Phi: 0 °

Name: LOWER MARSH EL. -7.0/-10.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Lower Marsh Cohesion Spatial Fn: Lower Marsh Phi: 0 °

Name: LACUSTRINE EL. -16.0 TO -32.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Phi: 0 °

Name: DMM - LOWER EMBANKMENT Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 1000 psf Phi: 0 °
Name: DMM - UPPER MARSH Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion: 1000 psf Phi: 0 °
Name: DMM - LOWER MARSH Model: Spatial Mohr-Coulomb Weight Fn: Lower Marsh Cohesion: 1000 psf Phi: 0 °
Name: DMM - LACUSTRINE Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability (Block) LWL-Q (-2.3)

File Name: 17thReach09.gsz

Last Edited By: Dieckmann, Timothy MVS

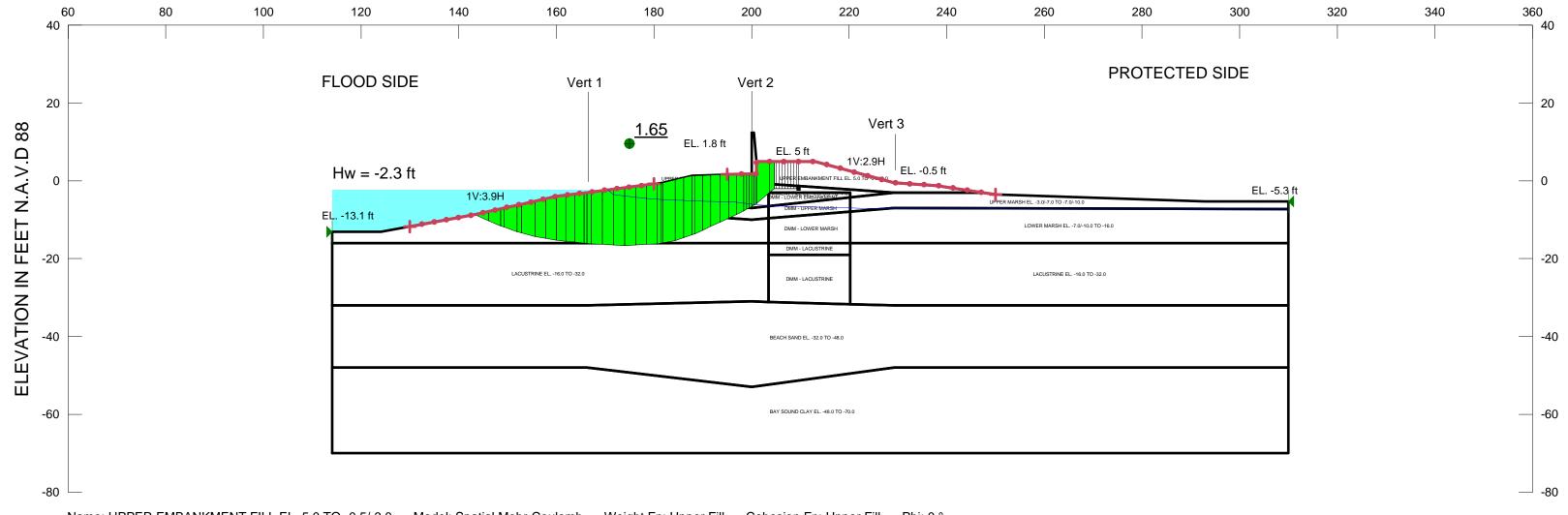




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17th STREET OUTFALL CANAL, REACH 09, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-Q (-2.3) STA. 588+70 - 593+00 WEST ORLEANS PARISH, LOUISIANA



Name: UPPER EMBANKMENT FILL EL. 5.0 TO -0.5/-3.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Fill Cohesion Fn: Upper Fill Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion Fn: Upper Marsh Phi: 0 ° Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion Fn: Upper Marsh Phi: 0 ° Name: UPPER Marsh Phi: 0

Name: BEACH SAND EL. -32.0 TO -48.0 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 30 °

Name: BAY SOUND CLAY EL. -48.0 TO -70.0 Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion Spatial Fn: Bay Sound Clay Phi: 0 °

Name: LOWER EMBANKMENT FILL EL. -0.5/-3.0 TO -7.0 Model: Spatial Mohr-Coulomb Weight Fn: Upper Fill Cohesion Fn: Lower enbankment fill Phi: 0 °

Name: LOWER MARSH EL. -7.0/-10.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Lower Marsh Cohesion Spatial Fn: Lower Marsh Phi: 0 °

Name: LACUSTRINE EL. -16.0 TO -32.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion Spatial Fn: Lacustrine Phi: 0 °

Name: DMM - LOWER EMBANKMENT Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 1000 psf Phi: 0 °
Name: DMM - UPPER MARSH Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion: 1000 psf Phi: 0 °
Name: DMM - LOWER MARSH Model: Spatial Mohr-Coulomb Weight Fn: Lower Marsh Cohesion: 1000 psf Phi: 0 °
Name: DMM - LACUSTRINE Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion: 1000 psf Phi: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-Q (-2.3)

File Name: 17thReach09.gsz

Last Edited By: Dieckmann, Timothy MVS

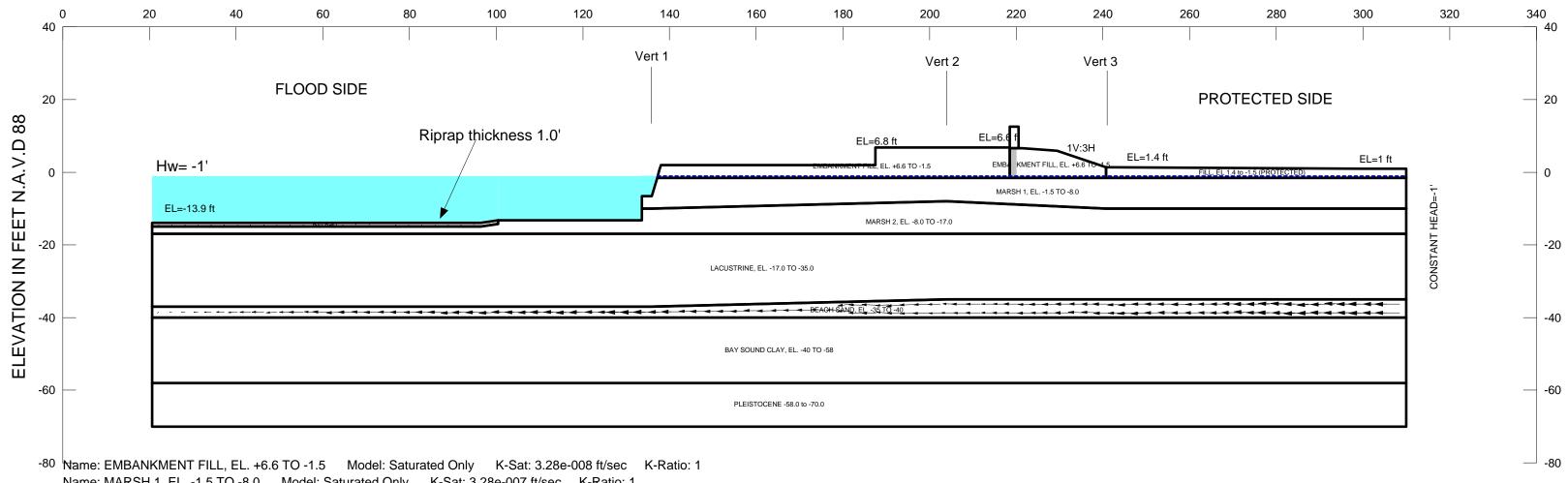




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17th STREET OUTFALL CANAL, REACH 09, FLOOD SIDE STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-Q (-2.3) STA. 588+70 - 593+00 WEST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -1.5 TO -8.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -35 TO -40 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -40 TO -58 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: FILL, EL 1.4 to -1.5 (PROTECTED) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1 Name: LACUSTRINE, EL. -17.0 TO -35.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: PLEISTOCENE -58.0 to -70.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: MARSH 2, EL. -8.0 TO -17.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Rip Rap Model: Saturated Only K-Sat: 0.00023 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach01.gsz Last Edited By: Dieckmann, Timothy MVS

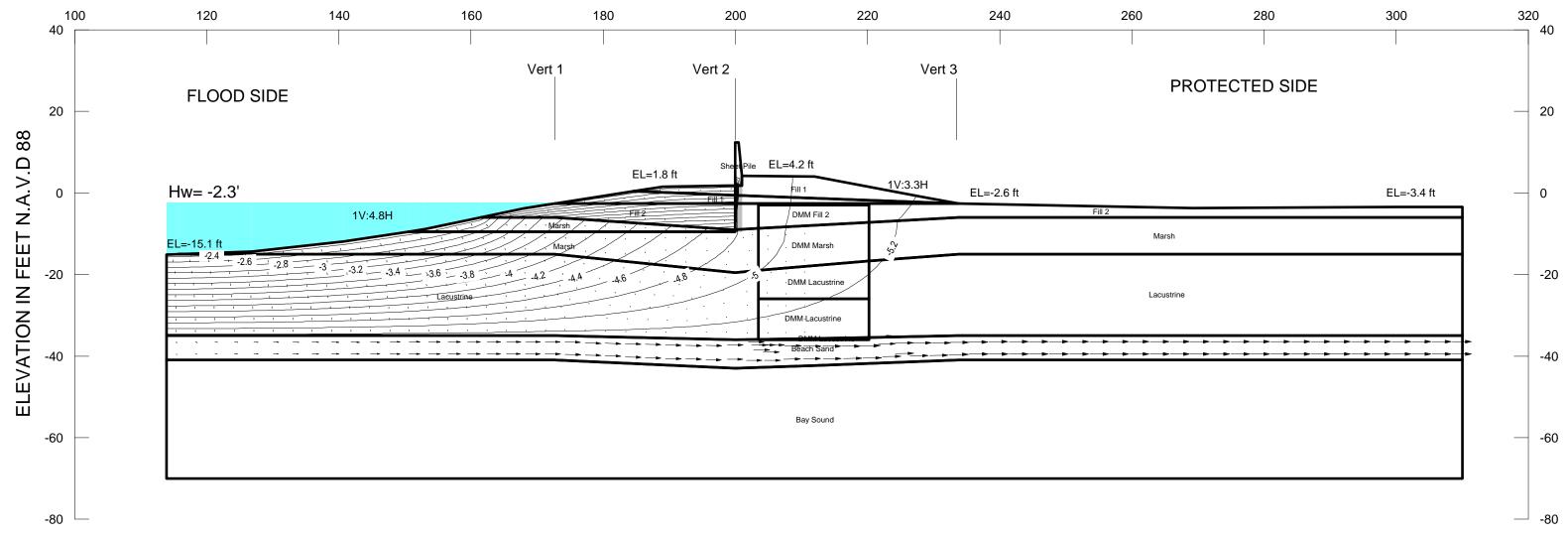




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17th STREET OUTFALL CANAL, REACH 01, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) Closure to STA. 552+21.5 WEST ORLEANS PARISH, LOUISIANA



Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1 Model: Saturated Only K-Sat: 3.28e-008 ft/sec Name: Fill 1 Model: Saturated Only K-Sat: 3.28e-008 ft/sec Name: Fill 2 K-Ratio: 1 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Marsh Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Lacustrine Name: Beach Sand Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: Bay Sound Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DMM Fill 2 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DMM Marsh Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DMM Lacustrine Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach02.gsz

File Name: 17thReach02.gsz Last Edited By: Dieckmann, Timothy MVS

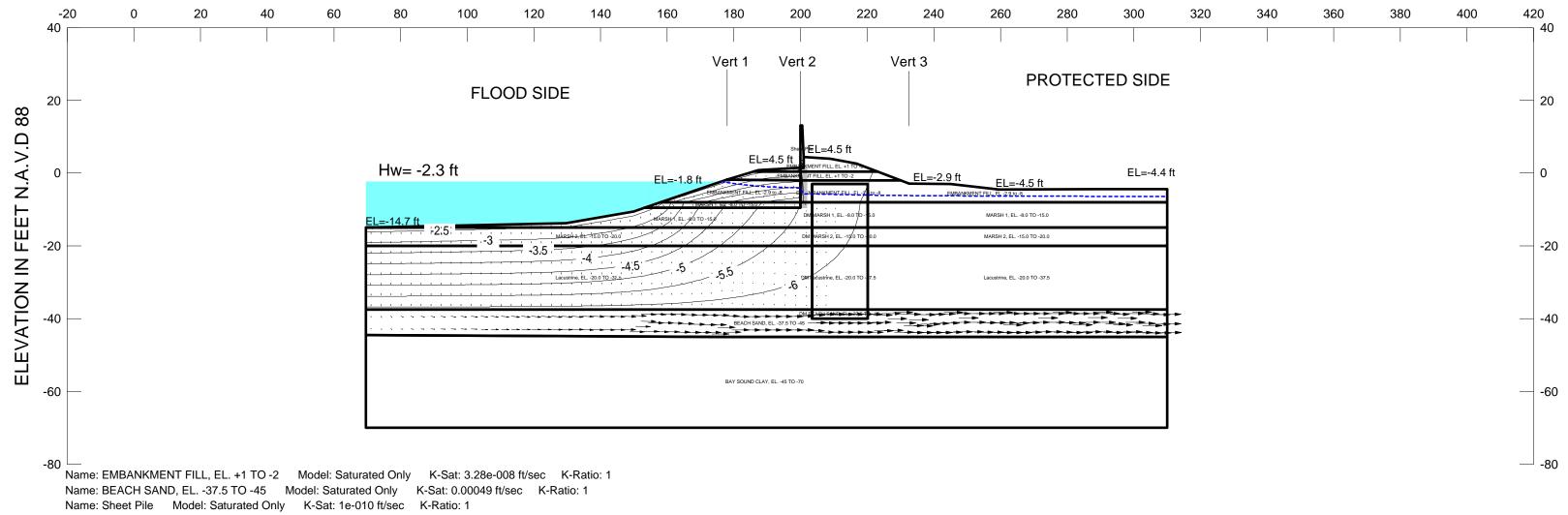




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17th STREET OUTFALL CANAL, REACH 2 FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 553+70 - 565+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL -2.9 to -8 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: MARSH 1, EL. -8.0 TO -15.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: MARSH 2, EL. -15.0 TO -20.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Lacustrine, EL. -20.0 TO -37.5 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DM EMBANKMENT FILL, EL -2.9 to -8 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DM MARSH 1, EL. -8.0 TO -15.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DM MARSH 2, EL. -15.0 TO -20.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Name: DM Lacustrine, EL. -20.0 TO -37.5 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DM BEACH SAND, EL. -37.5 TO -45 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q)
File Name: 17thReach03A.gsz
Last Edited By: Dieckmann, Timothy MVS

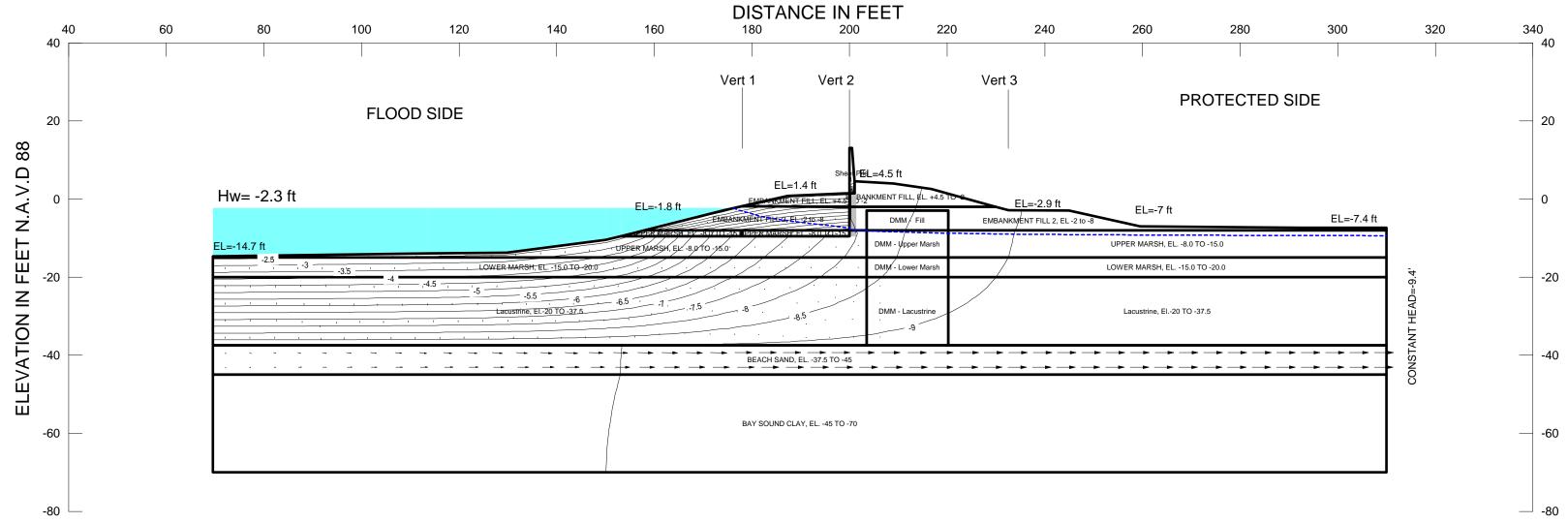




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17th STREET OUTFALL CANAL, REACH 03A, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 565+00 to 570+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +4.5 TO -2 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: UPPER MARSH, EL. -8.0 TO -15.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: BEACH SAND, EL. -37.5 TO -45 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1
Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: EMBANKMENT FILL 2, EL -2 to -8 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1
Name: LOWER MARSH, EL. -15.0 TO -20.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: Lacustrine, El.-20 TO -37.5 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: DMM - Fill Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: DMM - Lacustrine Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: DMM - Upper Marsh Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: DMM - Lower Marsh Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: DMM - Lower Marsh Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

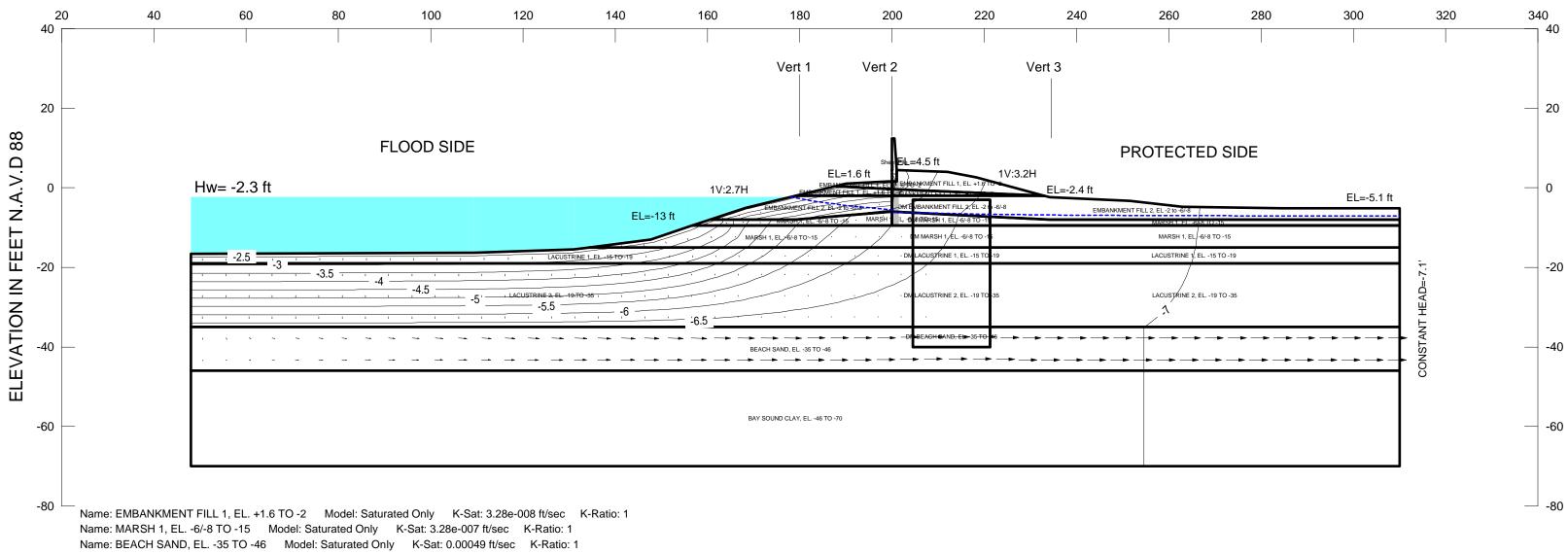
Name: Seepage Analysis (LWL-Q) File Name: 17thReach03B.gsz Last Edited By: Dieckmann, Timothy MVS





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17th STREET OUTFALL CANAL, REACH 3B FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 570+00 to 571+45 WEST ORLEANS PARISH, LOUISIANA



Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 2, EL -2 to -6/-8 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: LACUSTRINE 1, EL. -15 TO -19 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: LACUSTRINE 2, EL. -19 TO -35 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: DM EMBANKMENT FILL 2, EL -2 to -6/-8 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: DM MARSH 1, EL. -6/-8 TO -15 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: DM LACUSTRINE 1, EL. -15 TO -19 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: DM LACUSTRINE 2, EL. -19 TO -35 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: DM BEACH SAND, EL. -35 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach04.gsz Last Edited By: Dieckmann, Timothy MVS

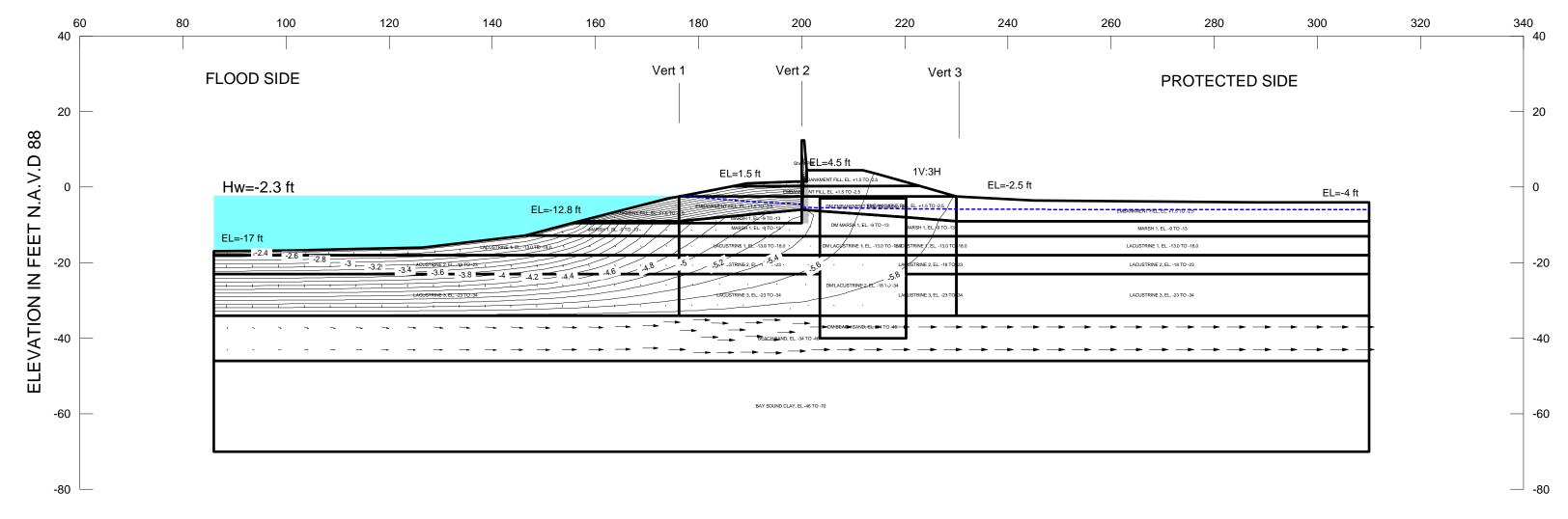




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17th STREET OUTFALL CANAL, REACH 04, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 571+45 - 575+45 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +1.5 TO -2.5 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: MARSH 1, EL. -9 TO -13 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: BEACH SAND, EL. -34 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: LACUSTRINE 1, EL. -13.0 TO -18.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: DM EMBANKMENT FILL, EL. -2.5 to -9 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: DM LACUSTRINE 1, EL. -9 TO -18.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: DM LACUSTRINE 2, EL. -18 TO -34 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: DM LACUSTRINE 1, EL. -13.0 TO -18.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: DM LACUSTRINE 2, EL. -18 TO -34 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: DM LACUSTRINE 2, EL. -18 TO -34 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: DM LACUSTRINE 2, EL. -18 TO -34 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: DM

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach05.gsz Last Edited By: Dieckmann, Timothy MVS

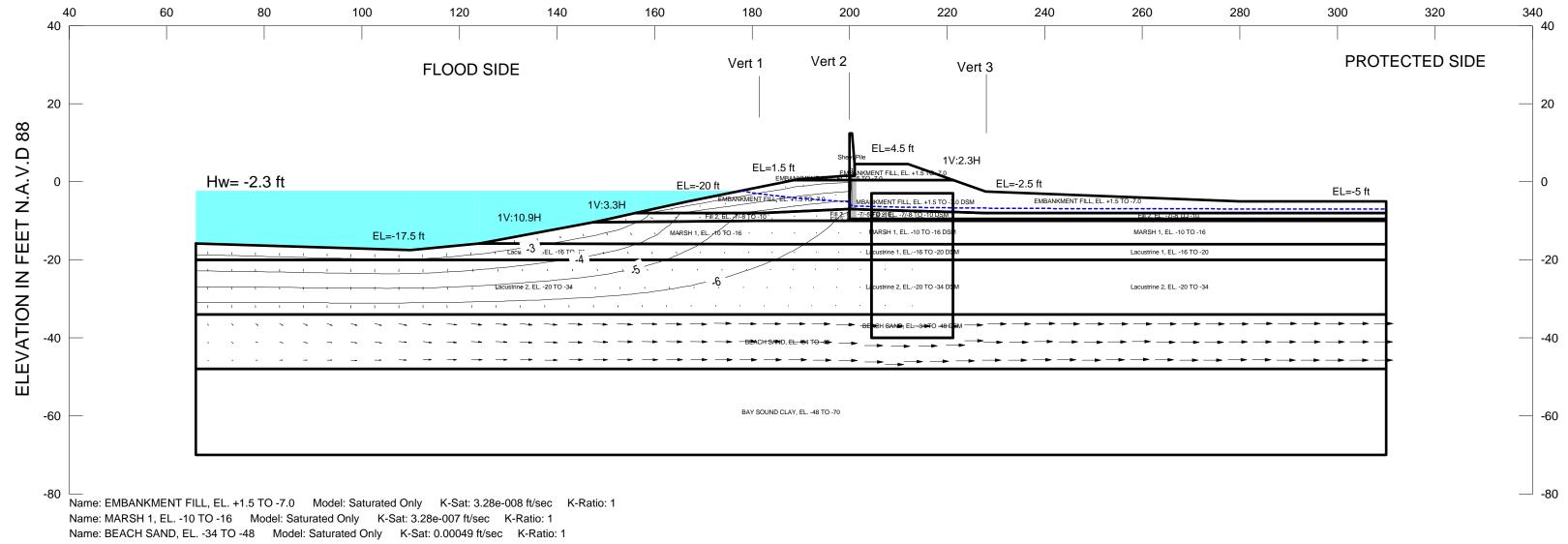




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17th STREET OUTFALL CANAL, REACH 05, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 575+45 TO 578+22.5 West ORLEANS PARISH, LOUISIANA



Name: BAY SOUND CLAY, EL. -48 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: Lacustrine 1, EL. -16 TO -20 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Lacustrine 2, EL. -20 TO -34 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Fill 2, EL. -7/-8 TO -10 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL, EL. +1.5 TO -7.0 DSM Model: Saturated Only K-Sat: 3.28e-008 ft/sec Name: MARSH 1, EL. -10 TO -16 DSM Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Lacustrine 1, EL. -16 TO -20 DSM Model: Saturated Only K-Sat: 3.28e-007 ft/sec

Name: Lacustrine 2, EL. -20 TO -34 DSM Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -34 TO -48 DSM Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: Fill 2, EL. -7/-8 TO -10 DSM Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach06.gsz Last Edited By: Dieckmann, Timothy MVS

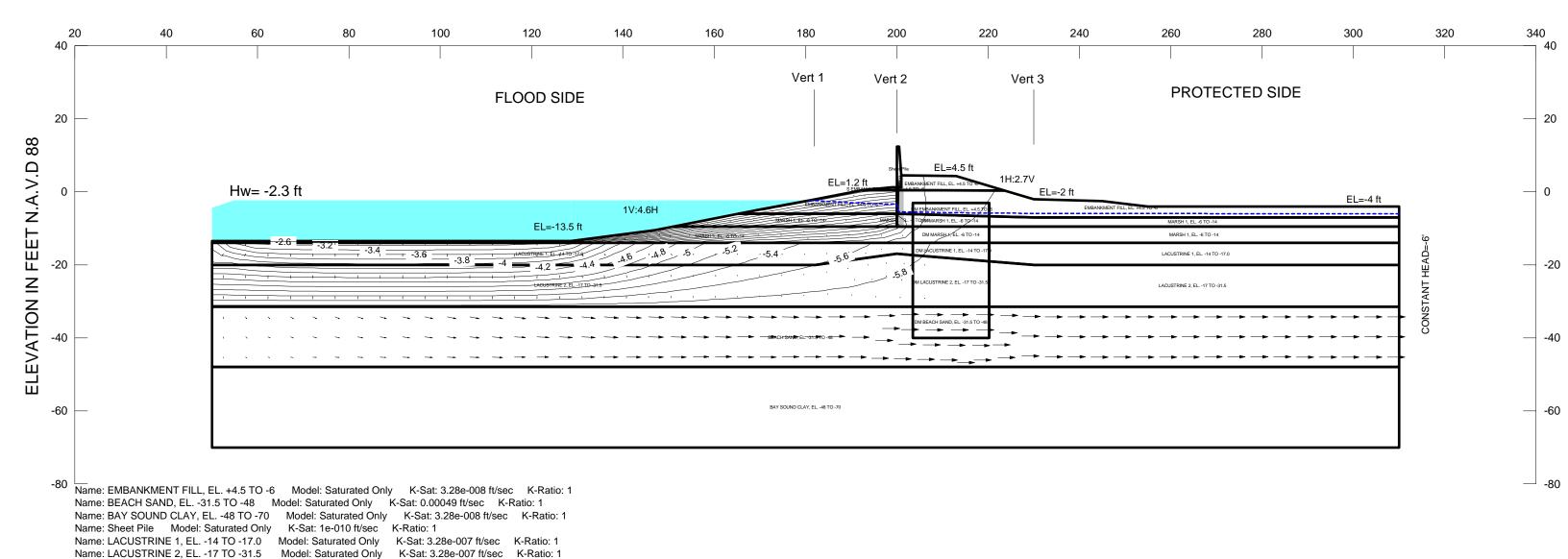




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17th STREET OUTFALL CANAL, REACH 06, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 578+22.5 TO 582+60 WEST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: MARSH 1, EL. -6 TO -14 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: DM MARSH 1, EL. -6 TO -14 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DM LACUSTRINE 1, EL. -14 TO -17.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DM LACUSTRINE 2, EL. -17 TO -31.5 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DM BEACH SAND, EL. -31.5 TO -48 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: S EMBANKMENT FILL, EL. +4.5 TO -6 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DM EMBANKMENT FILL, EL. +4.5 TO -6 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Seepage Analysis (LWL-Q) File Name: 17thReach07.gsz Last Edited By: Dieckmann, Timothy MVS

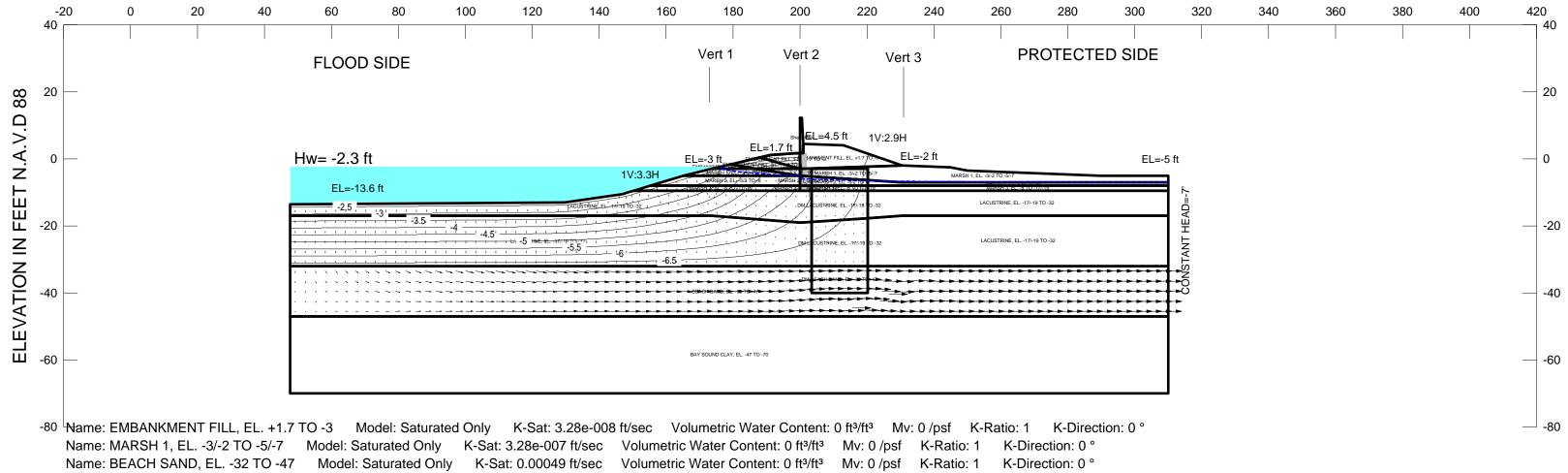




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17th STREET OUTFALL CANAL, REACH 7, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 582+60 to 585+55 WEST ORLEANS PARISH, LOUISIANA



Name: BAY SOUND CLAY, EL. -47 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: MARSH 2, EL. -5/2 TO -8 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: MARSH 3, EL. -8 TO -17/-19 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: LACUSTRINE, EL. -17/-19 TO -32 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: DM MARSH 1, EL. -3/-2 TO -5/-7 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: DM MARSH 2, EL. -5/2 TO -8 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: DM MARSH 3, EL. -8 TO -17/-19 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: DM LACUSTRINE, EL. -17/-19 TO -32 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: DM BEACH SAND, EL. -32 TO -47 Model: Saturated Only K-Sat: 0.00049 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach08.gsz Last Edited By: Dieckmann, Timothy MVS

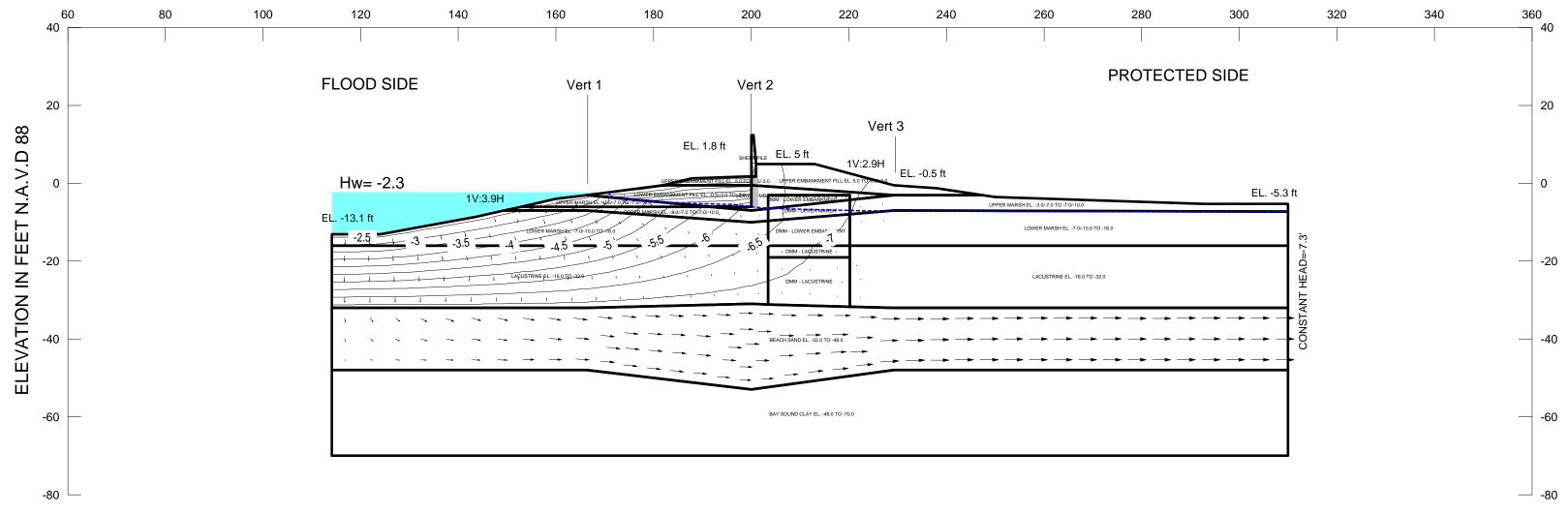




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17th STREET OUTFALL CANAL, REACH 08. FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 585+55 TO 588+70 WEST ORLEANS PARISH, LOUISIANA



Name: UPPER EMBANKMENT FILL EL. 5.0 TO -0.5/-3.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: UPPER MARSH EL. -3.0/-7.0 TO -7.0/-10.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BEACH SAND EL. -32.0 TO -48.0 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY EL. -48.0 TO -70.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: LOWER EMBANKMENT FILL EL. -0.5/-3.0 TO -7.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: SHEET PILE Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: LOWER MARSH EL. -7.0/-10.0 TO -16.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: LACUSTRINE EL. -16.0 TO -32.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: DMM - LOWER EMBANKMENT Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: DMM - UPPER MARSH Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: DMM - LACUSTRINE Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach09.gsz

Last Edited By: Dieckmann, Timothy MVS

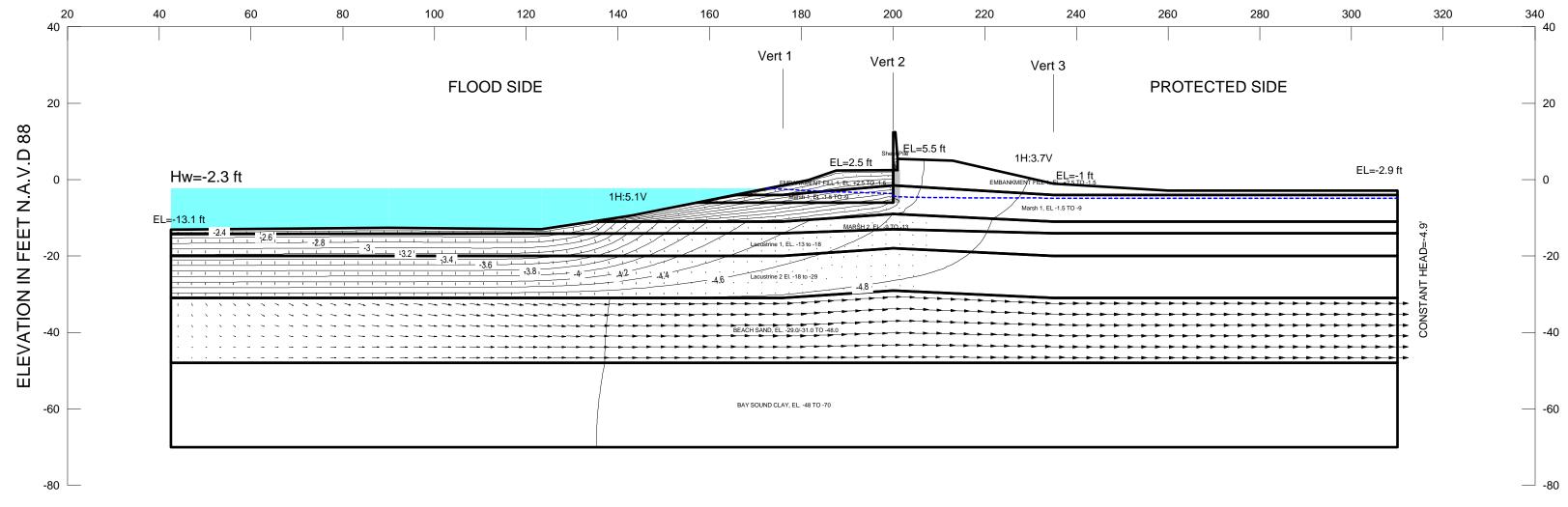




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17th STREET OUTFALL CANAL, REACH 09, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 588+70 - 593+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 1, EL. +2.5 TO -1.5 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH 2, EL. -9 TO -13 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -29.0/-31.0 TO -48.0 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -48 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Marsh 1, EL -1.5 TO -9 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: Lacustrine 1, EL. -13 to -18 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: Lacustrine 2 El. -18 to -29 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

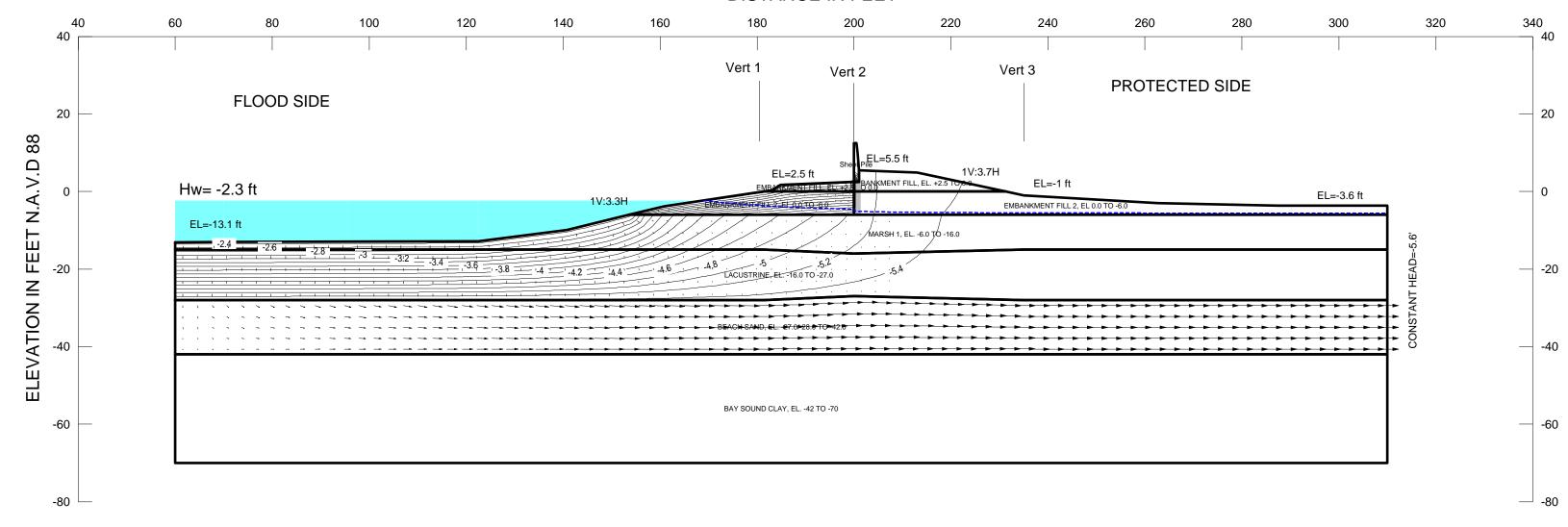
Name: Seepage Analysis (LWL-Q) File Name: 17thReach10.gsz Last Edited By: Dieckmann, Timothy MVS





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17th STREET OUTFALL CANAL, REACH 10, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 593+00 - 596+05 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.5 TO 0.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: MARSH 1, EL. -6.0 TO -16.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: BEACH SAND, EL. -27.0/-28.0 TO -42.0 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1
Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: LACUSTRINE, EL. -16.0 TO -27.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

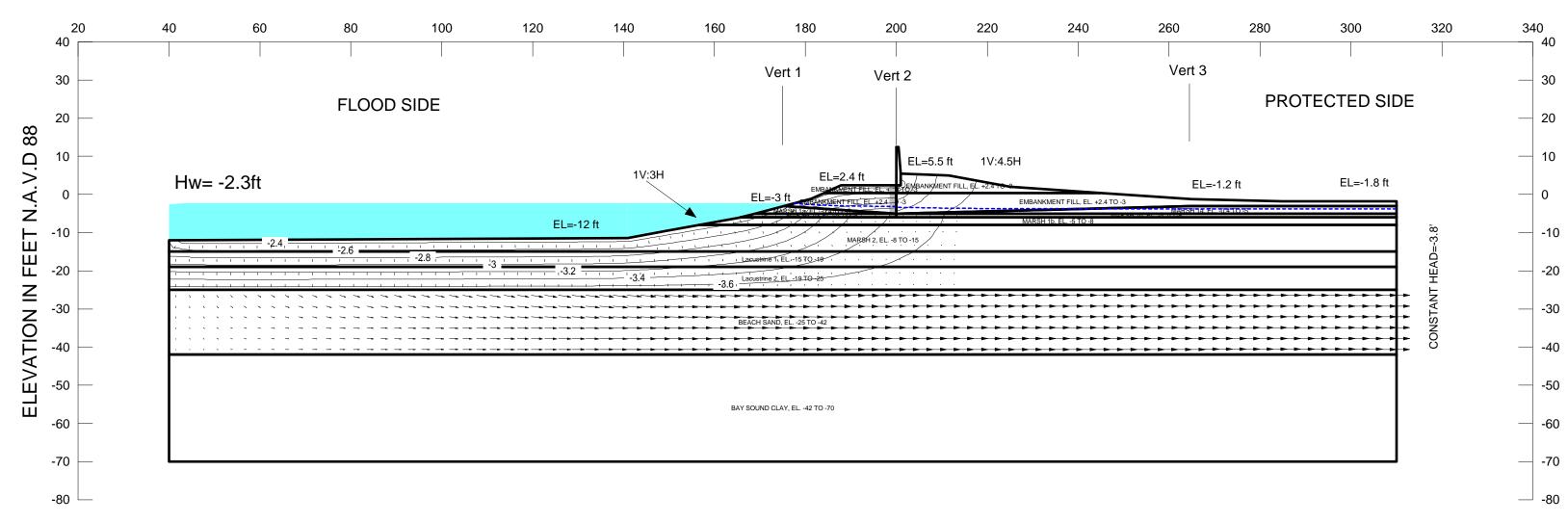
Name: Seepage Analysis (LWL-Q) File Name: 17thReach11.gsz Last Edited By: Dieckmann, Timothy MVS





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17th STREET OUTFALL CANAL, REACH 11, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 596+05 to 609+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.4 TO -3 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH 1b, EL. -5 TO -8 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: BEACH SAND, EL. -25 TO -42 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: MARSH 2, EL. -8 TO -15 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: Lacustrine 1, EL. -15 TO -19 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: Lacustrine 2, EL. -19 TO -25 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: MARSH 1a, EL. -0.4 TO -5 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach12.gsz Last Edited By: Redell, Chris MVS



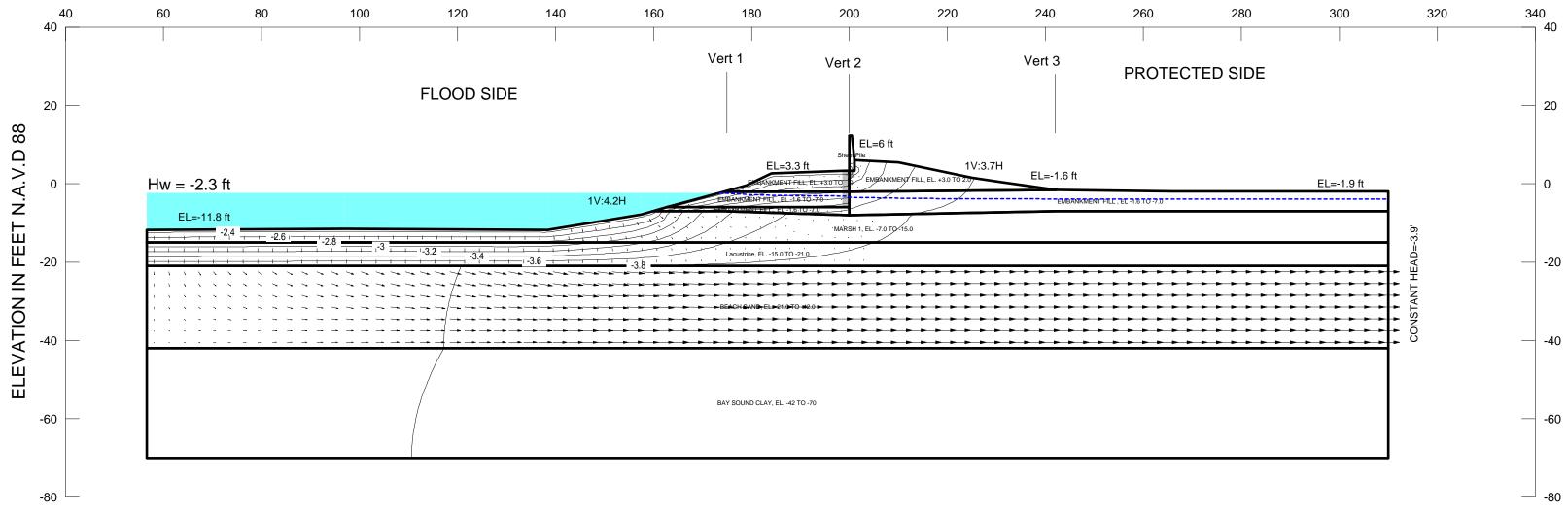
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17th STREET OUTFALL CANAL, REACH 12, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q)

STA. 609+00 to 614+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +3.0 TO 2.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -21.0 TO -42.0 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL, EL -1.6 TO -7.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH 1, EL. -7.0 TO -15.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Lacustrine, EL. -15.0 TO -21.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -42 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

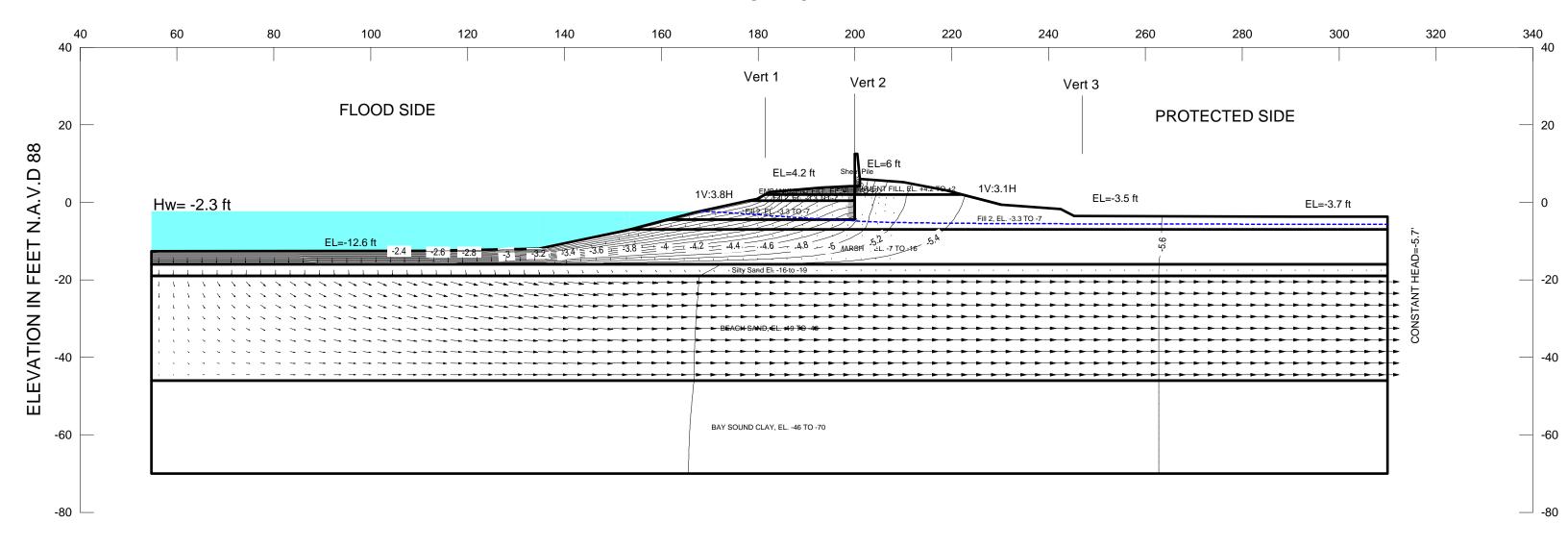
Name: Seepage Analysis (LWL-Q) File Name: 17thReach13.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 13, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 614+00 to 617+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +4.2 TO +2 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -19 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: Fill 2, EL. -3.3 TO -7 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: MARSH 1, EL. -7 TO -16 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Silty Sand El. -16 to -19 Model: Saturated Only K-Sat: 2.3e-005 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach14.gsz Last Edited By: Redell, Chris MVS

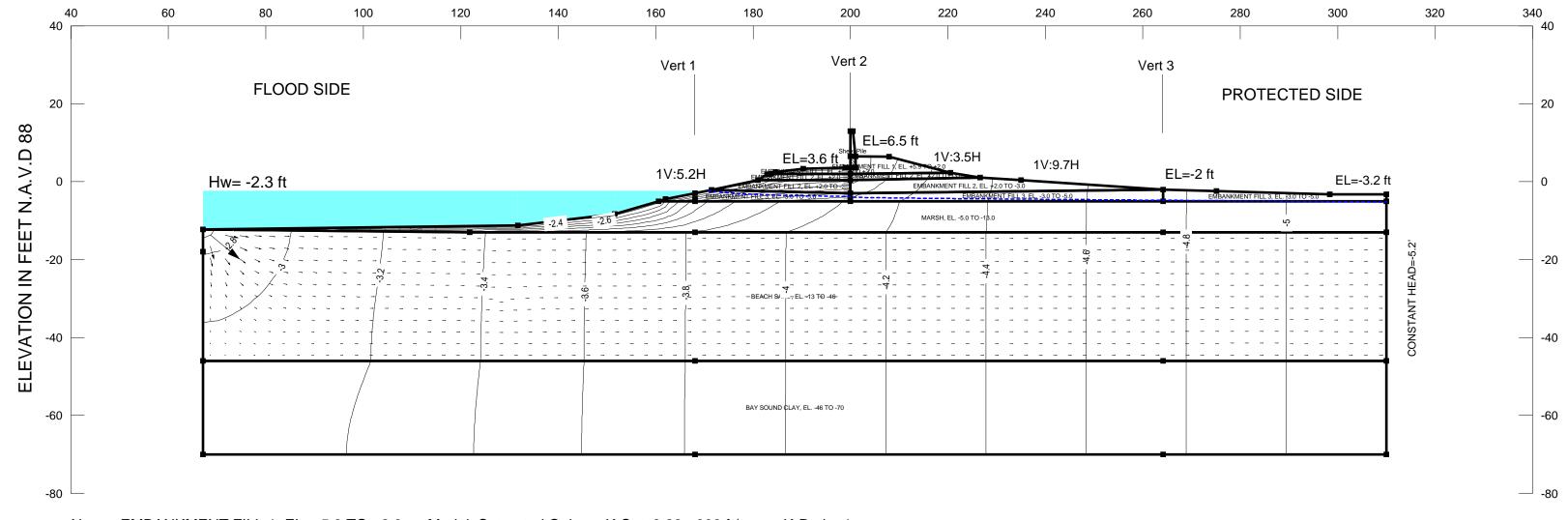




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17th STREET OUTFALL CANAL, REACH 14, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 617+00 to 625+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 1, EL. +5.9 TO +2.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH, EL. -5.0 TO -13.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -13 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 2, EL. +2.0 TO -3.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: EMBANKMENT FILL 3, EL. -3.0 TO -5.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach15A.gsz Last Edited By: Redell, Chris MVS

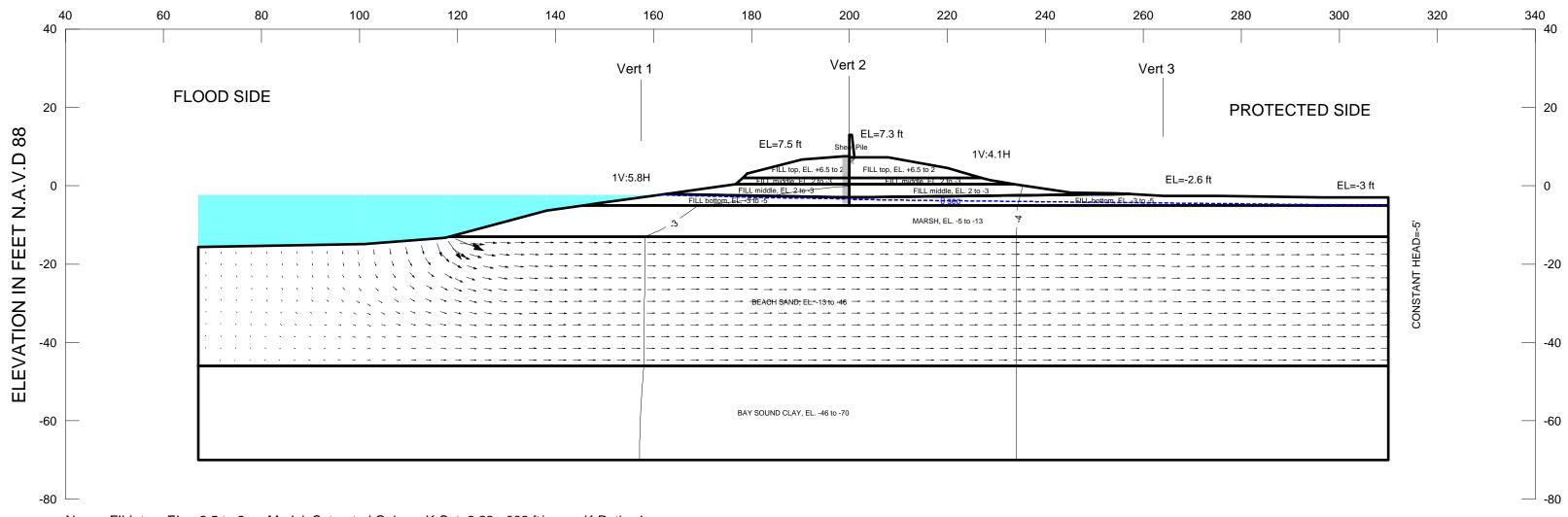




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17th STREET OUTFALL CANAL, REACH 15A, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 626+56 to 635+00 WEST ORLEANS PARISH, LOUISIANA



Name: FILL top, EL. +6.5 to 2 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: MARSH, EL. -5 to -13 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -13 to -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -46 to -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: FILL middle, EL. 2 to -3 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: FILL bottom, EL. -3 to -5 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach15B.gsz Last Edited By: Dieckmann, Timothy MVS

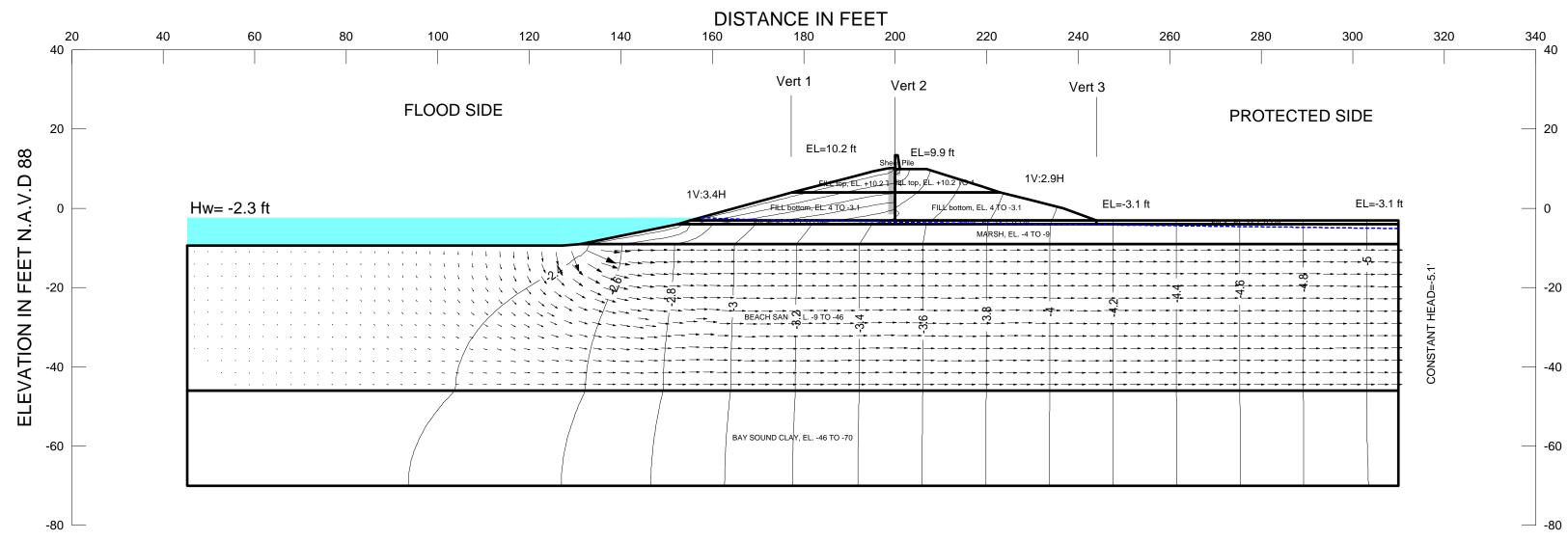




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17th STREET OUTFALL CANAL, REACH 15B, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 635+00 to 639+06 WEST ORLEANS PARISH, LOUISIANA



Name: FILL top, EL. +10.2 TO 4 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: MARSH, EL. -4 TO -9 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -9 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: Fill a , EL. -3.1 TO -4 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: FILL bottom, EL. 4 TO -3.1 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach16.gsz Last Edited By: Redell, Chris MVS

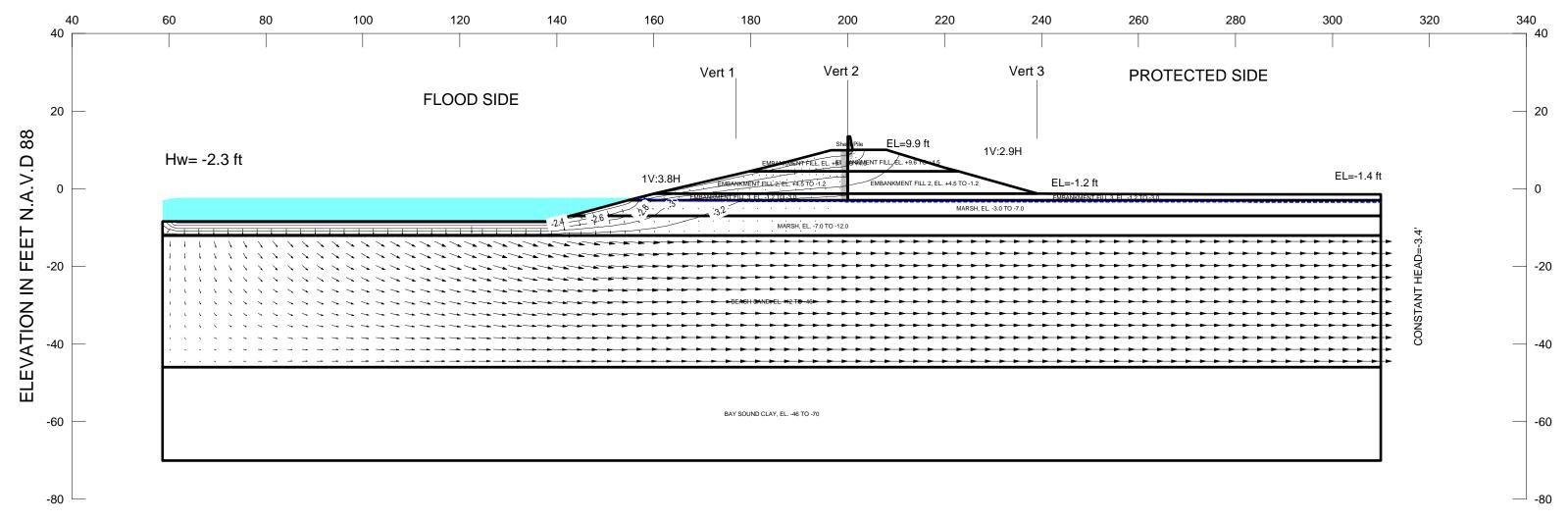




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17th STREET OUTFALL CANAL, REACH 16, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 641+85 - 658+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.6 TO +4.5 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH, EL. -3.0 TO -7.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -12 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 3, EL. -1.2 TO -3.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH, EL. -7.0 TO -12.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 2, EL. +4.5 TO -1.2 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach17.gsz Last Edited By: Redell, Chris MVS

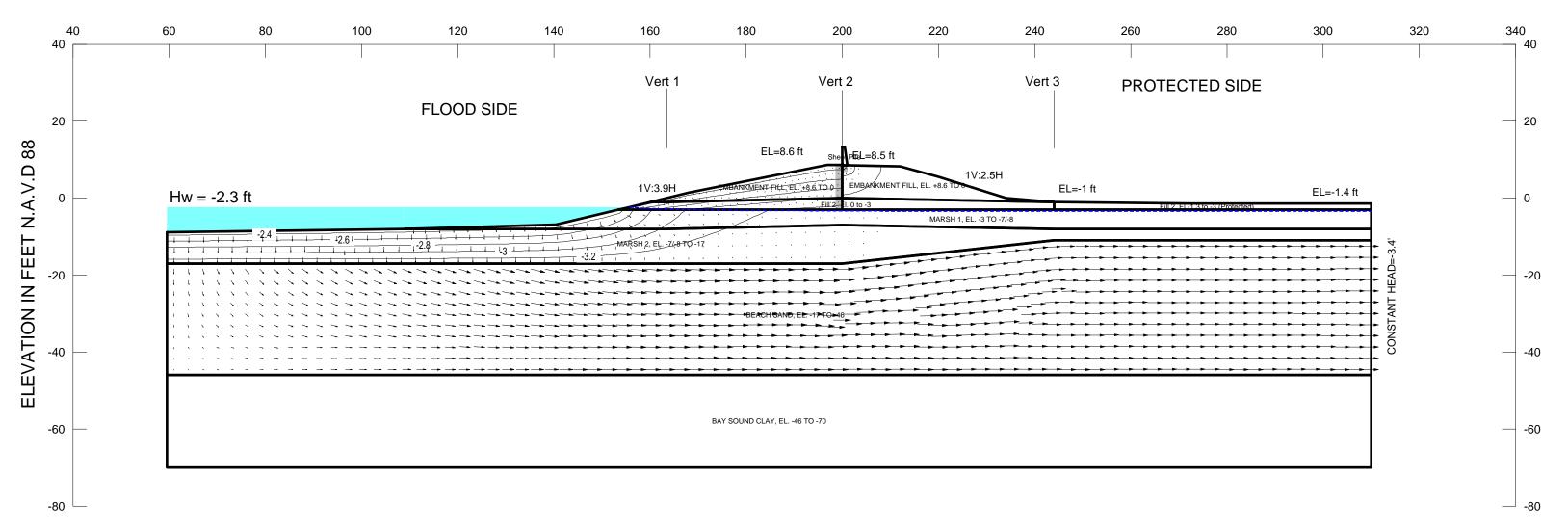




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17th STREET OUTFALL CANAL, REACH 17, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 658+00 - 663+00 WEST ORLEANS PARISH, LOUISIANAS



Name: EMBANKMENT FILL, EL. +8.6 TO 0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: MARSH 1, EL. -3 TO -7/-8 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -17 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: MARSH 2, EL. -7/-8 TO -17 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Fill 2, El. 0 to -3 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Fill 2, El -1.3 to -3 (Protected) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach18.gsz Last Edited By: Redell, Chris MVS

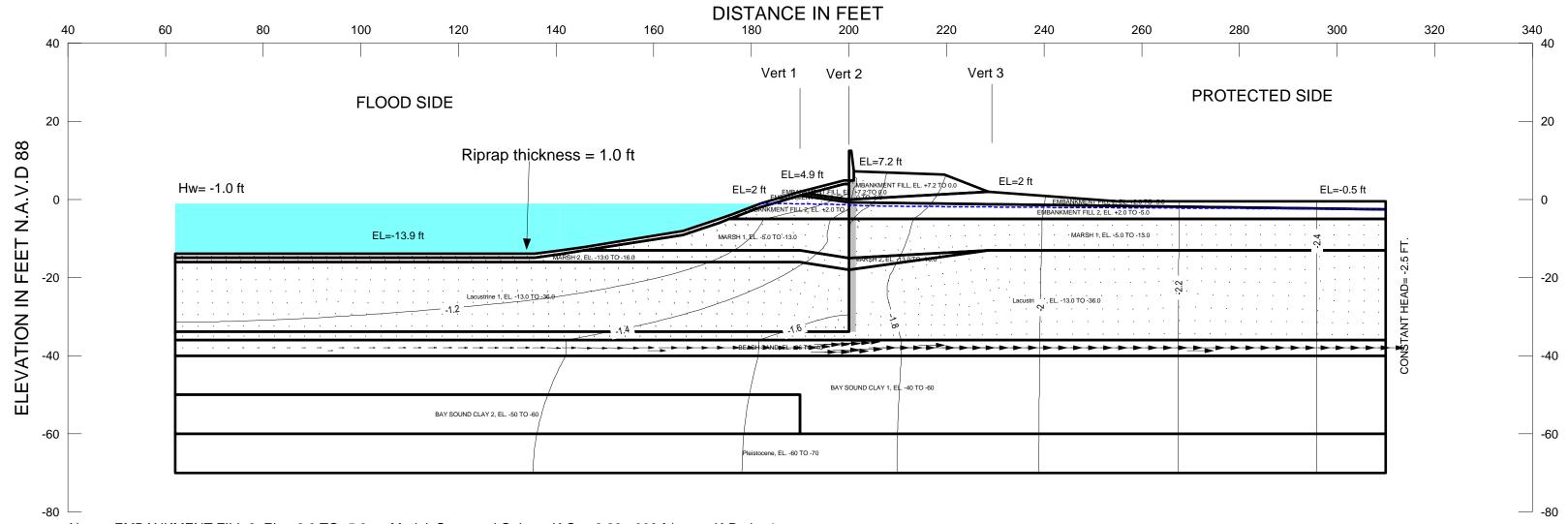




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17th STREET OUTFALL CANAL, REACH 18, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 663+00 to 669+36 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL. +2.0 TO -5.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH 1, EL. -5.0 TO -13.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -36 TO -40 Model: Saturated Only K-Sat: 2.3e-005 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY 1, EL. -40 TO -60 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: Lacustrine 1, EL. -13.0 TO -36.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Pleistocene, EL. -60 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL, EL. +7.2 TO 0.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH 2, EL. -13.0 TO -16.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY 2, EL. -50 TO -60 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Rip Rap Model: Saturated Only K-Sat: 0.00023 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) (-1) File Name: 17thReach19.gsz Last Edited By: Redell, Chris MVS

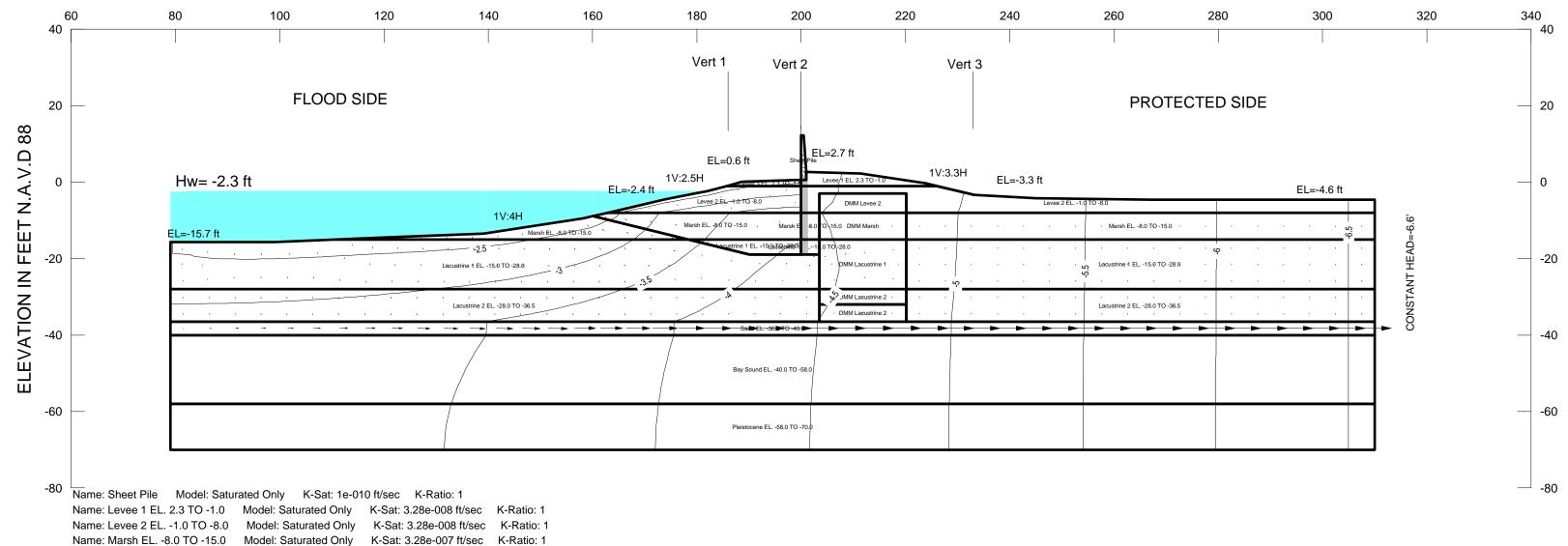




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17th STREET OUTFALL CANAL, REACH 19, FLOOD SIDE STABILITY ANALYSIS. CASE: Seepage Analysis (LWL-Q) (-1) STA. Closure to 552+17 EAST ORLEANS PARISH, LOUISIANA



Name: Lacustrine 1 EL. -15.0 TO -28.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Lacustrine 2 EL. -28.0 TO -36.5 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Sand EL. -36.5 TO -40.0 Model: Saturated Only K-Sat: 2.3e-005 ft/sec K-Ratio: 1 Name: Bay Sound EL. -40.0 TO -58.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: Pleistocene EL. -58.0 TO -70.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DMM Levee 2 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DMM Marsh Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DMM Lacustrine 1 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DMM Lacustrine 2 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

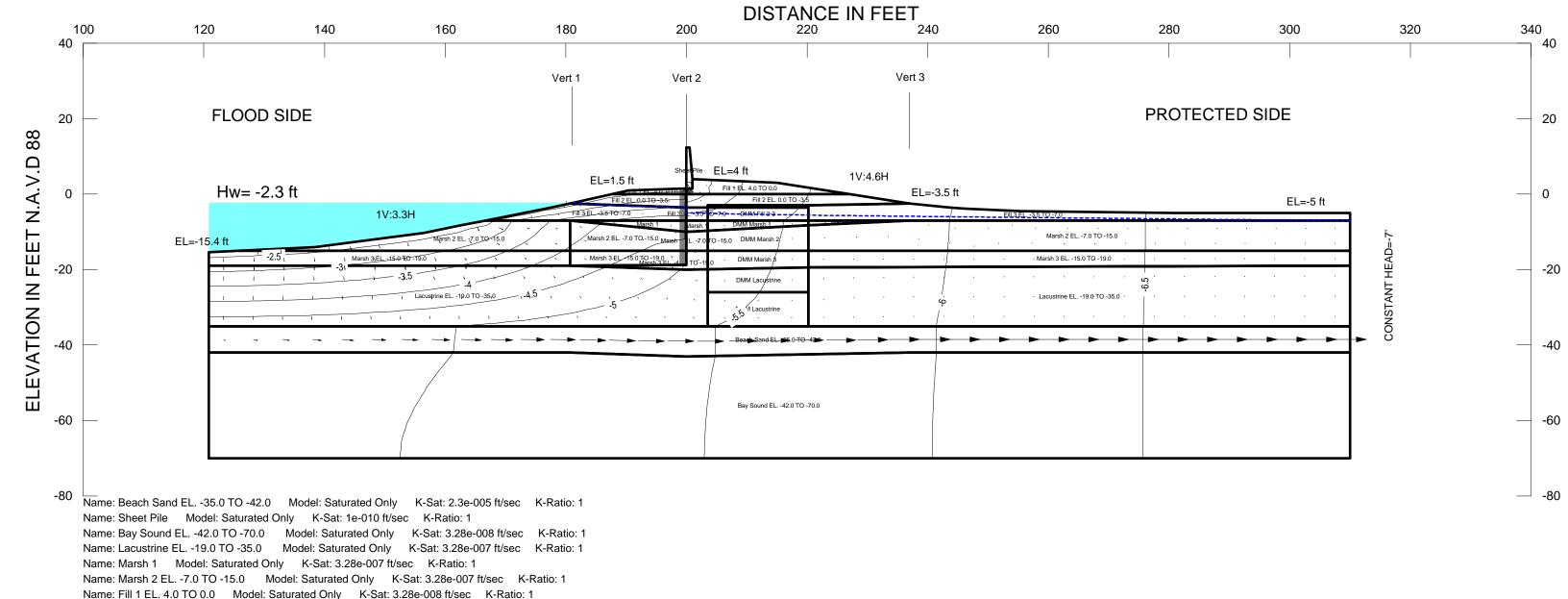
WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach20.gsz Last Edited By: Redell, Chris MVS





17th STREET OUTFALL CANAL, REACH 20, FLOOD SIDE STABILITY ANALYSIS CASE: Seepage Analysis (LWL-Q) STA. 553+58 to 560+10 EAST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

Name: Fill 3 EL. -3.5 TO -7.0

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

Name: Fill 2 EL. 0.0 TO -3.5 Model: Saturated Only

Name: DMM Marsh 1 Model: Saturated Only

Name: DMM Marsh 2 Model: Saturated Only

Name: DMM Marsh 3 Model: Saturated Only

Name: DMM Lacustrine Model: Saturated Only

K-Sat: 3,28e-008 ft/sec K-Ratio: 1

Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

K-Sat: 3.28e-007 ft/sec

K-Sat: 3.28e-007 ft/sec

K-Sat: 3.28e-007 ft/sec K-Ratio: 1 K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Marsh 3 EL. -15.0 TO -19.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Name: DMM Fill 2-3 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

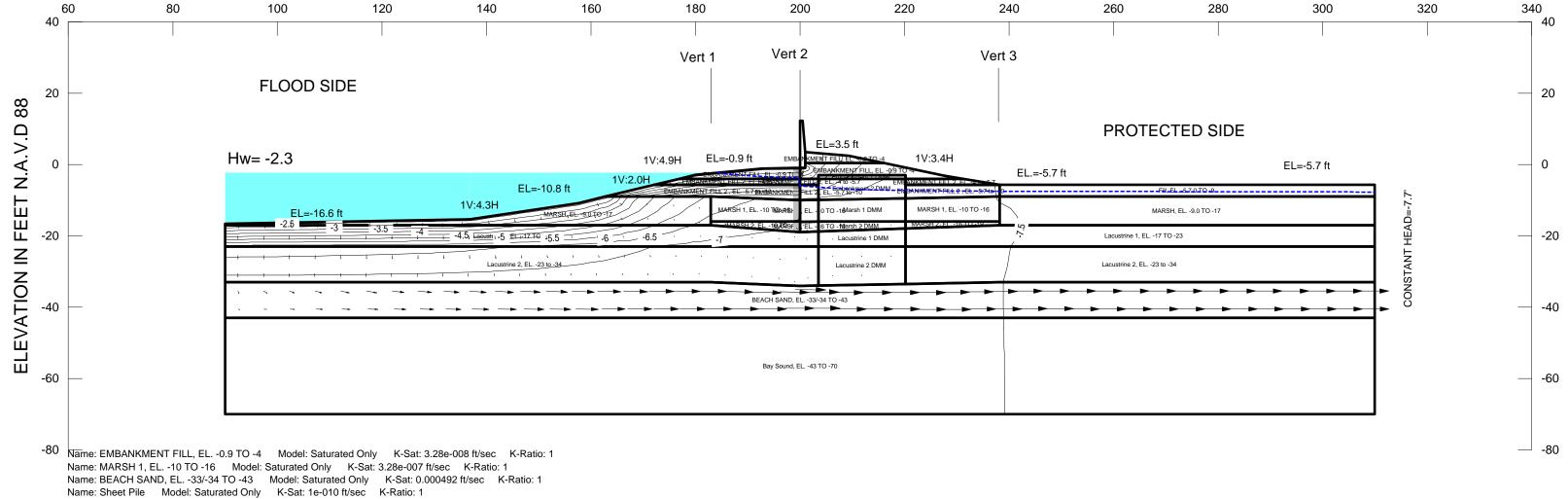
Name: Seepage Analysis (LWL-Q) File Name: 17thReach21.gsz Last Edited By: Redell, Chris MVS



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17th STREET OUTFALL CANAL, REACH 21, FLOOD SIDE STABILITY ANALYSIS CASE: Seepage Analysis (LWL-Q) STA. 566+00 to 570+73 EAST ORLEANS PARISH, LOUISIANA



Name: BEACH SAND, EL. -33/-34 TO -43 Model: Saturated Only K-Sat: 0.000492 ft/sec K-Ratio: 1
Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1
Name: MARSH 2, EL. -16 TO -19 Model: Saturated Only K-Sat: 2e-006 ft/sec K-Ratio: 1
Name: MARSH, EL. -9.0 TO -17 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: Lacustrine 1, EL. -17 TO -23 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: Lacustrine 2, EL. -23 to -34 Model: Saturated Only K-Sat: 2e-006 ft/sec K-Ratio: 1
Name: Fill, EL. -5.7.0 TO -9 Model: Saturated Only K-Sat: 2e-006 ft/sec K-Ratio: 1
Name: Bay Sound, EL. -43 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: EMBANKMENT FILL 2, EL. -4 to -5.7 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: Embankment 1 DMM Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: Marsh 1 DMM Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: Lacustrine 1 DMM Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: Lacustrine 2 DMM Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: Embankment 2 DMM Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: Embankment 2 DMM Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: Embankment 2 DMM Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: Embankment 2 DMM Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: Embankment 2 DMM Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach22.gsz Last Edited By: Redell, Chris MVS

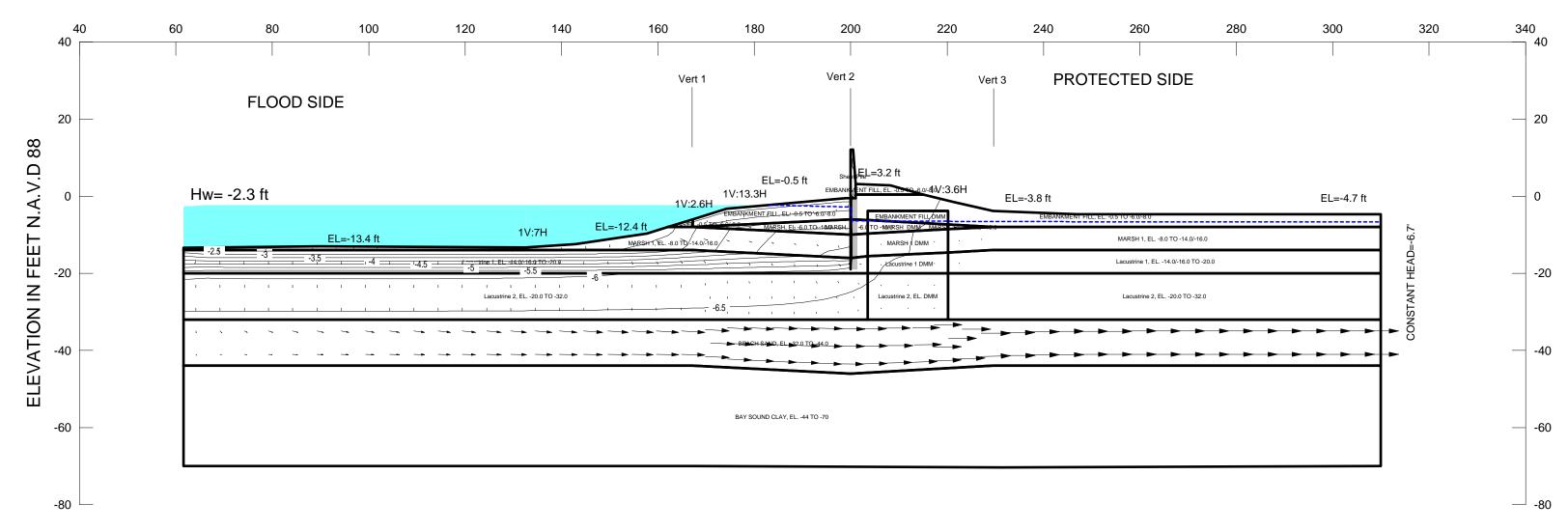




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17th STREET OUTFALL CANAL, REACH 22, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 570+73 - 581+50 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. -0.5 TO -6.0/-8.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -32.0 TO -44.0 Model: Saturated Only K-Sat: 0.000492 ft/sec K-Ratio: 1 Name: MARSH, EL -6.0 TO -10.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 0.1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: Lacustrine 1, EL. -14.0/-16.0 TO -20.0 Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 0.1 Name: MARSH 1, EL. -8.0 TO -14.0/-16.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Lacustrine 2, EL. -20.0 TO -32.0 Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -44 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY, EL. -44 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: Name: Lacustrine 1 DMM Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 0.1

Name: MARSH 1 DMM Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: MARSH DMM Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 0.1

Name: EMBANKMENT FILL DMM Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Lacustrine 2, EL. DMM Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1

GENERAL NOTES

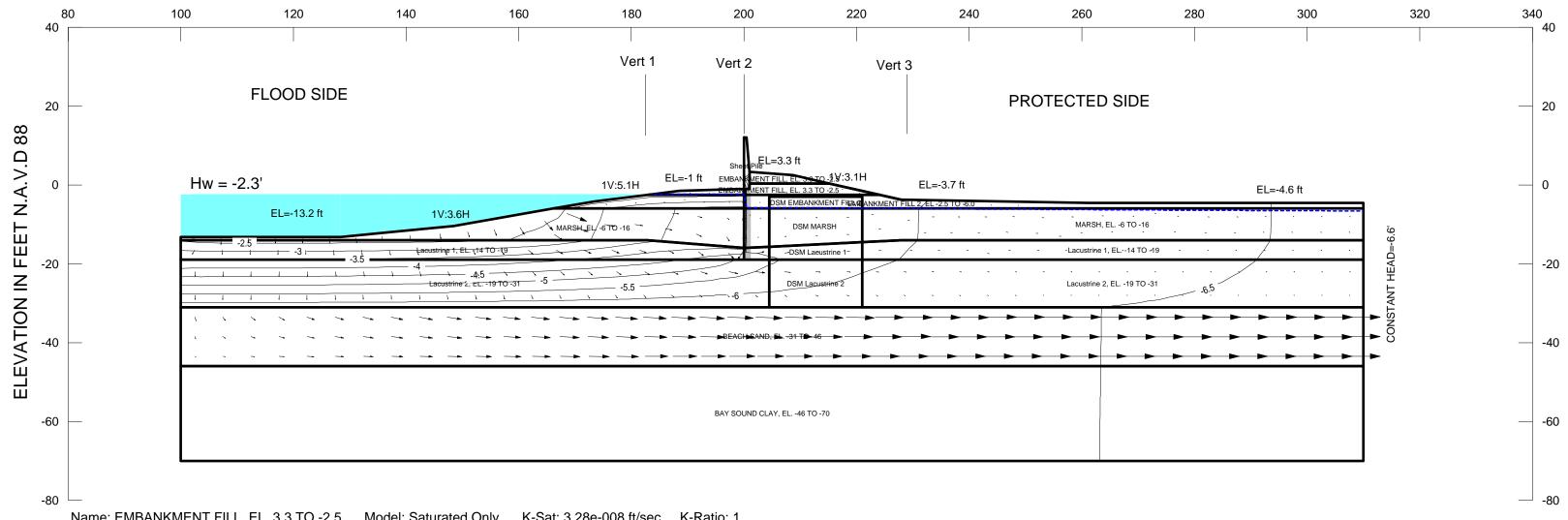
CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach23.gsz Last Edited By: Dieckmann, Timothy MVS



17th STREET OUTFALL CANAL, REACH 23, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 581+50 to 588+67 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. 3.3 TO -2.5 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH, EL. -6 TO -16 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -31 TO -46 Model: Saturated Only K-Sat: 2.3e-005 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 2, EL -2.5 TO -6.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 0.1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: Lacustrine 1, EL. -14 TO -19 Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 0.1 Name: Lacustrine 2, EL. -19 TO -31 Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 0.1 Name: DSM EMBANKMENT FILL 2 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 0.1

Name: DSM MARSH Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1 Name: DSM Lacustrine 1 Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 0.1 Name: DSM Lacustrine 2 Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 0.1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach24.gsz Last Edited By: Dieckmann, Timothy MVS

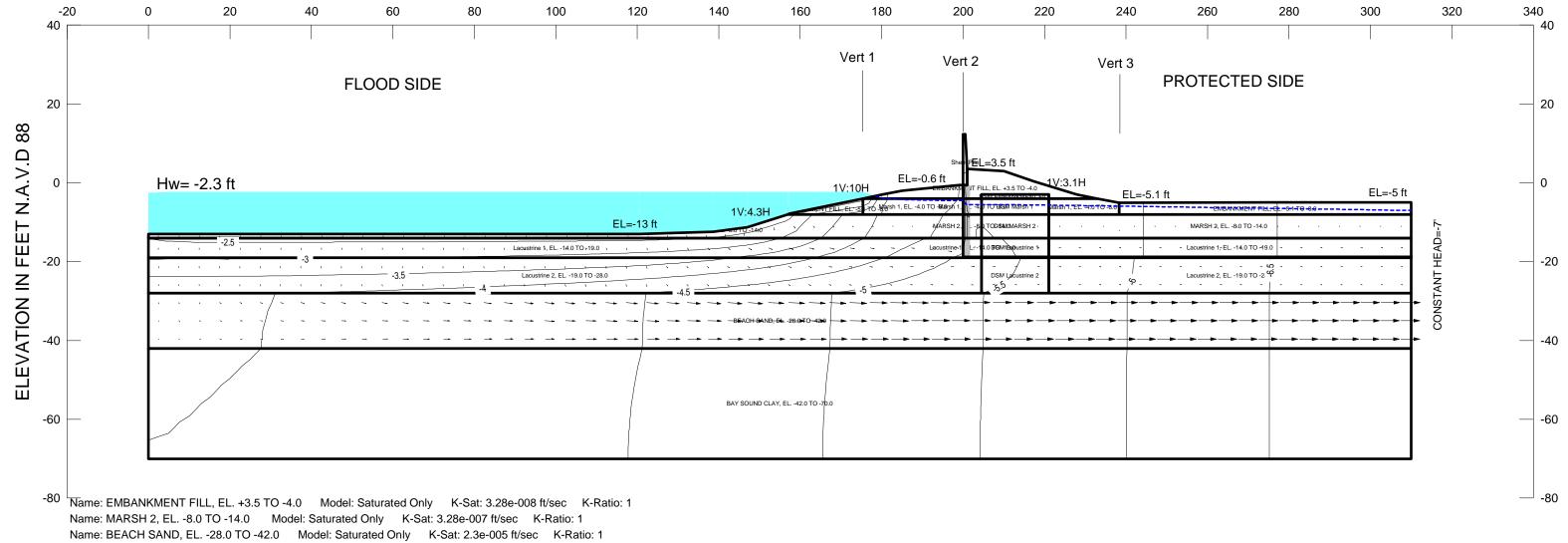




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17th STREET OUTFALL CANAL, REACH 24, FLOOD SIDE STABILITY ANALYSIS. CASE: Seepage Analysis (LWL-Q) STA. 588+67 to 598+24 EAST ORLEANS PARISH, LOUISIANA



Name: BAY SOUND CLAY, EL. -42.0 TO -70.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1 Name: Lacustrine 1, EL. -14.0 TO -19.0 Model: Saturated Only K-Sat: 2e-006 ft/sec K-Ratio: 0.1 Name: Marsh 1, EL. -4.0 TO -8.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: EMBANKMENT FILL, EL. -5.1 TO -8.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: Lacustrine 2, EL. -19.0 TO -28.0 Model: Saturated Only K-Sat: 2e-006 ft/sec K-Ratio: 0.1 Name: DSM EMBANKMENT FILL Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DSM Marsh 1 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DSM MARSH 2 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DSM Lacustrine 1 Model: Saturated Only K-Sat: 2e-006 ft/sec K-Ratio: 0.1 Name: DSM Lacustrine 2 Model: Saturated Only K-Sat: 2e-006 ft/sec K-Ratio: 0.1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach25.gsz Last Edited By: Dieckmann, Timothy MVS

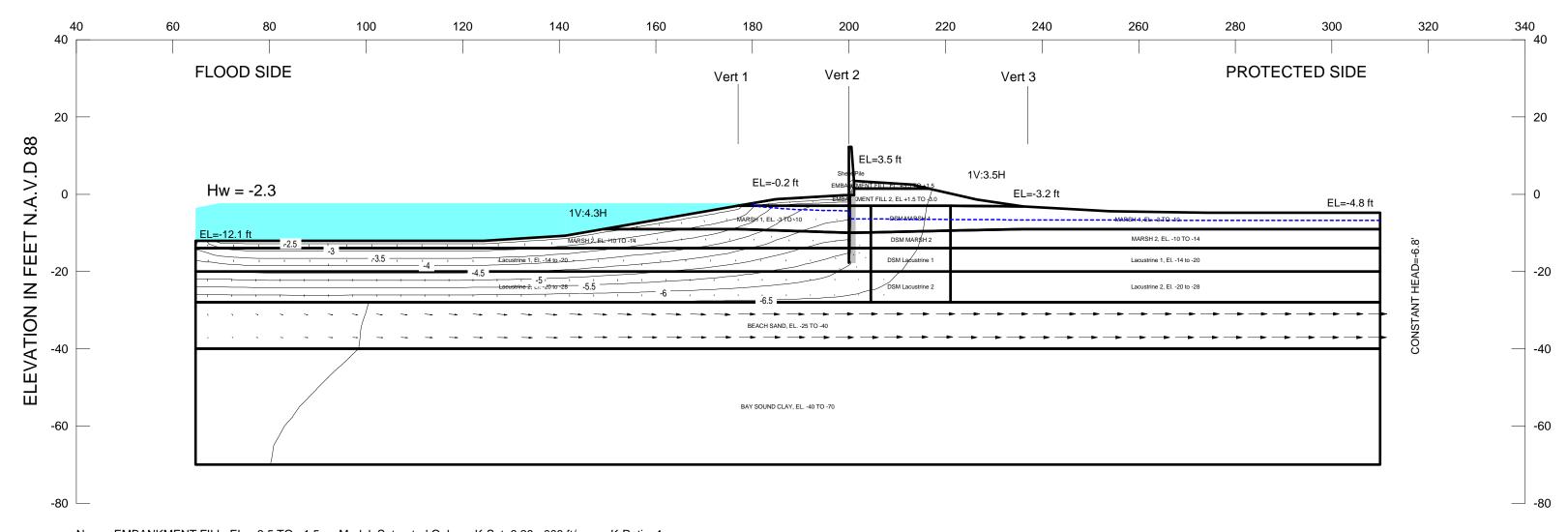




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17th STREET OUTFALL CANAL, REACH 25, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 598+24-608+00 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +3.5 TO +1.5 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: MARSH 1, EL. -3 TO -10 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -25 TO -40 Model: Saturated Only K-Sat: 0.000492 ft/sec K-Ratio: 1
Name: BAY SOUND CLAY, EL. -40 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 2, EL +1.5 TO -3.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: MARSH 2, EL. -10 TO -14 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: Lacustrine 1, El. -14 to -20 Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1
Name: Lacustrine 2, El. -20 to -28 Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1

Name: DSM MARSH 1 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: DSM MARSH 2 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: DSM Lacustrine 1 Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1
Name: DSM Lacustrine 2 Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-Q) File Name: 17thReach26.gsz Last Edited By: Dieckmann, Timothy MVS

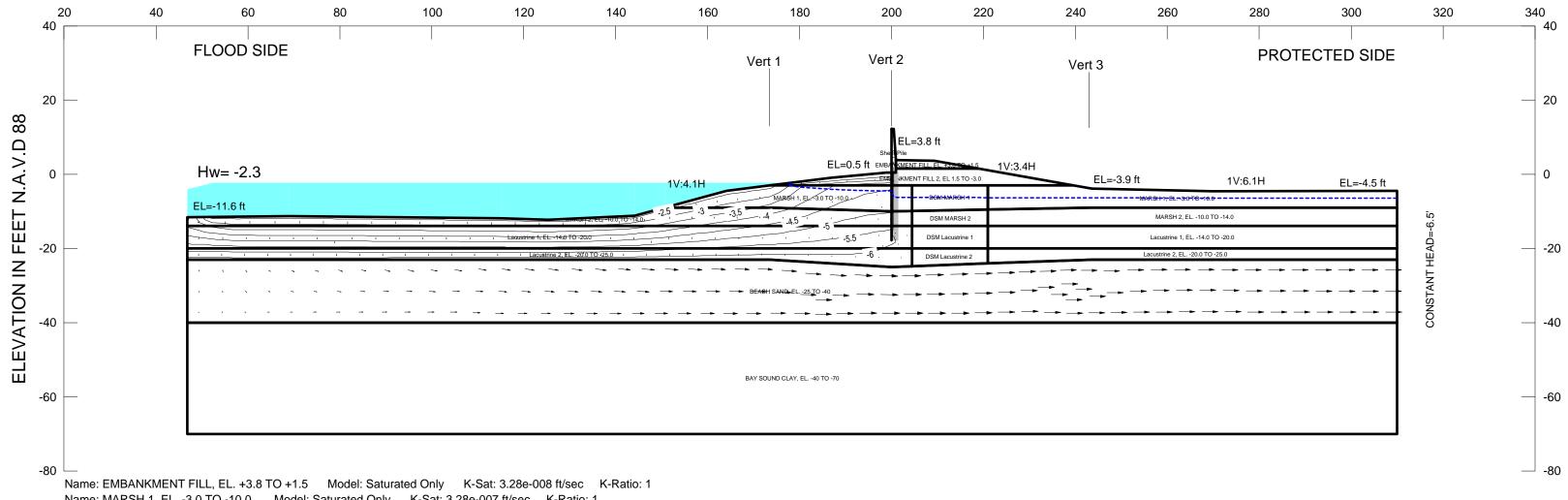




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17th STREET OUTFALL CANAL, REACH 26, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-Q) STA. 608+00- 612+92 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -3.0 TO -10.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -25 TO -40 Model: Saturated Only K-Sat: 0.000492 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -40 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: EMBANKMENT FILL 2, EL 1.5 TO -3.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1 Name: MARSH 2, EL. -10.0 TO -14.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Lacustrine 2, EL. -20.0 TO -25.0 Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1 Name: Lacustrine 1, EL. -14.0 TO -20.0 Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1 Name: DSM MARSH 1 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DSM MARSH 2 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DSM Lacustrine 1 Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1

Name: DSM Lacustrine 2 Model: Saturated Only K-Sat: 3,27e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED. SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis LWL-Q File Name: 17thReach27.gsz Last Edited By: Dieckmann, Timothy MVS

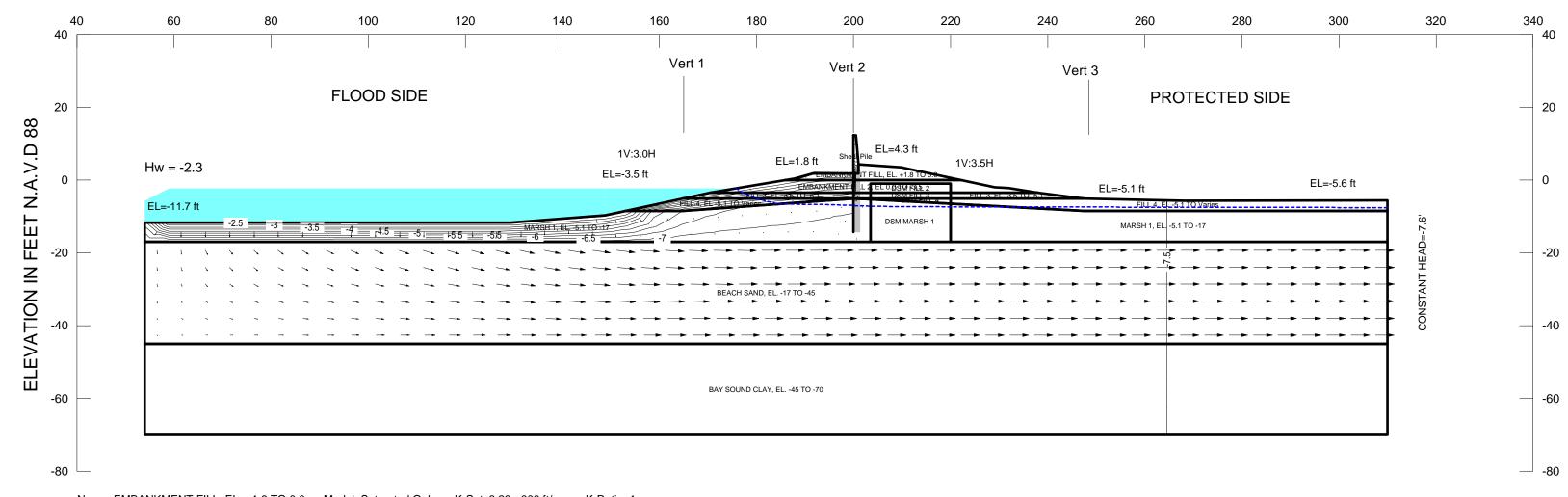


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17th STREET OUTFALL CANAL, REACH 27, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis LWL-Q STA. 614+30-617+81 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +1.8 TO 0.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: MARSH 1, EL. -5.1 TO -17 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -17 TO -45 Model: Saturated Only K-Sat: 0.000492 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: EMBANKMENT FILL 2, EL 0.0 TO -3.5 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1 Name: FILL 3, EL -3.5 TO -5.1 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: FILL 4, EL -5.1 TO Varies Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DSM FILL 2 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DSM FILL 3 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DSM FILL 4 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DSM MARSH 1 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis LWL-Q File Name: 17thReach28.gsz Last Edited By: Dieckmann, Timothy MVS

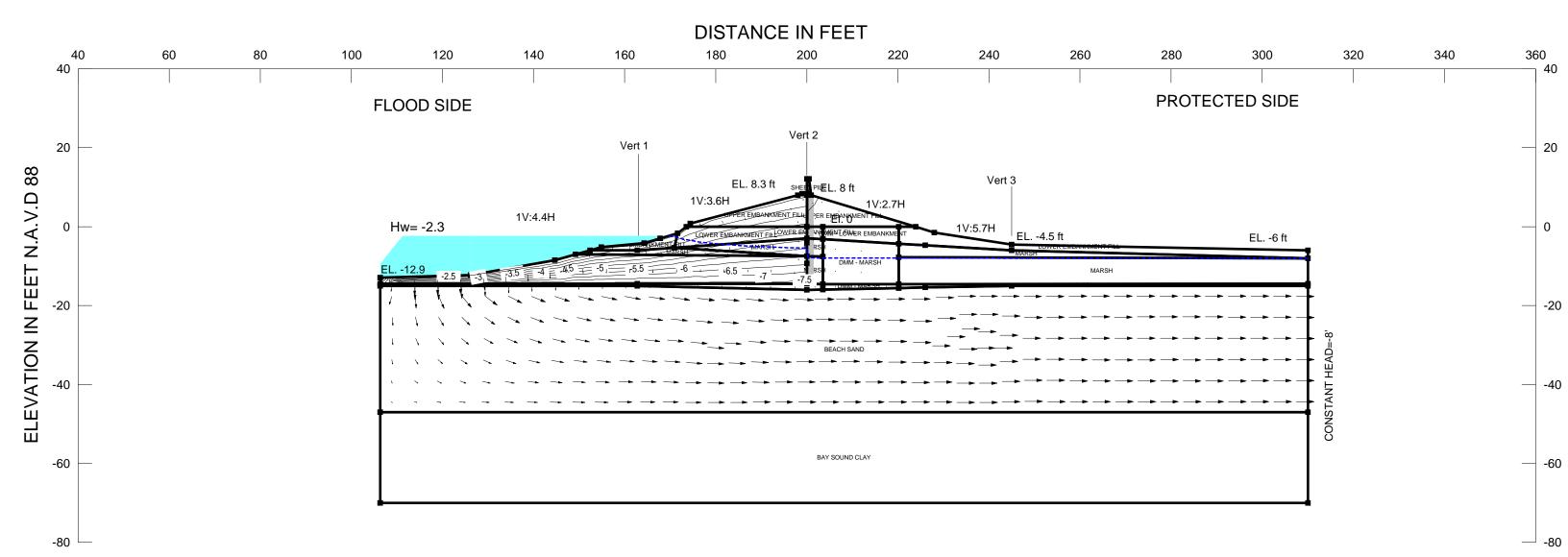




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17th STREET OUTFALL CANAL, REACH 28, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis LWL-Q STA, 615+03-620+30 EAST ORLEANS PARISH, LOUISIANA



Name: UPPER EMBANKMENT FILL Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: BEACH SAND Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: LOWER EMBANKMENT FILL Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: SHEET PILE Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1 Name: DMM - MARSH Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: DMM - LOWER EMBANKMENT Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis LWL-Q (-2.3) File Name: 17thReach29.gsz

Last Edited By: Dieckmann, Timothy MVS

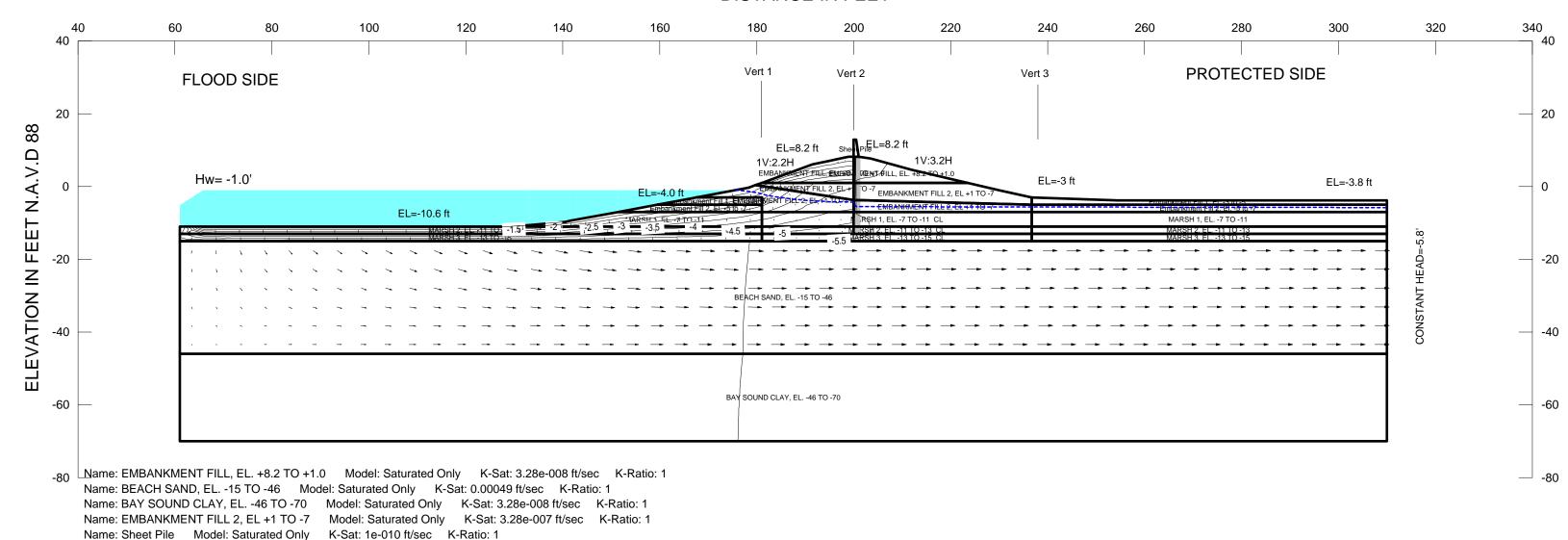




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17th STREET OUTFALL CANAL, REACH 29, FLOOD SIDE STABILITY ANALYSIS CASE: Seepage Analysis LWL-Q (-2.3) STA. 620+30 - 624+88 EAST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

Name: Embankment Fill 1, El. -3 to -5 Name: Embankment Fill 2, El. -5 to -7

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: MARSH 1, EL. -7 TO -11 CL Model: Saturated Only

Name: MARSH 2, EL. -11 TO -13 CL Model: Saturated Only

Name: MARSH 3, EL. -13 TO -15 CL Model: Saturated Only

Name: MARSH 1, EL. -7 TO -11 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: MARSH 2, EL. -11 TO -13 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: MARSH 3, EL. -13 TO -15 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Seepage Analysis LWL-Q (-1.0) File Name: 17thReach30.gsz Last Edited By: Dieckmann, Timothy MVS

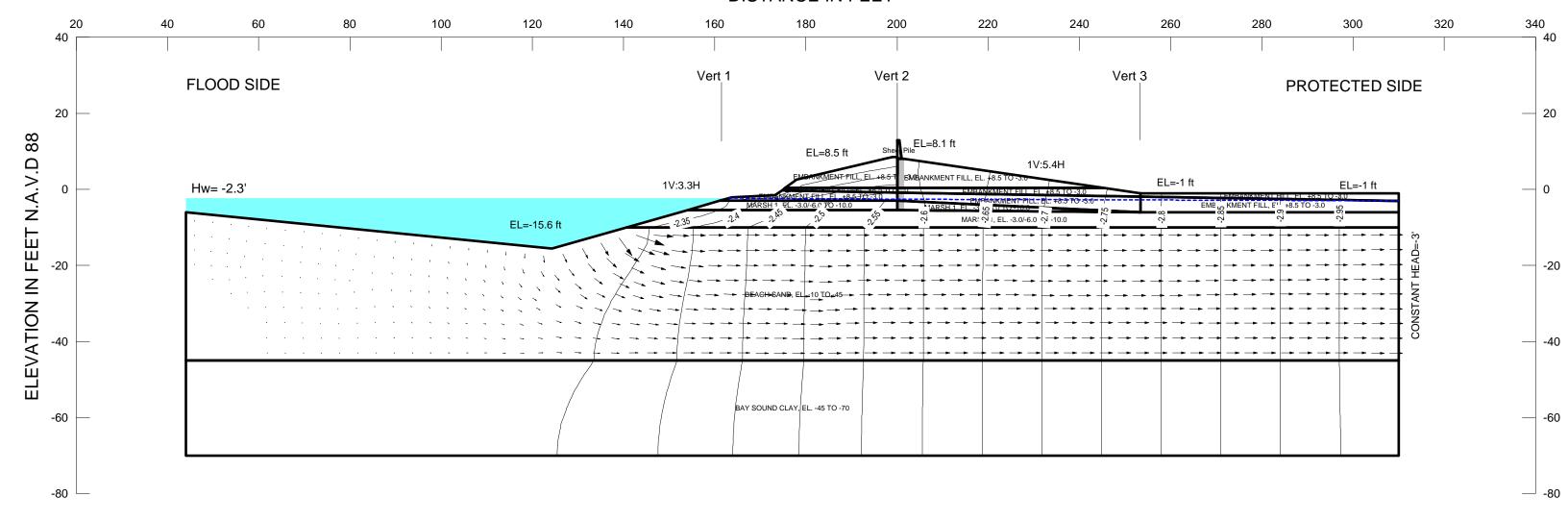




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17th STREET OUTFALL CANAL, REACH 30, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis LWL-Q (-1.0) STA, 626+73 to 634+09 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.5 TO -3.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: MARSH 1, EL. -3.0/-6.0 TO -10.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -10 TO -45 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis LWL-Q (-2.3) File Name: 17thReach31.gsz Last Edited By: Dieckmann, Timothy MVS

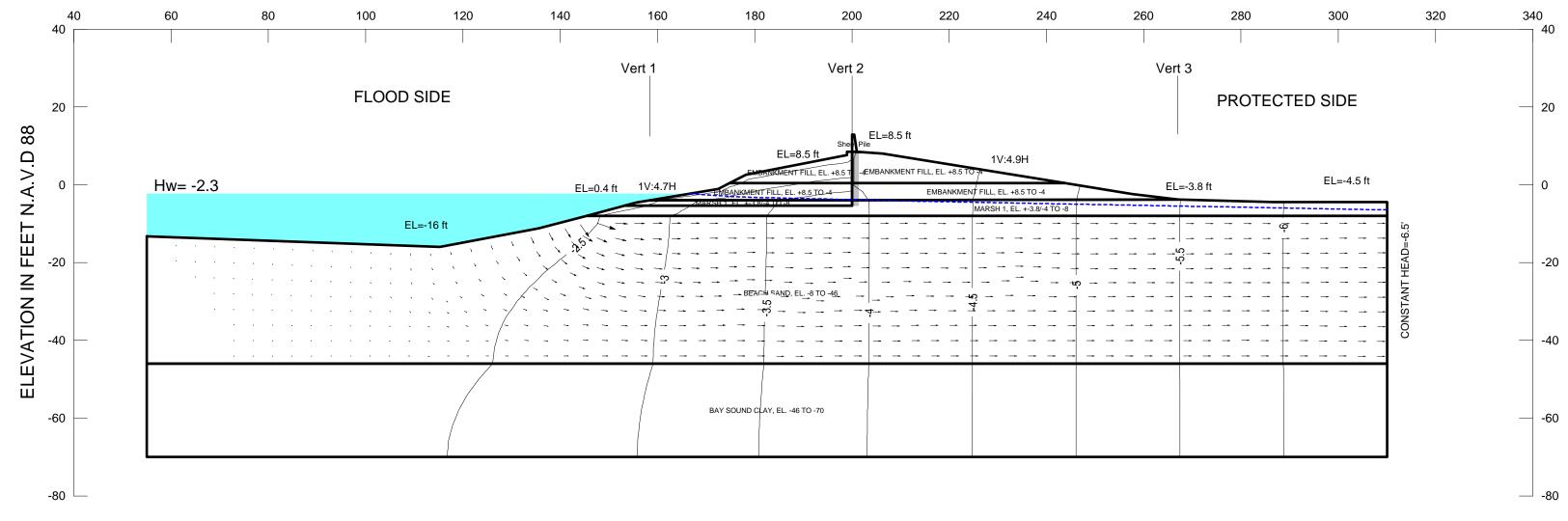




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17th STREET OUTFALL CANAL, REACH 31, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis LWL-Q (-2.3) STA. 634+09 to 637+00 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.5 TO -4 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: MARSH 1, EL. +-3.8/-4 TO -8 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: BEACH SAND, EL. -8 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1
Name: BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis LWL-Q File Name: 17thReach32.gsz Last Edited By: Dieckmann, Timothy MVS

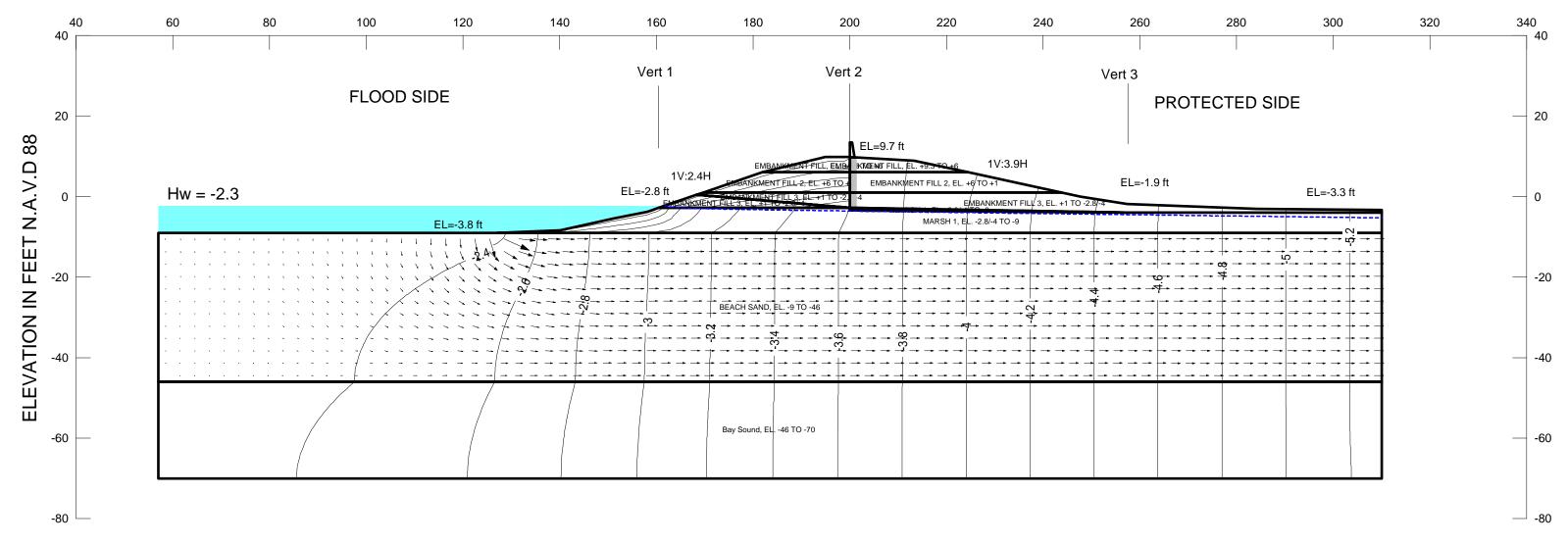




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17th STREET OUTFALL CANAL, REACH 32, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis LWL-Q STA. 637+00 to 638+44 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.3 TO +6 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH 1, EL. -2.8/-4 TO -9 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: BEACH SAND, EL. -9 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: Bay Sound, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 2, EL. +6 TO +1 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 3, EL. +1 TO -2.8/-4 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

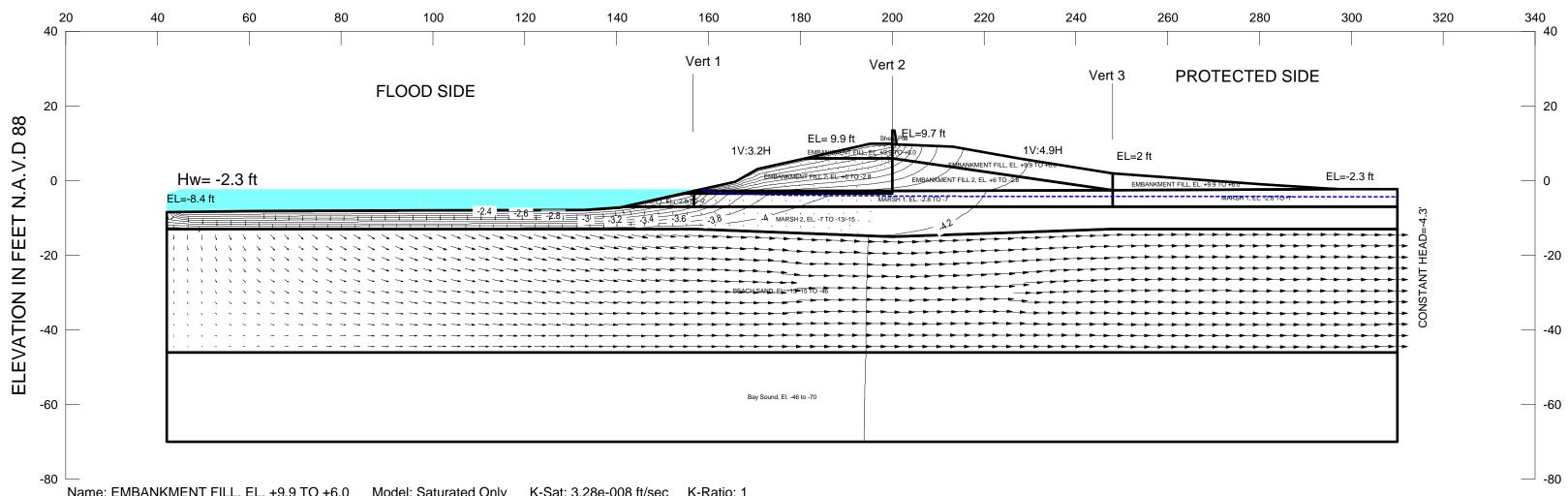
Name: Seepage Analysis LWL-Q File Name: 17thReach33.gsz Last Edited By: Dieckmann, Timothy MVS





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17th STREET OUTFALL CANAL, REACH 33, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis LWL-Q STA. 643+40 to 658+00 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +9.9 TO +6.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH 1, EL. -2.8 TO -7 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -13/-15 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: MARSH 2, EL. -7 TO -13/-15 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 2, EL. +6 TO -2.8 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Bay Sound, El. -46 to -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis LWL-Q (-2.3)

File Name: 17thReach34.gsz Last Edited By: Dieckmann, Timothy MVS

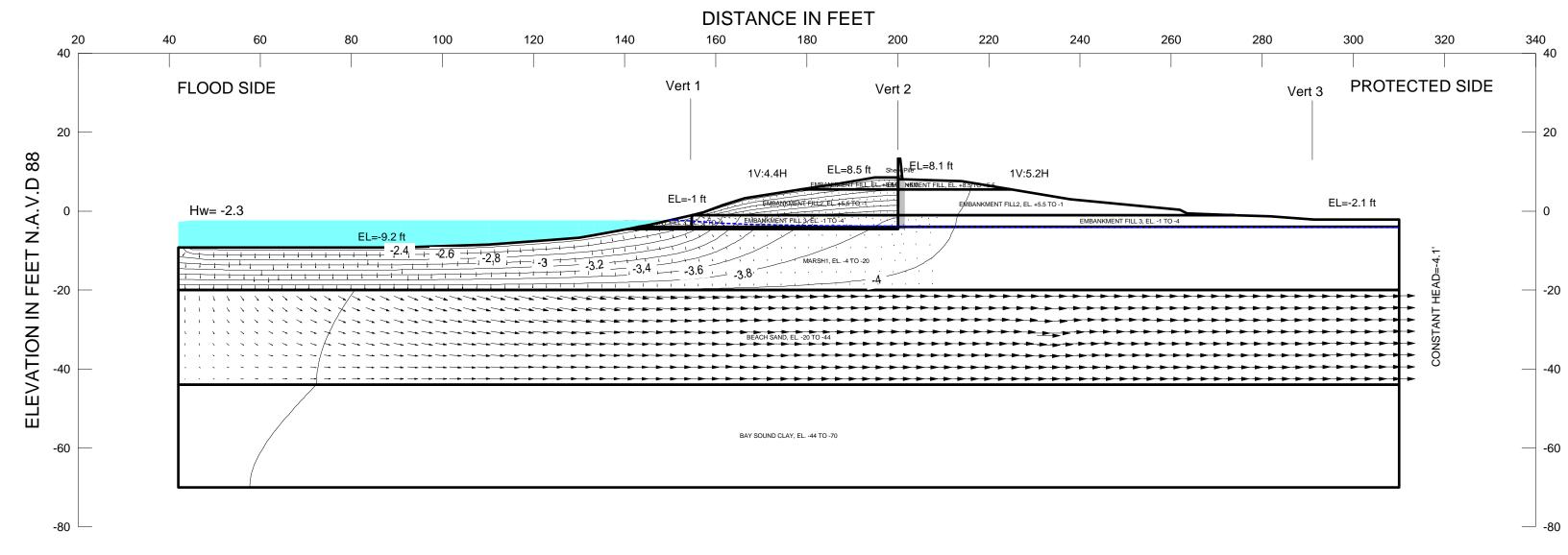




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17th STREET OUTFALL CANAL, REACH 34, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis LWL-Q (-2.3) STA. 658+00-662+87 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +8.5 TO +5.5 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: EMBANKMENT FILL 3, EL. -1 TO -4 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: BEACH SAND, EL. -20 TO -44 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1
Name: BAY SOUND CLAY, EL. -44 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: MARSH1, EL. -4 TO -20 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL2, EL. +5.5 TO -1 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis LWL-Q File Name: 17thReach35.gsz Last Edited By: Dieckmann, Timothy MVS



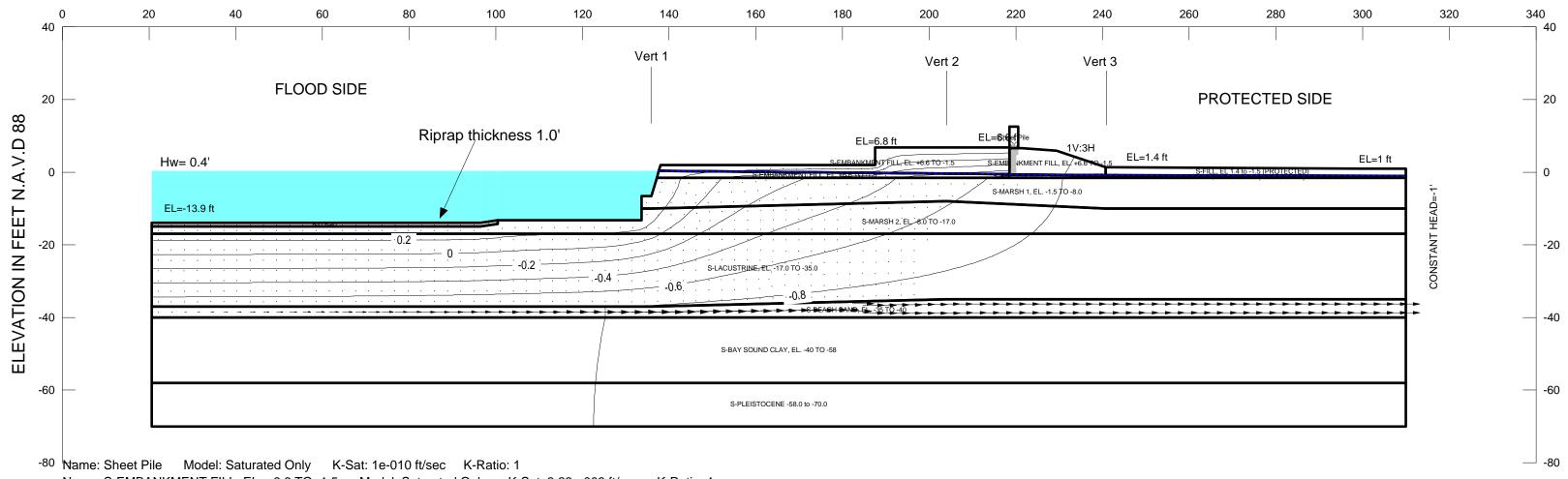


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17th STREET OUTFALL CANAL, REACH 35, FLOOD SIDE STABILITY ANALYSIS, CASE: Seepage Analysis LWL-Q STA. 662+87 to 670+63 EAST ORLEANS PARISH, LOUISIANA

Appendix D – LWL S-case Stability Analyses			



Name: S-EMBANKMENT FILL, EL. +6.6 TO -1.5 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: S-FILL, EL 1.4 to -1.5 (PROTECTED) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: S-MARSH 1, EL. -1.5 TO -8.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: S-MARSH 2, EL. -8.0 TO -17.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: S-LACUSTRINE, EL. -17.0 TO -35.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: S-BAY SOUND CLAY, EL. -40 TO -58 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: S-PLEISTOCENE -58.0 to -70.0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: S-BEACH SAND, EL. -35 TO -40 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: Rip Rap Model: Saturated Only K-Sat: 0.00023 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-S) File Name: 17thReach01.gsz Last Edited By: Dieckmann, Timothy MVS



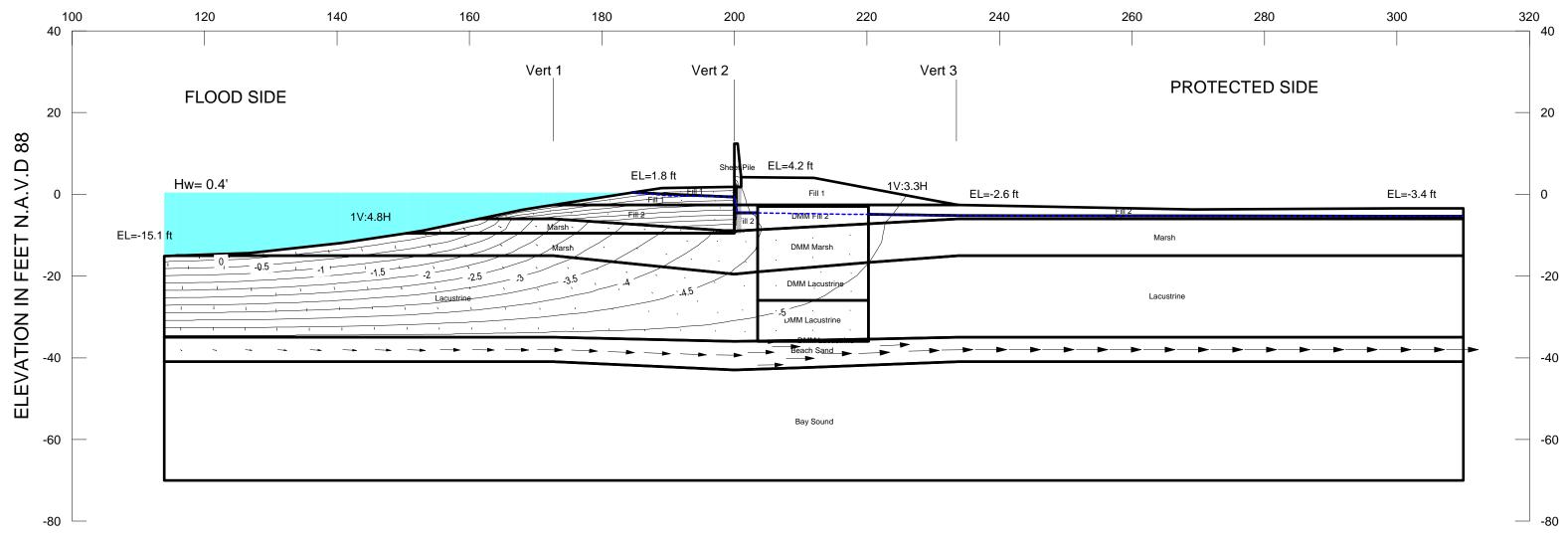


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17th STREET OUTFALL CANAL, REACH 01, STABILITY ANALYSIS. CASE: Seepage Analysis (LWL-S)

Closure to STA. 552+21.5 WEST ORLEANS PARISH, LOUISIANA



Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1 Model: Saturated Only K-Sat: 3.28e-008 ft/sec Name: Fill 1 K-Ratio: 1 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: Fill 2 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Marsh Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Lacustrine Name: Beach Sand Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: Bay Sound Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DMM Fill 2 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DMM Marsh Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DMM Lacustrine Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-S) File Name: 17thReach02.gsz

Last Edited By: Dieckmann, Timothy MVS

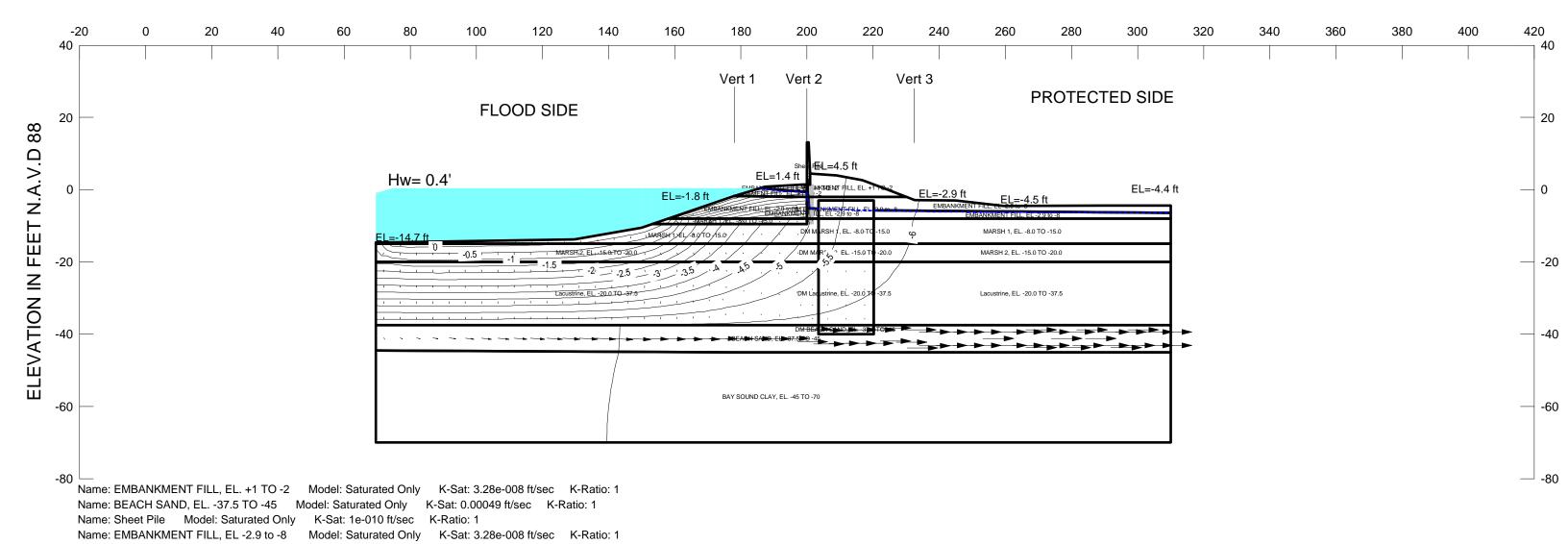




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17th STREET OUTFALL CANAL, REACH 2, STABILITY ANALYSIS. CASE: Seepage Analysis (LWL-S) STA. 553+70 - 565+00 WEST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -8.0 TO -15.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: MARSH 2, EL. -15.0 TO -20.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Lacustrine, EL. -20.0 TO -37.5 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DM EMBANKMENT FILL, EL -2.9 to -8 Name: DM MARSH 1, EL. -8.0 TO -15.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DM MARSH 2, EL. -15.0 TO -20.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DM Lacustrine, EL. -20.0 TO -37.5 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DM BEACH SAND, EL. -37.5 TO -45 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-S) File Name: 17thReach03A.gsz Last Edited By: Dieckmann, Timothy MVS



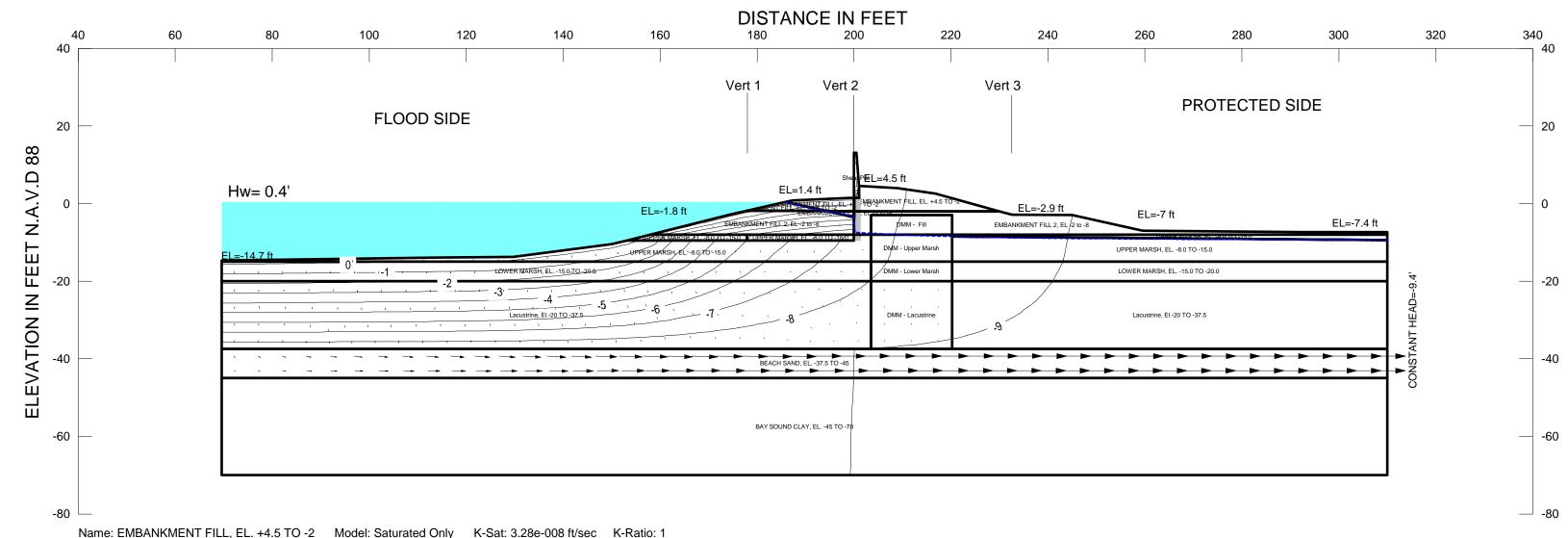
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of Engineers® Saint Louis District New Orleans District 17th STREET OUTFALL CANAL, REACH 03A,

STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-S) STA. 565+00 to 570+00 WEST ORLEANS PARISH, LOUISIANA



Name: UPPER MARSH, EL. -8.0 TO -15.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: BEACH SAND, EL. -37.5 TO -45 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1
Name: BAY SOUND CLAY, EL. -45 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: EMBANKMENT FILL 2, EL -2 to -8 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1
Name: LOWER MARSH, EL. -15.0 TO -20.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: Lacustrine, El.-20 TO -37.5 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: DMM - Fill Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: DMM - Lacustrine Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: DMM - Lower Marsh Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: DMM - Lower Marsh Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

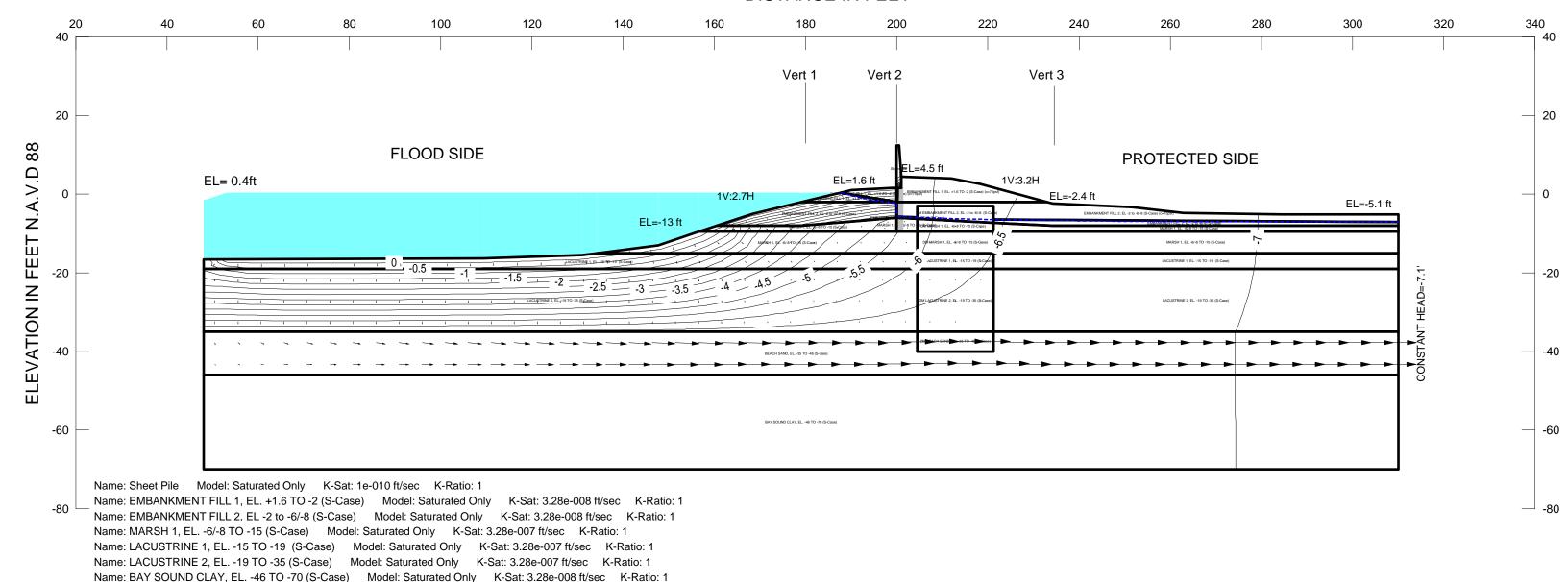
Name: Seepage Analysis (LWL-S) File Name: 17thReach03B.gsz Last Edited By: Dieckmann, Timothy MVS





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17th STREET OUTFALL CANAL, REACH 3B STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-S) STA. 570+00 to 571+45 WEST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: DM EMBANKMENT FILL 2, EL -2 to -6/-8 (S-Case) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 1, EL. +1.6 TO -2 (S-Case) (c=75psf) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 2, EL -2 to -6/-8 (S-Case) (c=75psf) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: DM MARSH 1, EL. -6/-8 TO -15 (S-Case) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DM LACUSTRINE 1, EL. -15 TO -19 (S-Case) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DM LACUSTRINE 2, EL. -19 TO -35 (S-Case) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DM BEACH SAND, EL. -35 TO -46 (S-Case) Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -35 TO -46 (S-case) Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: Seepage Analysis (LWL-S) File Name: 17thReach04.gsz Last Edited By: Dieckmann, Timothy MVS

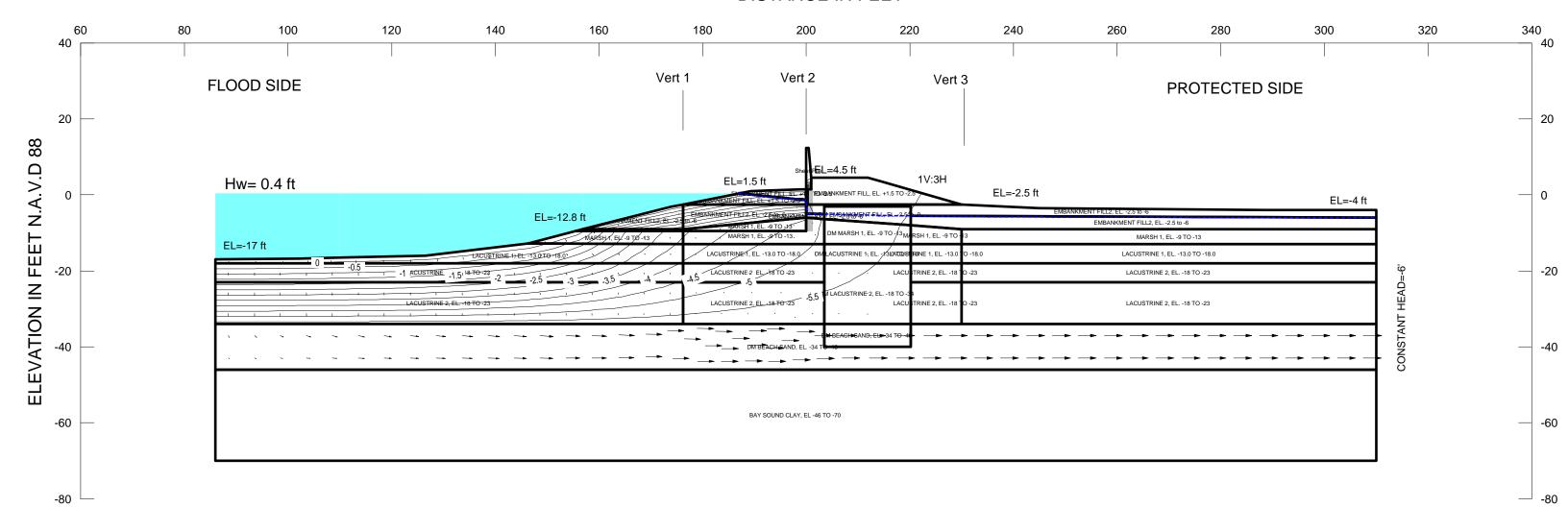




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17th STREET OUTFALL CANAL, REACH 04, STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-S) STA. 571+45 - 575+45 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +1.5 TO -2.5 Model: Saturated Only K-Sat: 3.28e-008 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: MARSH 1, EL. -9 TO -13 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec Volumetric Water Content: 0 ft/s/ft3 Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: LACUSTRINE 1, EL. -13.0 TO -18.0 Name: EMBANKMENT FILL2, EL. -2.5 to -6 Model: Saturated Only K-Sat: 3.28e-008 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: BAY SOUND CLAY, EL -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: LACUSTRINE 2, EL. -18 TO -23 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: DM EMBANKMENT FILL, EL. -2.5 to -9 Model: Saturated Only K-Sat: 3.28e-008 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: DM MARSH 1, EL. -9 TO -13 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: DM LACUSTRINE 1, EL. -13.0 TO -18.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: DM LACUSTRINE 2, EL. -18 TO -34 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft3/ft3 Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: DM BEACH SAND, EL. -34 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-S) File Name: 17thReach05.gsz Last Edited By: Dieckmann, Timothy MVS





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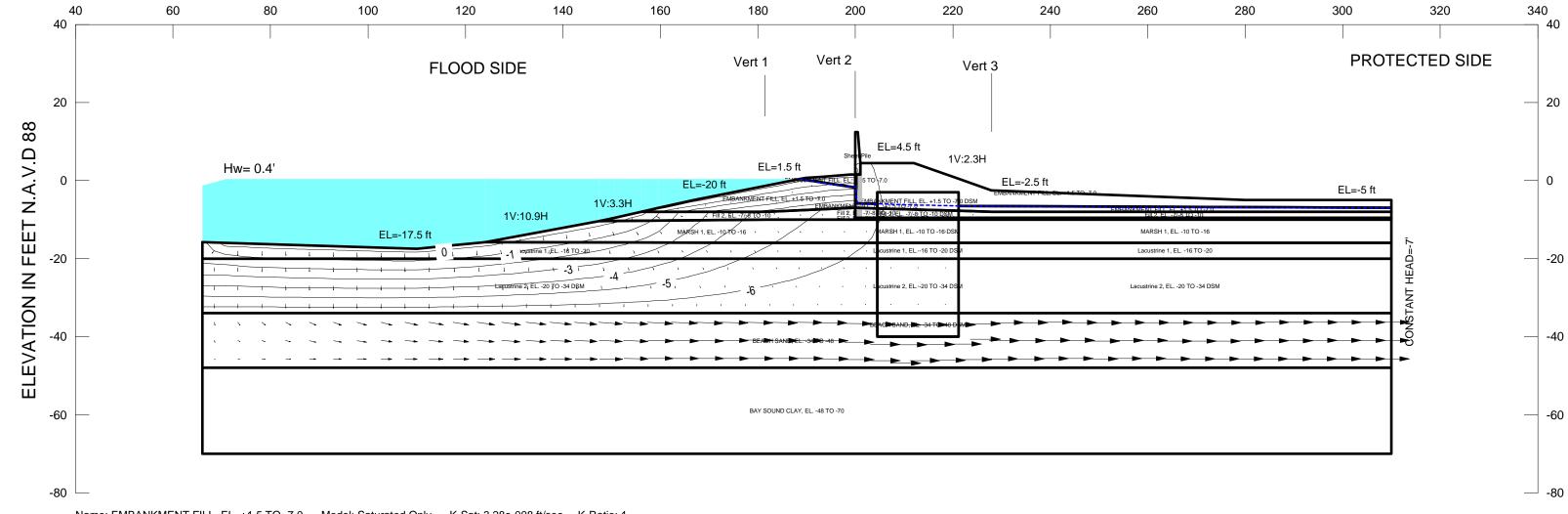
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17th STREET OUTFALL CANAL, REACH 05, STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-S) STA. 575+45 TO 578+22.5 West

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HURRICANE PROTECTION PROJECT

ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +1.5 TO -7.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: MARSH 1, EL. -10 TO -16 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -34 TO -48 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY, EL. -48 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: Lacustrine 1, EL. -16 TO -20 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Fill 2, EL. -7/-8 TO -10 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL, EL. +1.5 TO -7.0 DSM Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: MARSH 1, EL. -10 TO -16 DSM Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Lacustrine 1, EL. -16 TO -20 DSM Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Lacustrine 2, EL. -20 TO -34 DSM Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -34 TO -48 DSM Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Fill 2, EL. -7/-8 TO -10 DSM Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Fill 2, EL. -7/-8 TO -10 DSM Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

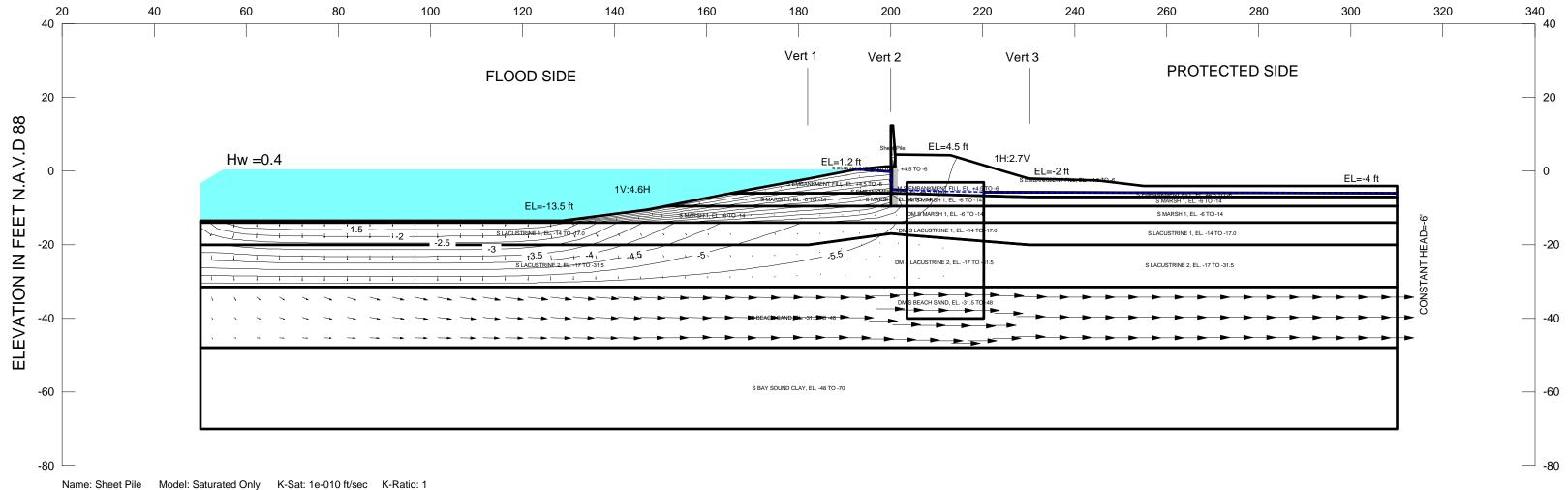
Name: Seepage Analysis (LWL-S) File Name: 17thReach06.gsz Last Edited By: Dieckmann, Timothy MVS



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17th STREET OUTFALL CANAL, REACH 06, STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-S) STA. 578+22.5 TO 582+60 WEST ORLEANS PARISH, LOUISIANA



Name: S EMBANKMENT FILL, EL. +4.5 TO -6 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: S MARSH 1, EL. -6 TO -14 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: S LACUSTRINE 1, EL. -14 TO -17.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: S LACUSTRINE 2, EL. -17 TO -31.5 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: S BAY SOUND CLAY, EL. -48 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DM S EMBANKMENT FILL, EL. +4.5 TO -6 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DM S MARSH 1, EL. -6 TO -14 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DM S LACUSTRINE 1, EL. -14 TO -17.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DM S LACUSTRINE 2, EL. -17 TO -31.5 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DM S BEACH SAND, EL. -31.5 TO -48 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: S BEACH SAND, EL. -31.5 TO -48 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-S) File Name: 17thReach07.gsz Last Edited By: Dieckmann, Timothy MVS

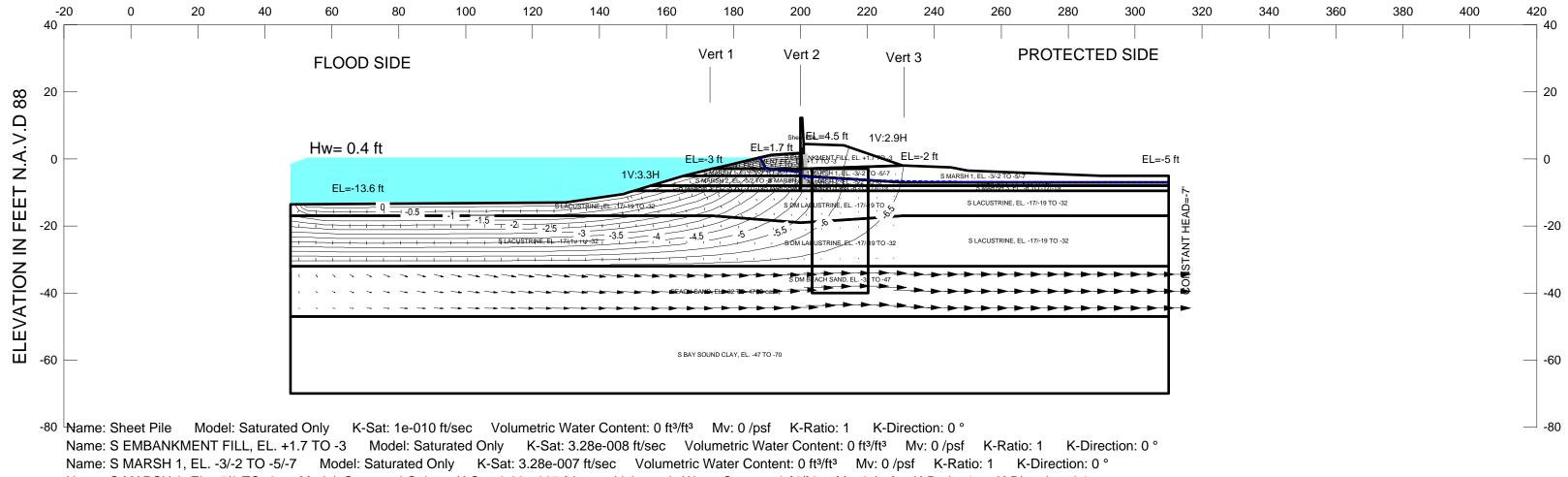




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17th STREET OUTFALL CANAL, REACH 7, STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-S) STA. 582+60 to 585+55 WEST ORLEANS PARISH, LOUISIANA



Name: S MARSH 2, EL. -5/2 TO -8 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: S MARSH 3, EL. -8 TO -17/-19 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: S LACUSTRINE, EL. -17/-19 TO -32 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 Name: S BAY SOUND CLAY, EL. -47 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: S DM MARSH 1, EL. -3/-2 TO -5/-7 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: S DM MARSH 2, EL. -5/2 TO -8 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: S DM MARSH 3, EL. -8 TO -17/-19 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: S DM LACUSTRINE, EL. -17/-19 TO -32 Model: Saturated Only K-Sat: 3.28e-007 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: S DM BEACH SAND, EL. -32 TO -47 Model: Saturated Only K-Sat: 0.00049 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 ° Name: BEACH SAND, EL. -32 TO -47 (S-case) Model: Saturated Only K-Sat: 0.00049 ft/sec Volumetric Water Content: 0 ft³/ft³ Mv: 0 /psf K-Ratio: 1 K-Direction: 0 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA, SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-S) File Name: 17thReach08.gsz Last Edited By: Dieckmann, Timothy MVS

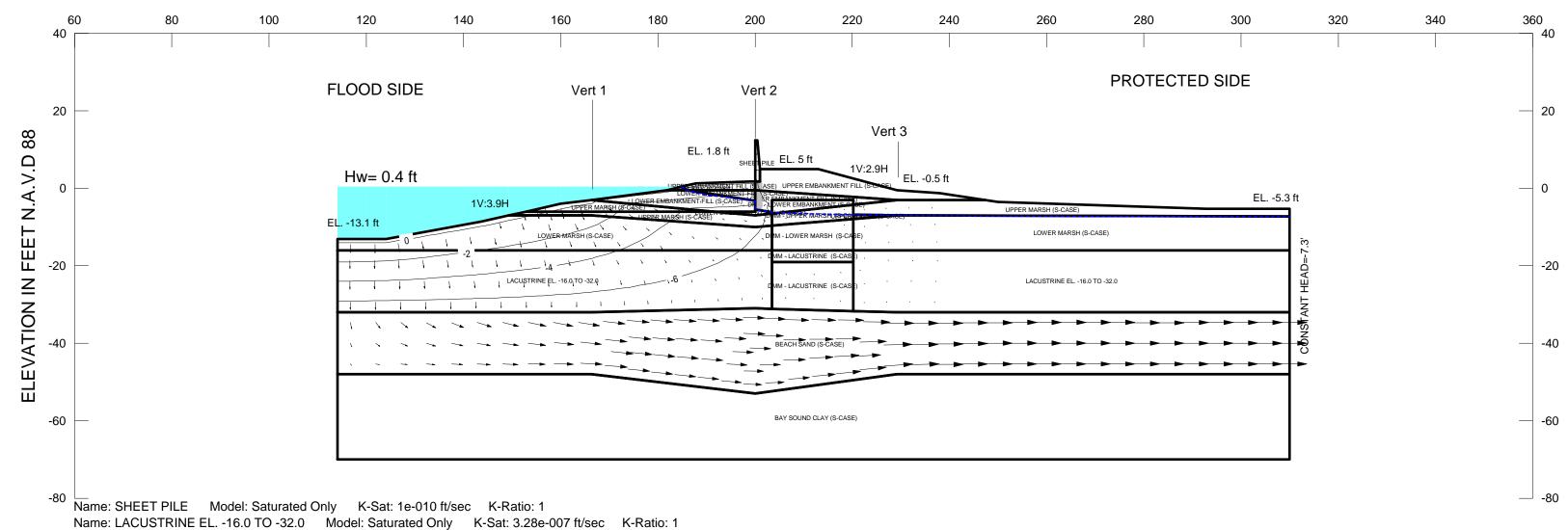




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17th STREET OUTFALL CANAL, REACH 08. STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-S) STA. 585+55 TO 588+70 WEST ORLEANS PARISH, LOUISIANA



Name: UPPER EMBANKMENT FILL (S-CASE) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: UPPER MARSH (S-CASE) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BEACH SAND (S-CASE) Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY (S-CASE) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: LOWER EMBANKMENT FILL (S-CASE) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: LOWER MARSH (S-CASE) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: DMM - LOWER EMBANKMENT (S-CASE) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: DMM - UPPER MARSH (S-CASE) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DMM - LOWER MARSH (S-CASE) Name: DMM - LACUSTRINE (S-CASE) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-S) File Name: 17thReach09.gsz

Last Edited By: Dieckmann, Timothy MVS



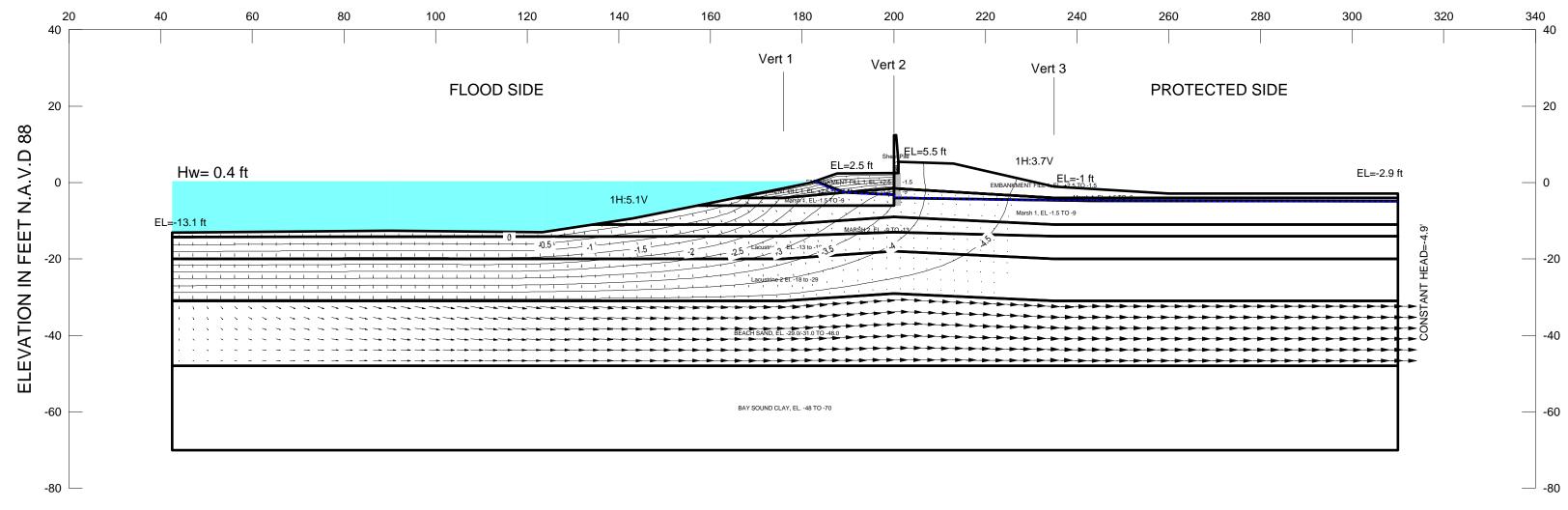


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17th STREET OUTFALL CANAL, REACH 09, STABILITY ANALYSIS.

CASE: Seepage Analysis (LWL-S) STA. 588+70 - 593+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 1, EL. +2.5 TO -1.5 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH 2, EL. -9 TO -13 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -29.0/-31.0 TO -48.0 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1
Name: BAY SOUND CLAY, EL. -48 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Marsh 1, EL -1.5 TO -9 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: Lacustrine 1, EL. -13 to -18 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: Lacustrine 2 El. -18 to -29 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-S) File Name: 17thReach10.gsz Last Edited By: Dieckmann, Timothy MVS



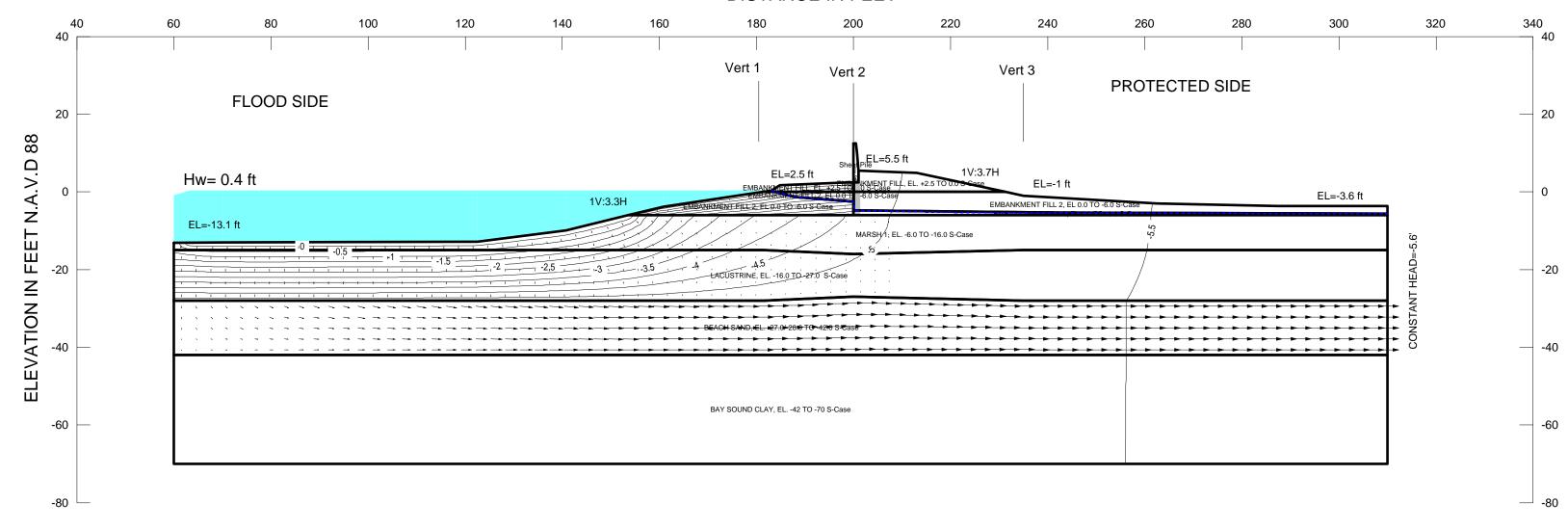


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17th STREET OUTFALL CANAL, REACH 10, STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-S) STA. 593+00 - 596+05 WEST ORLEANS PARISH, LOUISIANA

MARCH 2013 LAKE PONTCHARTRAIN, LA. AND VICINITY

HURRICANE PROTECTION PROJECT



Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL, EL. +2.5 TO 0.0 S-Case Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 S-Case Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH 1, EL. -6.0 TO -16.0 S-Case Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY, EL. -42 TO -70 S-Case Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: LACUSTRINE, EL. -16.0 TO -27.0 S-Case Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -27.0/-28.0 TO -42.0 S-Case Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

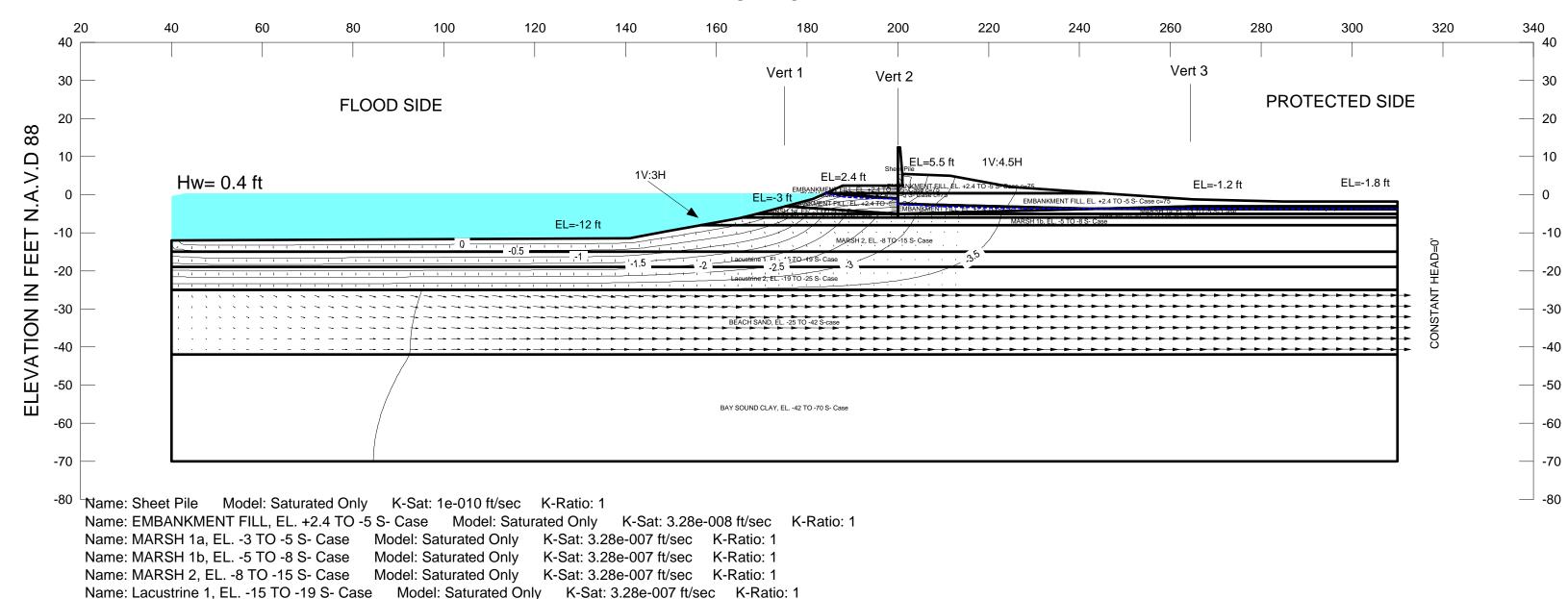
Name: Seepage Analysis (LWL-S) File Name: 17thReach11.gsz Last Edited By: Dieckmann, Timothy MVS





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17th STREET OUTFALL CANAL, REACH 11, STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-S) STA. 596+05 to 609+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.4 TO -5 S- Case c=75 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: MARSH 1a, EL. -3 TO -5 S- Case (c=75 psf) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Lacustrine 2, EL. -19 TO -25 S- Case Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY, EL. -42 TO -70 S- Case Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -25 TO -42 S-case Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-S) File Name: 17thReach12.gsz Last Edited By: Redell, Chris MVS

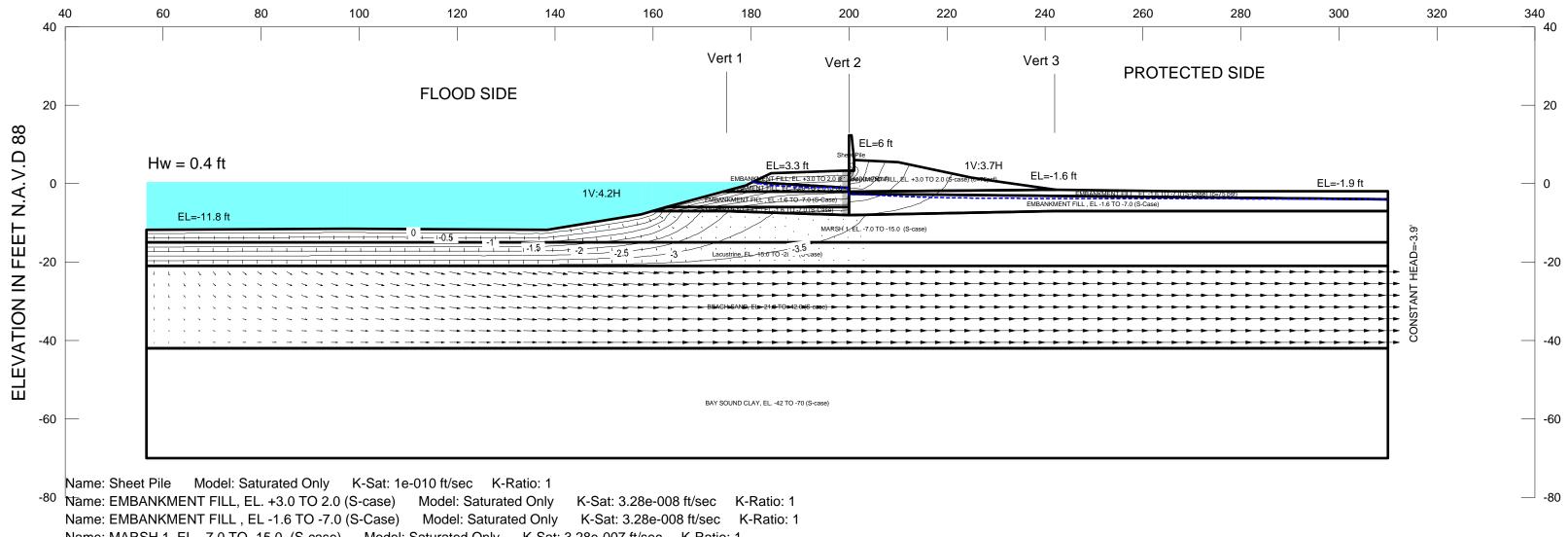




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17th STREET OUTFALL CANAL, REACH 12, STABILITY ANALYSIS. CASE: Seepage Analysis (LWL-S) STA. 609+00 to 614+00 WEST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -7.0 TO -15.0 (S-case) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Lacustrine, EL. -15.0 TO -28.0 (S-case) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -42 TO -70 (S-case) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -21.0 TO -42.0 (S-case) Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL, EL. +3.0 TO 2.0 (S-case) (c=75psf) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: EMBANKMENT FILL, EL -1.6 TO -7.0 (S-Case) (c=75 psf) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-S) File Name: 17thReach13.gsz Last Edited By: Redell, Chris MVS



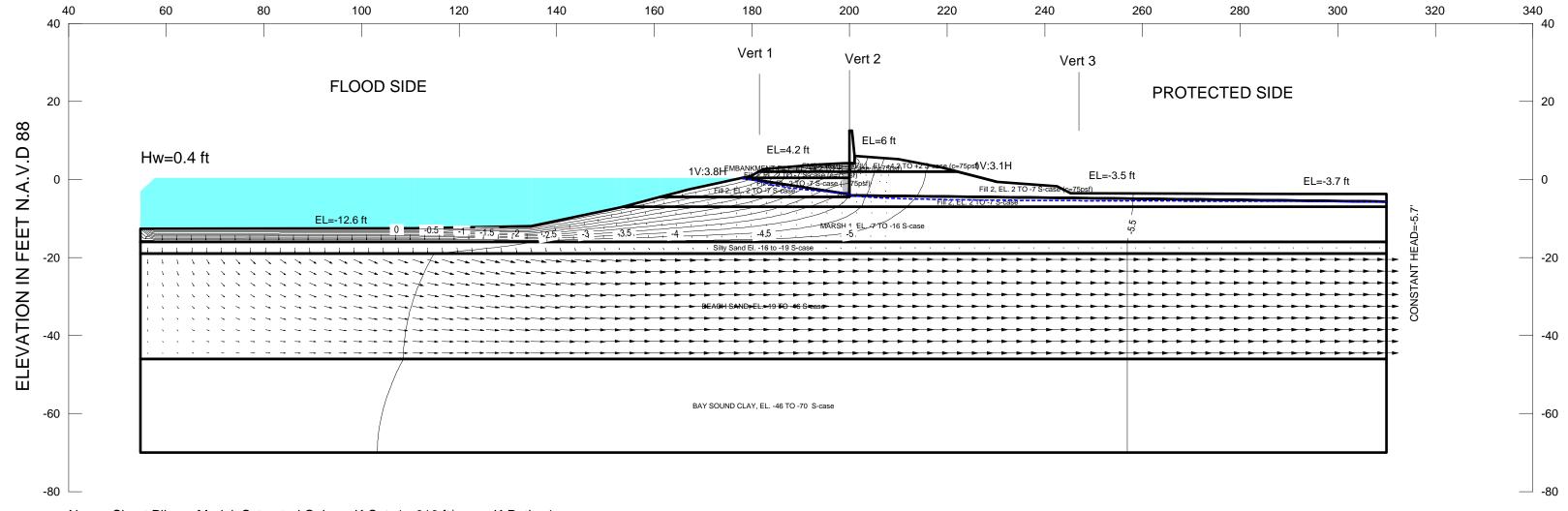


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17th STREET OUTFALL CANAL, REACH 13, STABILITY ANALYSIS,

CASE: Seepage Analysis (LWL-S) STA. 614+00 to 617+00 WEST ORLEANS PARISH, LOUISIANA



Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: Fill 2, EL. 2 TO -7 S-case Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: MARSH 1, EL. -7 TO -16 S-case Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Silty Sand El. -16 to -19 S-case Model: Saturated Only K-Sat: 2.3e-005 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -19 TO -46 S-case Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -46 TO -70 S-case Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL, EL. +4.2 TO +2 S-case (c=75psf) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Fill 2, EL. 2 TO -7 S-case (c=75psf) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-S) File Name: 17thReach14.gsz Last Edited By: Redell, Chris MVS

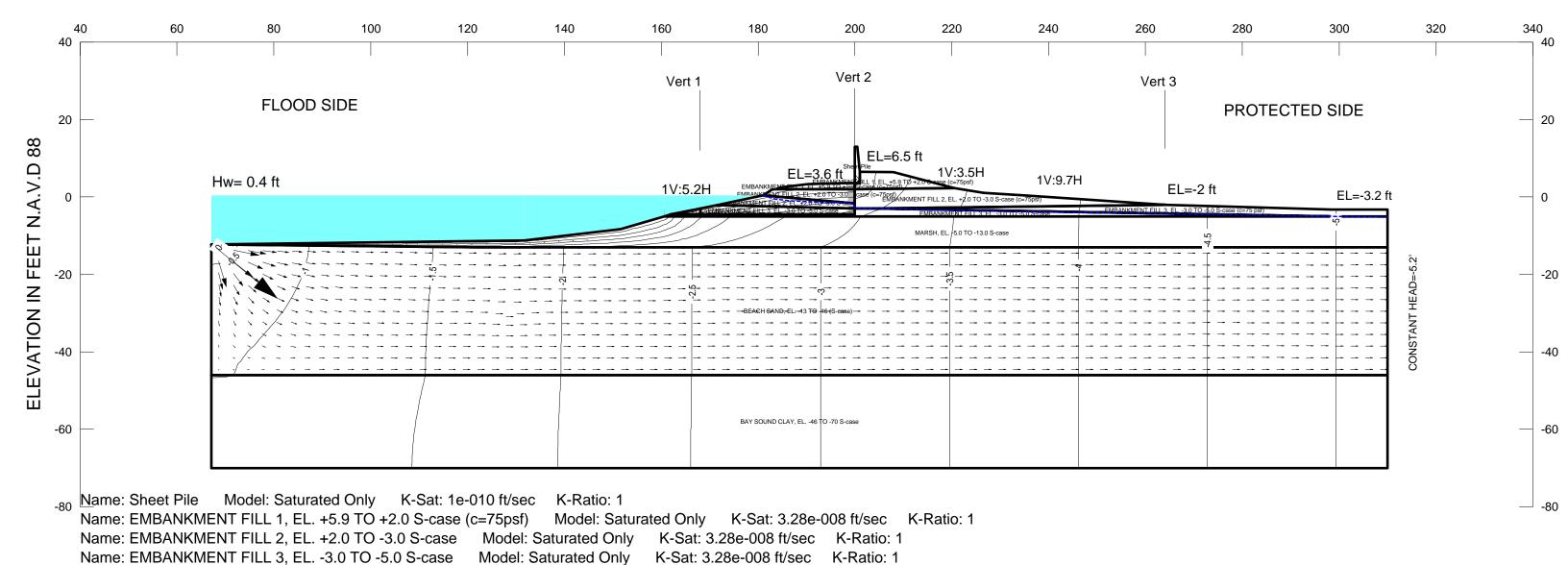




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17th STREET OUTFALL CANAL, REACH 14, STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-S) STA. 617+00 to 625+00 WEST ORLEANS PARISH, LOUISIANA



Name: MARSH, EL. -5.0 TO -13.0 S-case Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -46 TO -70 S-case Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 2, EL. +2.0 TO -3.0 S-case (c=75psf) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -13 TO -46 (S-case) Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 3, EL. -3.0 TO -5.0 S-case (c=75 psf) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-S) File Name: 17thReach15A.gsz Last Edited By: Redell, Chris MVS



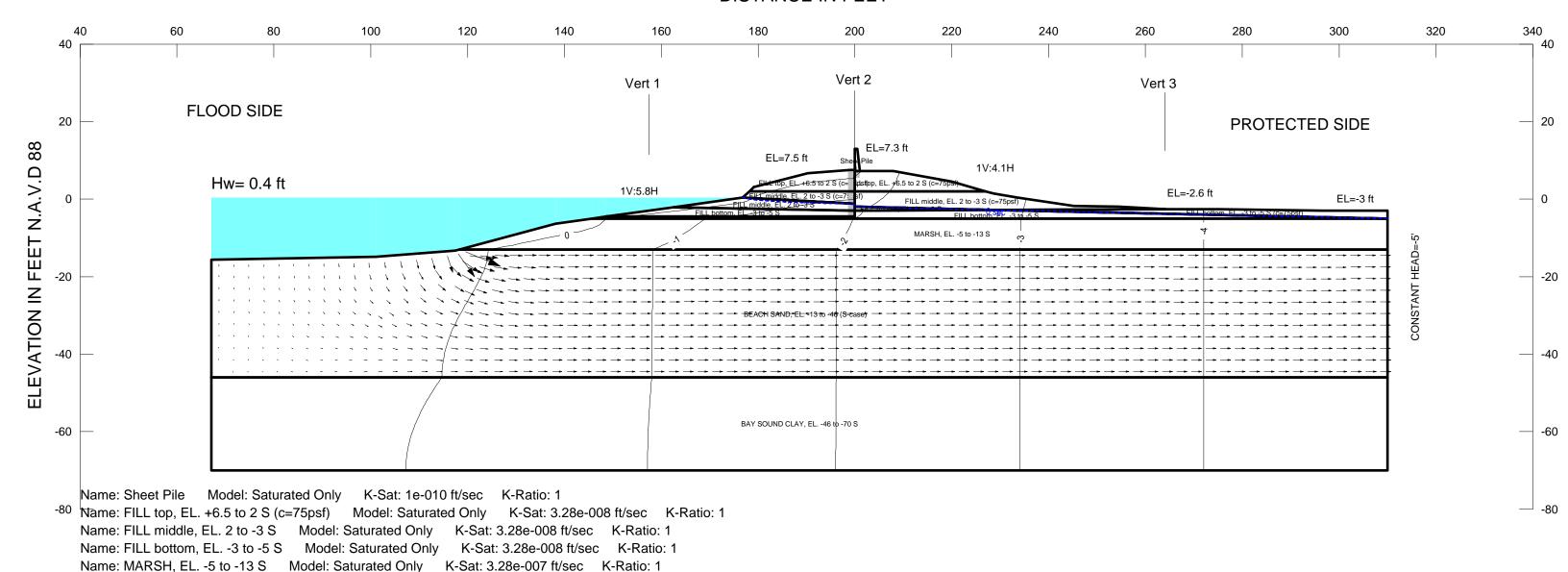


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17th STREET OUTFALL CANAL, REACH 15A, STABILITY ANALYSIS,

CASE: Seepage Analysis (LWL-S) STA. 626+56 to 635+00 WEST ORLEANS PARISH, LOUISIANA



K-Ratio: 1

K-Ratio: 1

K-Ratio: 1

K-Sat: 3.28e-008 ft/sec

Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1



CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

Name: FILL middle, EL. 2 to -3 S (c=75psf)

Name: FILL bottom, EL. -3 to -5 S (c=75psf)

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: BAY SOUND CLAY, EL. -46 to -70 S Model: Saturated Only K-Sat: 3.28e-008 ft/sec

Name: BEACH SAND, EL. -13 to -46 (S-case) Model: Saturated Only K-Sat: 0.00049 ft/sec

Model: Saturated Only

Name: Seepage Analysis (LWL-S) File Name: 17thReach15B.gsz Last Edited By: Redell, Chris MVS



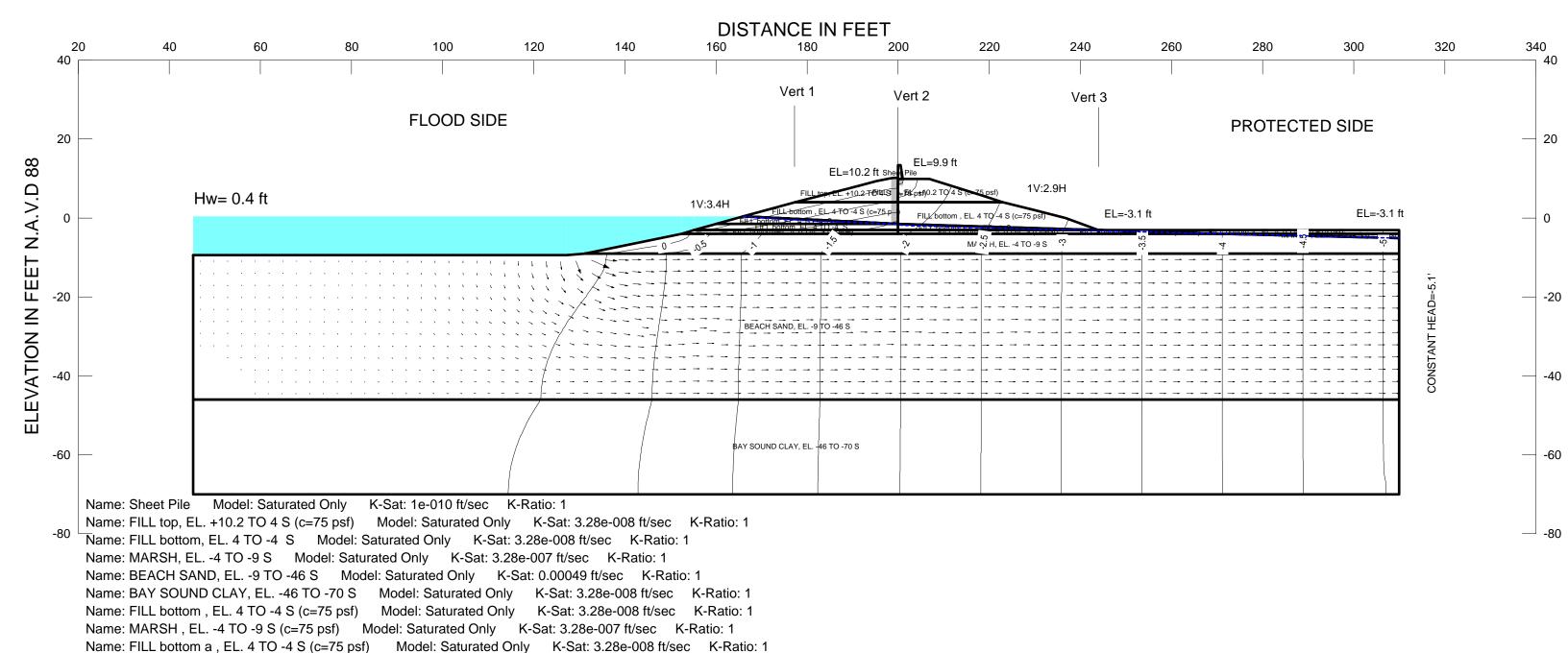


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17th STREET OUTFALL CANAL, REACH 15B, STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-S) STA. 635+00 to 639+06 WEST

ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: FILL bottom, EL. 4 TO -4 S (Linear) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Seepage Analysis (LWL-S) File Name: 17thReach16.gsz Last Edited By: Redell, Chris MVS

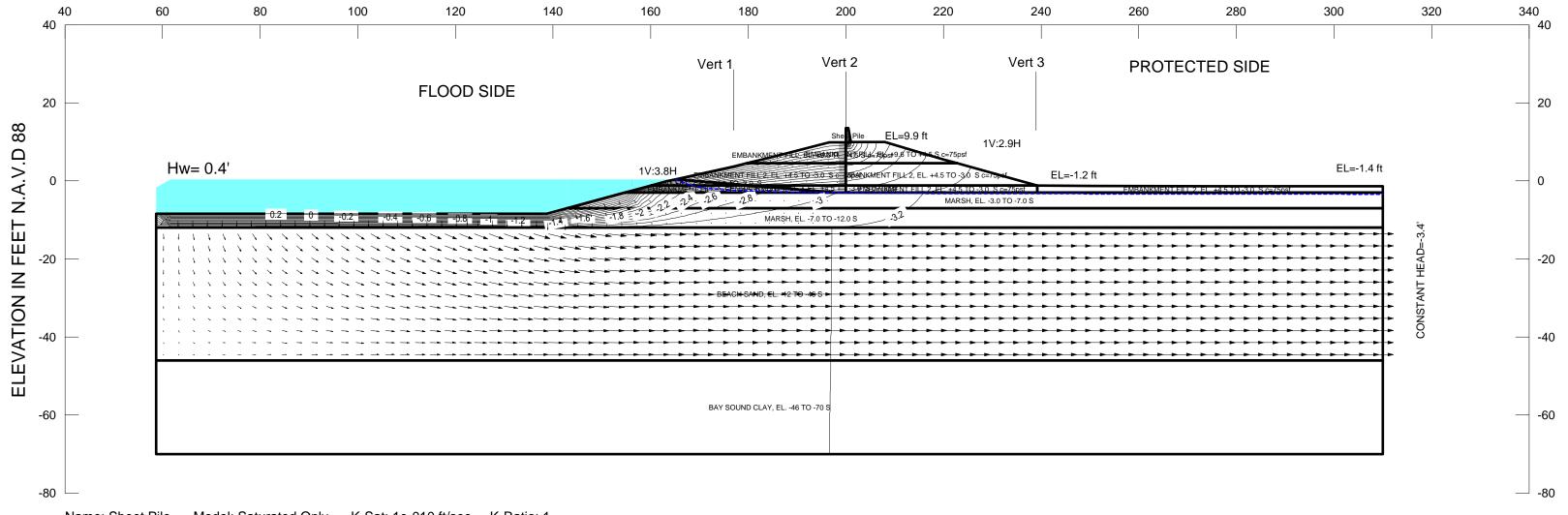


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17th STREET OUTFALL CANAL, REACH 16, STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-S)

CASE: Seepage Analysis (LWL-S) STA. 641+85 - 658+00 WEST ORLEANS PARISH, LOUISIANA



Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 S Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH, EL. -3.0 TO -7.0 S Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: MARSH, EL. -7.0 TO -12.0 S Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY, EL. -46 TO -70 S Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 S c=75psf Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL, EL. +9.6 TO +4.5 S c=75psf Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -12 TO -46 S Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-S) File Name: 17thReach17.gsz Last Edited By: Redell, Chris MVS





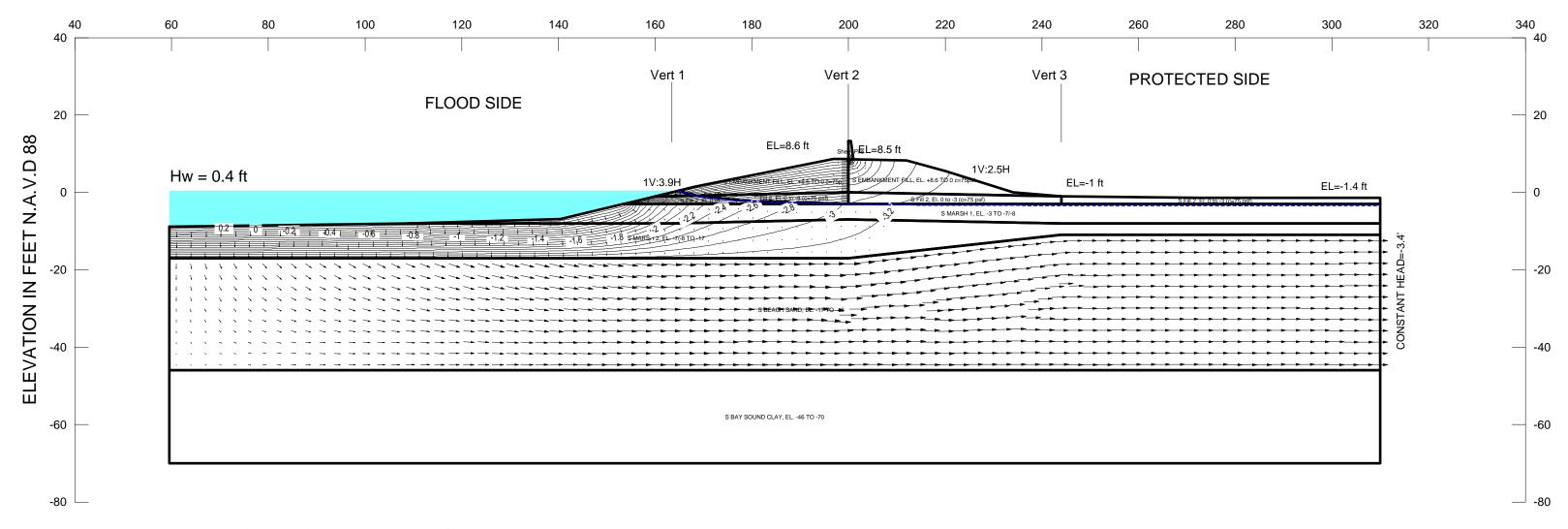
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17th STREET OUTFALL CANAL, REACH 17, STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-S)

STA. 658+00 - 663+00 WEST ORLEANS PARISH, LOUISIANAS



Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: S EMBANKMENT FILL, EL. +8.6 TO 0 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: S Fill 2, El. 0 to -3 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: S MARSH 1, EL. -3 TO -7/-8 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: S MARSH 2, EL. -7/-8 TO -17 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: S BAY SOUND CLAY, EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: S BEACH SAND, EL. -17 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: S EMBANKMENT FILL, EL. +8.6 TO 0 c=75psf Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: S Fill 2, El. 0 to -3 (c=75 psf) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-S) File Name: 17thReach18.gsz Last Edited By: Redell, Chris MVS

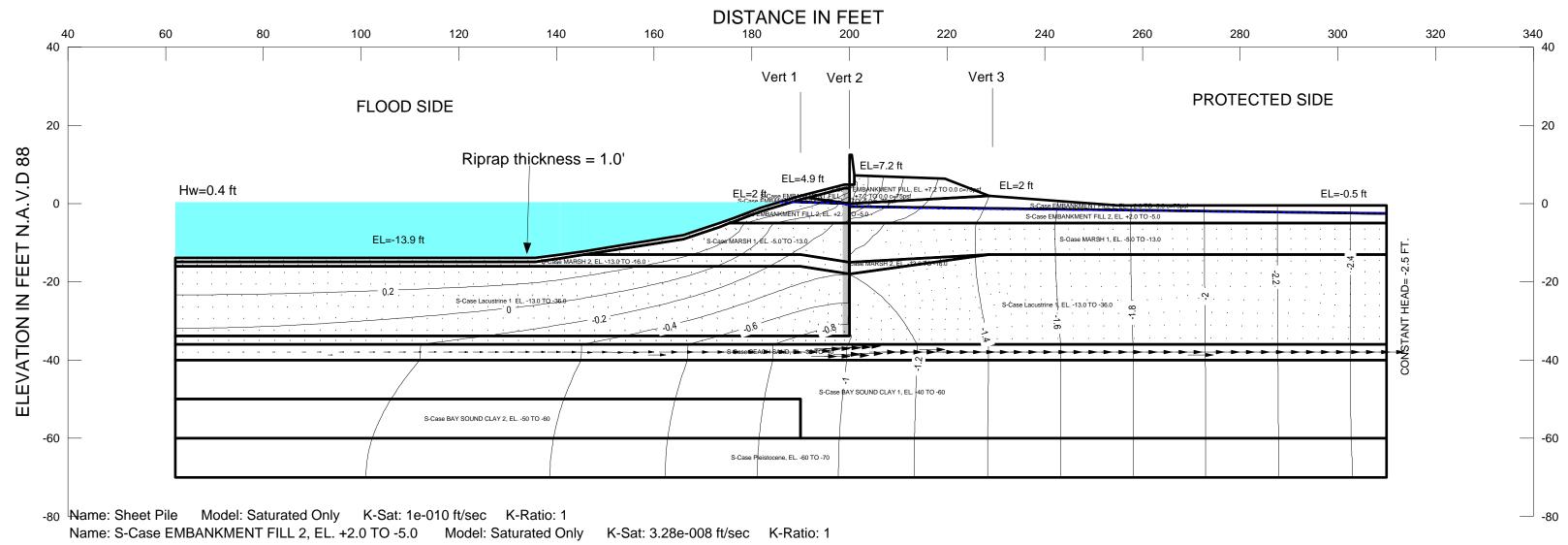






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17th STREET OUTFALL CANAL, REACH 18, STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-S) STA. 663+00 to 669+36 WEST ORLEANS PARISH, LOUISIANA



Name: S-Case MARSH 1, EL. -5.0 TO -13.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: S-Case BAY SOUND CLAY 1, EL. -40 TO -60 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: S-Case Lacustrine 1, EL. -13.0 TO -36.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: S-Case Pleistocene, EL. -60 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: S-Case MARSH 2, EL. -13.0 TO -16.0 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: S-Case BAY SOUND CLAY 2, EL. -50 TO -60 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Rip Rap Model: Saturated Only K-Sat: 0.00023 ft/sec K-Ratio: 1

Name: S-Case BEACH SAND, EL. -36 TO -40 Model: Saturated Only K-Sat: 2.3e-005 ft/sec K-Ratio: 1

Name: S-Case EMBANKMENT FILL, EL. +7.2 TO 0.0 c=75psf Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: S-Case EMBANKMENT FILL 2, EL. +2.0 TO -5.0 c=75psf Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-S) File Name: 17thReach19.gsz Last Edited By: Redell, Chris MVS





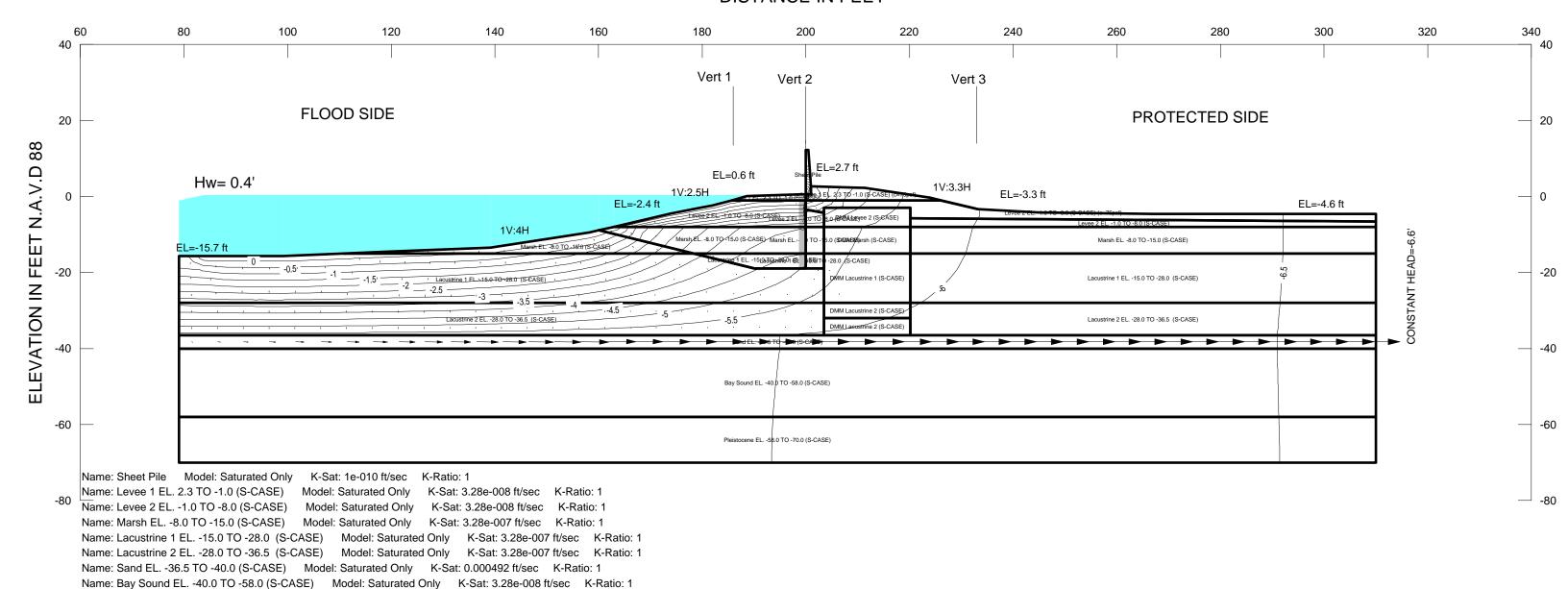
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US Army Corps

17th STREET OUTFALL CANAL, REACH 19, STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-S) STA. Closure to 552+17 EAST

ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Pleistocene EL. -58.0 TO -70.0 (S-CASE) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Levee 1 EL. 2.3 TO -1.0 (S-CASE) (c=75psf) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: Levee 2 EL. -1.0 TO -8.0 (S-CASE) (c=75psf) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: DMM Levee 2 (S-CASE) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: DMM Marsh (S-CASE) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

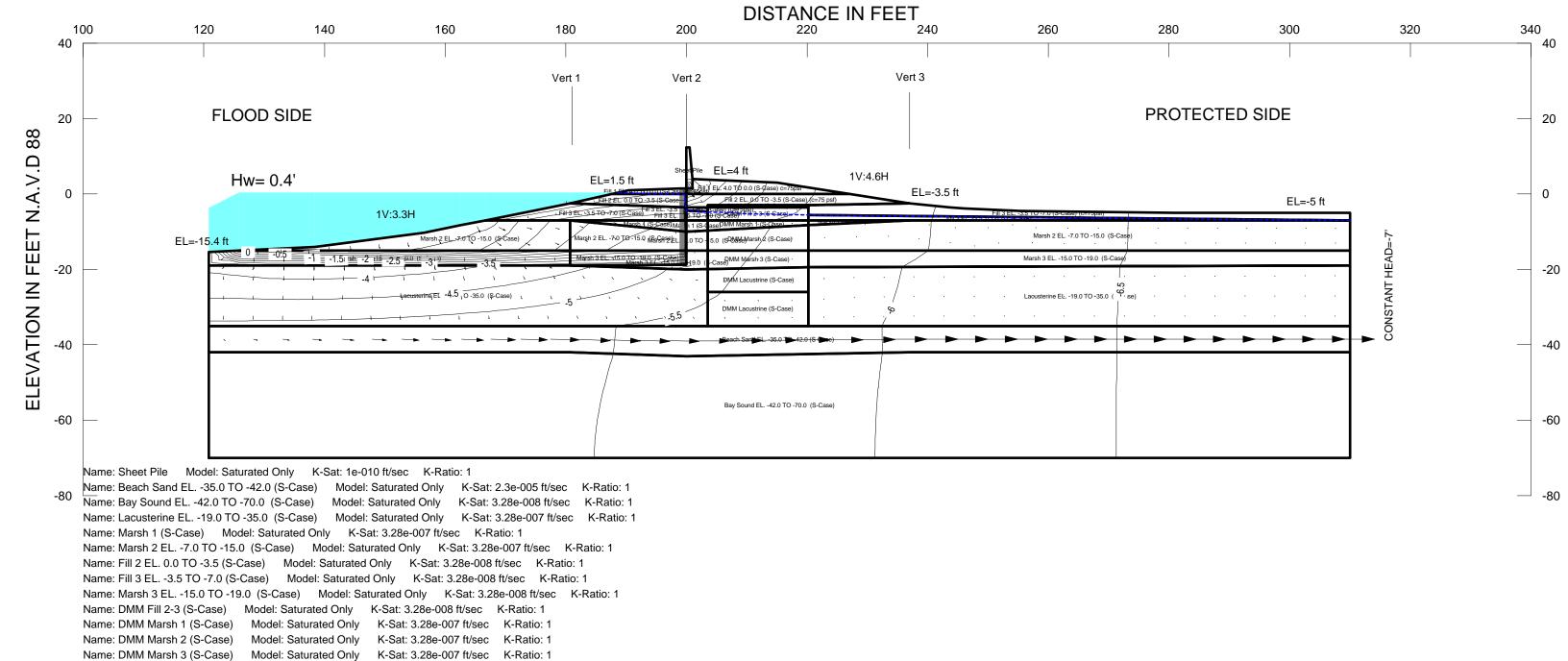
Name: DMM Lacustrine 1 (S-CASE) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: DMM Lacustrine 2 (S-CASE) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Seepage Analysis (LWL-S) File Name: 17thReach20.gsz Last Edited By: Redell, Chris MVS



17th STREET OUTFALL CANAL, REACH 20, STABILITY ANALYSIS CASE: Seepage Analysis (LWL-S) STA. 553+58 to 560+10 EAST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Fill 3 EL. -3.5 TO -7.0 (S-Case) (c=75psf) Model: Saturated Only

Name: DMM Lacustrine (S-Case) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Fill 1 EL. 4.0 TO 0.0 (S-Case) c=75psf Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: Fill 2 EL. 0.0 TO -3.5 (S-Case) (c=75 psf) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Seepage Analysis (LWL-S) File Name: 17thReach21.gsz Last Edited By: Redell, Chris MVS

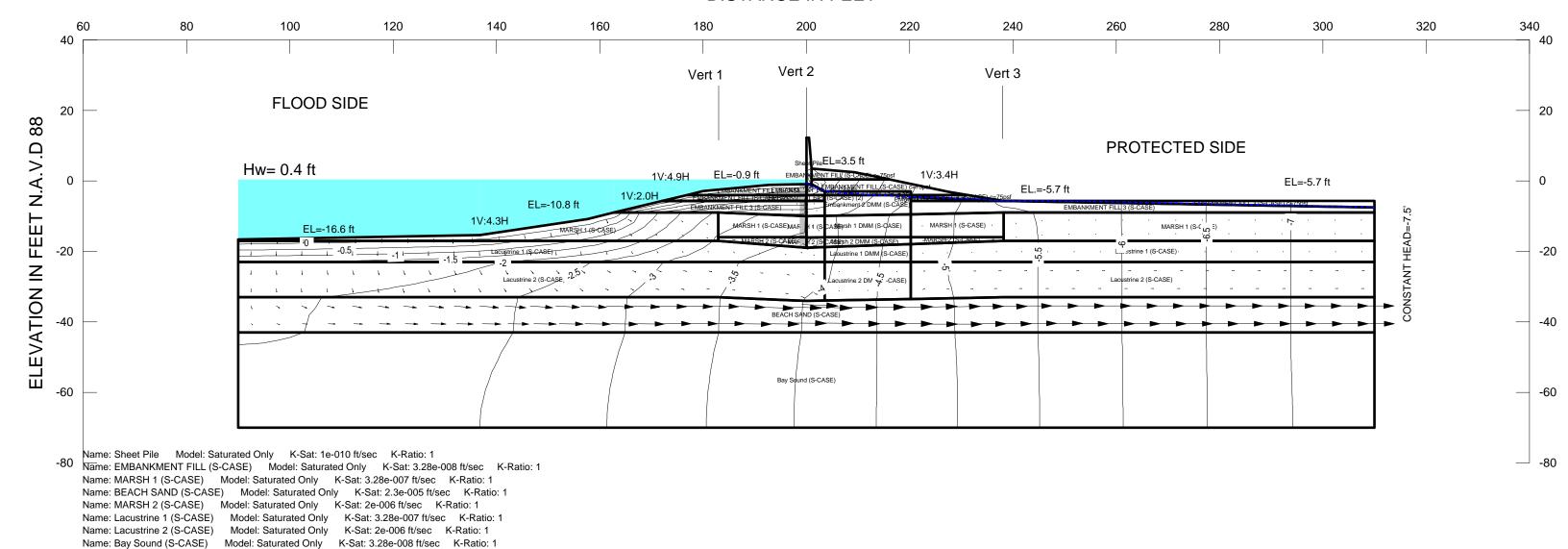




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17th STREET OUTFALL CANAL, REACH 21, STABILITY ANALYSIS CASE: Seepage Analysis (LWL-S) STA. 566+00 to 570+73 EAST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: EMBANKMENT FILL 3 (S-CASE) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: Embankment 1 DMM (S-CASE) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: Marsh 1 DMM (S-CASE) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Marsh 2 DMM (S-CASE) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Lacustrine 1 DMM (S-CASE) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Lacustrine 2 DMM (S-CASE) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Embankment 2 DMM (S-CASE) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: EMBANKMENT FILL (S-CASE) c=75psf Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: EMBANKMENT FILL 2 (S-CASE) c=75psf Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: EMBANKMENT FILL (S-CASE) (2) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: EMBANKMENT FILL 3 (S-CASE) c=75psf Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Seepage Analysis (LWL-S) File Name: 17thReach22.gsz Last Edited By: Redell, Chris MVS

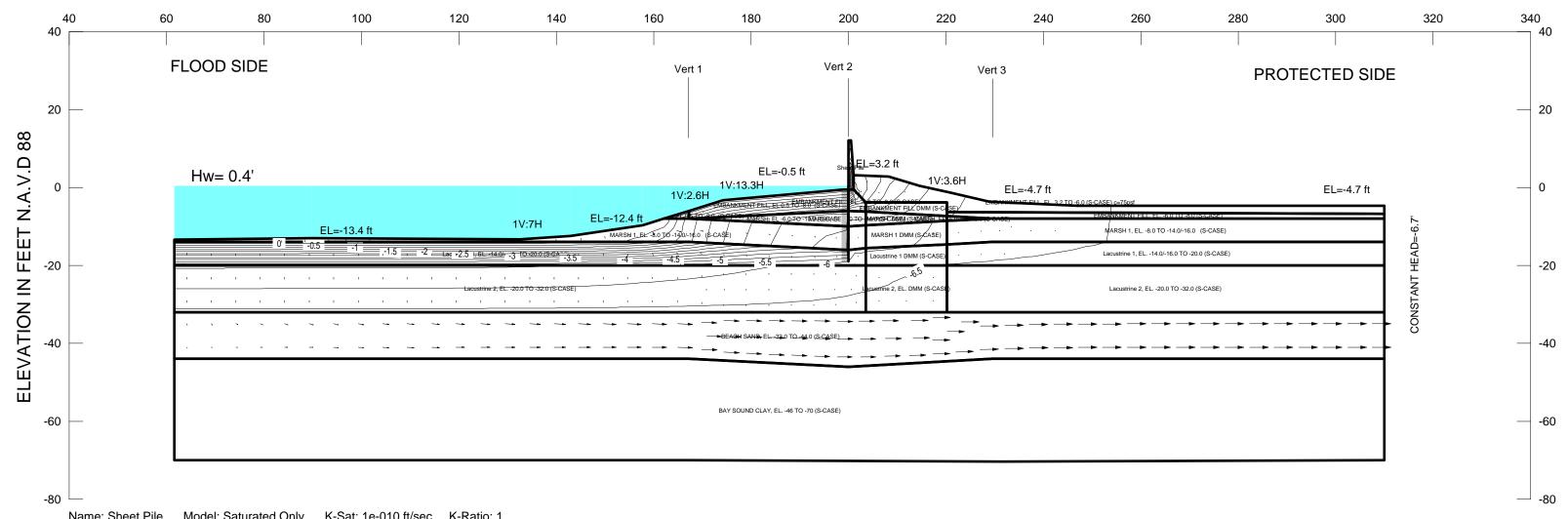




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17th STREET OUTFALL CANAL, REACH 22, STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-S) STA. 570+73 - 581+50 EAST ORLEANS PARISH, LOUISIANA



Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL, EL. -6.0 TO -8.0 (S-CASE) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -32.0 TO -44.0 (S-CASE) Model: Saturated Only K-Sat: 0.000492 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY, EL. -46 TO -70 (S-CASE) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: MARSH, EL -6.0 TO -10.0 (S-CASE) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 0.1

Name: Lacustrine 1, EL. -14.0/-16.0 TO -20.0 (S-CASE) Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 0.1

Name: MARSH 1, EL. -8.0 TO -14.0/-16.0 (S-CASE) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL, EL 0.5 TO -8.0 (S-CASE) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 0.1

Name: Lacustrine 2, EL. -20.0 TO -32.0 (S-CASE) Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1

Name: Lacustrine 1 DMM (S-CASE) Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 0.1

Name: MARSH 1 DMM (S-CASE) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: MARSH DMM (S-CASE) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 0.1 Name: EMBANKMENT FILL DMM (S-CASE) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Lacustrine 2, EL. DMM (S-CASE) Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL, EL. 3.2 TO -6.0 (S-CASE) c=75psf Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis LWL-S File Name: 17thReach23.gsz Last Edited By: Goltz, Amanda MVS

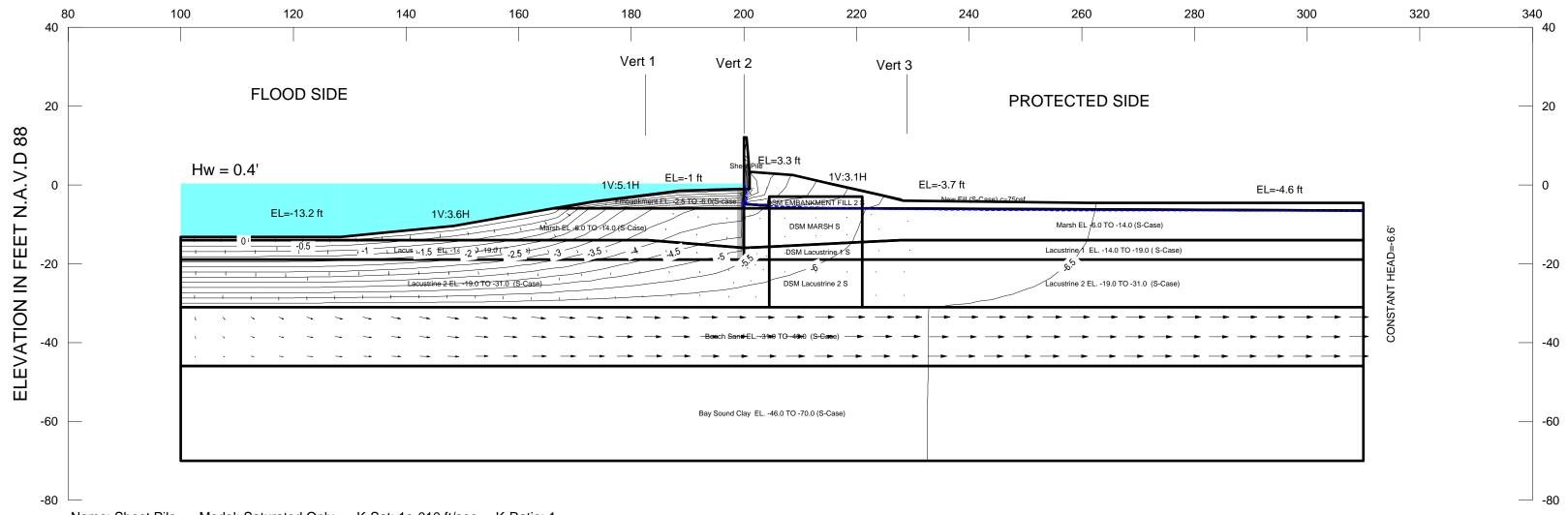




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17th STREET OUTFALL CANAL, REACH 23. STABILITY ANALYSIS, CASE: Seepage Analysis LWL-S STA. 581+50 to 588+67 EAST ORLEANS PARISH, LOUISIANA



Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: Bay Sound Clay EL. -46.0 TO -70.0 (S-Case) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Beach Sand EL. -31.0 TO -46.0 (S-Case) Model: Saturated Only K-Sat: 0.000492 ft/sec K-Ratio: 1

Name: Lacustrine 2 EL. -19.0 TO -31.0 (S-Case) Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1

Name: Lacustrine 1 EL. -14.0 TO -19.0 (S-Case) Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1

Name: Marsh EL -6.0 TO -14.0 (S-Case) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Embankment EL. -2.5 TO -6.0(S-case) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: DSM EMBANKMENT FILL 2 S Model: Saturated Only K-Sat: 1e-007 ft/sec K-Ratio: 0.1

Name: DSM MARSH S Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: DSM Lacustrine 1 S Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 0.1 Name: DSM Lacustrine 2 S Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 0.1

Name: New Fill (S-Case) c=75psf Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis LWL-S File Name: 17thReach24.gsz Last Edited By: Goltz, Amanda MVS



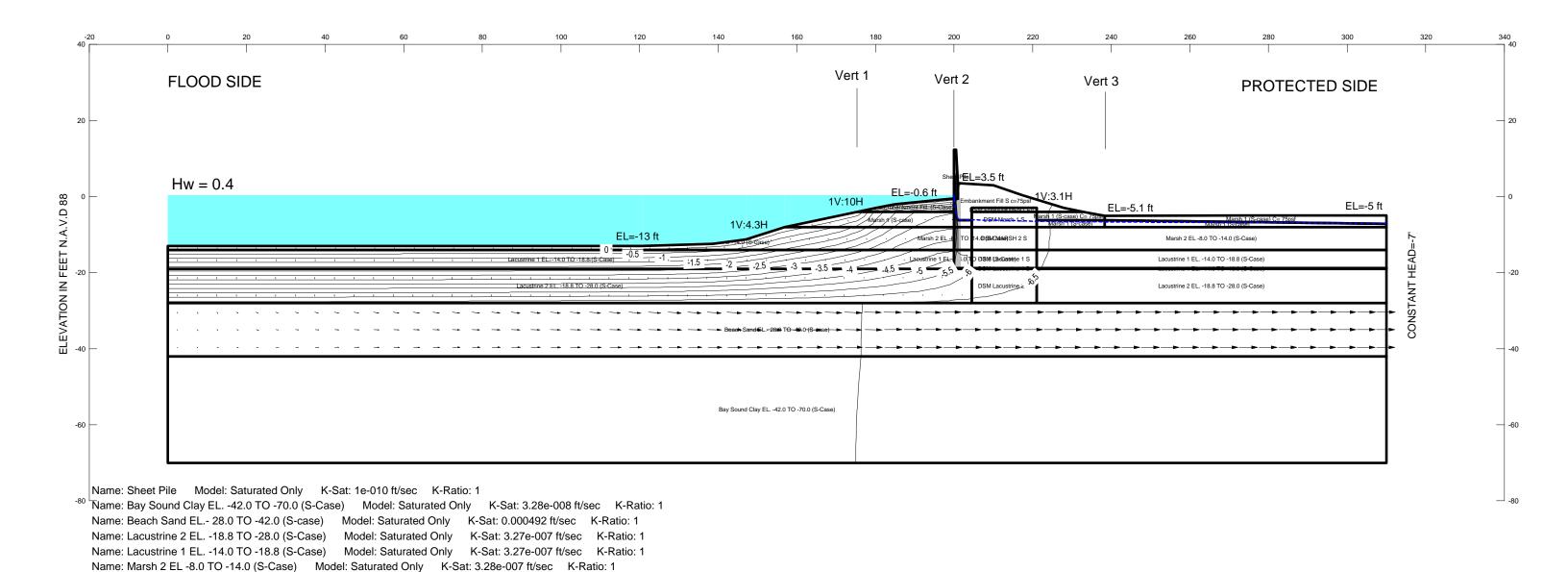


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17th STREET OUTFALL CANAL, REACH 24, STABILITY ANALYSIS,

CASE: Seepage Analysis LWL-S STA. 588+67 to 598+24 EAST ORLEANS PARISH, LOUISIANA





CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Marsh 1 (S-case) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: DSM Marsh 1 S Model: Saturated Only K-Sat: 3.27e-008 ft/sec K-Ratio: 1 Name: DSM MARSH 2 S Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1 Name: DSM Lacustrine 1 S Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 0.1 Name: DSM Lacustrine 2 S Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 0.1 Name: Embankment Fill S c=75psf Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: Marsh 1 (S-case) C= 75psf Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: Embankment Fill (S-Case) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: DSM EMBANKMENT FILL Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Seepage Analysis LWL- S File Name: 17thReach25.gsz Last Edited By: Goltz, Amanda MVS

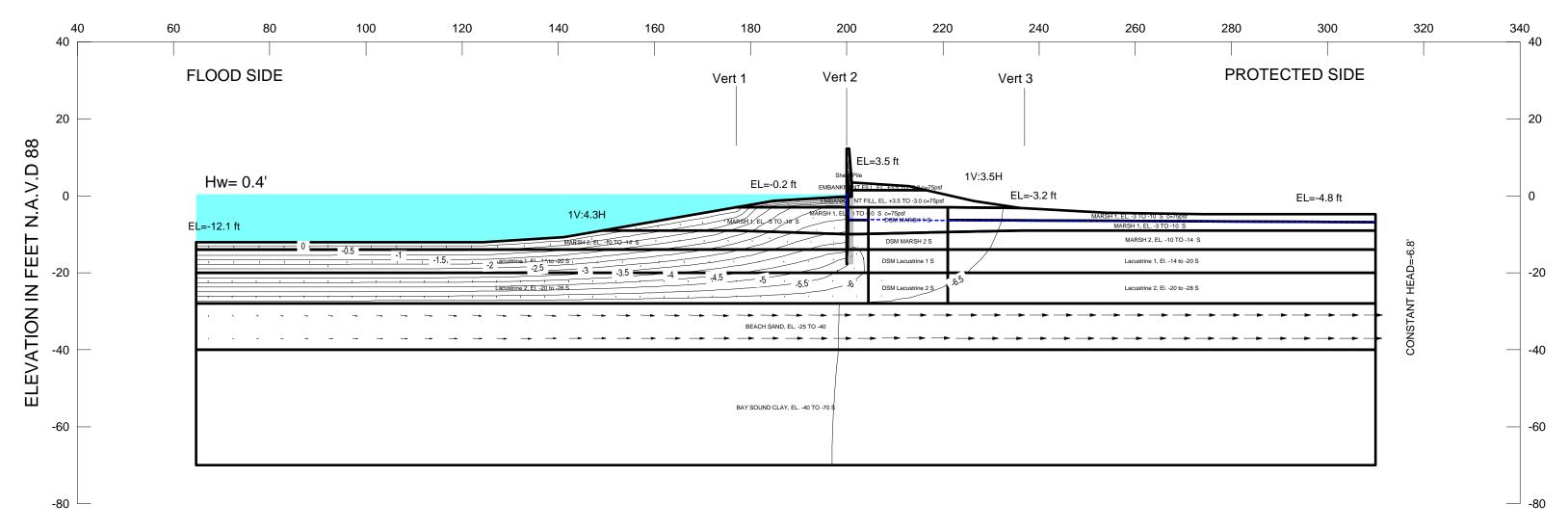




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17th STREET OUTFALL CANAL, REACH 25, STABILITY ANALYSIS, CASE: Seepage Analysis LWL- S STA. 598+24-608+00 EAST ORLEANS PARISH, LOUISIANA



Name: BEACH SAND, EL. -25 TO -40 Model: Saturated Only K-Sat: 0.000492 ft/sec K-Ratio: 1

Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: MARSH 1, EL. -3 TO -10 S Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY, EL. -40 TO -70 S Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH 2, EL. -10 TO -14 S Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: Lacustrine 1, El. -14 to -20 S Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1

Name: Lacustrine 1, El. -14 to -20 S Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1

Name: Lacustrine 2, El. -20 to -28 S Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1

Name: DSM MARSH 1 S Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: DSM MARSH 2 S Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: DSM Lacustrine 1 S Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1
Name: DSM Lacustrine 2 S Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL, EL. +3.5 TO -3.0 c=75psf Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH 1, EL. -3 TO -10 S c=75psf Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

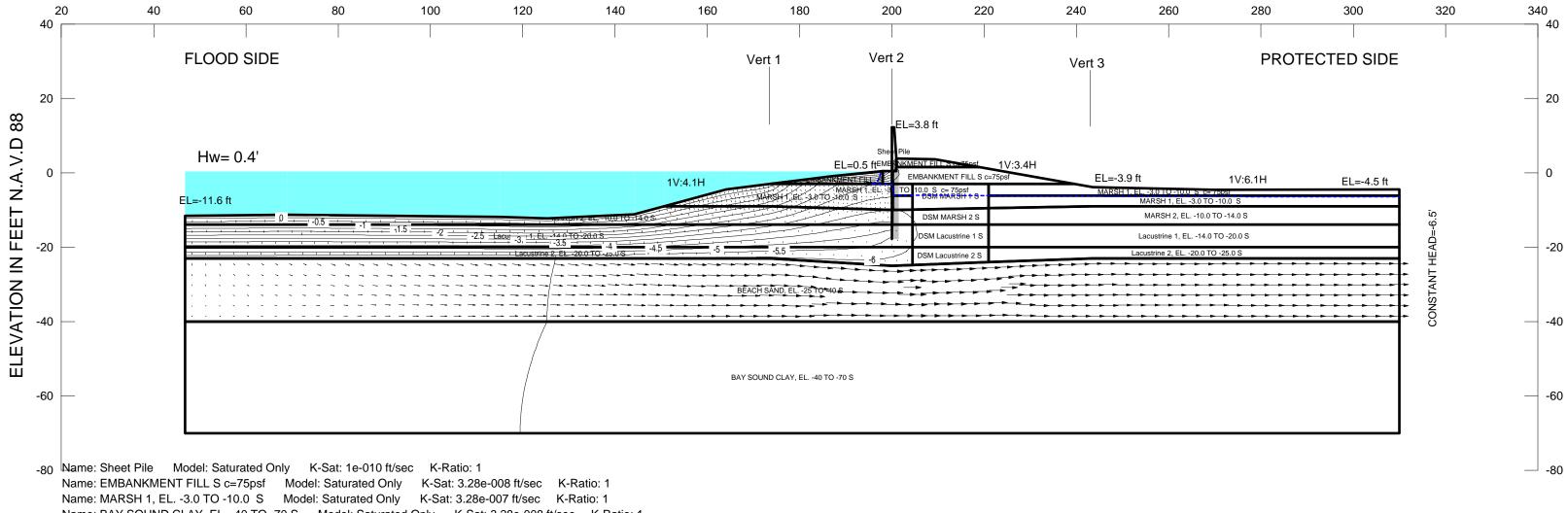
Name: Seepage Analysis LWL-S File Name: 17thReach26.gsz Last Edited By: Goltz, Amanda MVS





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17th STREET OUTFALL CANAL, REACH 26, STABILITY ANALYSIS, CASE: Seepage Analysis LWL-S STA. 608+00- 612+92 EAST ORLEANS PARISH, LOUISIANA



Name: BAY SOUND CLAY, EL. -40 TO -70 S Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: EMBANKMENT FILL S Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: MARSH 2, EL. -10.0 TO -14.0 S Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Lacustrine 2, EL. -20.0 TO -25.0 S Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1 Name: Lacustrine 1, EL. -14.0 TO -20.0 S Model: Saturated Only K-Sat: 3.27e-007 ft/sec K-Ratio: 1 Name: DSM MARSH 1 S Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: DSM MARSH 2 S Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DSM Lacustrine 1 S Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: DSM Lacustrine 2 S Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -25 TO -40 S Model: Saturated Only K-Sat: 0.000492 ft/sec K-Ratio: 1

Name: MARSH 1, EL. -3.0 TO -10.0 S c= 75psf Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED. SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis LWL-S File Name: 17thReach27.gsz Last Edited By: Goltz, Amanda MVS

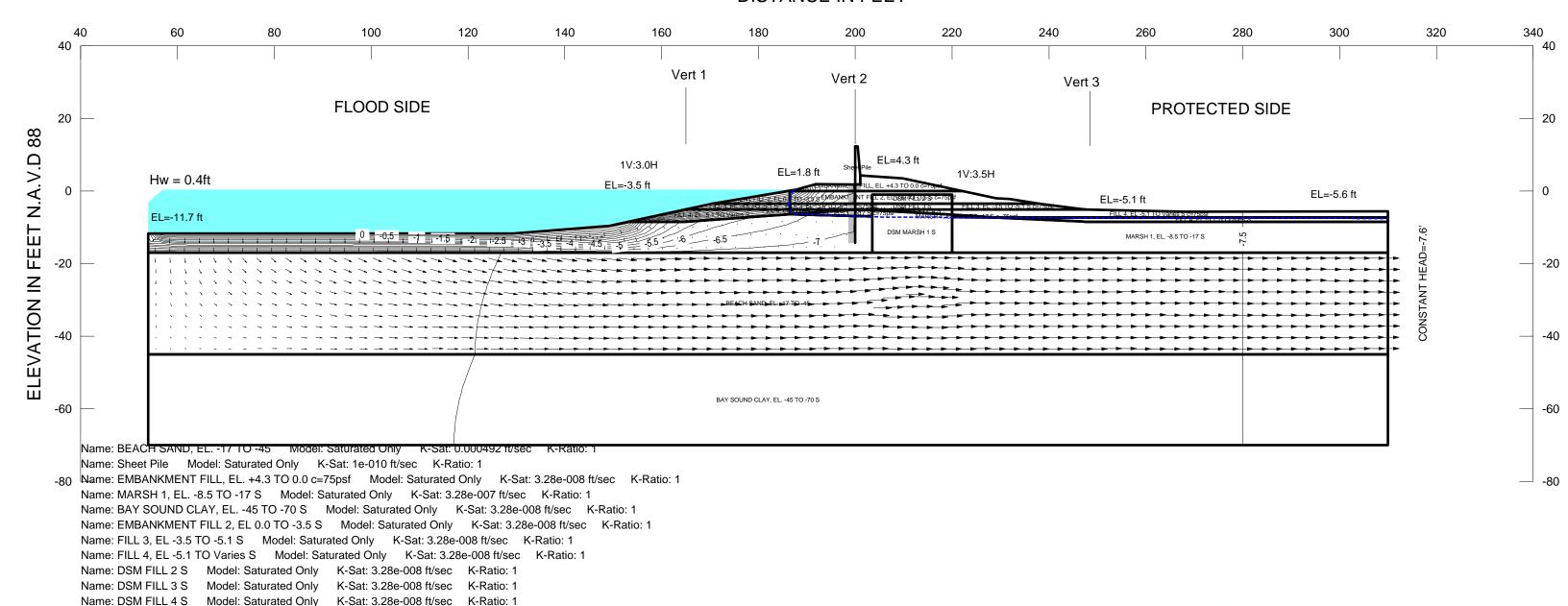




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17th STREET OUTFALL CANAL, REACH 27, STABILITY ANALYSIS, CASE: Seepage Analysis LWL-S STA. 614+30-617+81 EAST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: DSM MARSH 1 S Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: MARSH 1, EL. -8.5 TO -17 S c=75psf Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: FILL 4, EL -5.1 TO Varies S c=75psf Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: FILL 3, EL -3.5 TO -5.1 S c=75psf Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL 2, EL 0.0 TO -3.5 S c=75psf Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: Seepage Analysis LWL-S File Name: 17thReach28.gsz Last Edited By: Goltz, Amanda MVS





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17th STREET OUTFALL CANAL, REACH 28, STABILITY ANALYSIS, CASE: Seepage Analysis LWL-S STA, 615+03-620+30 EAST ORLEANS PARISH, LOUISIANA

DISTANCE IN FEET 180 200 40 60 80 100 120 140 160 220 240 260 280 300 320 340 360 40 40 FLOOD SIDE PROTECTED SIDE Vert 2 Vert 1 20 20 **ELEVATION IN FEET N.A.V.D 88** Vert 3 EL. 8.3 ft EL. 8 ft 1V:3.6H Hw = 0.4'1V:4.4H 0 1V:5.7H EL. -6 ft EL. -1.7 ft MARSH S -20 -20 -40 BAY SOUND CLAY S -60 -60

Name: SHEET PILE Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: UPPER EMBANKMENT FILL S Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH S Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY S Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: LOWER EMBANKMENT FILL S Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: DMM - MARSH S Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: DMM - LOWER EMBANKMENT S Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: BEACH SAND S Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

GENERAL NOTES

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CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis LWL-S File Name: 17thReach29.gsz Last Edited By: Goltz, Amanda MVS

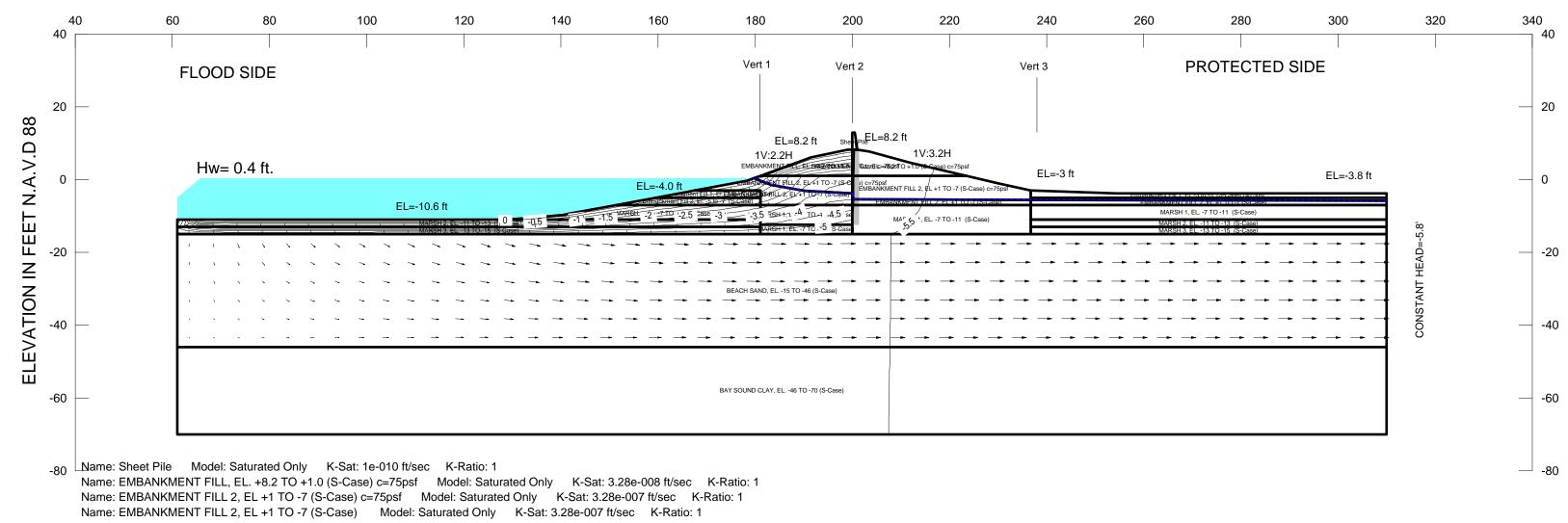




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17th STREET OUTFALL CANAL, REACH 29 STABILITY ANALYSIS CASE: Seepage Analysis LWL-S STA. 620+30 - 624+88 EAST ORLEANS PARISH, LOUISIANA



Name: BEACH SAND, EL. -15 TO -46 (S-Case) Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -46 TO -70 (S-Case) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: MARSH 1, EL. -7 TO -11 (S-Case) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: MARSH 2, EL. -11 TO -13 (S-Case) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: MARSH 3, EL. -13 TO -15 (S-Case) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Embankment Fill 1, El. -3 to -5 (S-Case) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Embankment Fill 2, El. -5 to -7 (S-Case) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Embankment Fill 1, El. -3 to -5 (S-Case) c=75psf Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: Embankment Fill 2, El. -5 to -7 (S-Case) c=75psf Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

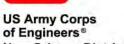
CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

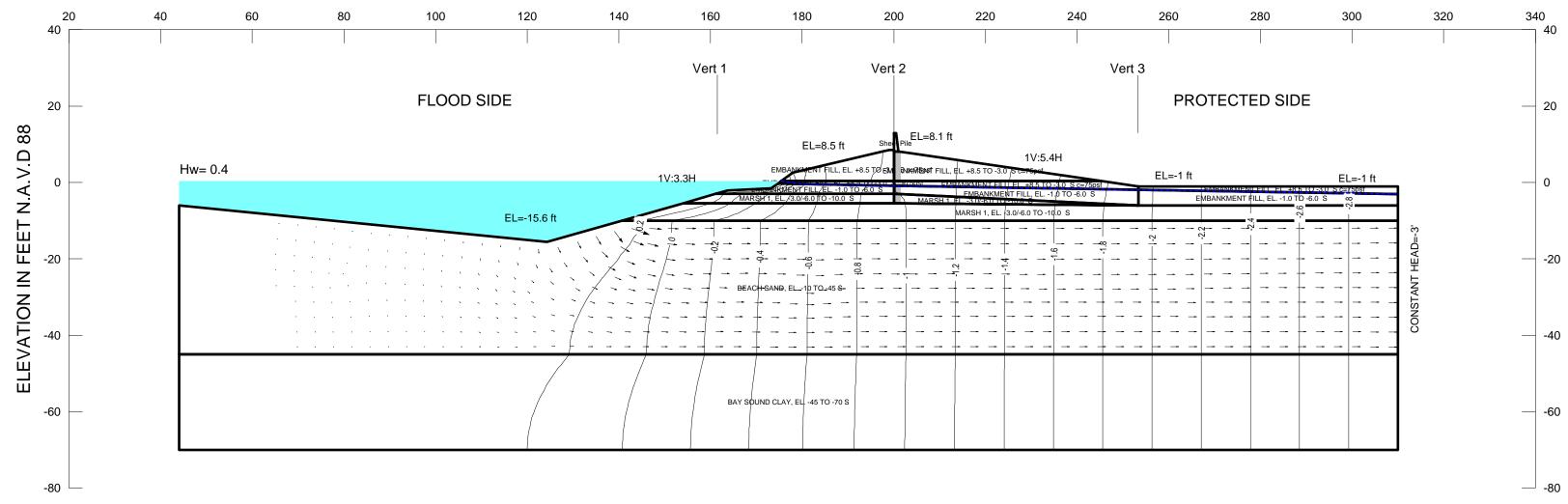
Name: Seepage Analysis LWL-S File Name: 17thReach30.gsz Last Edited By: Goltz, Amanda MVS



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17th STREET OUTFALL CANAL, REACH 30, STABILITY ANALYSIS, CASE: Seepage Analysis LWL-S STA. 626+73 to 634+09 EAST ORLEANS PARISH, LOUISIANA



Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: MARSH 1, EL. -3.0/-6.0 TO -10.0 S Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -10 TO -45 S Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1 Name: BAY SOUND CLAY, EL. -45 TO -70 S Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: EMBANKMENT FILL, EL. -1.0 TO -6.0 S Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: EMBANKMENT FILL, EL. +8.5 TO -3.0 S c=75psf Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis LWL-S File Name: 17thReach31.gsz Last Edited By: Goltz, Amanda MVS

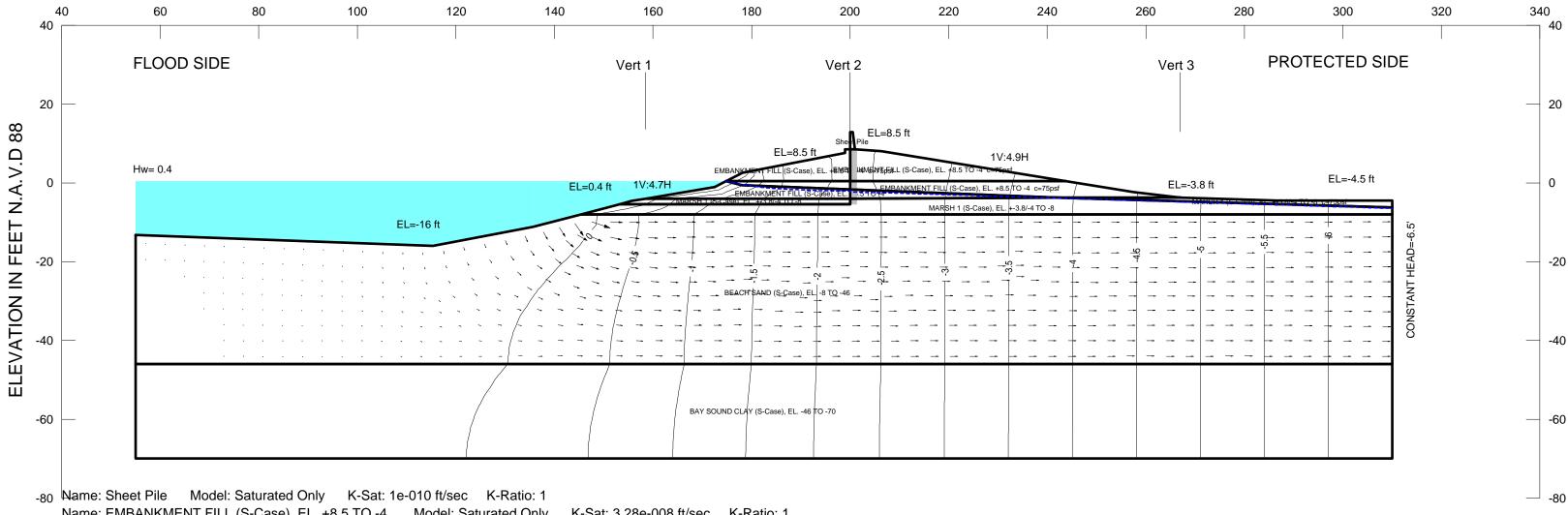




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17th STREET OUTFALL CANAL, REACH 31, STABILITY ANALYSIS, CASE: Seepage Analysis LWL-S STA. 634+09 to 637+00 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL (S-Case), EL. +8.5 TO -4 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH 1 (S-Case), EL. +-3.8/-4 TO -8 Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1 Name: BEACH SAND (S-Case), EL. -8 TO -46 Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY (S-Case), EL. -46 TO -70 Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL (S-Case), EL. +8.5 TO -4 c=75psf Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH 1 (S-Case), EL. +-3.8/-4 TO -8 c=75psf Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis LWL-S File Name: 17thReach32.gsz Last Edited By: Goltz, Amanda MVS

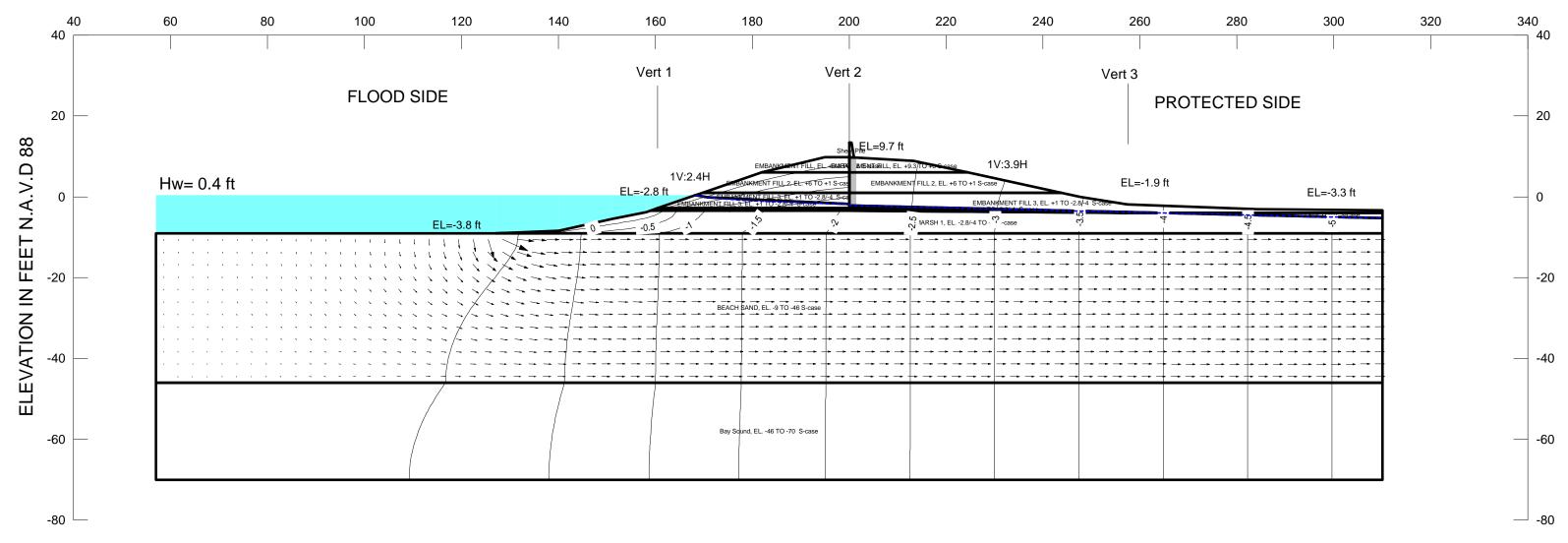




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17th STREET OUTFALL CANAL, REACH 32, STABILITY ANALYSIS, CASE: Seepage Analysis LWL-S STA. 637+00 to 638+44 EAST ORLEANS PARISH, LOUISIANA



Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL, EL. +9.3 TO +6 S-case Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: EMBANKMENT FILL 2, EL. +6 TO +1 S-case Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1
Name: EMBANKMENT FILL 3, EL. +1 TO -2.8/-4 S-case Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: MARSH 1, EL. -2.8/-4 TO -9 S-case Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1
Name: BEACH SAND, EL. -9 TO -46 S-case Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1
Name: Bay Sound, EL. -46 TO -70 S-case Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

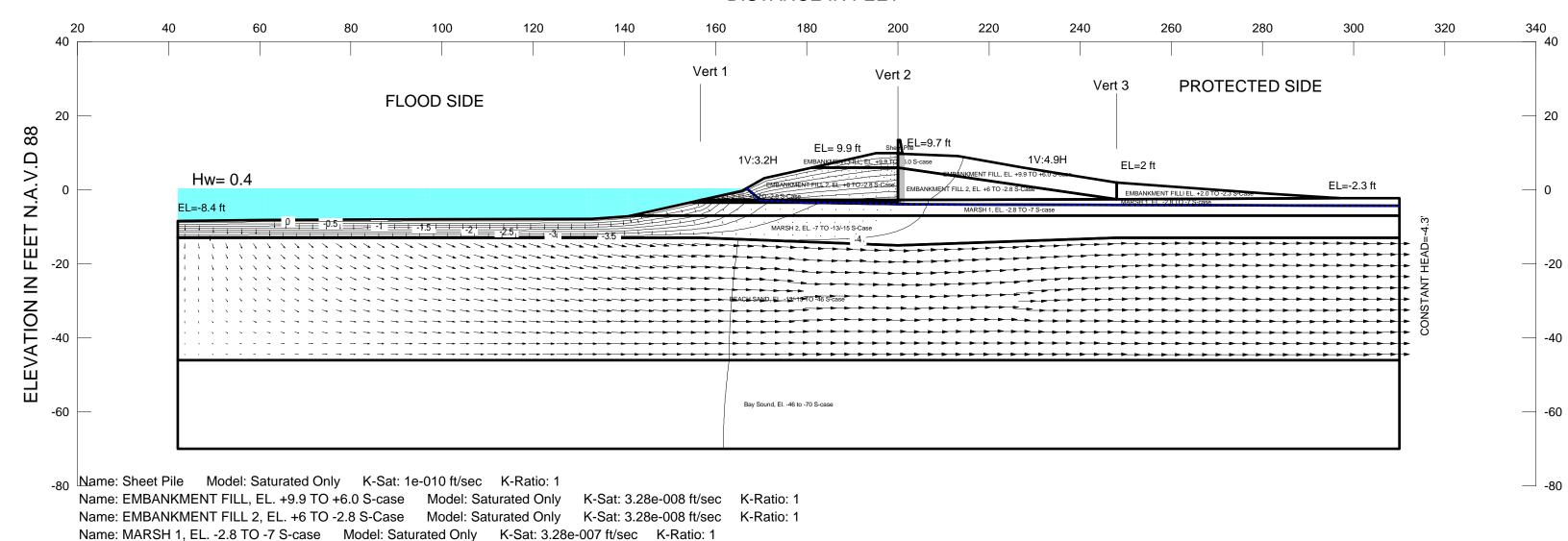
Name: Seepage Analysis (LWL-S) File Name: 17thReach33.gsz Last Edited By: Dieckmann, Timothy MVS





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17th STREET OUTFALL CANAL, REACH 33, STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-S) STA. 643+40 to 658+00 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 2, EL. -7 TO -13/-15 S-Case Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BEACH SAND, EL. -13/-15 TO -46 S-case Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

Name: Bay Sound, El. -46 to -70 S-case Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

Name: EMBANKMENT FILLI EL. +2.0 TO -2.3 S-Case Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-S) File Name: 17thReach34.gsz

Last Edited By: Dieckmann, Timothy MVS

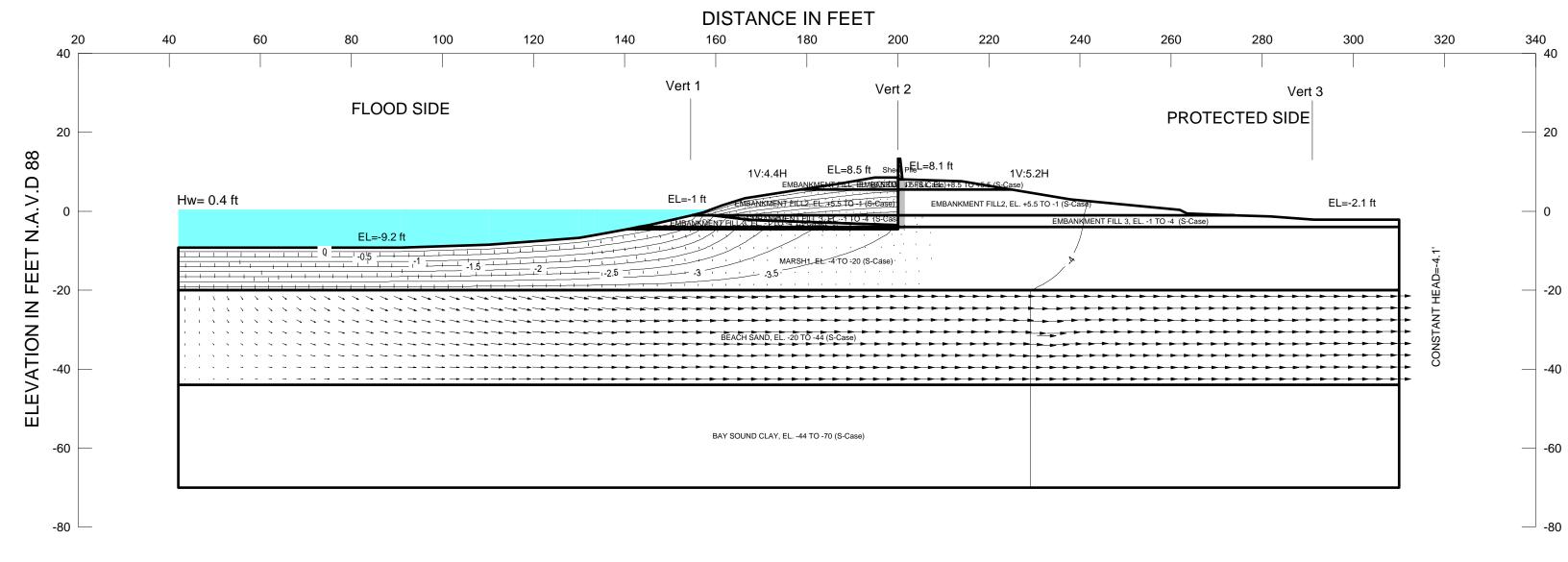


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17th STREET OUTFALL CANAL, REACH 34, STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-S) STA. 658+00- 662+87 EAST ORLEANS PARISH, LOUISIANA



Name: Sheet Pile Model: Saturated Only K-Sat: 1e-010 ft/sec K-Ratio: 1

Name: EMBANKMENT FILL, EL. +8.5 TO +5.5 (S-Case) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: EMBANKMENT FILL2, EL. +5.5 TO -1 (S-Case) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: EMBANKMENT FILL 3, EL. -1 TO -4 (S-Case) Model: Saturated Only K-Sat: 3.28e-007 ft/sec

Name: MARSH1, EL. -4 TO -20 (S-Case) Model: Saturated Only K-Sat: 3.28e-007 ft/sec K-Ratio: 1

Name: BAY SOUND CLAY, EL. -44 TO -70 (S-Case) Model: Saturated Only K-Sat: 3.28e-008 ft/sec K-Ratio: 1 Name: BEACH SAND, EL. -20 TO -44 (S-Case) Model: Saturated Only K-Sat: 0.00049 ft/sec K-Ratio: 1

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Seepage Analysis (LWL-S) File Name: 17thReach35.gsz Last Edited By: Dieckmann, Timothy MVS

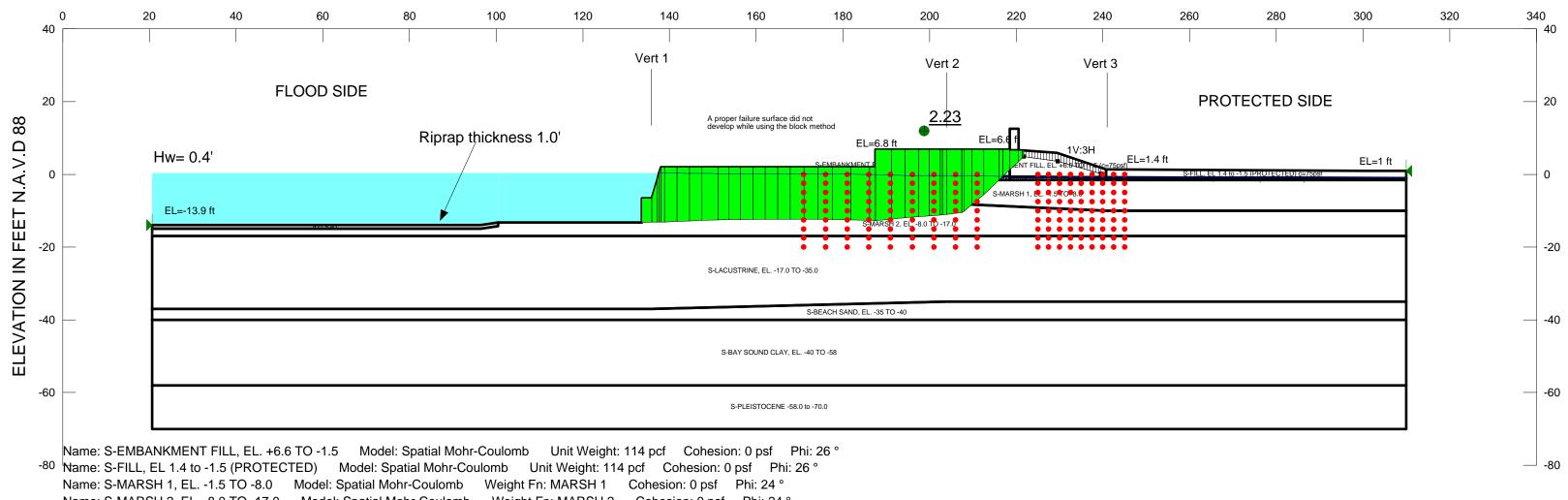




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17th STREET OUTFALL CANAL, REACH 35, STABILITY ANALYSIS, CASE: Seepage Analysis (LWL-S) STA. 662+87 to 670+63 EAST ORLEANS PARISH, LOUISIANA



Name: S-MARSH 2, EL. -8.0 TO -17.0 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 0 psf Phi: 24 ° Name: S-LACUSTRINE, EL. -17.0 TO -35.0 Model: Spatial Mohr-Coulomb Weight Fn: LACUSTRINE Cohesion: 0 psf Phi: 26 ° Name: S-BAY SOUND CLAY, EL. -40 TO -58 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 ° Name: S-PLEISTOCENE -58.0 to -70.0 Model: Spatial Mohr-Coulomb Weight Fn: Pleistocene Cohesion: 0 psf Phi: 32 ° Name: S-BEACH SAND, EL. -35 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: S-EMBANKMENT FILL, EL. +6.6 TO -1.5 (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26°

Name: Rip Rap Model: Spatial Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 0 psf Phi: 40 ° Name: S-FILL, EL 1.4 to -1.5 (PROTECTED) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-S-FS thru File Name: 17thReach01.gsz Last Edited By: Redell, Chris MVS



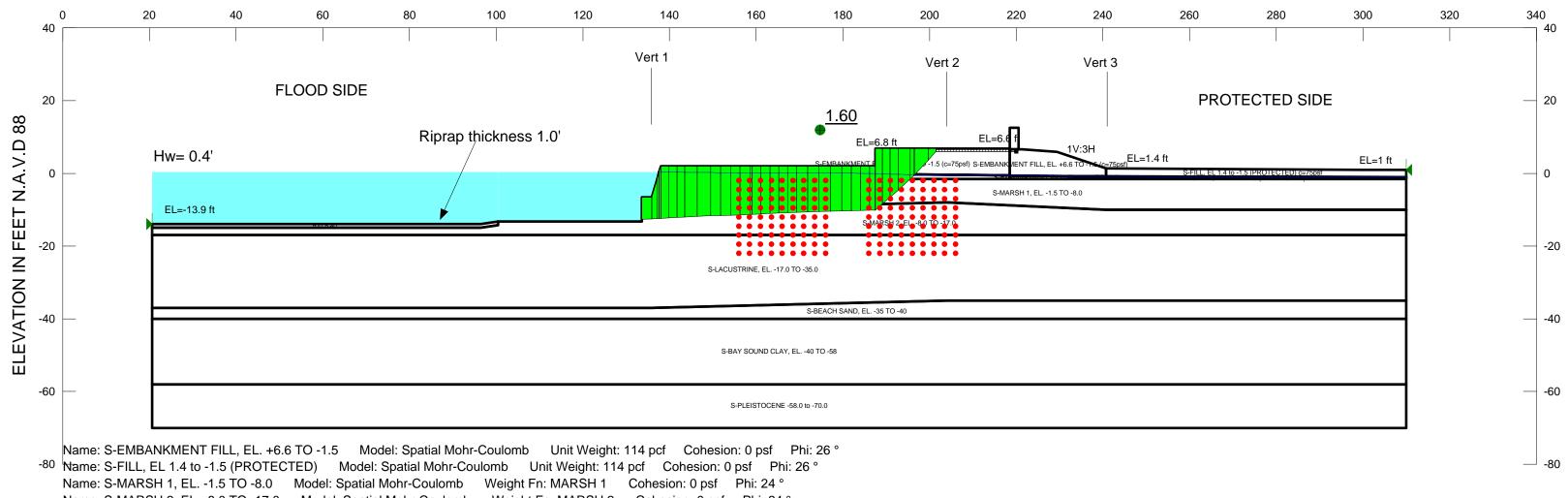


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17th STREET OUTFALL CANAL, REACH 01, STABILITY ANALYSIS.

CASE: Slope Stability (Block) LWL-S-FS thru Closure to STA. 552+21.5 WEST ORLEANS PARISH, LOUISIANA



Name: S-MARSH 2, EL. -8.0 TO -17.0 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 0 psf Phi: 24 ° Name: S-LACUSTRINE, EL. -17.0 TO -35.0 Model: Spatial Mohr-Coulomb Weight Fn: LACUSTRINE Cohesion: 0 psf Phi: 26 ° Name: S-BAY SOUND CLAY, EL. -40 TO -58 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 ° Name: S-PLEISTOCENE -58.0 to -70.0 Model: Spatial Mohr-Coulomb Weight Fn: Pleistocene Cohesion: 0 psf Phi: 32 ° Name: S-BEACH SAND, EL. -35 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: S-EMBANKMENT FILL, EL. +6.6 TO -1.5 (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26° Name: Rip Rap Model: Spatial Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 0 psf Phi: 40 °

Name: S-FILL, EL 1.4 to -1.5 (PROTECTED) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-S-FS in front File Name: 17thReach01.gsz Last Edited By: Redell, Chris MVS



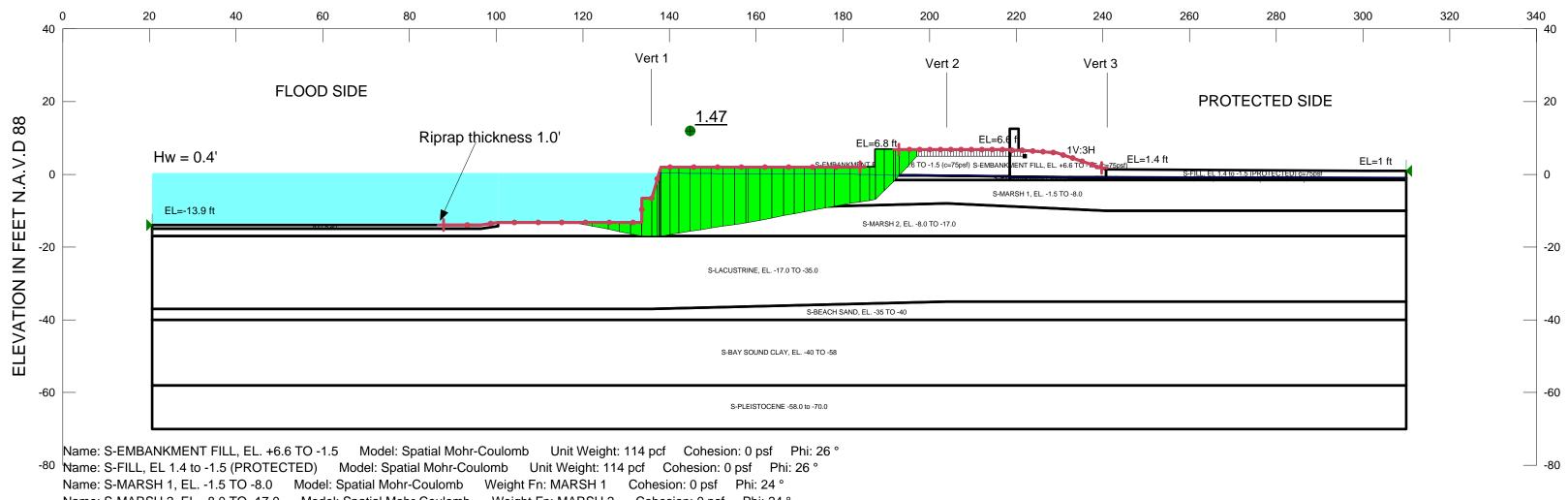


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17th STREET OUTFALL CANAL, REACH 01, STABILITY ANALYSIS. CASE: Slope Stability (Block) LWL-S-FS in front

Closure to STA. 552+21.5 WEST ORLEANS PARISH, LOUISIANA



Name: S-MARSH 2, EL. -8.0 TO -17.0 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 0 psf Phi: 24 ° Name: S-LACUSTRINE, EL. -17.0 TO -35.0 Model: Spatial Mohr-Coulomb Weight Fn: LACUSTRINE Cohesion: 0 psf Phi: 26 ° Name: S-BAY SOUND CLAY, EL. -40 TO -58 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 ° Name: S-PLEISTOCENE -58.0 to -70.0 Model: Spatial Mohr-Coulomb Weight Fn: Pleistocene Cohesion: 0 psf Phi: 32 ° Name: S-BEACH SAND, EL. -35 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: S-EMBANKMENT FILL, EL. +6.6 TO -1.5 (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26° Name: Rip Rap Model: Spatial Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 0 psf Phi: 40 °

Name: S-FILL, EL 1.4 to -1.5 (PROTECTED) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-S-FS in front File Name: 17thReach01.gsz Last Edited By: Redell, Chris MVS



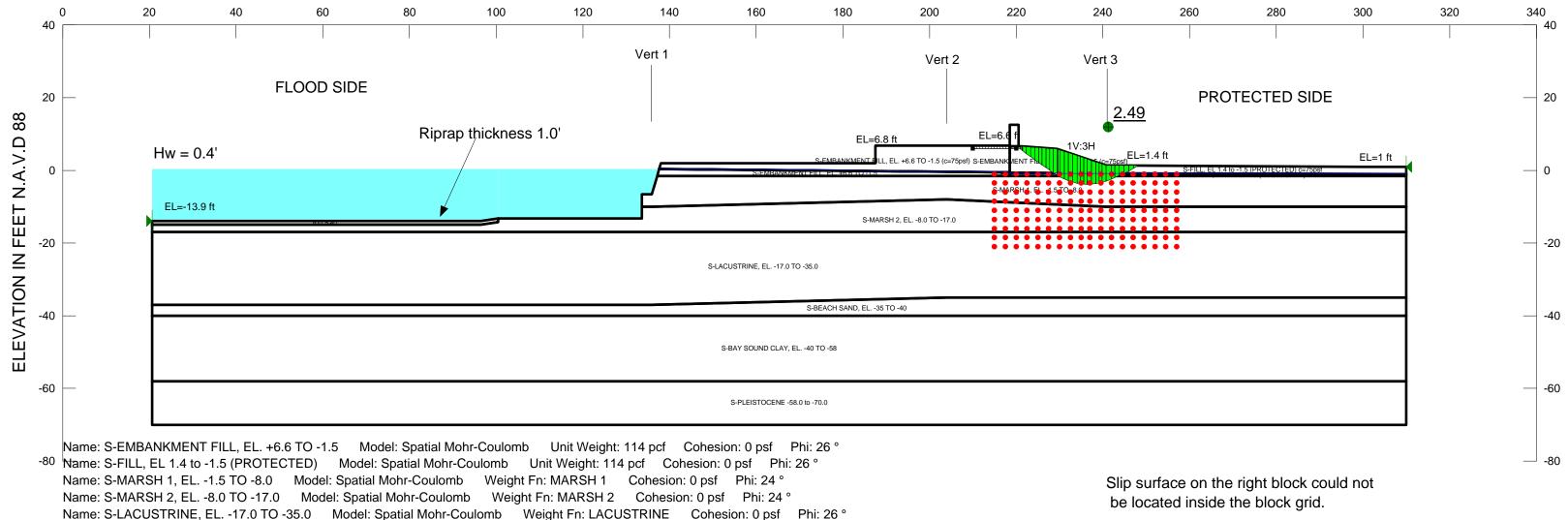


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17th STREET OUTFALL CANAL, REACH 01, STABILITY ANALYSIS.

CASE: Slope Stability (Entry/Exit) LWL-S-FS in front Closure to STA. 552+21.5 WEST ORLEANS PARISH, LOUISIANA



be located inside the block grid.

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: S-BAY SOUND CLAY, EL. -40 TO -58 Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 ° Name: S-PLEISTOCENE -58.0 to -70.0 Model: Spatial Mohr-Coulomb Weight Fn: Pleistocene Cohesion: 0 psf Phi: 32 °

Name: S-EMBANKMENT FILL, EL. +6.6 TO -1.5 (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26°

Name: S-FILL, EL 1.4 to -1.5 (PROTECTED) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °

Name: S-BEACH SAND, EL. -35 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: Rip Rap Model: Spatial Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 0 psf Phi: 40 °

Name: Slope Stability (Block) LWL-S-PS File Name: 17thReach01.gsz Last Edited By: Redell, Chris MVS

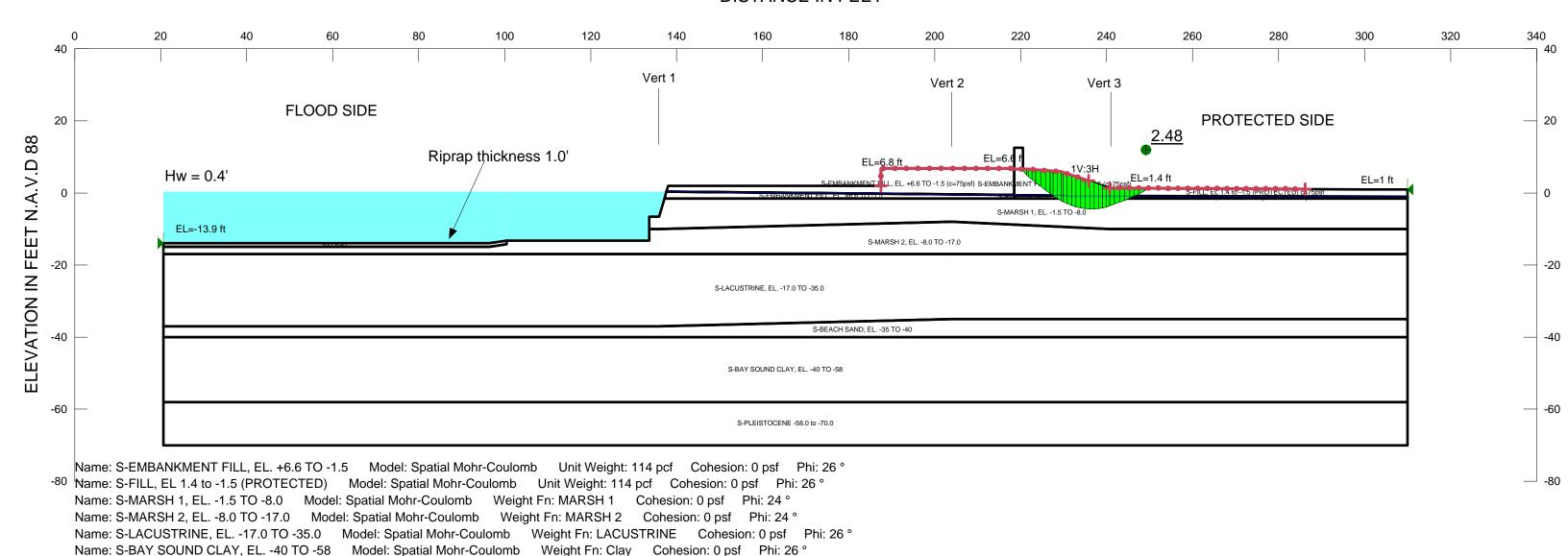


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17th STREET OUTFALL CANAL, REACH 01, STABILITY ANALYSIS.

CASE: Slope Stability (Block) LWL-S-PS Closure to STA. 552+21.5 WEST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: S-PLEISTOCENE -58.0 to -70.0 Model: Spatial Mohr-Coulomb Weight Fn: Pleistocene Cohesion: 0 psf Phi: 32 °

Name: S-EMBANKMENT FILL, EL. +6.6 TO -1.5 (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26°

Name: S-FILL, EL 1.4 to -1.5 (PROTECTED) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °

Name: S-BEACH SAND, EL. -35 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: Rip Rap Model: Spatial Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 0 psf Phi: 40 °

Name: Slope Stability (Entry/Exit) LWL-S-PS File Name: 17thReach01.gsz Last Edited By: Redell, Chris MVS



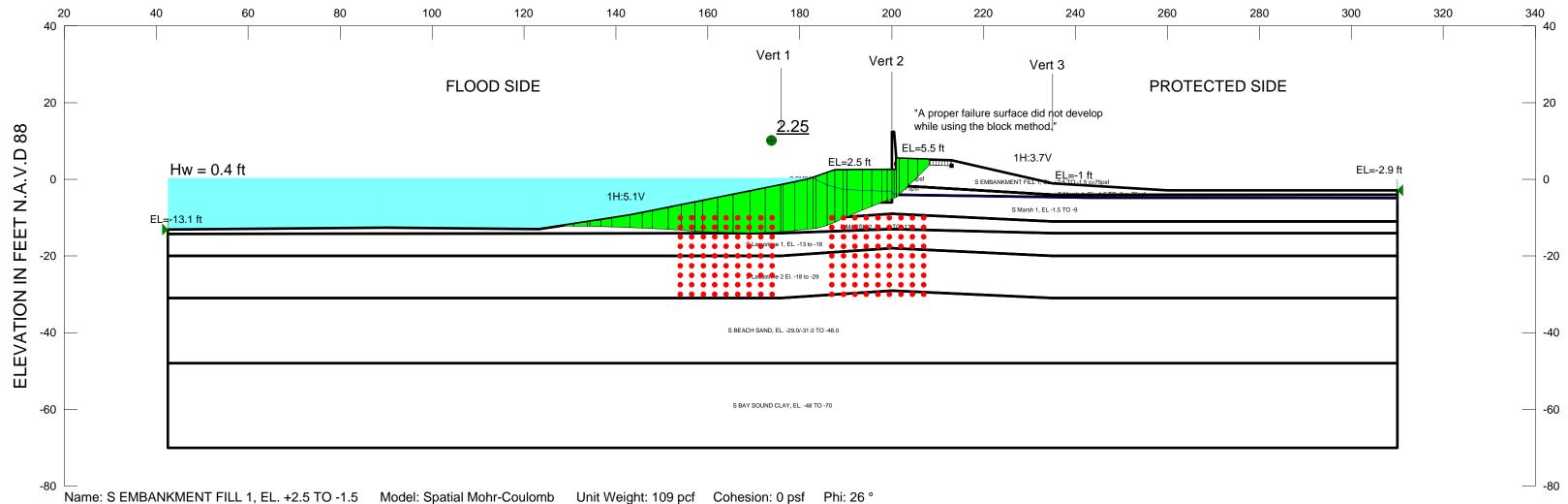


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17th STREET OUTFALL CANAL, REACH 01, STABILITY ANALYSIS.

CASE: Slope Stability (Entry/Exit) LWL-S-PS Closure to STA. 552+21.5 WEST ORLEANS PARISH, LOUISIANA



Name: S EMBANKMENT FILL 1, EL. +2.5 TO -1.5 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 26 °
Name: S Marsh 1, EL -1.5 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 0 psf Phi: 24 °
Name: S MARSH 2, EL. -9 TO -13 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 0 psf Phi: 24 °
Name: S Lacustrine 1, EL. -13 to -18 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °
Name: S Lacustrine 2 El. -18 to -29 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 0 psf Phi: 26 °
Name: S BAY SOUND CLAY, EL. -48 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 °
Name: S EMBANKMENT FILL 1, EL. +2.5 TO -1.5 c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 75 psf Phi: 26 °
Name: S Marsh 1, EL -1.5 TO -9 c=75psf Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 75 psf Phi: 24 °
Name: S BEACH SAND, EL. -29.0/-31.0 TO -48.0 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

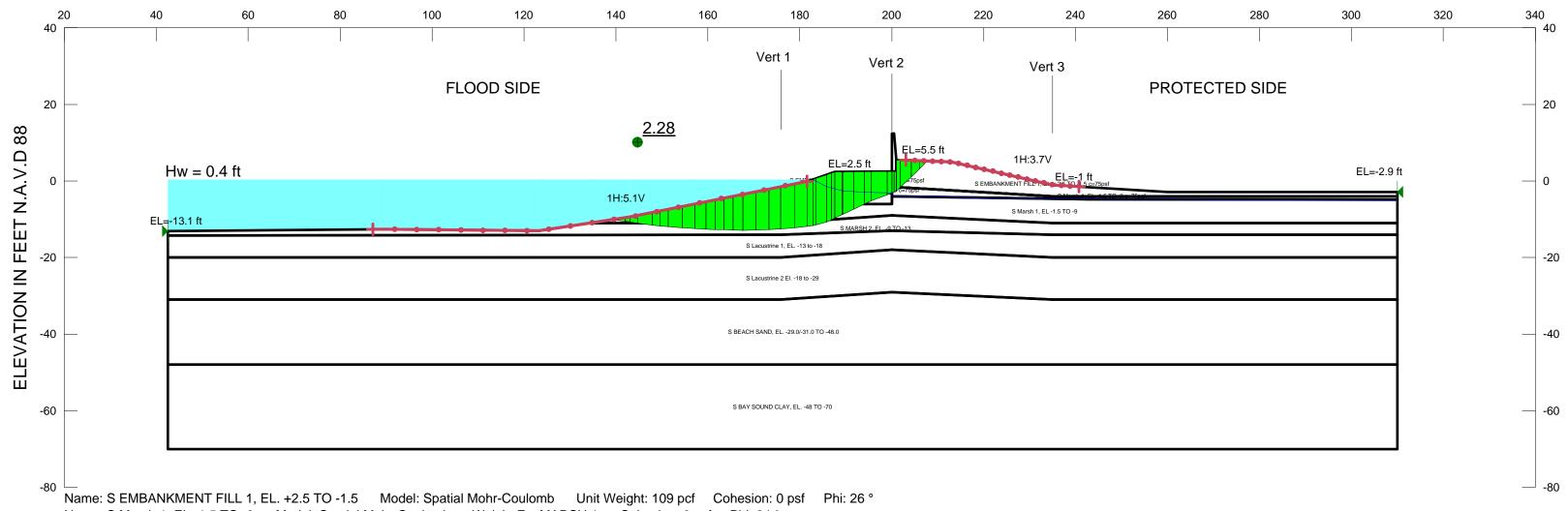
Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach10.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 10, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS STA. 593+00 - 596+05 WEST ORLEANS PARISH, LOUISIANA



Name: S EMBANKMENT FILL 1, EL. +2.5 TO -1.5 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 0 psf Phi: 24 °
Name: S MARSH 2, EL. -9 TO -13 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 0 psf Phi: 24 °
Name: S Lacustrine 1, EL. -13 to -18 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °
Name: S Lacustrine 2 El. -18 to -29 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 0 psf Phi: 26 °
Name: S BAY SOUND CLAY, EL. -48 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 °
Name: S EMBANKMENT FILL 1, EL. +2.5 TO -1.5 c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 75 psf Phi: 26 °
Name: S Marsh 1, EL -1.5 TO -9 c=75psf Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 75 psf Phi: 24 °

Name: S BEACH SAND, EL. -29.0/-31.0 TO -48.0 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

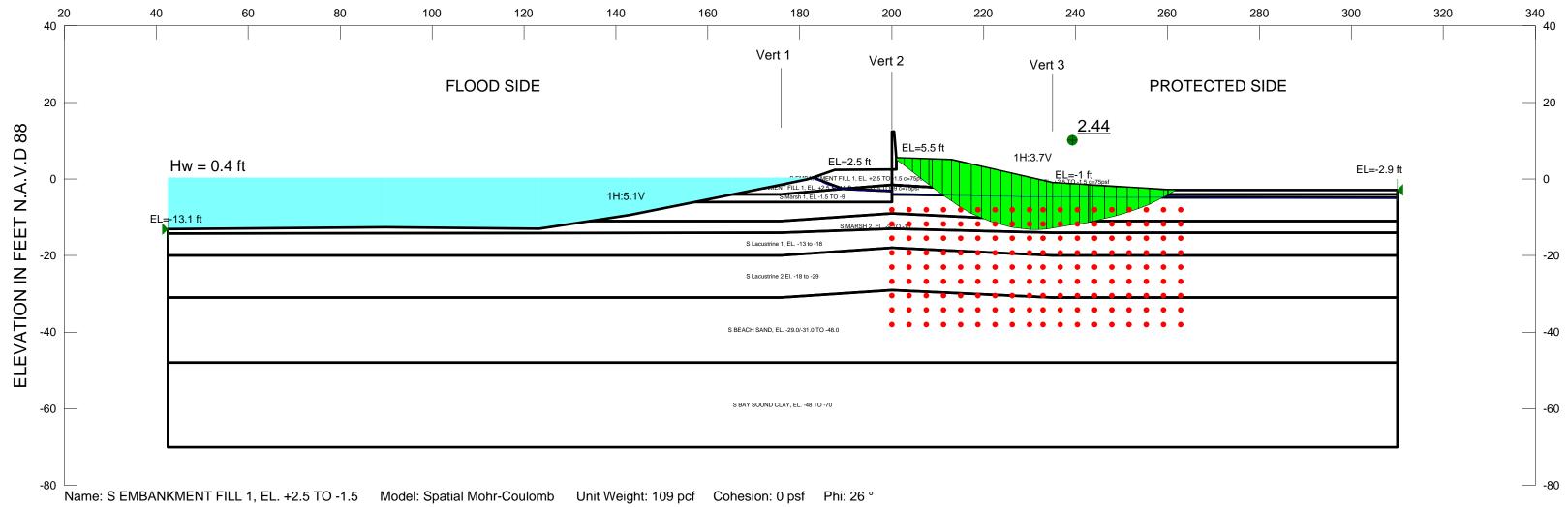
Name: Slope Stability (Enty/Exit) LWL-S-FS File Name: 17thReach10.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 10, STABILITY ANALYSIS, CASE: Slope Stability (Enty/Exit) LWL-S-FS STA. 593+00 - 596+05 WEST ORLEANS PARISH, LOUISIANA



Name: S EMBANKMENT FILL 1, EL. +2.5 TO -1.5 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 26 °
Name: S Marsh 1, EL -1.5 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 0 psf Phi: 24 °
Name: S MARSH 2, EL. -9 TO -13 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 0 psf Phi: 24 °
Name: S Lacustrine 1, EL. -13 to -18 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °
Name: S Lacustrine 2 El. -18 to -29 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 0 psf Phi: 26 °
Name: S BAY SOUND CLAY, EL. -48 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 °
Name: S EMBANKMENT FILL 1, EL. +2.5 TO -1.5 c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 75 psf Phi: 26 °
Name: S Marsh 1, EL -1.5 TO -9 c=75psf Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 75 psf Phi: 24 °
Name: S BEACH SAND, EL. -29.0/-31.0 TO -48.0 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

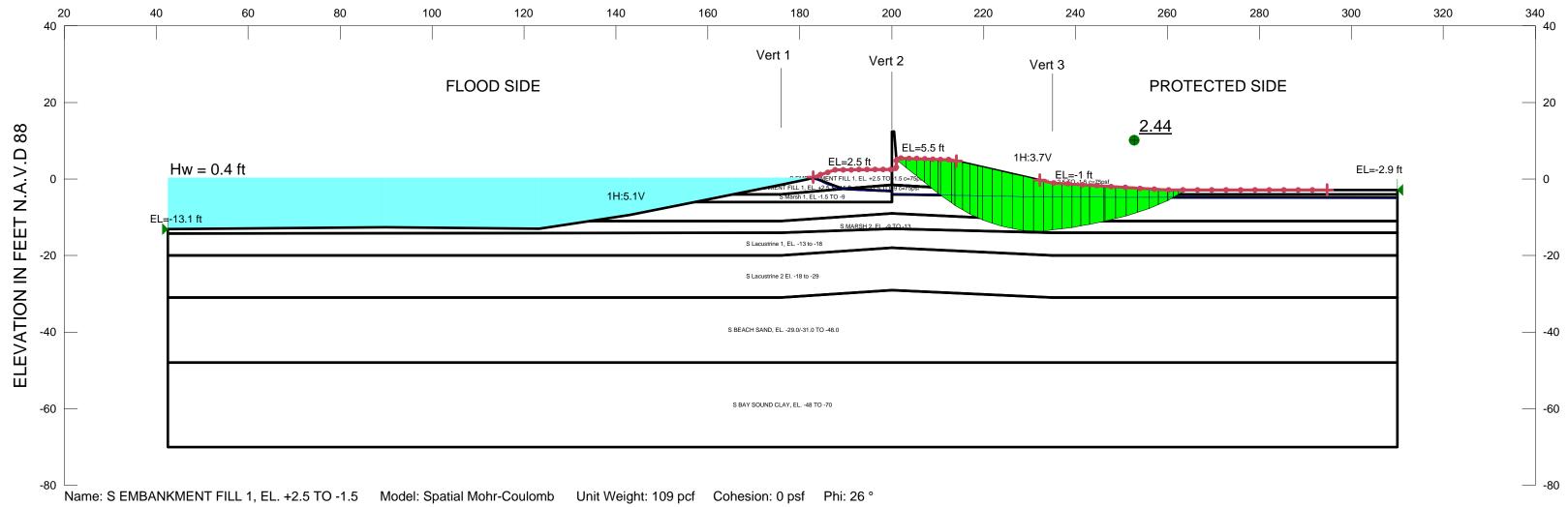
Name: Slope Stability (Block) LWL-S-PS File Name: 17thReach10.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 10, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS STA. 593+00 - 596+05 WEST ORLEANS PARISH, LOUISIANA



Name: S EMBANKMENT FILL 1, EL. +2.5 TO -1.5 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 26 °
Name: S Marsh 1, EL -1.5 TO -9 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 0 psf Phi: 24 °
Name: S MARSH 2, EL. -9 TO -13 Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 0 psf Phi: 24 °
Name: S Lacustrine 1, EL. -13 to -18 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °
Name: S Lacustrine 2 El. -18 to -29 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 0 psf Phi: 26 °
Name: S BAY SOUND CLAY, EL. -48 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 °
Name: S EMBANKMENT FILL 1, EL. +2.5 TO -1.5 c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 75 psf Phi: 26 °
Name: S Marsh 1, EL -1.5 TO -9 c=75psf Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 75 psf Phi: 24 °
Name: S BEACH SAND, EL. -29.0/-31.0 TO -48.0 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Enty/Exit) LWL-S-PS File Name: 17thReach10.gsz Last Edited By: Redell, Chris MVS

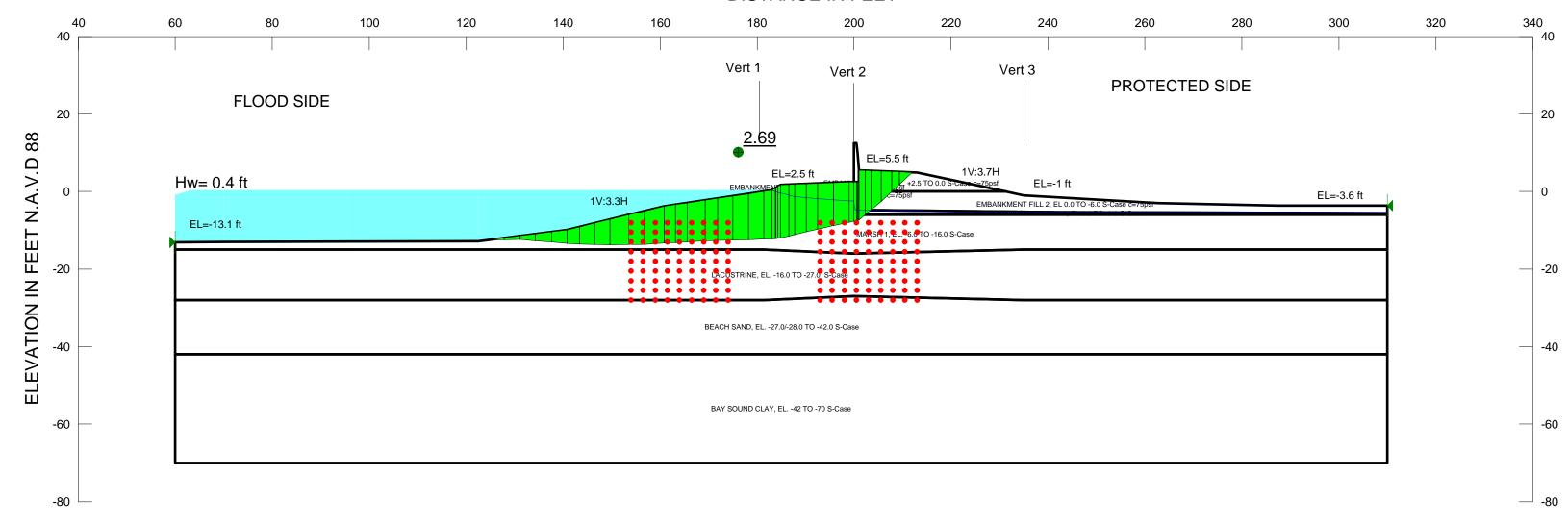




US Army Corps of Engineers® Saint Louis District

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17th STREET OUTFALL CANAL, REACH 10, STABILITY ANALYSIS, CASE: Slope Stability (Enty/Exit) LWL-S-PS STA. 593+00 - 596+05 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 S-Case Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion: 0 psf Phi: 26 °
Name: MARSH 1, EL. -6.0 TO -16.0 S-Case Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion: 0 psf Phi: 24 °
Name: BAY SOUND CLAY, EL. -42 TO -70 S-Case Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 °
Name: LACUSTRINE, EL. -16.0 TO -27.0 S-Case Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion: 0 psf Phi: 26 °
Name: BEACH SAND, EL. -27.0/-28.0 TO -42.0 S-Case Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: EMBANKMENT FILL, EL. +2.5 TO 0.0 S-Case c=75psf Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 75 psf Phi: 26 °
Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 S-Case c=75psf Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

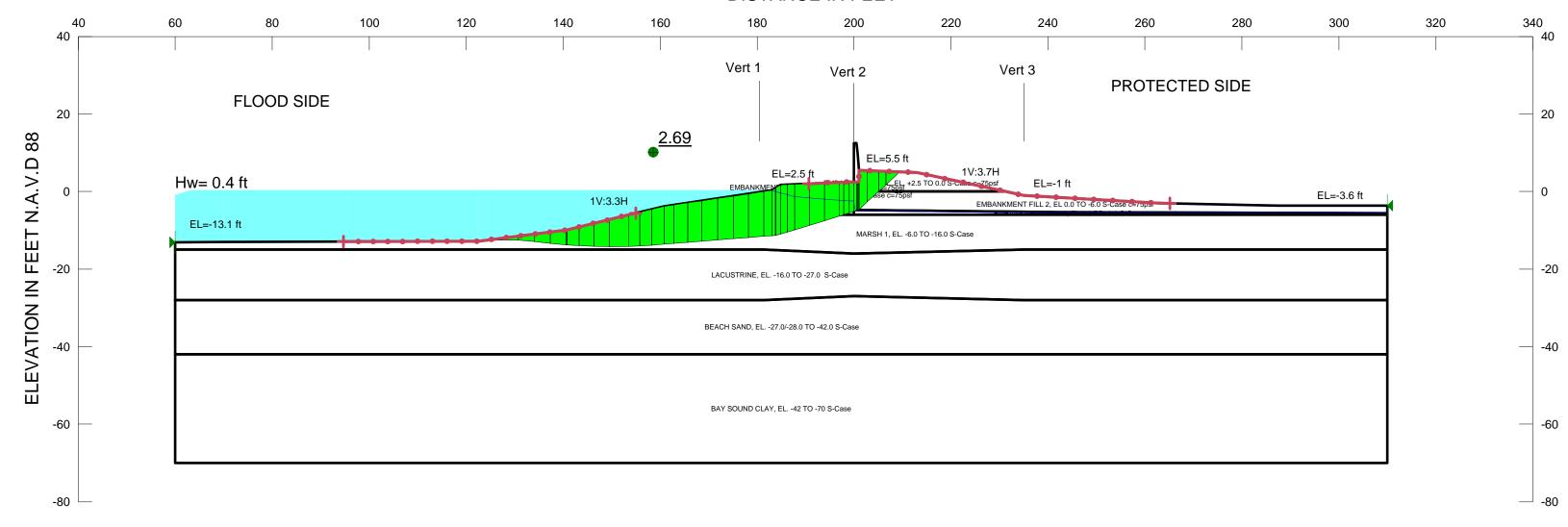
Name: Slope Stability (Block) FS S-case File Name: 17thReach11.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 11, STABILITY ANALYSIS, CASE: Slope Stability (Block) FS S-case STA. 596+05 to 609+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 S-Case Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion: 0 psf Phi: 26 ° Name: MARSH 1, EL. -6.0 TO -16.0 S-Case Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion: 0 psf Phi: 24 ° Name: BAY SOUND CLAY, EL. -42 TO -70 S-Case Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 ° Name: LACUSTRINE, EL. -16.0 TO -27.0 S-Case Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion: 0 psf Phi: 26 ° Name: BEACH SAND, EL. -27.0/-28.0 TO -42.0 S-Case Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: EMBANKMENT FILL, EL. +2.5 TO 0.0 S-Case c=75psf Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 S-Case c=75psf Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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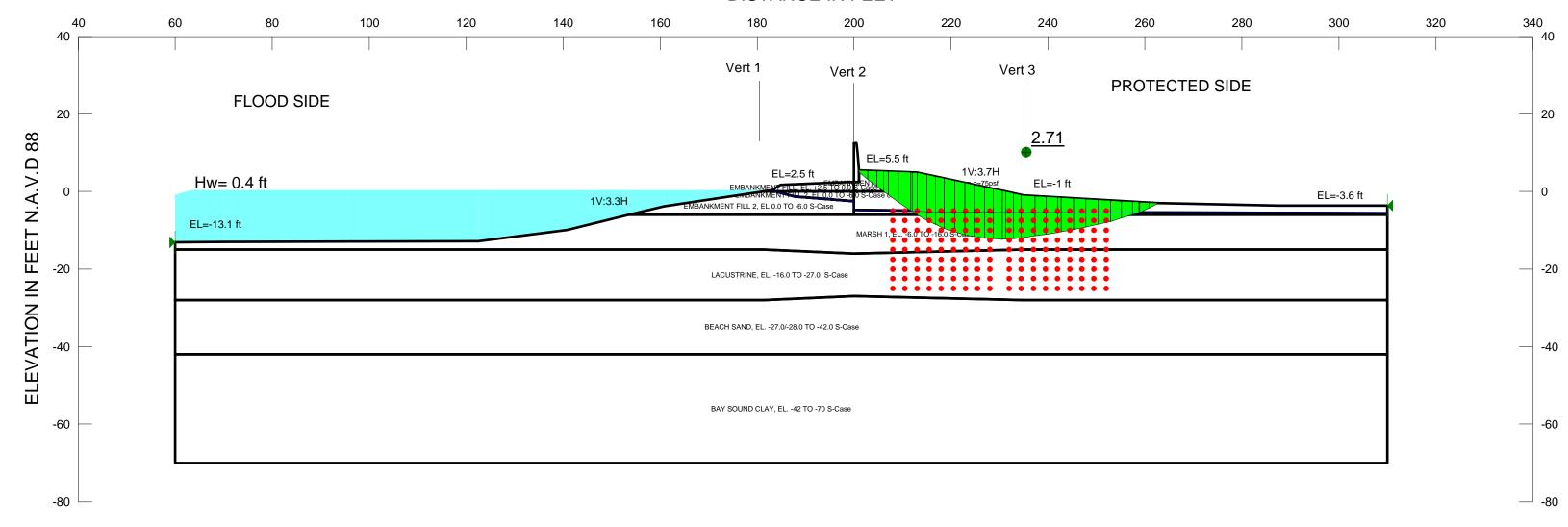
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17th STREET OUTFALL CANAL, REACH 11, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) FS S-case STA. 596+05 to 609+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 S-Case Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion: 0 psf Phi: 26 °
Name: MARSH 1, EL. -6.0 TO -16.0 S-Case Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion: 0 psf Phi: 24 °
Name: BAY SOUND CLAY, EL. -42 TO -70 S-Case Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 °
Name: LACUSTRINE, EL. -16.0 TO -27.0 S-Case Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion: 0 psf Phi: 26 °
Name: BEACH SAND, EL. -27.0/-28.0 TO -42.0 S-Case Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: EMBANKMENT FILL, EL. +2.5 TO 0.0 S-Case c=75psf Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 75 psf Phi: 26 °
Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 S-Case c=75psf Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

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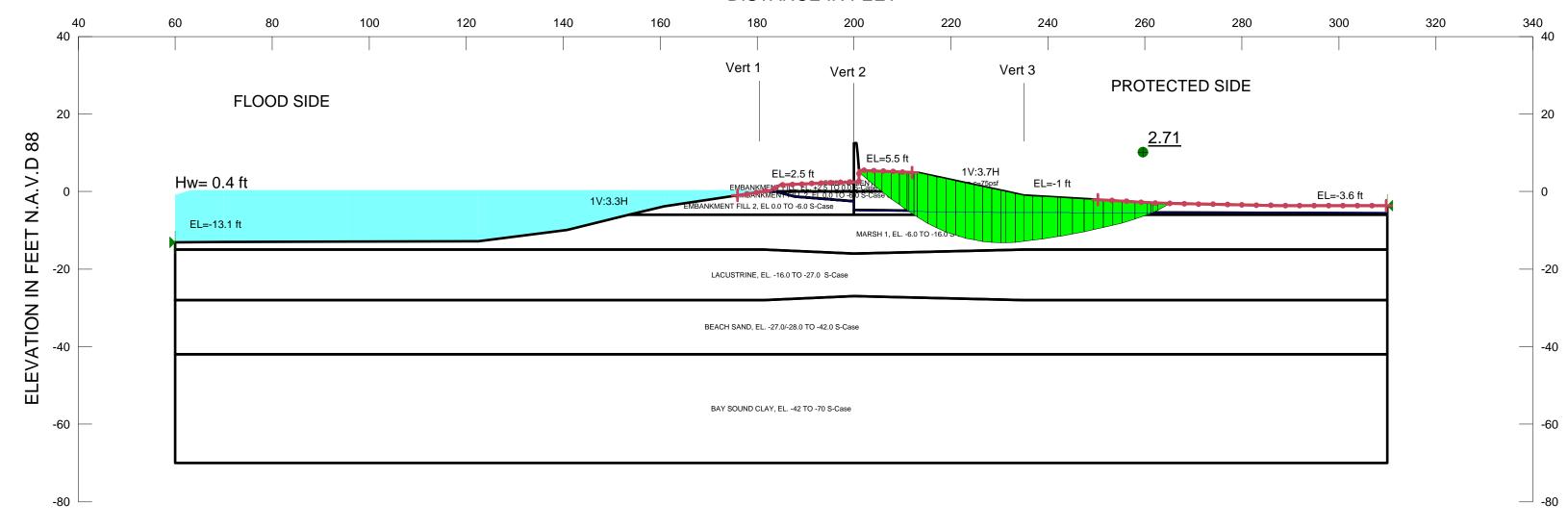
Name: Slope Stability (Block) PS S-case File Name: 17thReach11.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 11, STABILITY ANALYSIS, CASE: Slope Stability (Block) PS S-case STA. 596+05 to 609+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 S-Case Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion: 0 psf Phi: 26 °
Name: MARSH 1, EL. -6.0 TO -16.0 S-Case Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion: 0 psf Phi: 24 °
Name: BAY SOUND CLAY, EL. -42 TO -70 S-Case Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 °
Name: LACUSTRINE, EL. -16.0 TO -27.0 S-Case Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion: 0 psf Phi: 26 °
Name: BEACH SAND, EL. -27.0/-28.0 TO -42.0 S-Case Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: EMBANKMENT FILL, EL. +2.5 TO 0.0 S-Case c=75psf Model: Mohr-Coulomb Unit Weight: 118 pcf Cohesion: 75 psf Phi: 26 °
Name: EMBANKMENT FILL 2, EL 0.0 TO -6.0 S-Case c=75psf Model: Spatial Mohr-Coulomb Weight Fn: FILL 2 Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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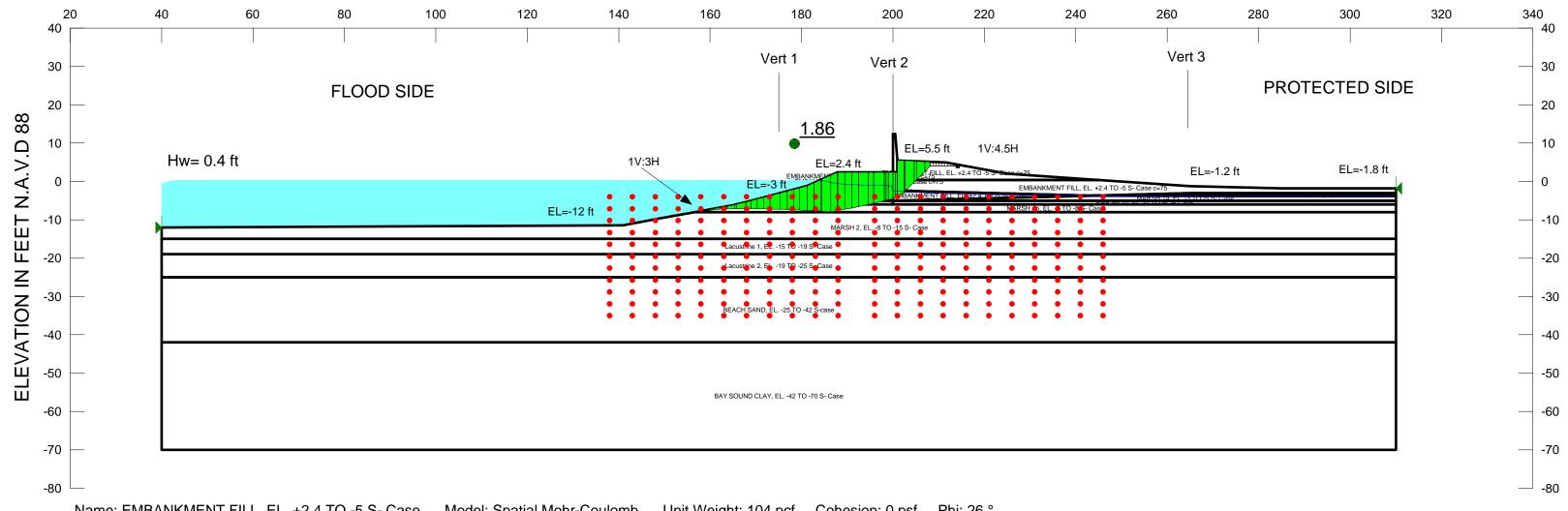
Name: Slope Stability (Entry/Exit) PS S-case File Name: 17thReach11.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 11, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) PS S-case STA. 596+05 to 609+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.4 TO -5 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 26 °

Name: MARSH 1a, EL. -3 TO -5 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion: 0 psf Phi: 24 °
Name: MARSH 1b, EL. -5 TO -8 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion: 0 psf Phi: 24 °
Name: MARSH 2, EL. -8 TO -15 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 24 °
Name: Lacustrine 1, EL. -15 TO -19 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 °
Name: BAY SOUND CLAY, EL. -42 TO -70 S- Case Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 °
Name: Lacustrine 2, EL. -19 TO -25 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL, EL. +2.4 TO -5 S- Case c=75 Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 75 psf Phi: 26 °

Name: MARSH 1a, EL. -3 TO -5 S- Case (c=75 psf) Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion: 75 psf Phi: 24 ° Name: BEACH SAND, EL. -25 TO -42 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
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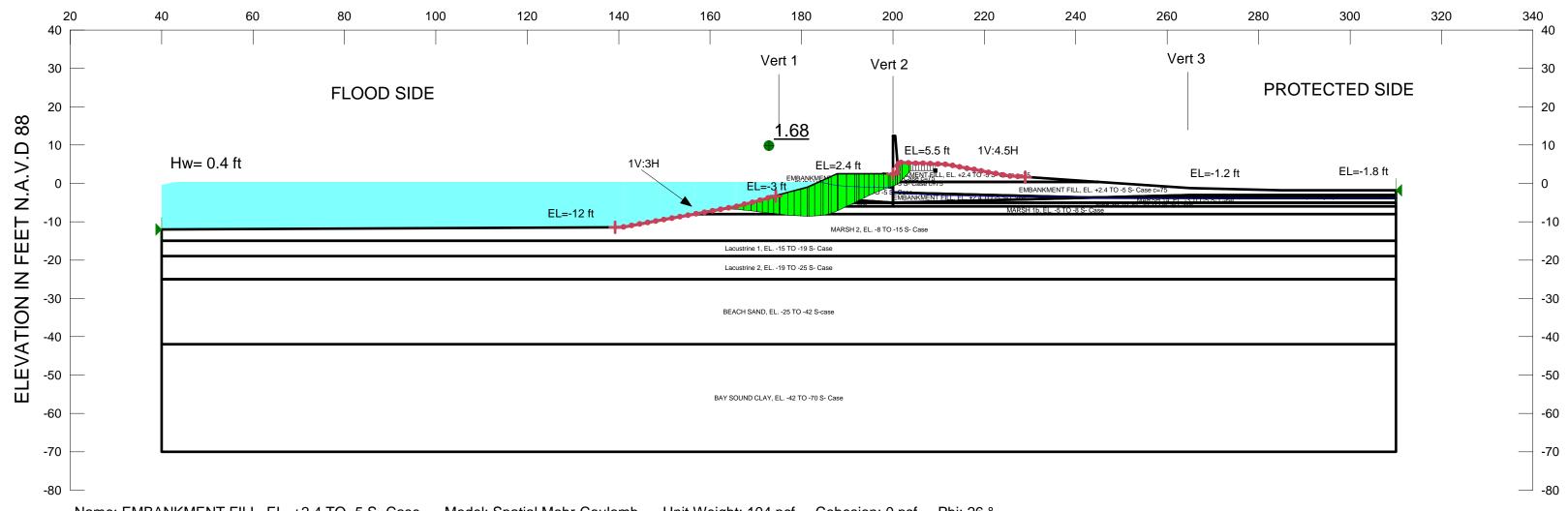
Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach12.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 12, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS STA. 609+00 to 614+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.4 TO -5 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 26 ° Name: MARSH 1a, EL. -3 TO -5 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion: 0 psf Phi: 24 °

Name: MARSH 1b, EL. -5 TO -8 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion: 0 psf Phi: 24 ° Name: MARSH 2, EL. -8 TO -15 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 24 °

Name: Lacustrine 1, EL. -15 TO -19 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 °

Name: BAY SOUND CLAY, EL. -42 TO -70 S- Case Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 ° Name: Lacustrine 2, EL. -19 TO -25 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL, EL. +2.4 TO -5 S- Case c=75 Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 75 psf Phi: 26 °

Name: MARSH 1a, EL. -3 TO -5 S- Case (c=75 psf) Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion: 75 psf Phi: 24 °

Name: BEACH SAND, EL. -25 TO -42 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
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Name: Slope Stability (Entry/ Exit) LWL-S-FS File Name: 17thReach12.gsz Last Edited By: Redell, Chris MVS

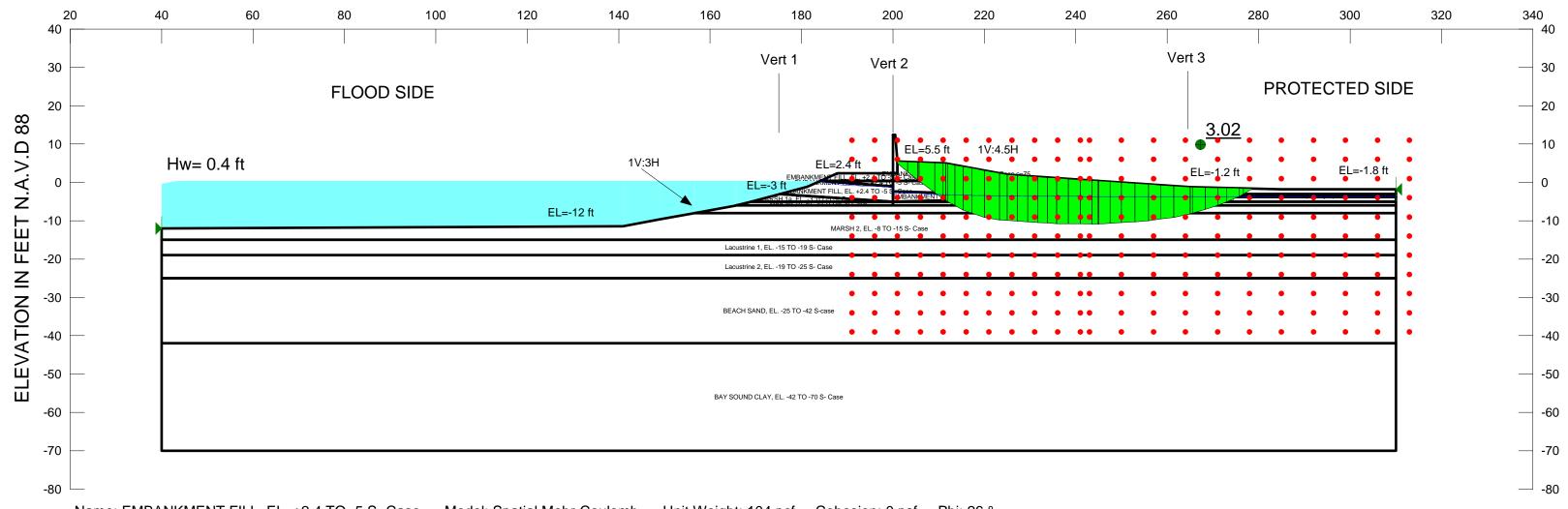




New Orleans District

17th STREET OUTFALL CANAL, REACH 12,

17th STREET OUTFALL CANAL, REACH 12, STABILITY ANALYSIS, CASE: Slope Stability (Entry/ Exit) LWL-S-FS STA. 609+00 to 614+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.4 TO -5 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 26 °

Name: MARSH 1a, EL. -3 TO -5 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion: 0 psf Phi: 24 ° Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion: 0 psf Phi: 24° Name: MARSH 1b, EL. -5 TO -8 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 24 ° Name: MARSH 2, EL. -8 TO -15 S- Case Name: Lacustrine 1, EL. -15 TO -19 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: BAY SOUND CLAY, EL. -42 TO -70 S- Case Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 ° Name: Lacustrine 2, EL. -19 TO -25 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL, EL. +2.4 TO -5 S- Case c=75 Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 75 psf Phi: 26 °

Name: MARSH 1a, EL. -3 TO -5 S- Case (c=75 psf) Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion: 75 psf Phi: 24 ° Name: BEACH SAND, EL. -25 TO -42 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

GENERAL NOTES

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Name: Slope Stability (Block) LWL-S-PS File Name: 17thReach12.gsz Last Edited By: Redell, Chris MVS

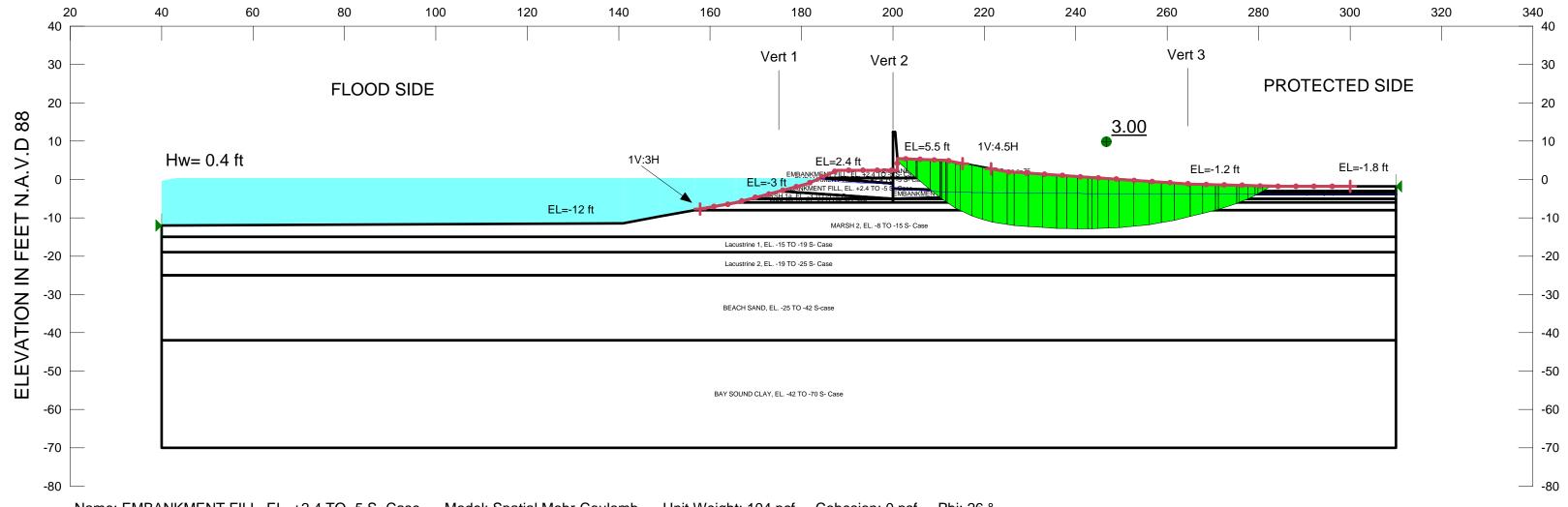




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17th STREET OUTFALL CANAL, REACH 12, STABILITY ANALYSIS. CASE: Slope Stability (Block) LWL-S-PS STA. 609+00 to 614+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +2.4 TO -5 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 0 psf Phi: 26 °
Name: MARSH 1a, EL. -3 TO -5 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion: 0 psf Phi: 24 °
Name: MARSH 1b, EL. -5 TO -8 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion: 0 psf Phi: 24 °
Name: MARSH 2, EL. -8 TO -15 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 24 °
Name: Lacustrine 1, EL. -15 TO -19 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 °
Name: BAY SOUND CLAY, EL. -42 TO -70 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 °
Name: Lacustrine 2, EL. -19 TO -25 S- Case Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. +2.4 TO -5 S- Case c=75 Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 75 psf Phi: 26 °

Name: EMBANKMENT FILL, EL. +2.4 TO -5 S- Case c=75 Model: Spatial Mohr-Coulomb Unit Weight: 104 pcf Cohesion: 75 psf Phi: 26 ° Name: MARSH 1a, EL. -3 TO -5 S- Case (c=75 psf) Model: Spatial Mohr-Coulomb Unit Weight: 67 pcf Cohesion: 75 psf Phi: 24 °

Name: BEACH SAND, EL. -25 TO -42 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

GENERAL NOTES

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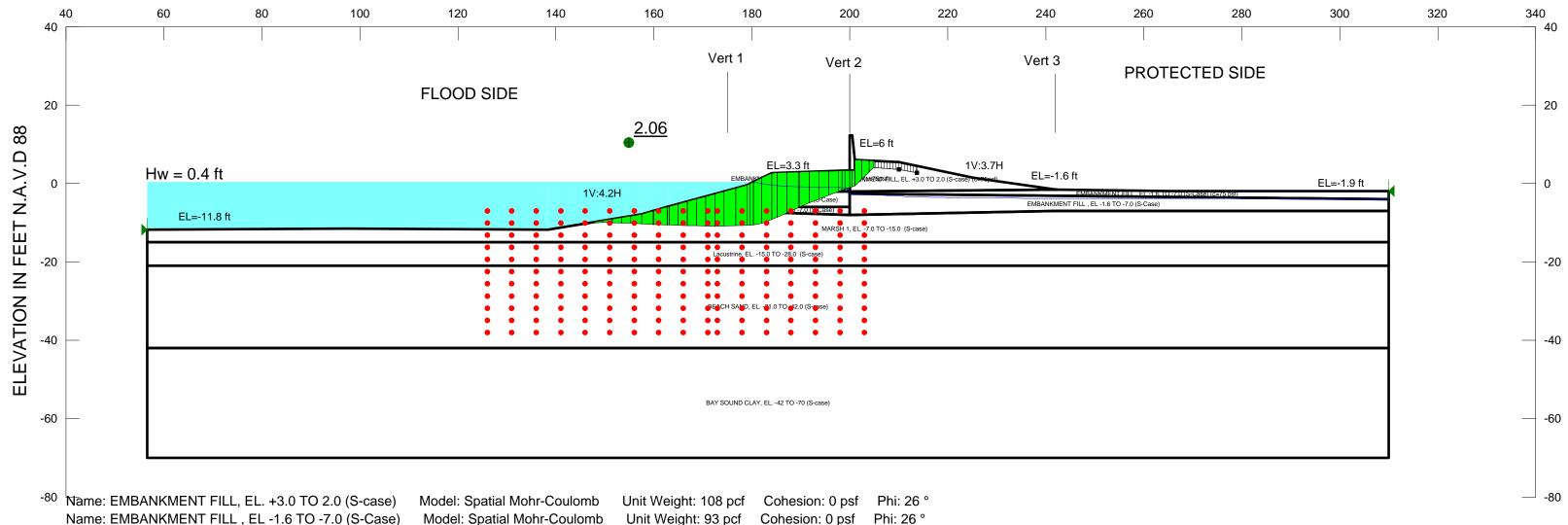
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int Louis District New Orleans District

17th STREET OUTFALL CANAL, REACH 12, STABILITY ANALYSIS, CASE: Slope Stability (Entry/ Exit) LWL-S-PS STA. 609+00 to 614+00 WEST ORLEANS PARISH, LOUISIANA



Unit Weight: 93 pcf Name: MARSH 1, EL. -7.0 TO -15.0 (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion: 0 psf Phi: 24 ° Name: Lacustrine, EL. -15.0 TO -28.0 (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 ° Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion: 0 psf Phi: 26 ° Name: BAY SOUND CLAY, EL. -42 TO -70 (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34° Name: BEACH SAND, EL. -21.0 TO -42.0 (S-case)

Name: EMBANKMENT FILL, EL. +3.0 TO 2.0 (S-case) (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL, EL -1.6 TO -7.0 (S-Case) (c=75 psf) Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

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Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach13.gsz Last Edited By: Redell, Chris MVS





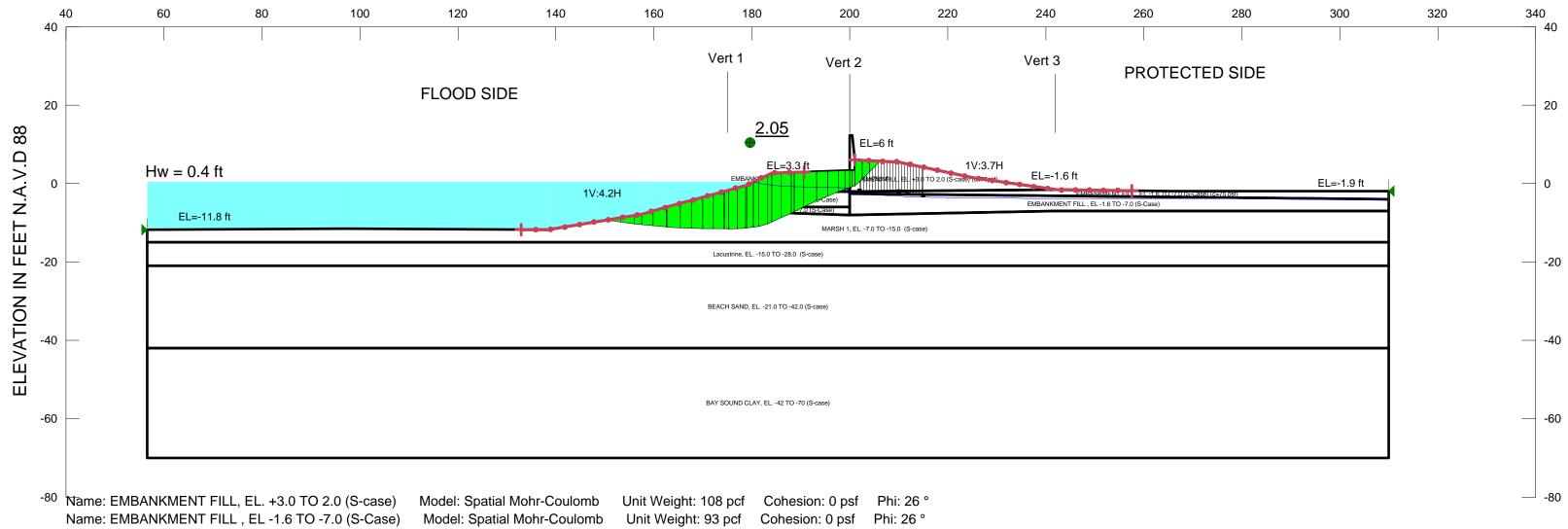
US Army Corps of Engineers® Saint Louis District New Orleans District

17th STREET OUTFALL CANAL, REACH 13, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS STA. 614+00 to 617+00 WEST

ORLEANS PARISH, LOUISIANA **MARCH 2013**

HURRICANE PROTECTION PROJECT

LAKE PONTCHARTRAIN, LA. AND VICINITY



Name: MARSH 1, EL. -7.0 TO -15.0 (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion: 0 psf Phi: 24 ° Name: Lacustrine, EL. -15.0 TO -28.0 (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 ° Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion: 0 psf Phi: 26 ° Name: BAY SOUND CLAY, EL. -42 TO -70 (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: BEACH SAND, EL. -21.0 TO -42.0 (S-case)

Name: EMBANKMENT FILL, EL. +3.0 TO 2.0 (S-case) (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL, EL -1.6 TO -7.0 (S-Case) (c=75 psf) Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

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Name: Slope Stability (Entry/Exit) LWL-S-FS File Name: 17thReach13.gsz Last Edited By: Redell, Chris MVS

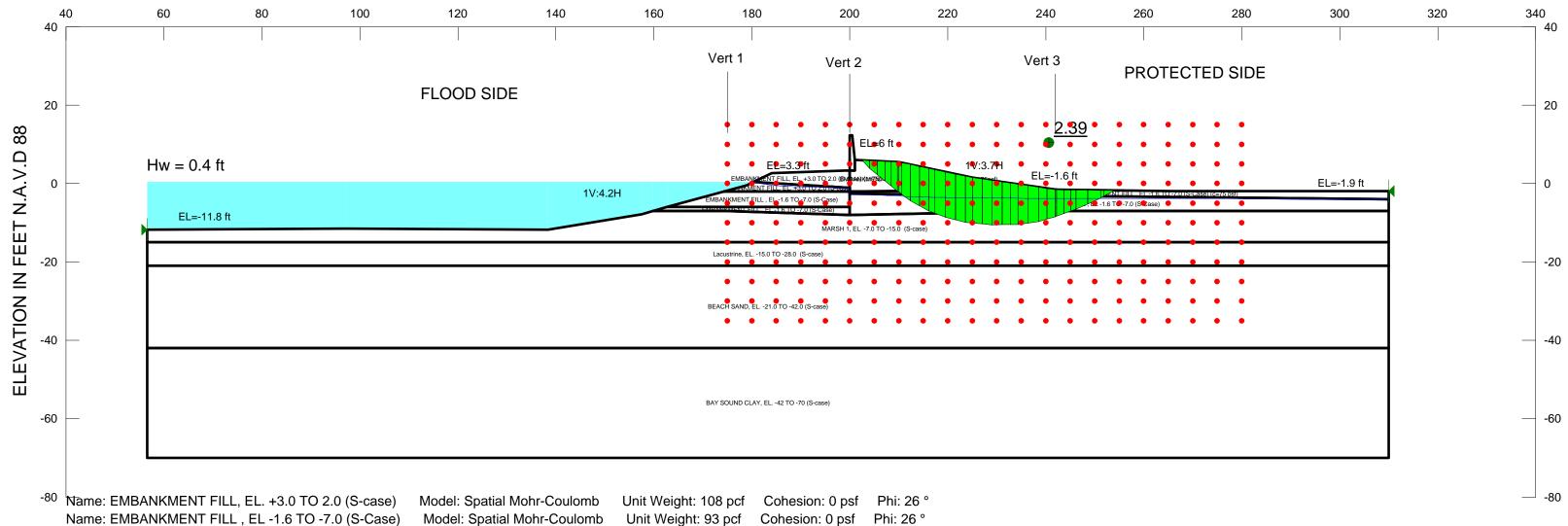




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17th STREET OUTFALL CANAL, REACH 13, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S-FS

STA. 614+00 to 617+00 WEST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -7.0 TO -15.0 (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion: 0 psf Phi: 24 ° Name: Lacustrine, EL. -15.0 TO -28.0 (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 ° Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion: 0 psf Phi: 26 ° Name: BAY SOUND CLAY, EL. -42 TO -70 (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34° Name: BEACH SAND, EL. -21.0 TO -42.0 (S-case)

Name: EMBANKMENT FILL, EL. +3.0 TO 2.0 (S-case) (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL, EL -1.6 TO -7.0 (S-Case) (c=75 psf) Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

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Name: Slope Stability (Block) LWL-S-PS File Name: 17thReach13.gsz Last Edited By: Redell, Chris MVS



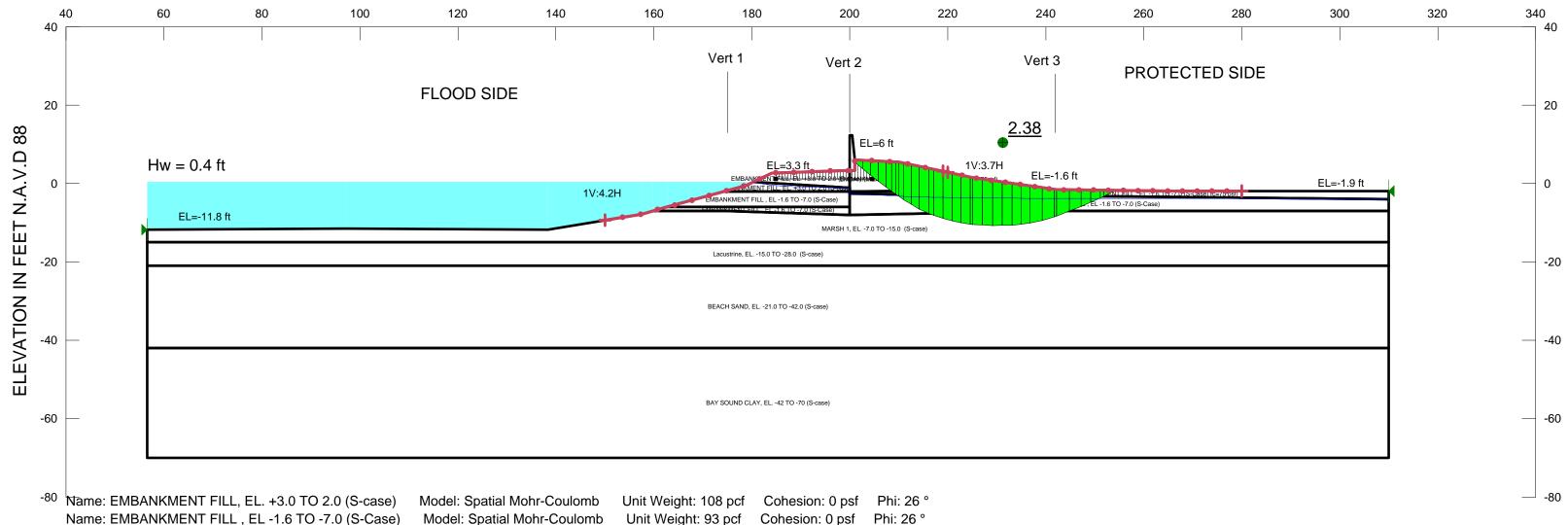


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17th STREET OUTFALL CANAL, REACH 13, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS

STA. 614+00 to 617+00 WEST ORLEANS PARISH, LOUISIANA



Phi: 26 °

Phi: 26 °

Unit Weight: 93 pcf Name: MARSH 1, EL. -7.0 TO -15.0 (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion: 0 psf Phi: 24 ° Name: Lacustrine, EL. -15.0 TO -28.0 (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 ° Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion: 0 psf Phi: 26 ° Name: BAY SOUND CLAY, EL. -42 TO -70 (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: BEACH SAND, EL. -21.0 TO -42.0 (S-case) Name: EMBANKMENT FILL, EL. +3.0 TO 2.0 (S-case) (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 75 psf

Name: EMBANKMENT FILL, EL -1.6 TO -7.0 (S-Case) (c=75 psf) Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion: 75 psf

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-S-PS File Name: 17thReach13.gsz Last Edited By: Redell, Chris MVS



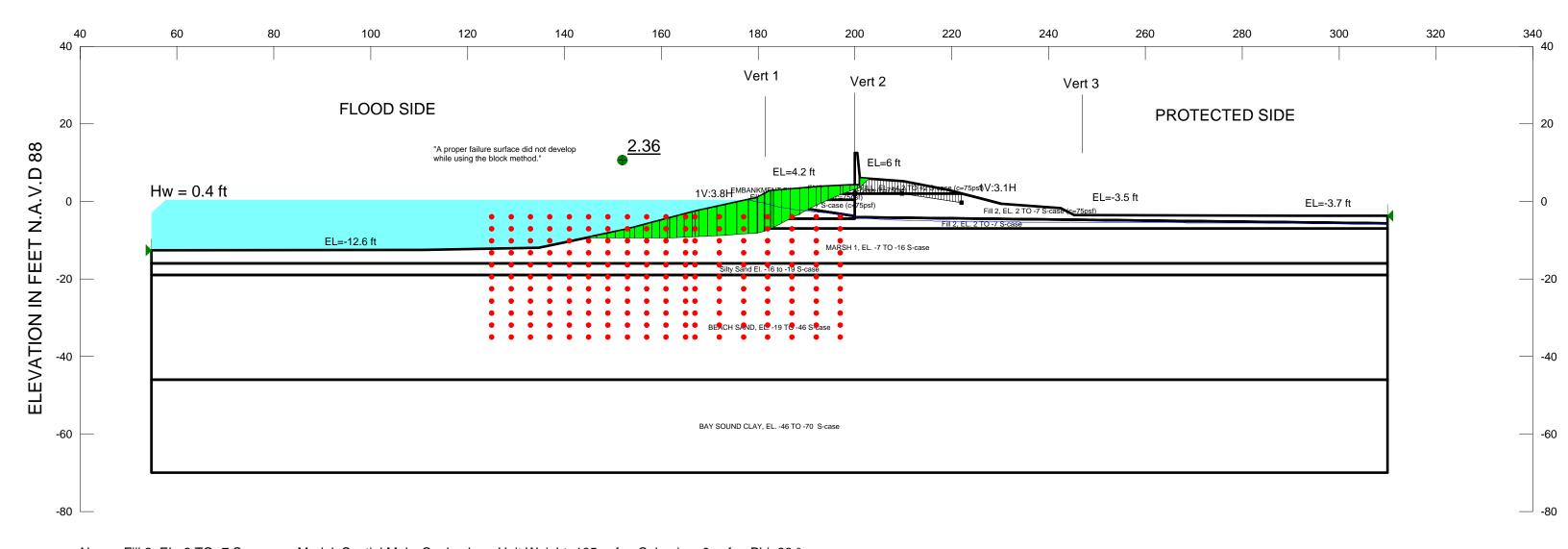


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17th STREET OUTFALL CANAL, REACH 13, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) LWL-S-PS STA. 614+00 to 617+00 WEST ORLEANS PARISH, LOUISIANA



Name: Fill 2, EL. 2 TO -7 S-case Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: MARSH 1, EL. -7 TO -16 S-case Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion: 0 psf Phi: 24 ° Name: Silty Sand El. -16 to -19 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 33 ° Name: BEACH SAND, EL. -19 TO -46 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: BAY SOUND CLAY, EL. -46 TO -70 S-case Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL, EL. +4.2 TO +2 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 75 psf Phi: 26 °

Name: Fill 2, EL. 2 TO -7 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach14.gsz Last Edited By: Redell, Chris MVS

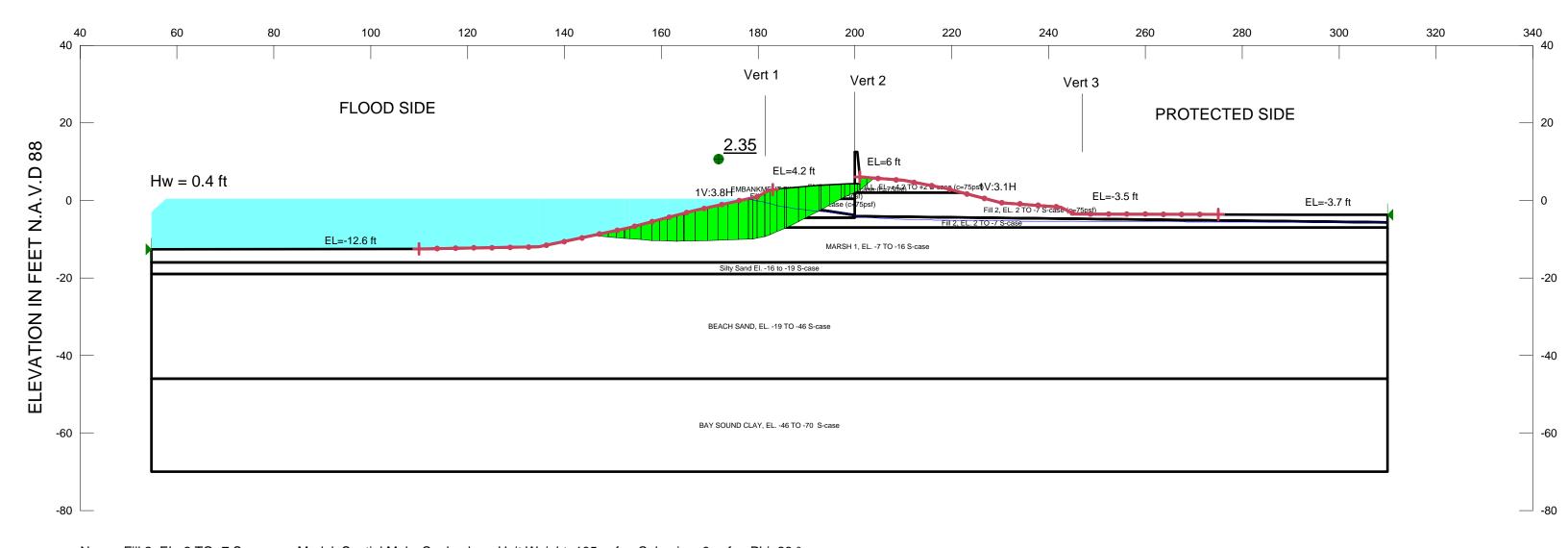




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17th STREET OUTFALL CANAL, REACH 14, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS STA. 617+00 to 625+00 WEST ORLEANS PARISH, LOUISIANA



Name: Fill 2, EL. 2 TO -7 S-case Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: MARSH 1, EL. -7 TO -16 S-case Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion: 0 psf Phi: 24 ° Name: Silty Sand El. -16 to -19 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 33 ° Name: BEACH SAND, EL. -19 TO -46 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: BAY SOUND CLAY, EL. -46 TO -70 S-case Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL, EL. +4.2 TO +2 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 75 psf Phi: 26 °

Name: Fill 2, EL. 2 TO -7 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope stability (Entry/Exit) LWL-S-FS File Name: 17thReach14.gsz Last Edited By: Redell, Chris MVS

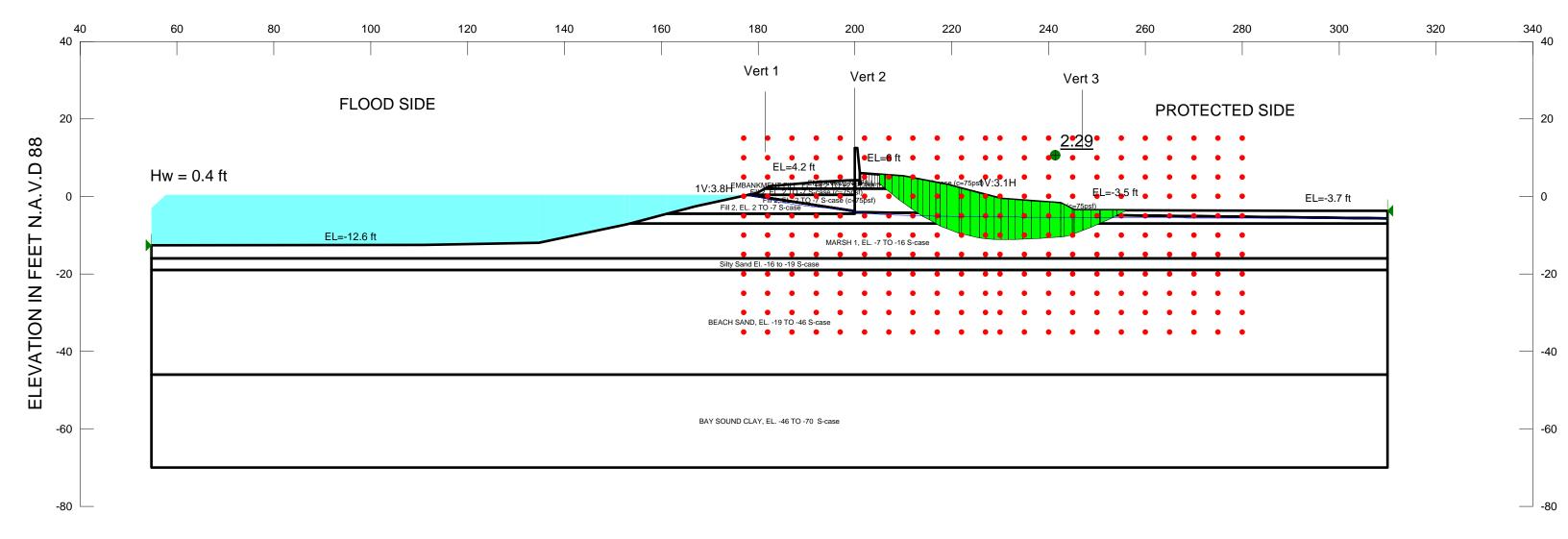




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17th STREET OUTFALL CANAL, REACH 14, STABILITY ANALYSIS, CASE: Slope stability (Entry/Exit) LWL-S-FS STA. 617+00 to 625+00 WEST ORLEANS PARISH, LOUISIANA



Name: Fill 2, EL. 2 TO -7 S-case Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: MARSH 1, EL. -7 TO -16 S-case Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion: 0 psf Phi: 24 ° Name: Silty Sand El. -16 to -19 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 33 ° Name: BEACH SAND, EL. -19 TO -46 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: BAY SOUND CLAY, EL. -46 TO -70 S-case Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL, EL. +4.2 TO +2 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 75 psf Phi: 26 °

Name: Fill 2, EL. 2 TO -7 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability (Block) LWL-S-PS File Name: 17thReach14.gsz Last Edited By: Redell, Chris MVS

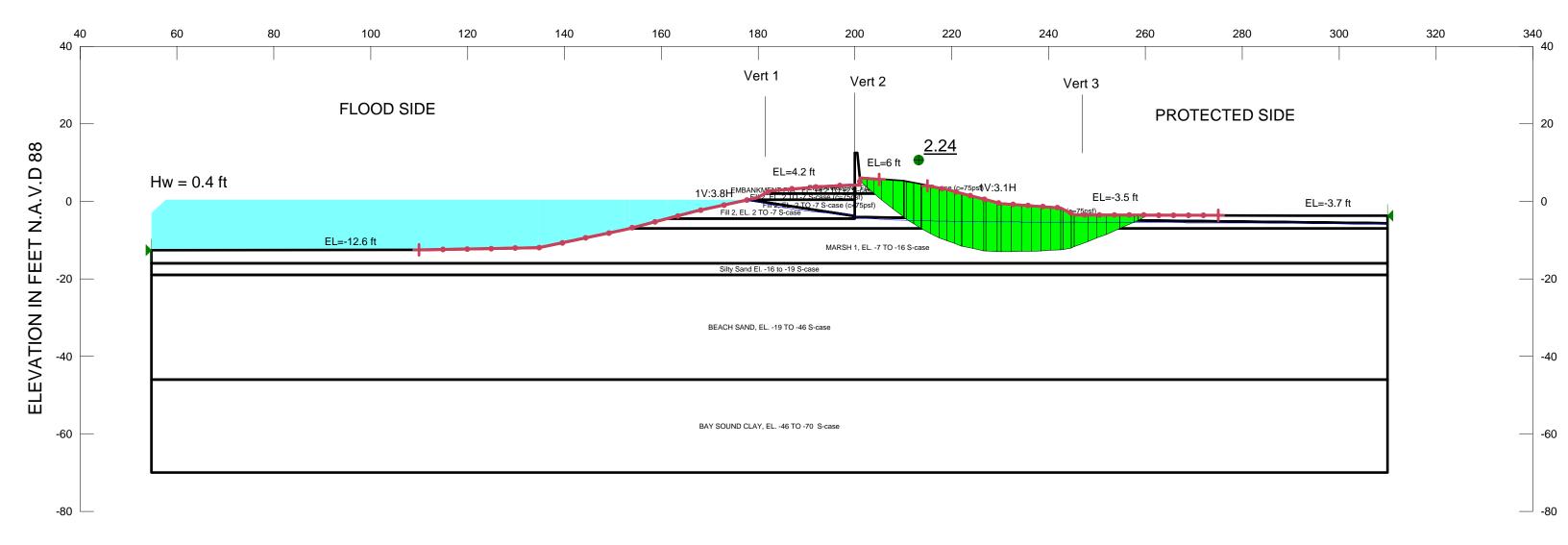




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17th STREET OUTFALL CANAL, REACH 14, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS STA. 617+00 to 625+00 WEST ORLEANS PARISH, LOUISIANA



Name: Fill 2, EL. 2 TO -7 S-case Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: MARSH 1, EL. -7 TO -16 S-case Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion: 0 psf Phi: 24 ° Name: Silty Sand El. -16 to -19 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 33 ° Name: BEACH SAND, EL. -19 TO -46 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: BAY SOUND CLAY, EL. -46 TO -70 S-case Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL, EL. +4.2 TO +2 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 75 psf Phi: 26 °

Name: Fill 2, EL. 2 TO -7 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

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Name: Slope stability (Entry/Exit) LWL-S-PS File Name: 17thReach14.gsz Last Edited By: Redell, Chris MVS

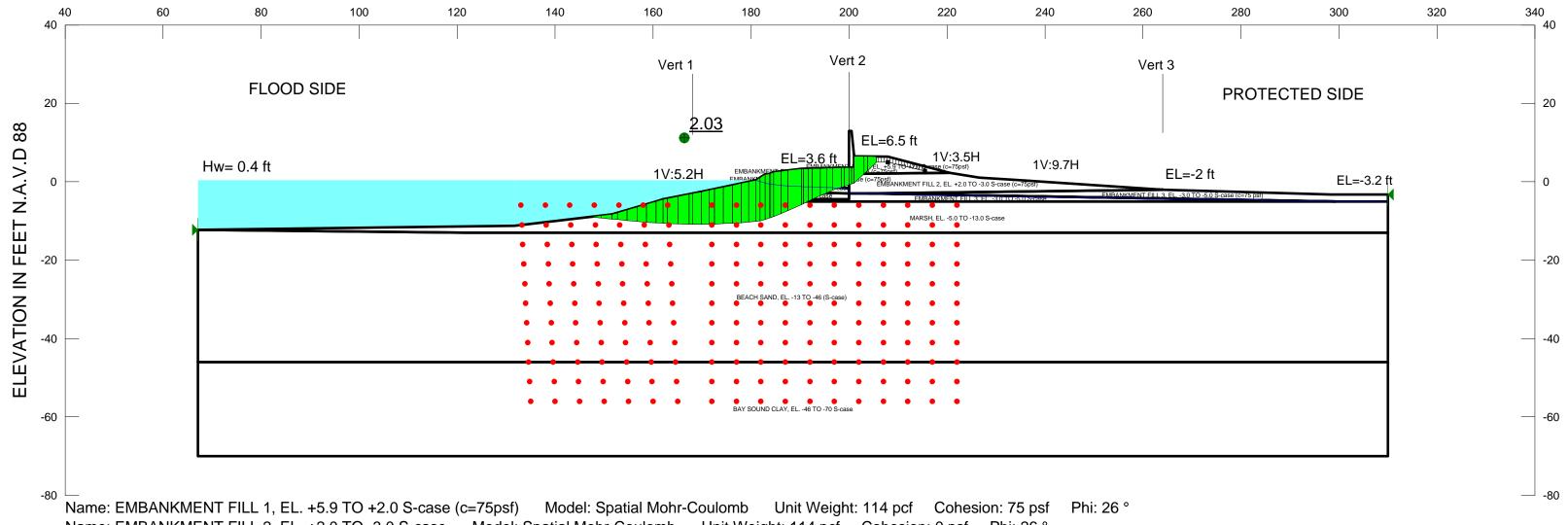




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17th STREET OUTFALL CANAL, REACH 14, STABILITY ANALYSIS, CASE: Slope stability (Entry/Exit) LWL-S-PS STA. 617+00 to 625+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL. +2.0 TO -3.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL 3, EL. -3.0 TO -5.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 26 °

Name: MARSH, EL. -5.0 TO -13.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion: 0 psf Phi: 24 ° Name: BAY SOUND CLAY, EL. -46 TO -70 S-case Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL 2, EL. +2.0 TO -3.0 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °

Name: BEACH SAND, EL. -13 TO -46 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: EMBANKMENT FILL 3, EL. -3.0 TO -5.0 S-case (c=75 psf) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach15A.gsz Last Edited By: Redell, Chris MVS



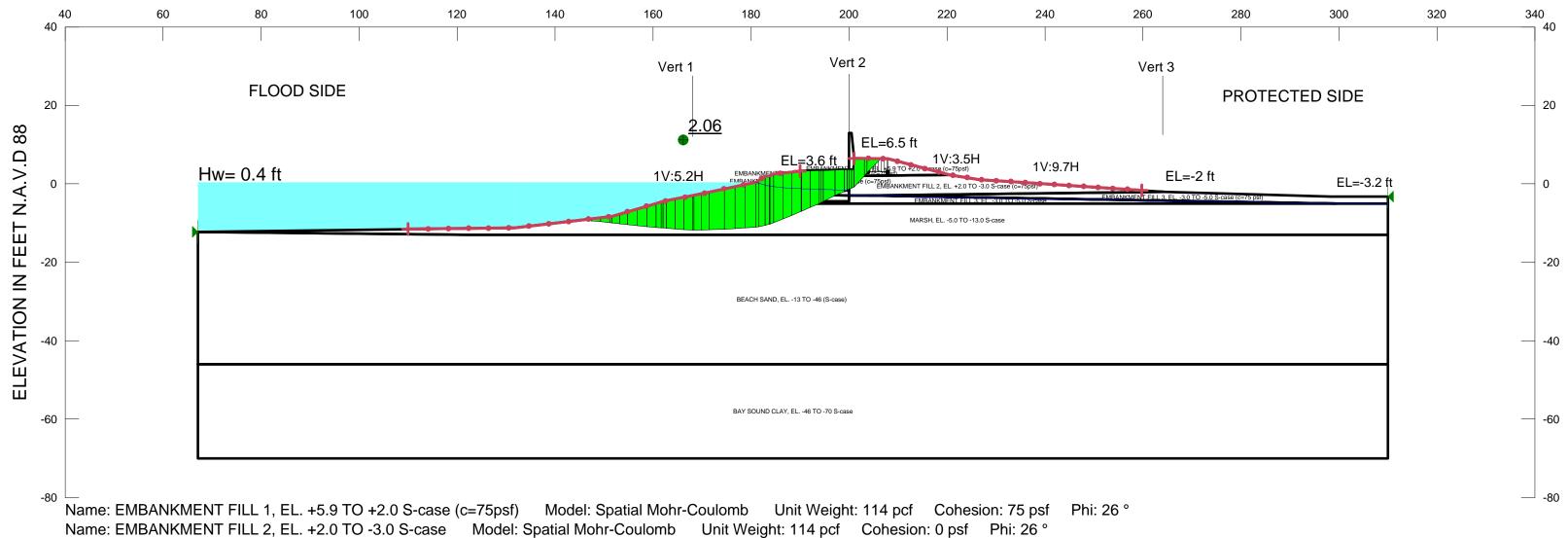


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17th STREET OUTFALL CANAL, REACH 15A, STABILITY ANALYSIS,

CASE: Slope Stability (Block) LWL-S-FS STA. 626+56 to 635+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 3, EL. -3.0 TO -5.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 26°

Name: MARSH, EL. -5.0 TO -13.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion: 0 psf Phi: 24 °

Name: BAY SOUND CLAY, EL. -46 TO -70 S-case Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL 2, EL. +2.0 TO -3.0 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °

Name: BEACH SAND, EL. -13 TO -46 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: EMBANKMENT FILL 3, EL. -3.0 TO -5.0 S-case (c=75 psf) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability (Entry/Exit) LWL-S-FS File Name: 17thReach15A.gsz Last Edited By: Redell, Chris MVS



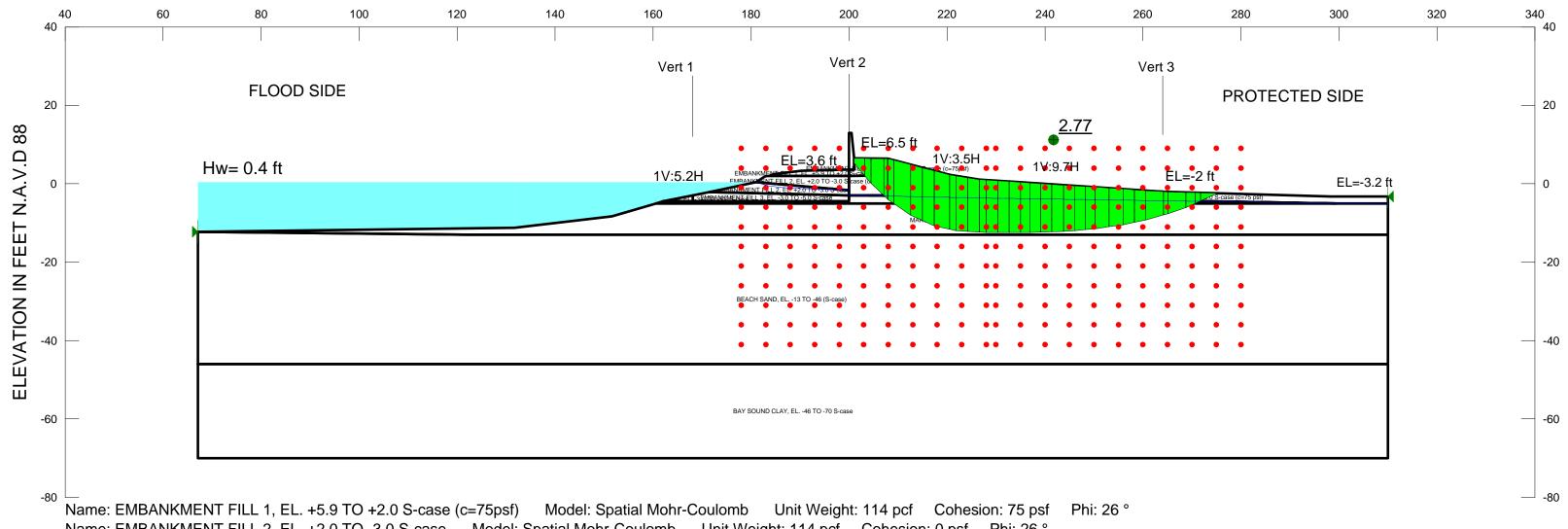


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17th STREET OUTFALL CANAL, REACH 15A, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) LWL-S-FS STA. 626+56 to 635+00 WEST ORLEANS PARISH, LOUISIANA



Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL 2, EL. +2.0 TO -3.0 S-case

Name: EMBANKMENT FILL 3, EL. -3.0 TO -5.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 26°

Name: MARSH, EL. -5.0 TO -13.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion: 0 psf Phi: 24 °

Name: BAY SOUND CLAY, EL. -46 TO -70 S-case Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL 2, EL. +2.0 TO -3.0 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °

Name: BEACH SAND, EL. -13 TO -46 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: EMBANKMENT FILL 3, EL. -3.0 TO -5.0 S-case (c=75 psf) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability (Block) LWL-S-PS File Name: 17thReach15A.gsz Last Edited By: Redell, Chris MVS



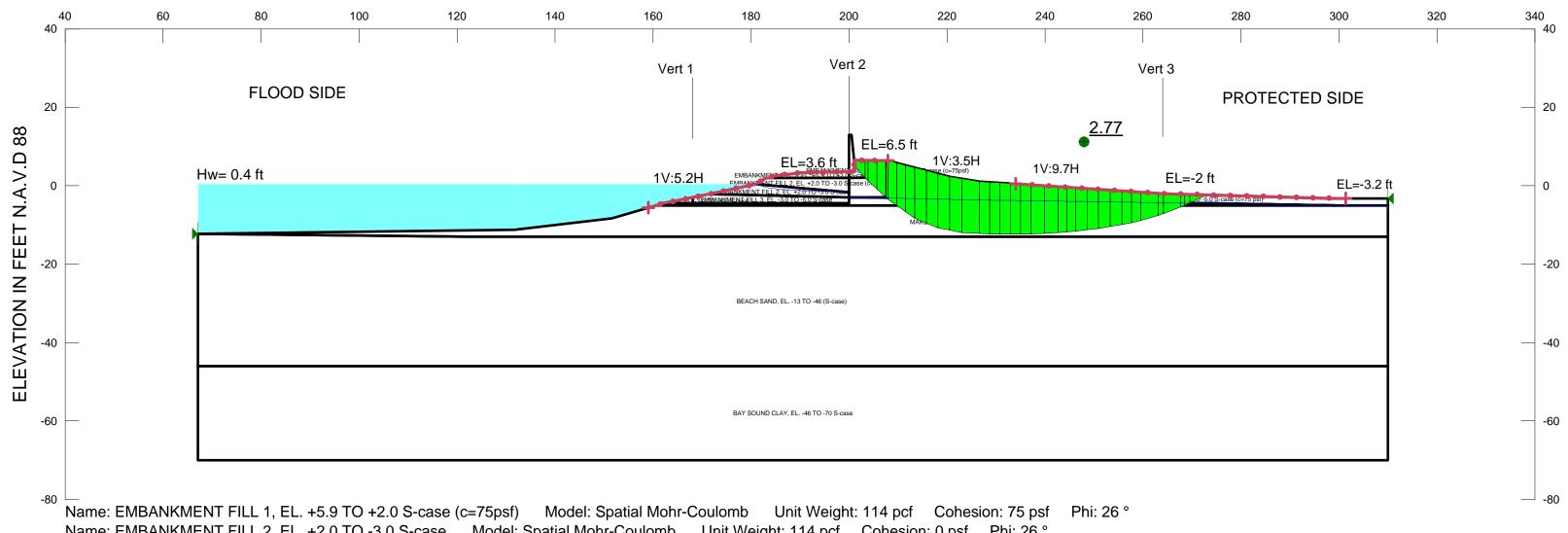


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17th STREET OUTFALL CANAL, REACH 15A, STABILITY ANALYSIS,

CASE: Slope Stability (Block) LWL-S-PS STA. 626+56 to 635+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL. +2.0 TO -3.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL 3, EL. -3.0 TO -5.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 26°

Name: MARSH, EL. -5.0 TO -13.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 94 pcf Cohesion: 0 psf Phi: 24 °

Name: BAY SOUND CLAY, EL. -46 TO -70 S-case Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL 2, EL. +2.0 TO -3.0 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °

Name: BEACH SAND, EL. -13 TO -46 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: EMBANKMENT FILL 3, EL. -3.0 TO -5.0 S-case (c=75 psf) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) PS S-case File Name: 17thReach15A.gsz Last Edited By: Redell, Chris MVS



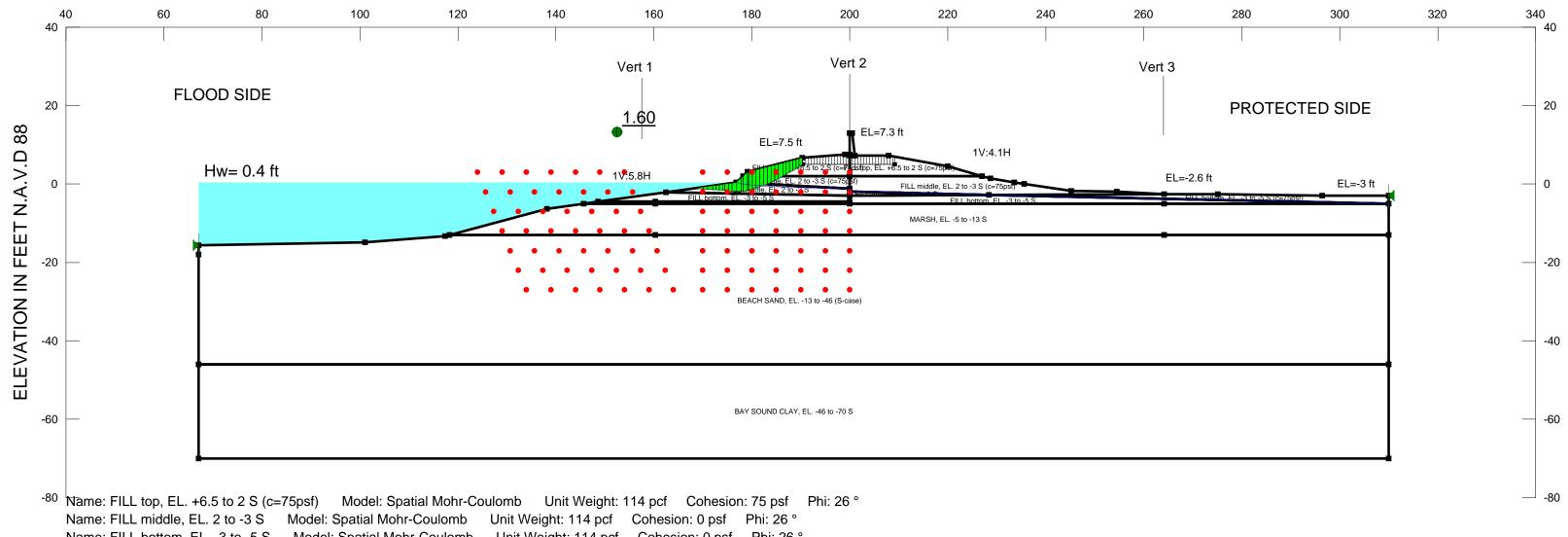


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17th STREET OUTFALL CANAL, REACH 15A, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) PS S-case STA. 626+56 to 635+00 WEST ORLEANS PARISH, LOUISIANA



Name: FILL bottom, EL. -3 to -5 S Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 26 ° Name: MARSH, EL. -5 to -13 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion: 0 psf Phi: 24 ° Name: BAY SOUND CLAY, EL. -46 to -70 S Model: Spatial Mohr-Coulomb Unit Weight: 102 pcf Cohesion: 0 psf Phi: 26 ° Name: BEACH SAND, EL. -13 to -46 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: FILL middle, EL. 2 to -3 S (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 ° Name: FILL bottom, EL. -3 to -5 S (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach15B.gsz Last Edited By: Redell, Chris MVS

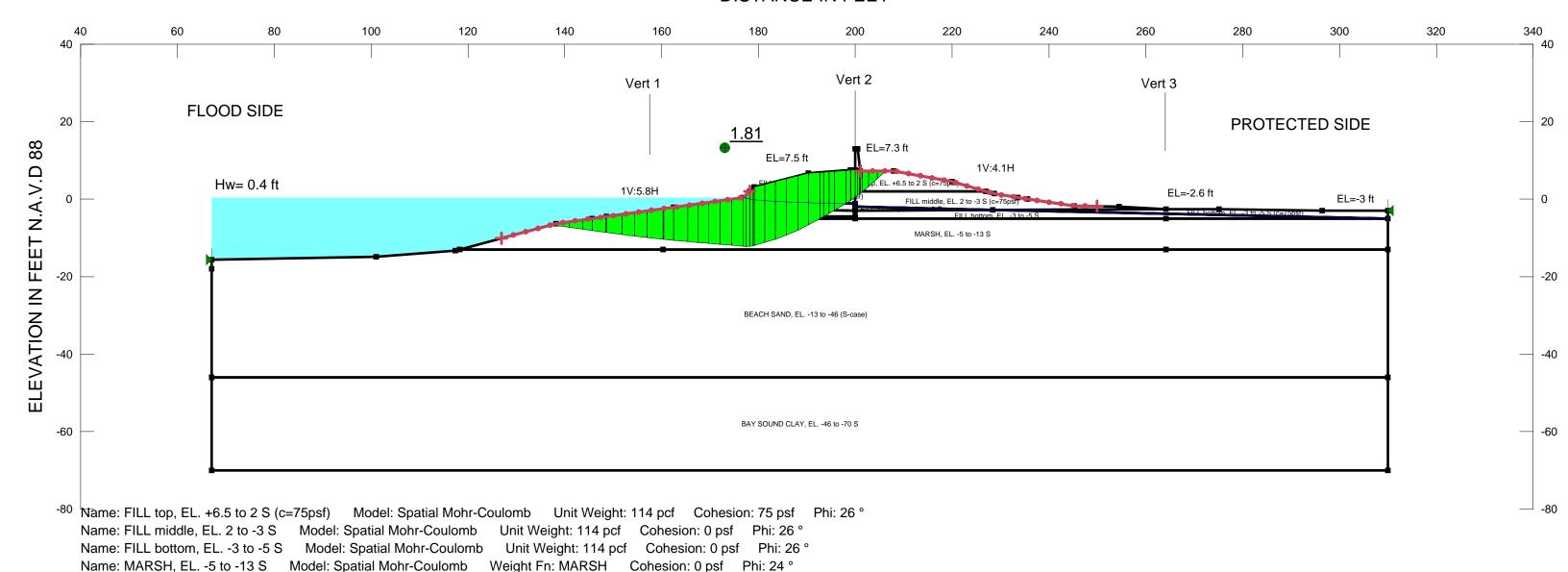




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17th STREET OUTFALL CANAL, REACH 15B, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS STA. 635+00 to 639+06 WEST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

Name: BEACH SAND, EL. -13 to -46 (S-case) Name: FILL middle, EL. 2 to -3 S (c=75psf)

Name: FILL bottom, EL. -3 to -5 S (c=75psf)

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: BAY SOUND CLAY, EL. -46 to -70 S Model: Spatial Mohr-Coulomb Unit Weight: 102 pcf Cohesion: 0 psf Phi: 26 °

Model: Spatial Mohr-Coulomb

Model: Spatial Mohr-Coulomb

Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °

Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °

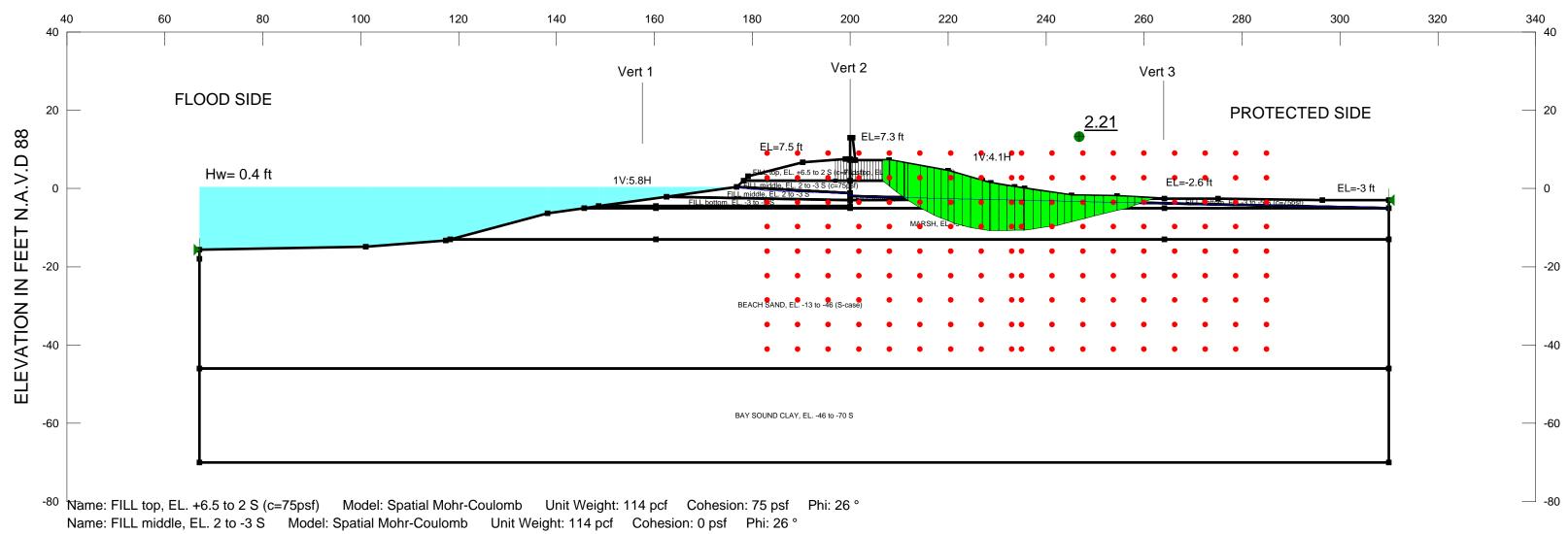
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17th STREET OUTFALL CANAL, REACH 15B, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S-FS STA. 635+00 to 639+06 WEST ORLEANS PARISH, LOUISIANA



Name: FILL bottom, EL. -3 to -5 S Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 0 psf Phi: 26 °
Name: MARSH, EL. -5 to -13 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion: 0 psf Phi: 24 °
Name: BAY SOUND CLAY, EL. -46 to -70 S Model: Spatial Mohr-Coulomb Unit Weight: 102 pcf Cohesion: 0 psf Phi: 26 °
Name: BEACH SAND, EL. -13 to -46 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: FILL middle, EL. 2 to -3 S (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °
Name: FILL bottom, EL. -3 to -5 S (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-S-PS File Name: 17thReach15B.gsz Last Edited By: Redell, Chris MVS

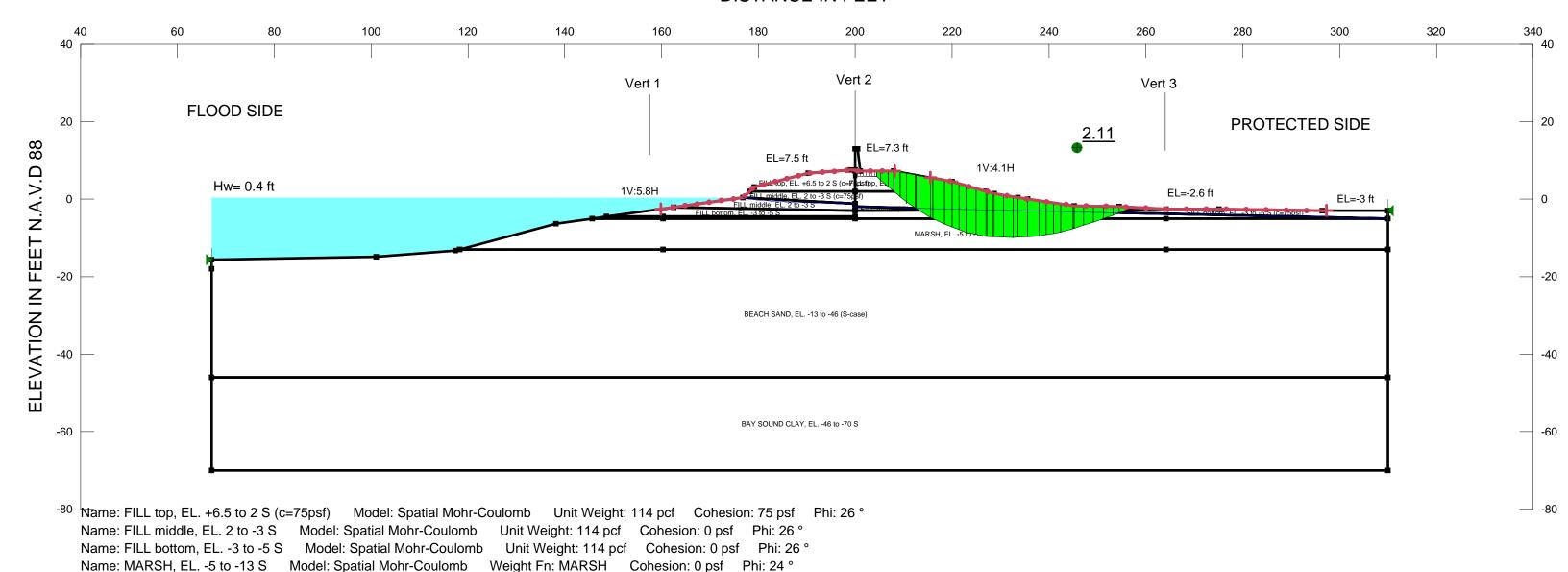




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17th STREET OUTFALL CANAL, REACH 15B, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS STA. 635+00 to 639+06 WEST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

Name: BEACH SAND, EL. -13 to -46 (S-case) Name: FILL middle, EL. 2 to -3 S (c=75psf)

Name: FILL bottom, EL. -3 to -5 S (c=75psf)

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: BAY SOUND CLAY, EL. -46 to -70 S Model: Spatial Mohr-Coulomb Unit Weight: 102 pcf Cohesion: 0 psf Phi: 26 °

Model: Spatial Mohr-Coulomb

Model: Spatial Mohr-Coulomb

Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °

Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 °

Name: Slope Stability (Entry/Exit) LWL-S-PS File Name: 17thReach15B.gsz Last Edited By: Redell, Chris MVS



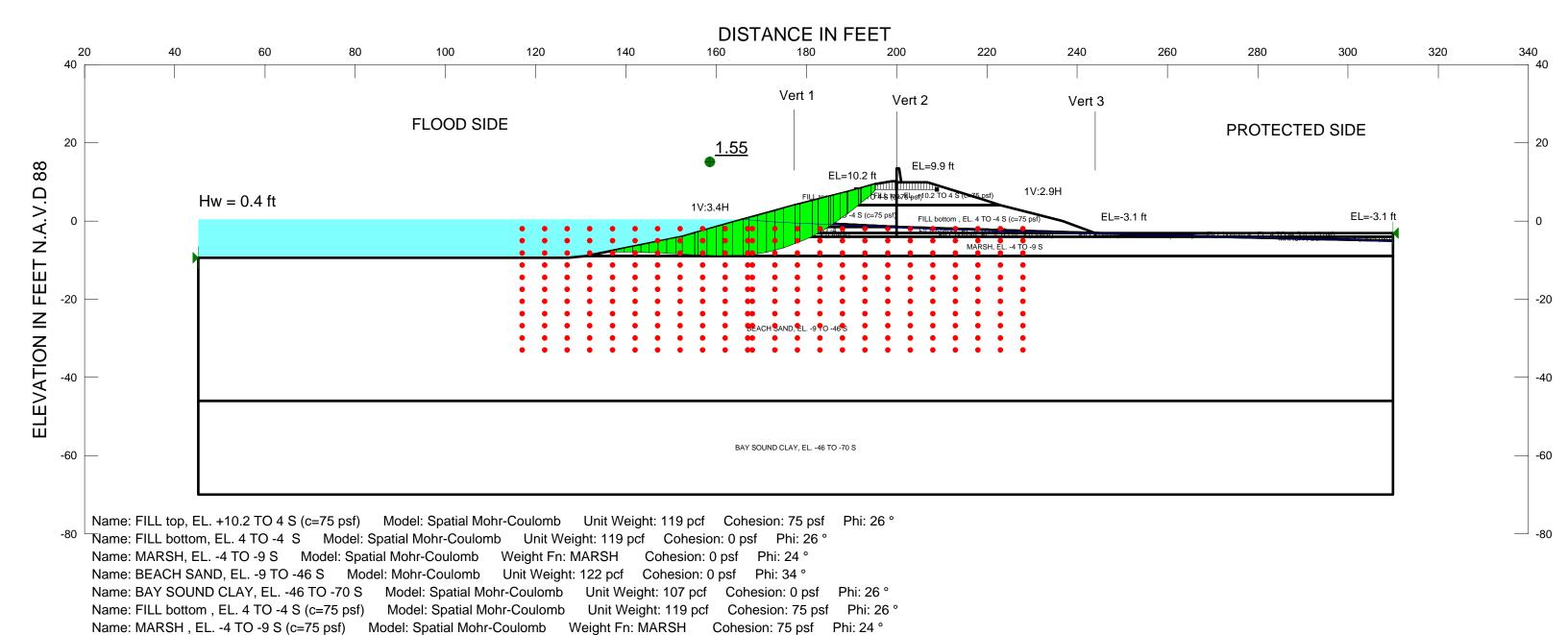


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17th STREET OUTFALL CANAL, REACH 15B, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S-PS STA. 635+00 to 639+06 WEST

ORLEANS PARISH, LOUISIANA **MARCH 2013**



Model: Spatial Mohr-Coulomb Weight Fn: Fill 2 Cohesion: 75 psf Phi: 26 °

Name: FILL bottom, EL. 4 TO -4 S (Linear) Model: Spatial Mohr-Coulomb Weight Fn: Fill 2 Cohesion: 0 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: FILL bottom a, EL. 4 TO -4 S (c=75 psf)

Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach16.gsz Last Edited By: Redell, Chris MVS

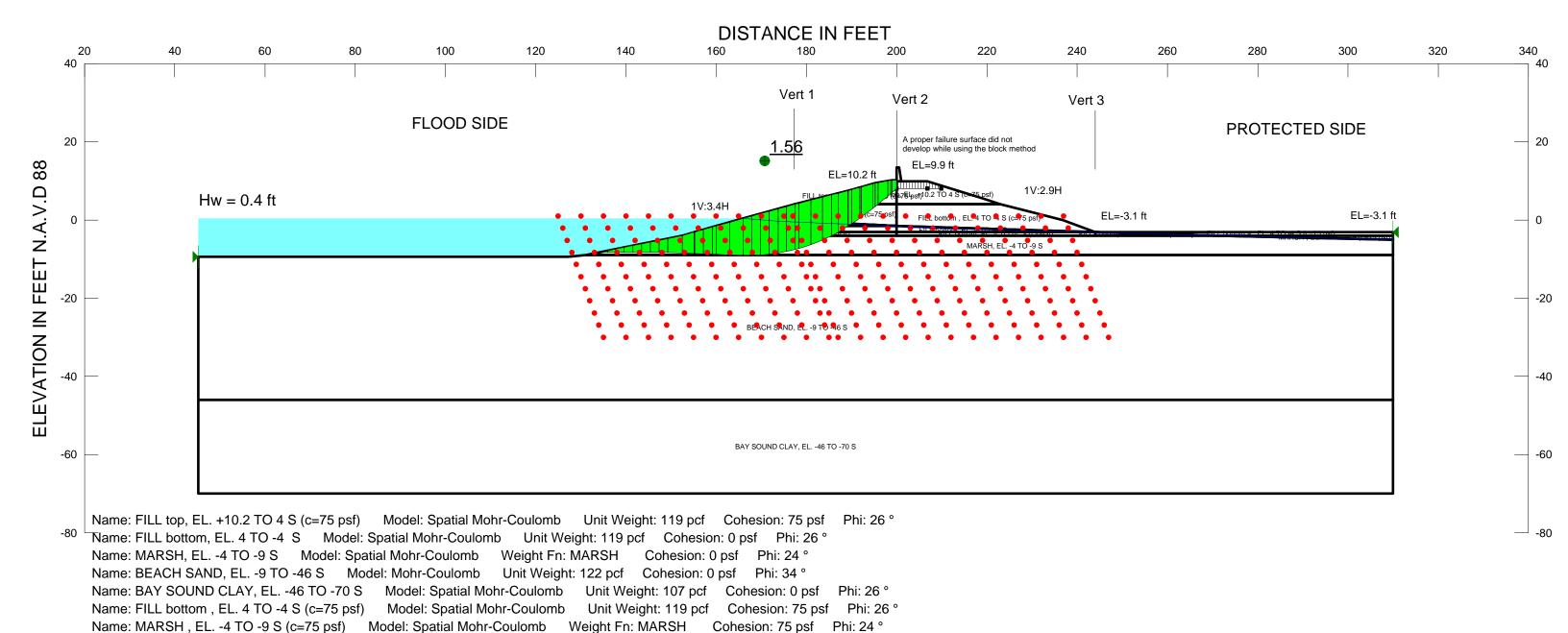




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17th STREET OUTFALL CANAL, REACH 16, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS STA. 641+85 - 658+00 WEST ORLEANS PARISH, LOUISIANA



CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: FILL bottom a, EL. 4 TO -4 S (c=75 psf) Model: Spatial Mohr-Coulomb Weight Fn: Fill 2 Cohesion: 75 psf Phi: 26 ° Name: FILL bottom, EL. 4 TO -4 S (Linear) Model: Spatial Mohr-Coulomb Weight Fn: Fill 2 Cohesion: 0 psf Phi: 26 °

Name: Slope Stability (Block) LWL-S-FS (thru) File Name: 17thReach16.gsz Last Edited By: Redell, Chris MVS

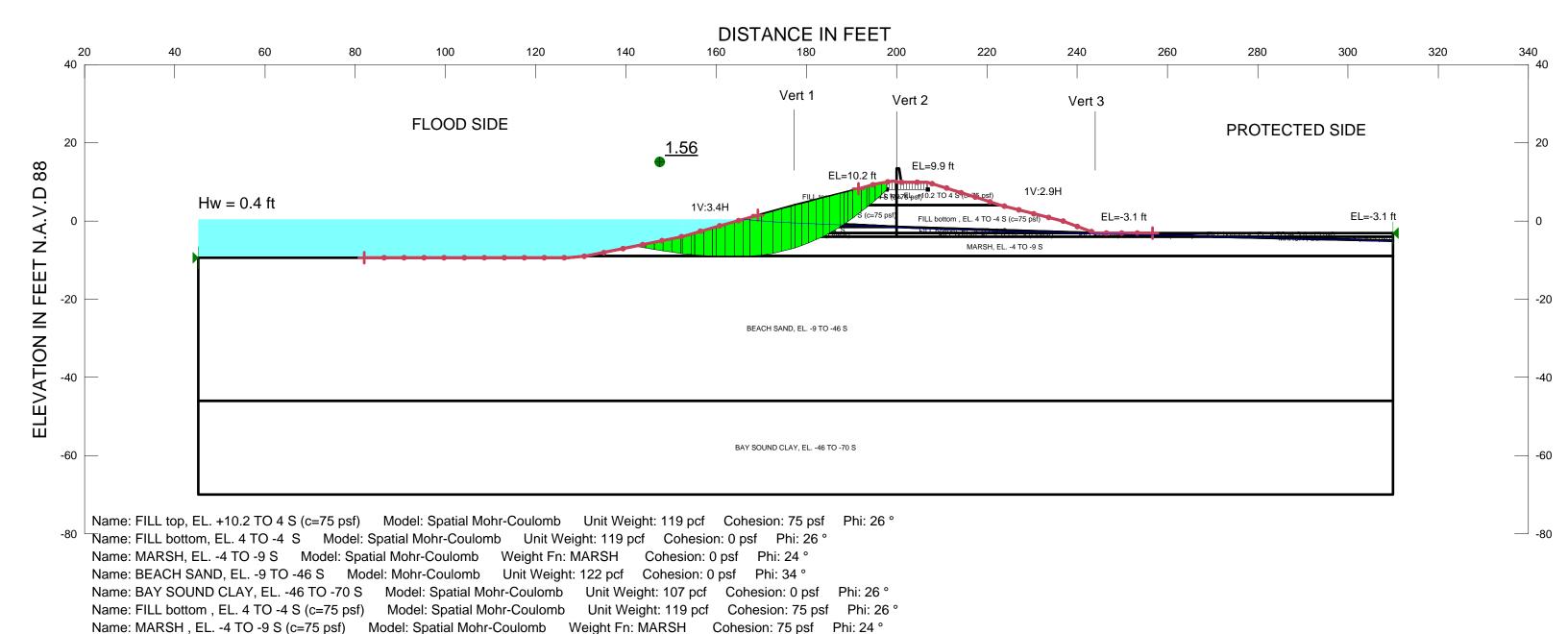




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17th STREET OUTFALL CANAL, REACH 16, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS (thru) STA. 641+85 - 658+00 WEST ORLEANS PARISH, LOUISIANA



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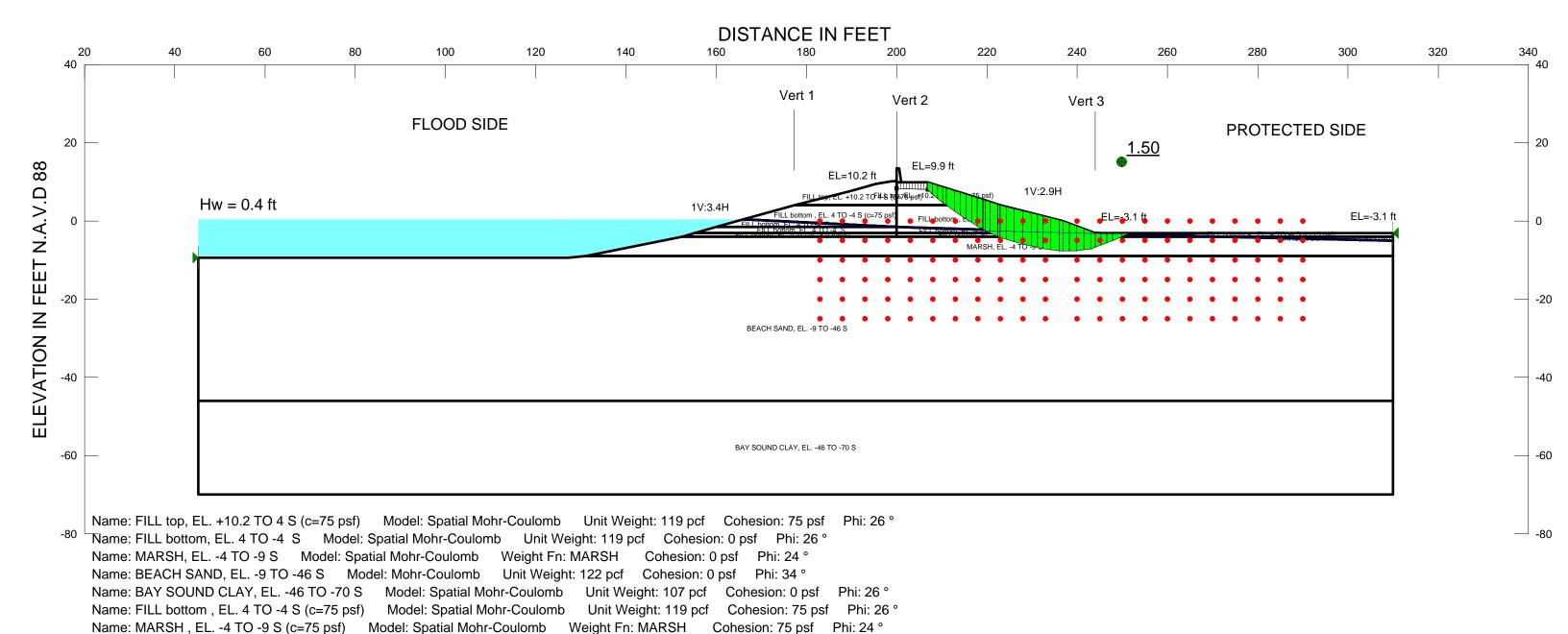


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17th STREET OUTFALL CANAL, REACH 16, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S-FS STA. 641+85 - 658+00 WEST ORLEANS PARISH, LOUISIANA



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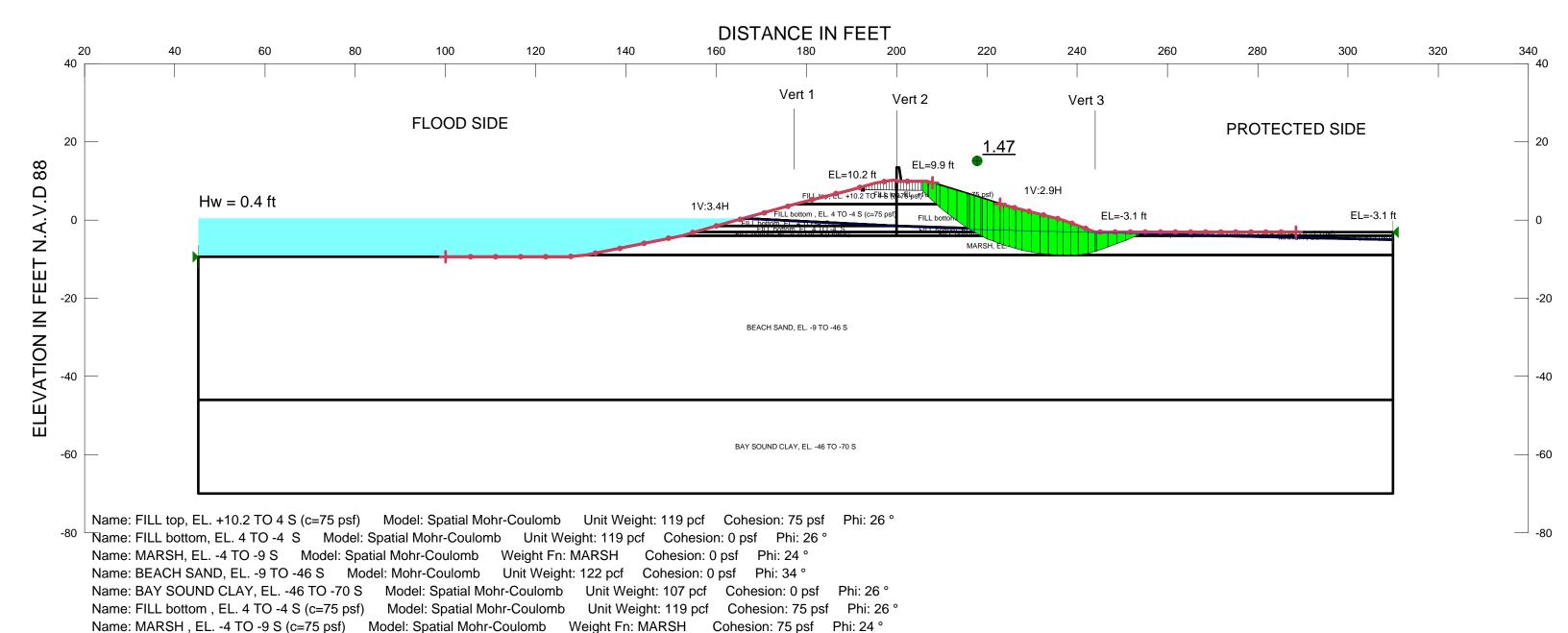




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17th STREET OUTFALL CANAL, REACH 16, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS STA. 641+85 - 658+00 WEST ORLEANS PARISH, LOUISIANA



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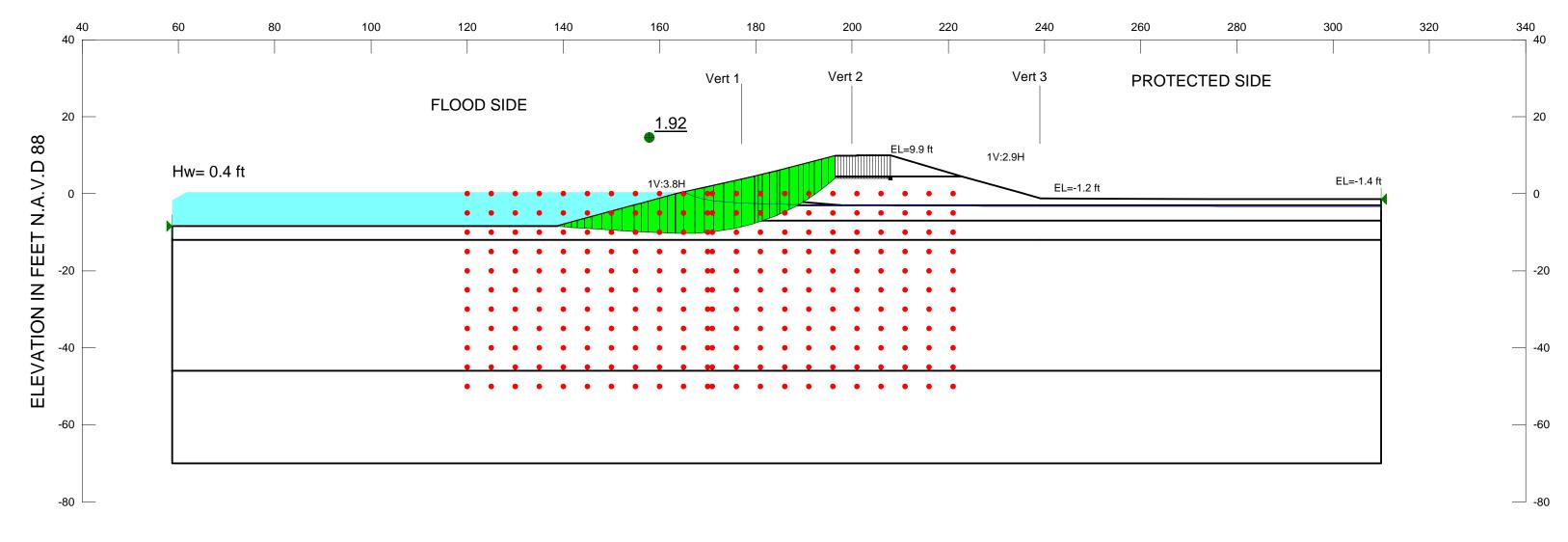


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17th STREET OUTFALL CANAL, REACH 16, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S-PS STA. 641+85 - 658+00 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 S Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 0 psf Phi: 26 °

Name: MARSH, EL. -3.0 TO -7.0 S Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 24 ° Name: MARSH, EL. -7.0 TO -12.0 S Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 24 °

Name: BAY SOUND CLAY, EL. -46 TO -70 S Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL, EL. +9.6 TO +4.5 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 75 psf Phi: 26 °

Name: BEACH SAND, EL. -12 TO -46 S Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

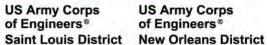
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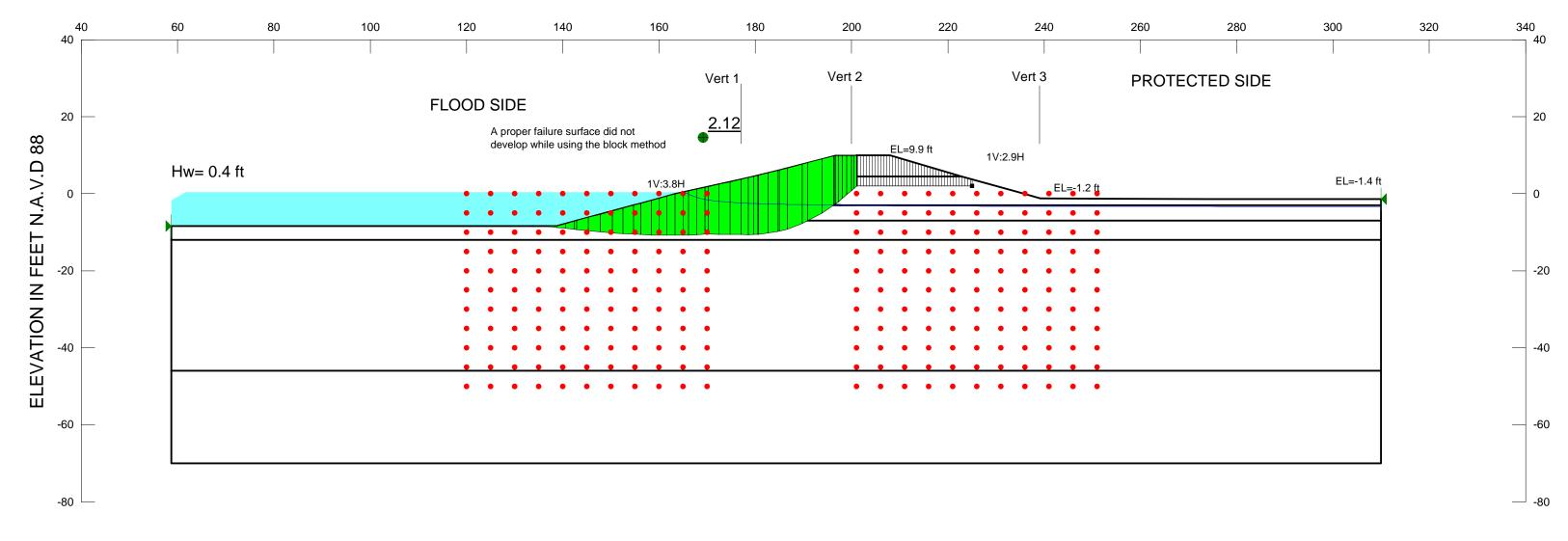






17th STREET OUTFALL CANAL, REACH 17, STABILITY ANALYSIS,

CASE: Slope Stability (Block) LWL-S-FS STA. 658+00 - 663+00 WEST ORLEANS PARISH, LOUISIANAS



Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 S Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 0 psf Phi: 26 °

Name: MARSH, EL. -3.0 TO -7.0 S Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 24 ° Name: MARSH, EL. -7.0 TO -12.0 S Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 24 °

Name: BAY SOUND CLAY, EL. -46 TO -70 S Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL, EL. +9.6 TO +4.5 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 75 psf Phi: 26 °

Name: BEACH SAND, EL. -12 TO -46 S Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

GENERAL NOTES

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Name: Slope Stability (Block) LWL-S-FS (thru) File Name: 17thReach17.gsz Last Edited By: Redell, Chris MVS



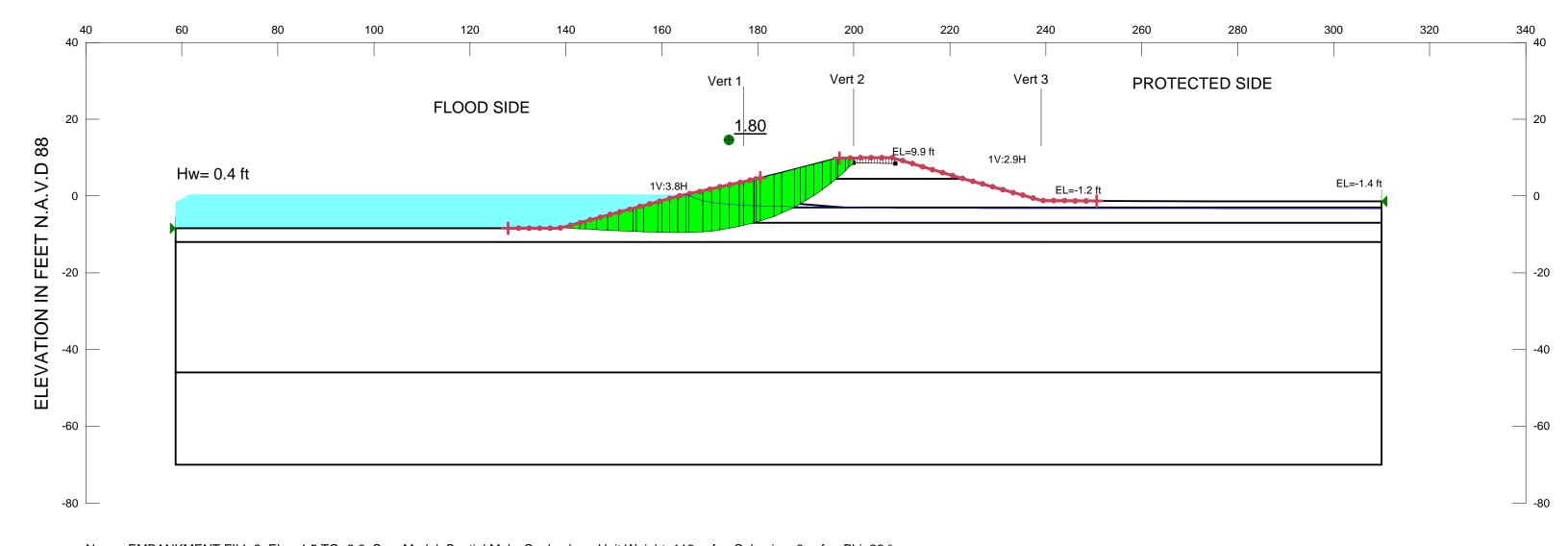


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17th STREET OUTFALL CANAL, REACH 17, STABILITY ANALYSIS,

CASE: Slope Stability (Block) LWL-S-FS (thru) STA. 658+00 - 663+00 WEST ORLEANS PARISH, LOUISIANAS



Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 S Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 0 psf Phi: 26 °

Name: MARSH, EL. -3.0 TO -7.0 S Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 24 ° Name: MARSH, EL. -7.0 TO -12.0 S Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 24 °

Name: BAY SOUND CLAY, EL. -46 TO -70 S Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL, EL. +9.6 TO +4.5 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 75 psf Phi: 26 °

Name: BEACH SAND, EL. -12 TO -46 S Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

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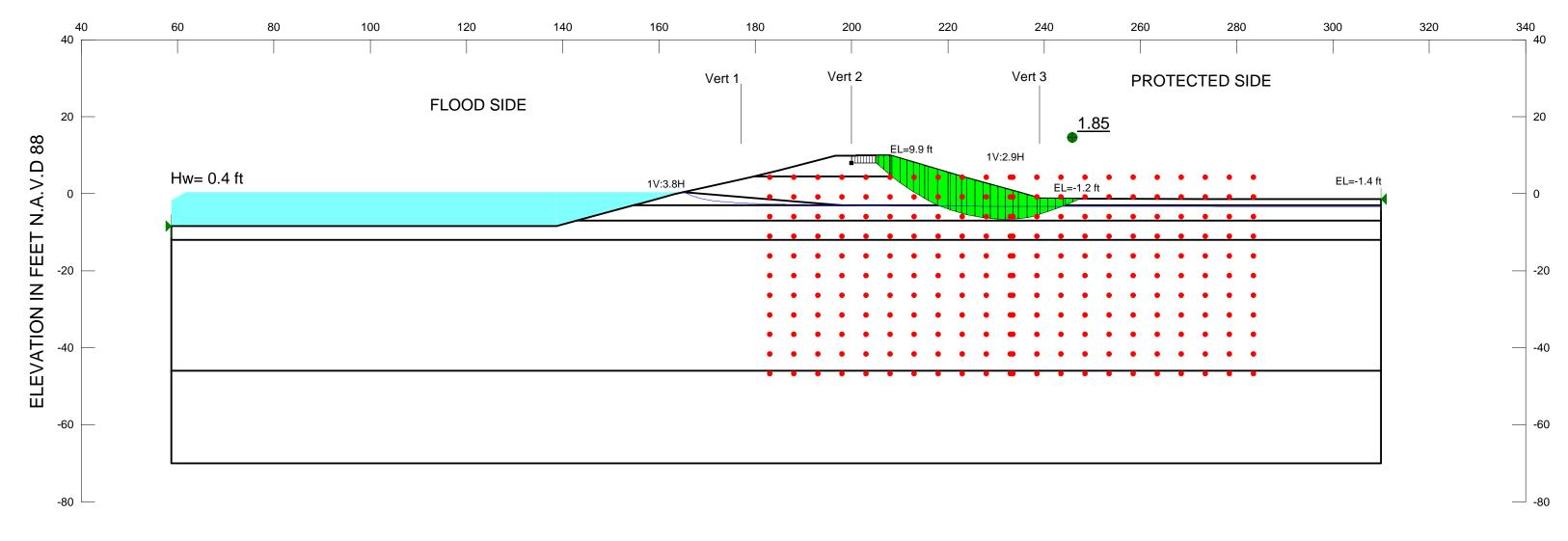




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17th STREET OUTFALL CANAL, REACH 17, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) LWL-S-FS STA. 658+00 - 663+00 WEST ORLEANS PARISH, LOUISIANAS



Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 S Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 0 psf Phi: 26 °

Name: MARSH, EL. -3.0 TO -7.0 S Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 24 ° Name: MARSH, EL. -7.0 TO -12.0 S Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 24 °

Name: BAY SOUND CLAY, EL. -46 TO -70 S Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL, EL. +9.6 TO +4.5 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 75 psf Phi: 26 °

Name: BEACH SAND, EL. -12 TO -46 S Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

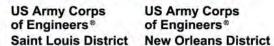
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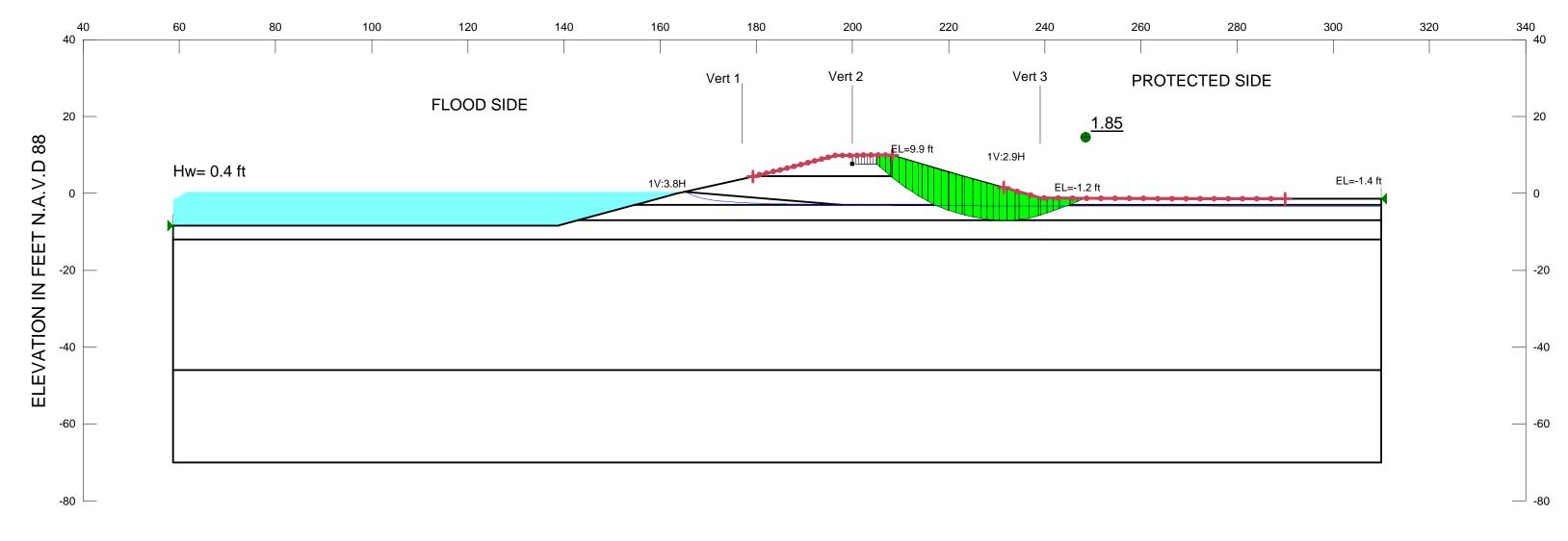






17th STREET OUTFALL CANAL, REACH 17, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS STA. 658+00 - 663+00 WEST

ORLEANS PARISH, LOUISIANAS



Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 S Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 0 psf Phi: 26 °

Name: MARSH, EL. -3.0 TO -7.0 S Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 24 ° Name: MARSH, EL. -7.0 TO -12.0 S Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 24 °

Name: BAY SOUND CLAY, EL. -46 TO -70 S Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL 2, EL. +4.5 TO -3.0 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 113 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL, EL. +9.6 TO +4.5 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 116 pcf Cohesion: 75 psf Phi: 26 °

Name: BEACH SAND, EL. -12 TO -46 S Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

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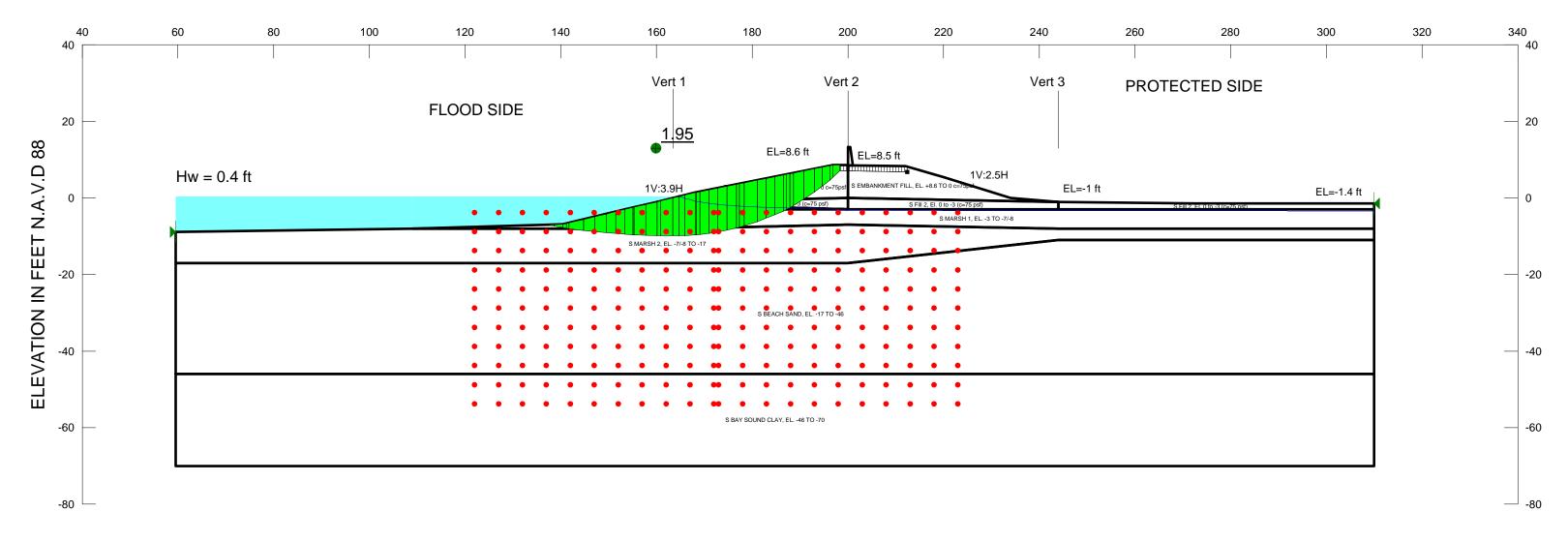
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17th STREET OUTFALL CANAL, REACH 17, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) LWL-S-PS STA. 658+00 - 663+00 WEST ORLEANS PARISH, LOUISIANAS

MARCH 2013



Name: S EMBANKMENT FILL, EL. +8.6 TO 0 Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 75 psf Phi: 26 °

Name: S Fill 2, El. 0 to -3 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 0 psf Phi: 26 °

Name: S MARSH 1, EL. -3 TO -7/-8 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 24 °
Name: S MARSH 2, EL. -7/-8 TO -17 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 24 °
Name: S BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °

Name: S BEACH SAND, EL. -17 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: S EMBANKMENT FILL, EL. +8.6 TO 0 c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 75 psf Phi: 26 °

Name: S Fill 2, El. 0 to -3 (c=75 psf) Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 75 psf Phi: 26 °

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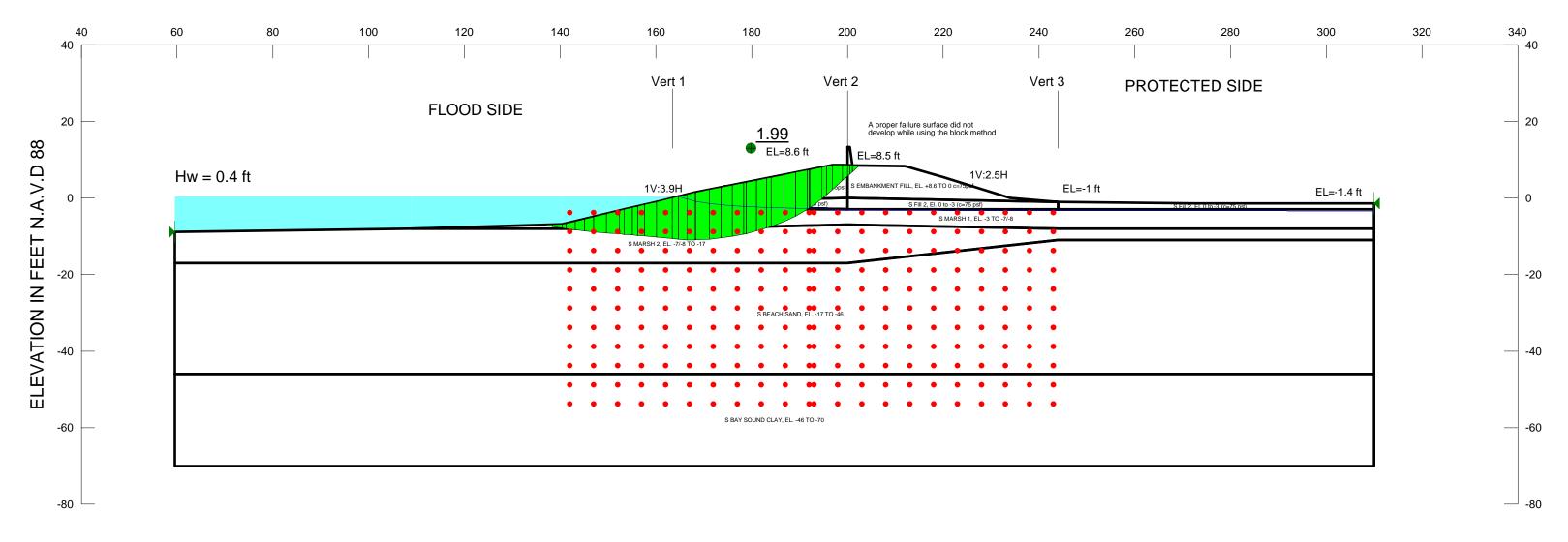


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17th STREET OUTFALL CANAL, REACH 18, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS STA. 663+00 to 669+36 WEST ORLEANS PARISH, LOUISIANA



Name: S EMBANKMENT FILL, EL. +8.6 TO 0 Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 75 psf Phi: 26 °

Name: S Fill 2, El. 0 to -3 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 0 psf Phi: 26 °

Name: S MARSH 1, EL. -3 TO -7/-8 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 24 ° Name: S MARSH 2, EL. -7/-8 TO -17 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 24 ° Name: S BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °

Name: S BEACH SAND, EL. -17 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: S EMBANKMENT FILL, EL. +8.6 TO 0 c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 75 psf Phi: 26 °

Name: S Fill 2, El. 0 to -3 (c=75 psf) Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 75 psf Phi: 26 °

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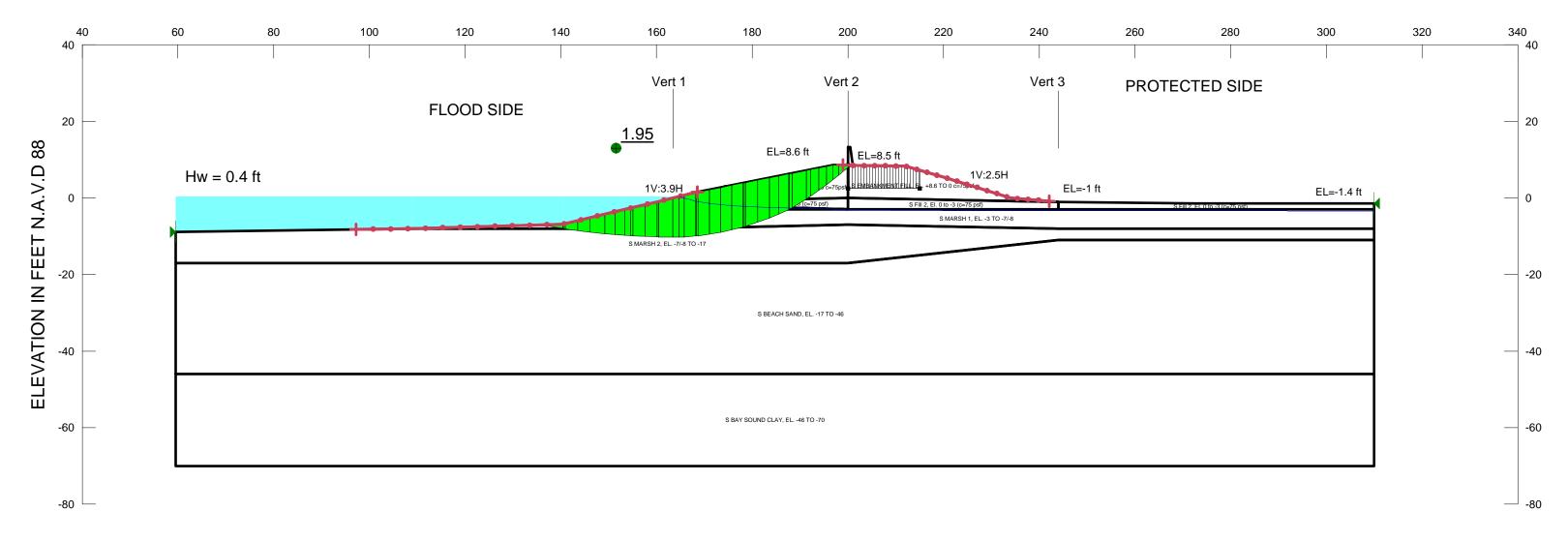


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17th STREET OUTFALL CANAL, REACH 18, STABILITY ANALYSIS,

CASE: Slope Stability (Block) LWL-S-FS (thru) STA. 663+00 to 669+36 WEST ORLEANS PARISH, LOUISIANA



Name: S EMBANKMENT FILL, EL. +8.6 TO 0 Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 75 psf Phi: 26 °

Name: S Fill 2, El. 0 to -3 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 0 psf Phi: 26 °

Name: S MARSH 1, EL. -3 TO -7/-8 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 24 ° Name: S MARSH 2, EL. -7/-8 TO -17 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 24 ° Name: S BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °

Name: S BEACH SAND, EL. -17 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: S EMBANKMENT FILL, EL. +8.6 TO 0 c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 75 psf Phi: 26 °

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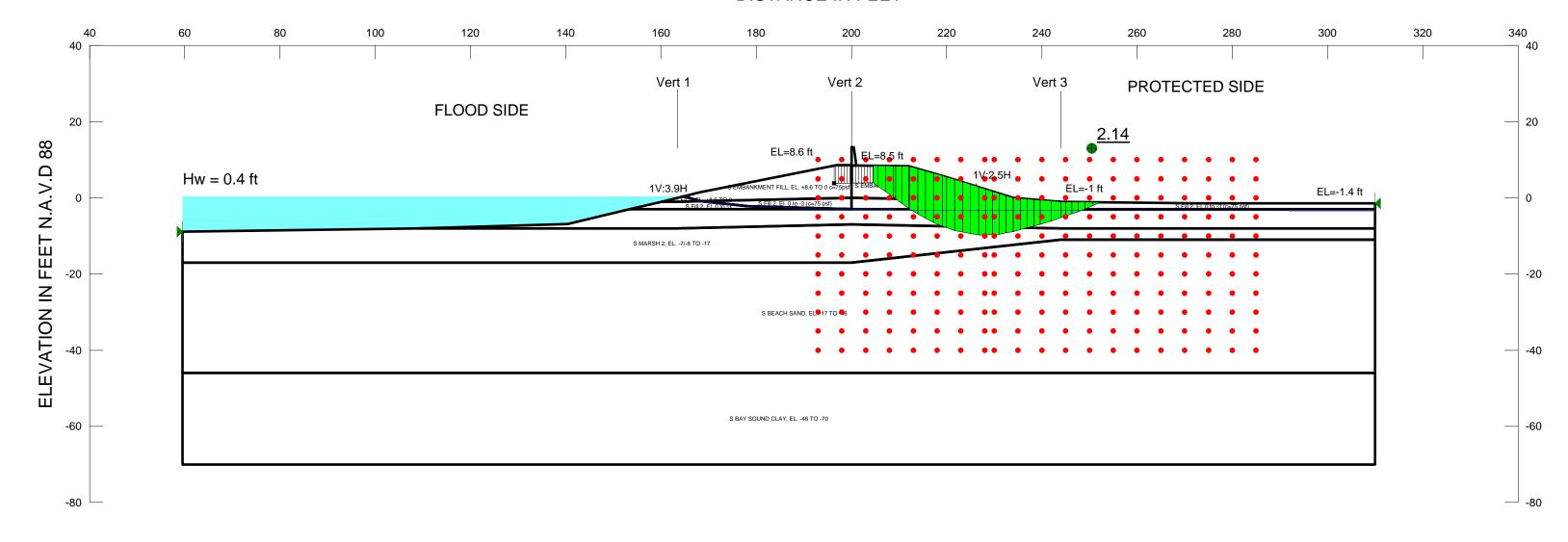


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17th STREET OUTFALL CANAL, REACH 18, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S-FS

STA. 663+00 to 669+36 WEST ORLEANS PARISH, LOUISIANA



Name: S EMBANKMENT FILL, EL. +8.6 TO 0 Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 75 psf Phi: 26 °

Name: S Fill 2, El. 0 to -3 Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 0 psf Phi: 26 °

Name: S MARSH 1, EL. -3 TO -7/-8 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 24 ° Name: S MARSH 2, EL. -7/-8 TO -17 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 24 ° Name: S BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °

Name: S BEACH SAND, EL. -17 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: S EMBANKMENT FILL, EL. +8.6 TO 0 c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 75 psf Phi: 26 °

Name: S Fill 2, El. 0 to -3 (c=75 psf) Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 75 psf Phi: 26 °

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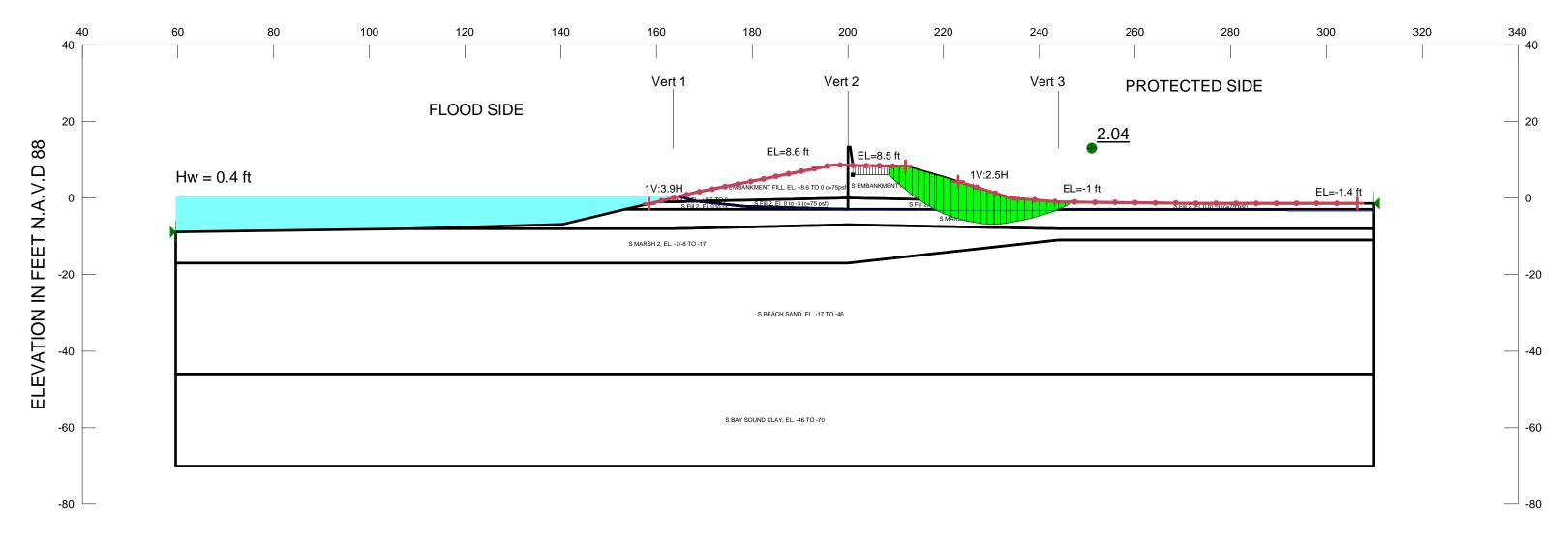


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17th STREET OUTFALL CANAL, REACH 18, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS

STA. 663+00 to 669+36 WEST ORLEANS PARISH, LOUISIANA



Name: S EMBANKMENT FILL, EL. +8.6 TO 0 Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 75 psf Phi: 26 °

Cohesion: 0 psf Phi: 26 ° Name: S Fill 2, El. 0 to -3 Model: Spatial Mohr-Coulomb Weight Fn: Fill

Name: S MARSH 1, EL. -3 TO -7/-8 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 24 ° Name: S MARSH 2, EL. -7/-8 TO -17 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 24 ° Name: S BAY SOUND CLAY, EL. -46 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °

Name: S BEACH SAND, EL. -17 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: S EMBANKMENT FILL, EL. +8.6 TO 0 c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 75 psf Phi: 26 °

Name: S Fill 2, El. 0 to -3 (c=75 psf) Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-S-PS File Name: 17thReach18.gsz Last Edited By: Redell, Chris MVS



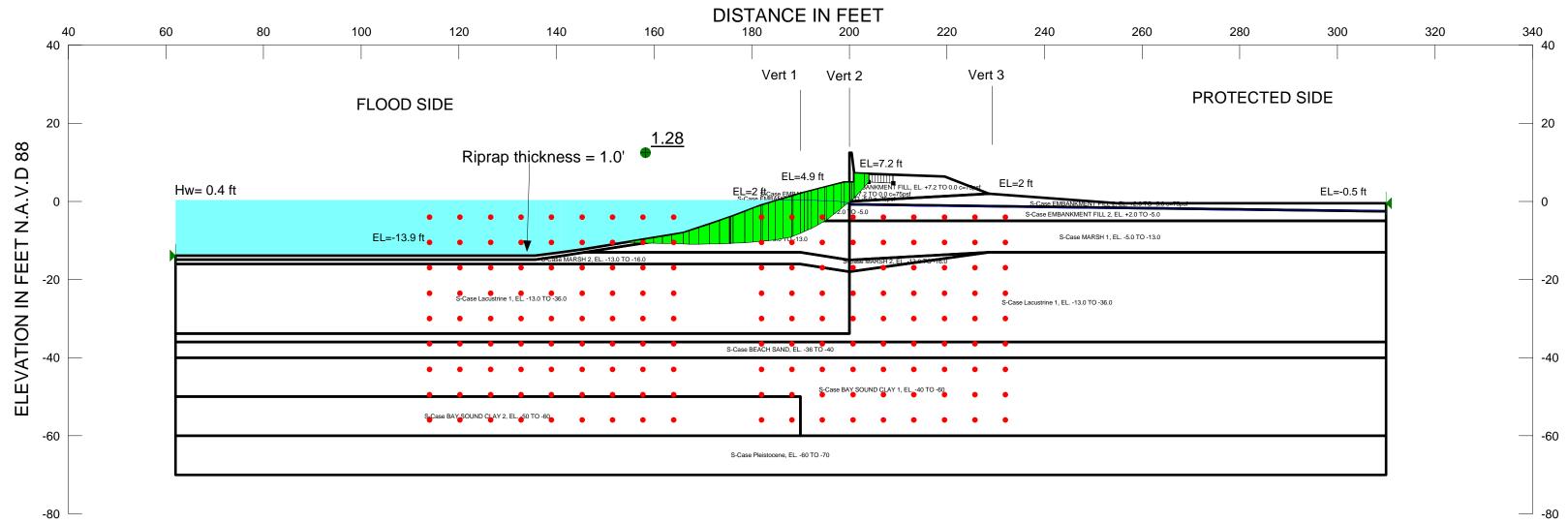


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17th STREET OUTFALL CANAL, REACH 18, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S-PS

STA. 663+00 to 669+36 WEST ORLEANS PARISH, LOUISIANA



Name: S-Case EMBANKMENT FILL 2, EL. +2.0 TO -5.0 Model: Spatial Mohr-Coulomb Weight Fn: Fill (2) Cohesion: 0 psf Phi: 26 °

Name: S-Case MARSH 1, EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion: 0 psf Phi: 24 °

Name: S-Case BAY SOUND CLAY 1, EL. -40 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 26 °

Name: S-Case Lacustrine 1, EL. -13.0 TO -36.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °

Name: S-Case Pleistocene, EL. -60 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 124 pcf Cohesion: 0 psf Phi: 32 °

Name: S-Case MARSH 2, EL. -13.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 24 °

Name: S-Case BAY SOUND CLAY 2, EL. -50 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 26 °

Name: Rip Rap Model: Spatial Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 0 psf Phi: 40 °

Name: S-Case BEACH SAND, EL. -36 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: S-Case EMBANKMENT FILL, EL. +7.2 TO 0.0 c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 75 psf Phi: 26 °

Name: S-Case EMBANKMENT FILL 2, EL. +2.0 TO -5.0 c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Fill (2) Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach19.gsz Last Edited By: Redell, Chris MVS

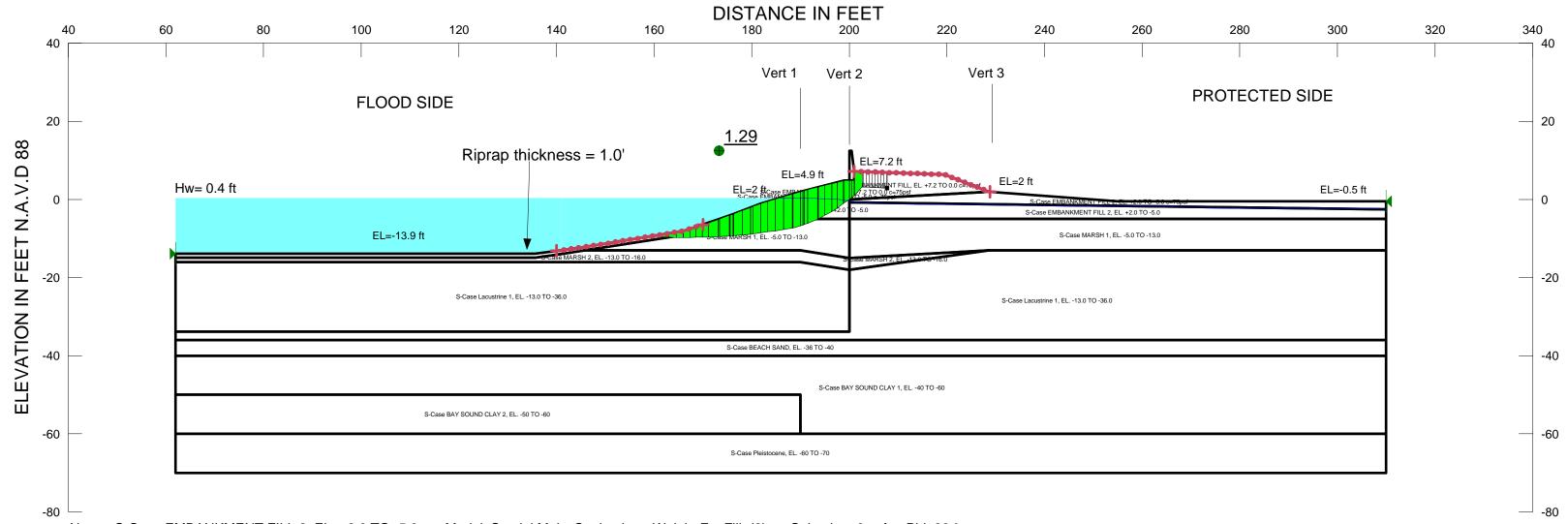




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17th STREET OUTFALL CANAL, REACH 19, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS STA. Closure to 552+17 EAST ORLEANS PARISH, LOUISIANA



Name: S-Case EMBANKMENT FILL 2, EL. +2.0 TO -5.0 Model: Spatial Mohr-Coulomb Weight Fn: Fill (2) Cohesion: 0 psf Phi: 26 °

Name: S-Case MARSH 1, EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion: 0 psf Phi: 24 °

Name: S-Case BAY SOUND CLAY 1, EL. -40 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 26 °

Name: S-Case Lacustrine 1, EL. -13.0 TO -36.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °

Name: S-Case Pleistocene, EL. -60 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 124 pcf Cohesion: 0 psf Phi: 32 °

Name: S-Case MARSH 2, EL. -13.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 24 °

Name: S-Case BAY SOUND CLAY 2, EL. -50 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 26 °

Name: Rip Rap Model: Spatial Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 0 psf Phi: 40 °

Name: S-Case BEACH SAND, EL. -36 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: S-Case EMBANKMENT FILL, EL. +7.2 TO 0.0 c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 75 psf Phi: 26 °

Name: S-Case EMBANKMENT FILL 2, EL. +2.0 TO -5.0 c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Fill (2) Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability (Entry/Exit) LWL-S-FS File Name: 17thReach19.gsz Last Edited By: Redell, Chris MVS

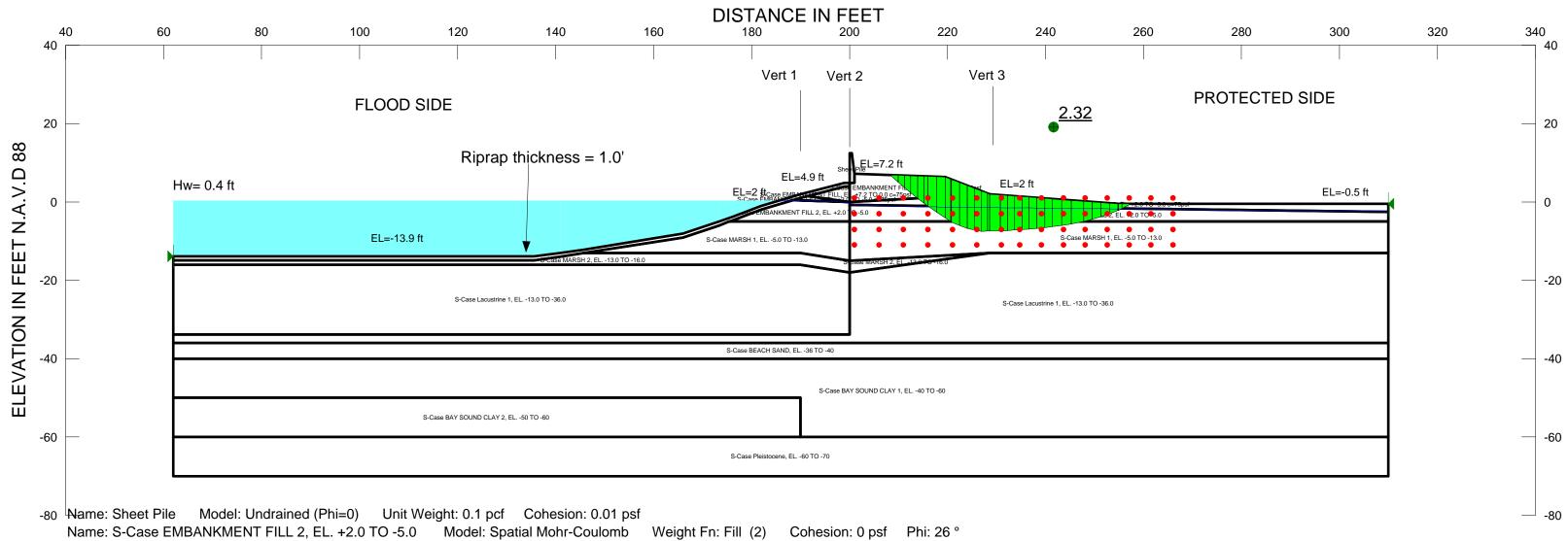




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17th STREET OUTFALL CANAL, REACH 19,

STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S-FS STA. Closure to 552+17 EAST ORLEANS PARISH, LOUISIANA



Name: S-Case MARSH 1, EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion: 0 psf Phi: 24 °

Name: S-Case BAY SOUND CLAY 1, EL. -40 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 26 °

Name: S-Case Lacustrine 1, EL. -13.0 TO -36.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °

Name: S-Case Pleistocene, EL. -60 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 124 pcf Cohesion: 0 psf Phi: 32 °

Name: S-Case MARSH 2, EL. -13.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 24 °

Name: S-Case BAY SOUND CLAY 2, EL. -50 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 26 ° Name: Rip Rap Model: Spatial Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 0 psf Phi: 40 °

Name: S-Case BEACH SAND, EL. -36 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: S-Case EMBANKMENT FILL, EL. +7.2 TO 0.0 c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 75 psf Phi: 26 °

Name: S-Case EMBANKMENT FILL 2, EL. +2.0 TO -5.0 c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Fill (2) Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-S-PS File Name: 17thReach19.gsz Last Edited By: Redell, Chris MVS

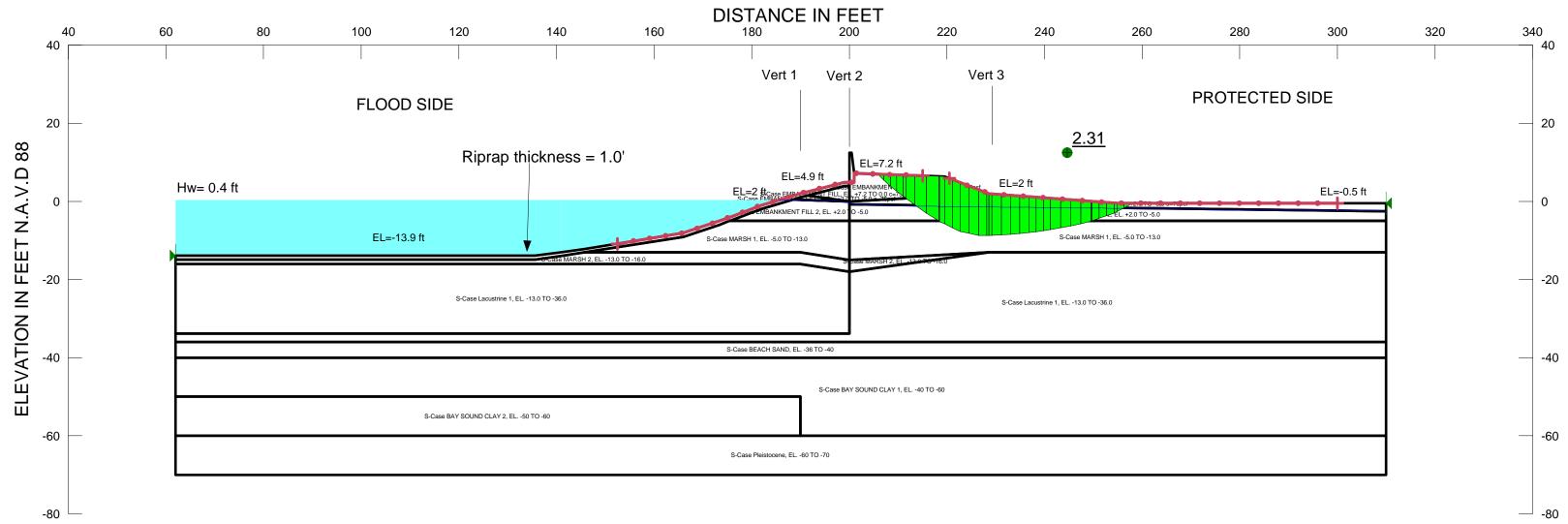




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17th STREET OUTFALL CANAL, REACH 19, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS STA. Closure to 552+17 EAST ORLEANS PARISH, LOUISIANA



Name: S-Case EMBANKMENT FILL 2, EL. +2.0 TO -5.0 Model: Spatial Mohr-Coulomb Weight Fn: Fill (2) Cohesion: 0 psf Phi: 26 °

Name: S-Case MARSH 1, EL. -5.0 TO -13.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 1 Cohesion: 0 psf Phi: 24 °

Name: S-Case BAY SOUND CLAY 1, EL. -40 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 26 °

Name: S-Case Lacustrine 1, EL. -13.0 TO -36.0 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °

Name: S-Case Pleistocene, EL. -60 TO -70 Model: Spatial Mohr-Coulomb Unit Weight: 124 pcf Cohesion: 0 psf Phi: 32 °

Name: S-Case MARSH 2, EL. -13.0 TO -16.0 Model: Spatial Mohr-Coulomb Weight Fn: Marsh 2 Cohesion: 0 psf Phi: 24 °

Name: S-Case BAY SOUND CLAY 2, EL. -50 TO -60 Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 0 psf Phi: 26 °

Name: Rip Rap Model: Spatial Mohr-Coulomb Unit Weight: 132 pcf Cohesion: 0 psf Phi: 40 °

Name: S-Case BEACH SAND, EL. -36 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: S-Case EMBANKMENT FILL, EL. +7.2 TO 0.0 c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 75 psf Phi: 26 °

Name: S-Case EMBANKMENT FILL 2, EL. +2.0 TO -5.0 c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Fill (2) Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

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Name: Slope Stability (Entry/Exit) LWL-S-PS File Name: 17thReach19.gsz Last Edited By: Redell, Chris MVS

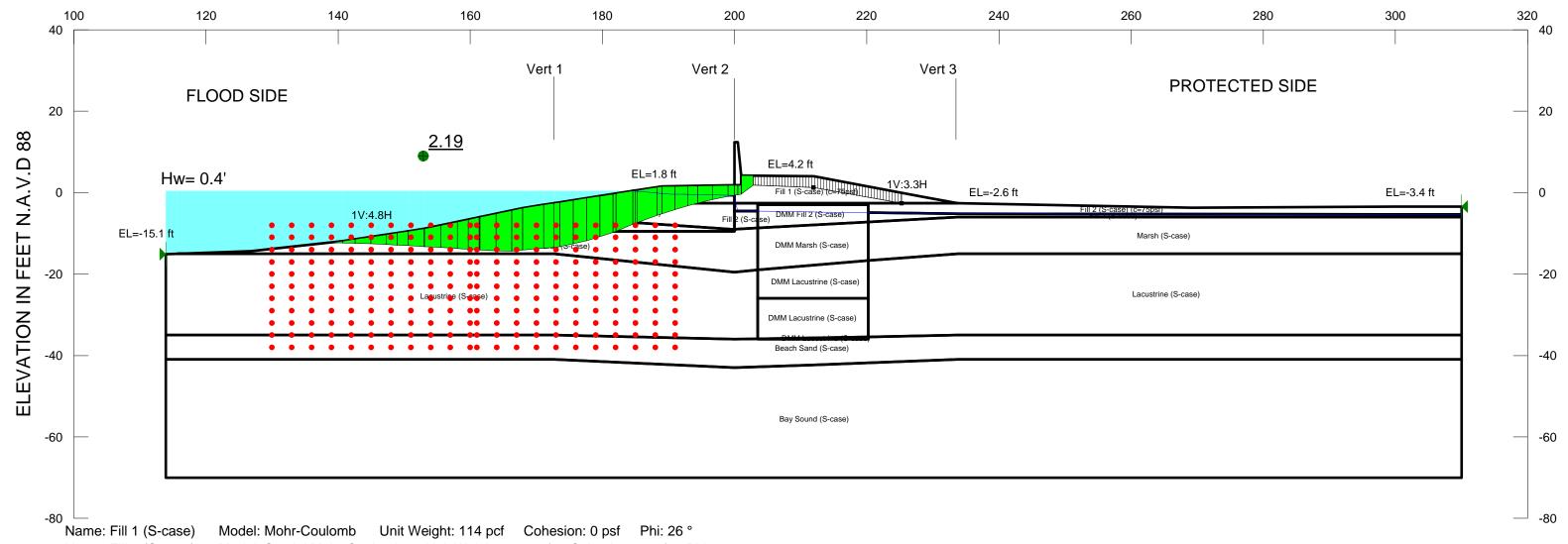




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17th STREET OUTFALL CANAL, REACH 19, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) LWL-S-PS STA. Closure to 552+17 EAST ORLEANS PARISH, LOUISIANA



Unit Weight: 110 pcf Cohesion: 0 psf Phi: 26 ° Name: Fill 2 (S-case) Model: Spatial Mohr-Coulomb Model: Spatial Mohr-Coulomb Weight Fn: Marsh Cohesion: 0 psf Phi: 24 ° Name: Marsh (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion: 0 psf Phi: 26 ° Name: Lacustrine (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 ° Name: Bay Sound (S-case) Name: DMM Fill 2 (S-case) Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 250 psf Phi: 26 ° Model: Spatial Mohr-Coulomb Unit Weight: 78 pcf Cohesion: 250 psf Phi: 24 ° Name: DMM Marsh (S-case) Name: DMM Lacustrine (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 250 psf Phi: 26 ° Name: Fill 1 (S-case) (c=75psf) Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 ° Name: Beach Sand (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34° Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 ° Name: Fill 2 (S-case) (c=75psf)

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach02.gsz Last Edited By: Redell, Chris MVS

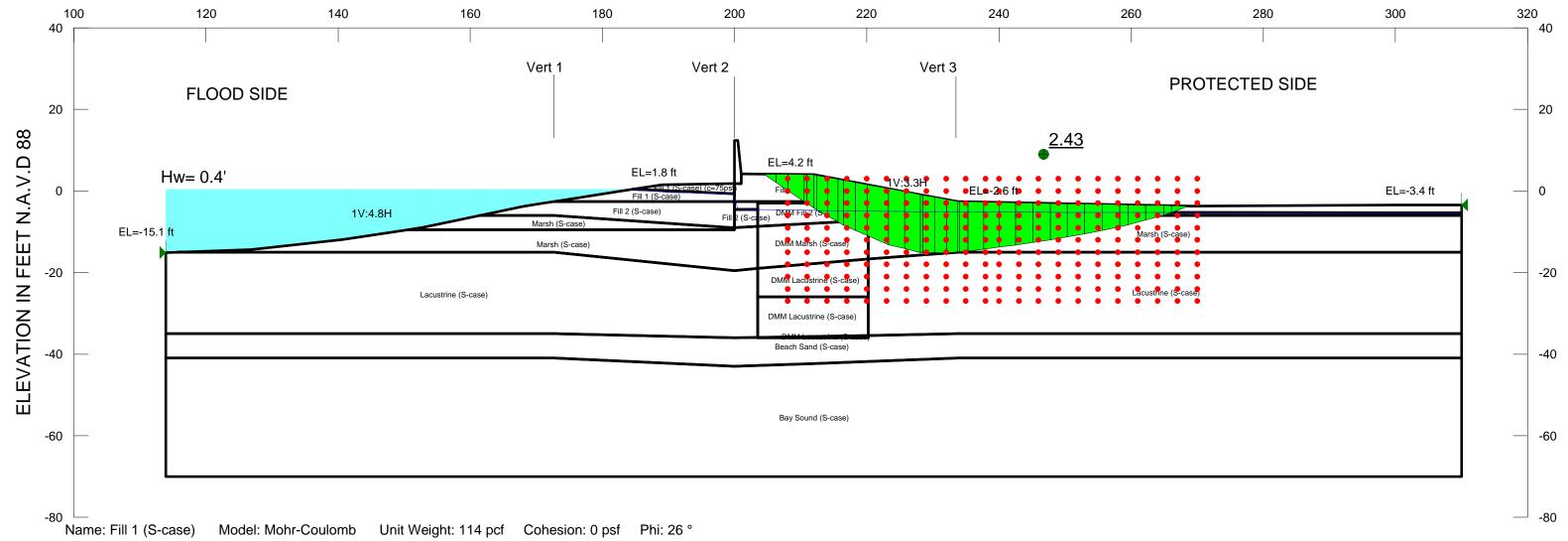




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17th STREET OUTFALL CANAL, REACH 2, STABILITY ANALYSIS. CASE: Slope Stability (Block) LWL-S-FS STA. 553+70 - 565+00 WEST ORLEANS PARISH, LOUISIANA



Unit Weight: 110 pcf Cohesion: 0 psf Phi: 26 ° Name: Fill 2 (S-case) Model: Spatial Mohr-Coulomb Model: Spatial Mohr-Coulomb Weight Fn: Marsh Cohesion: 0 psf Phi: 24 ° Name: Marsh (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion: 0 psf Phi: 26 ° Name: Lacustrine (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 ° Name: Bay Sound (S-case) Name: DMM Fill 2 (S-case) Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 250 psf Phi: 26 ° Name: DMM Marsh (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 78 pcf Cohesion: 250 psf Phi: 24 ° Name: DMM Lacustrine (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 250 psf Phi: 26 ° Name: Fill 1 (S-case) (c=75psf) Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 ° Name: Beach Sand (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34° Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 ° Name: Fill 2 (S-case) (c=75psf)

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

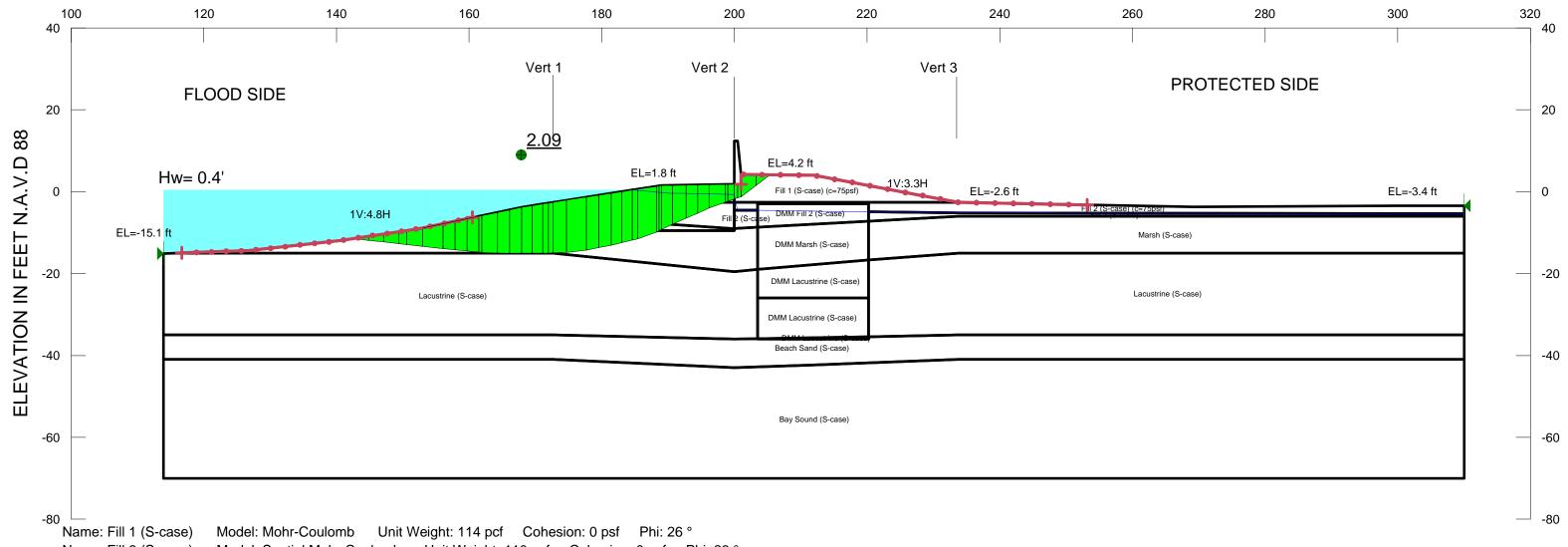
Name: Slope Stability (Block) LWL-S-PS File Name: 17thReach02.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 2, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS STA. 553+70 - 565+00 WEST ORLEANS PARISH, LOUISIANA



Unit Weight: 110 pcf Cohesion: 0 psf Phi: 26 ° Name: Fill 2 (S-case) Model: Spatial Mohr-Coulomb Model: Spatial Mohr-Coulomb Weight Fn: Marsh Cohesion: 0 psf Phi: 24 ° Name: Marsh (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion: 0 psf Phi: 26 ° Name: Lacustrine (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 ° Name: Bay Sound (S-case) Name: DMM Fill 2 (S-case) Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 250 psf Phi: 26 ° Name: DMM Marsh (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 78 pcf Cohesion: 250 psf Phi: 24 ° Name: DMM Lacustrine (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 250 psf Phi: 26 ° Name: Fill 1 (S-case) (c=75psf) Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 ° Name: Beach Sand (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34° Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 ° Name: Fill 2 (S-case) (c=75psf)

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-S-FS

File Name: 17thReach02.gsz Last Edited By: Redell, Chris MVS

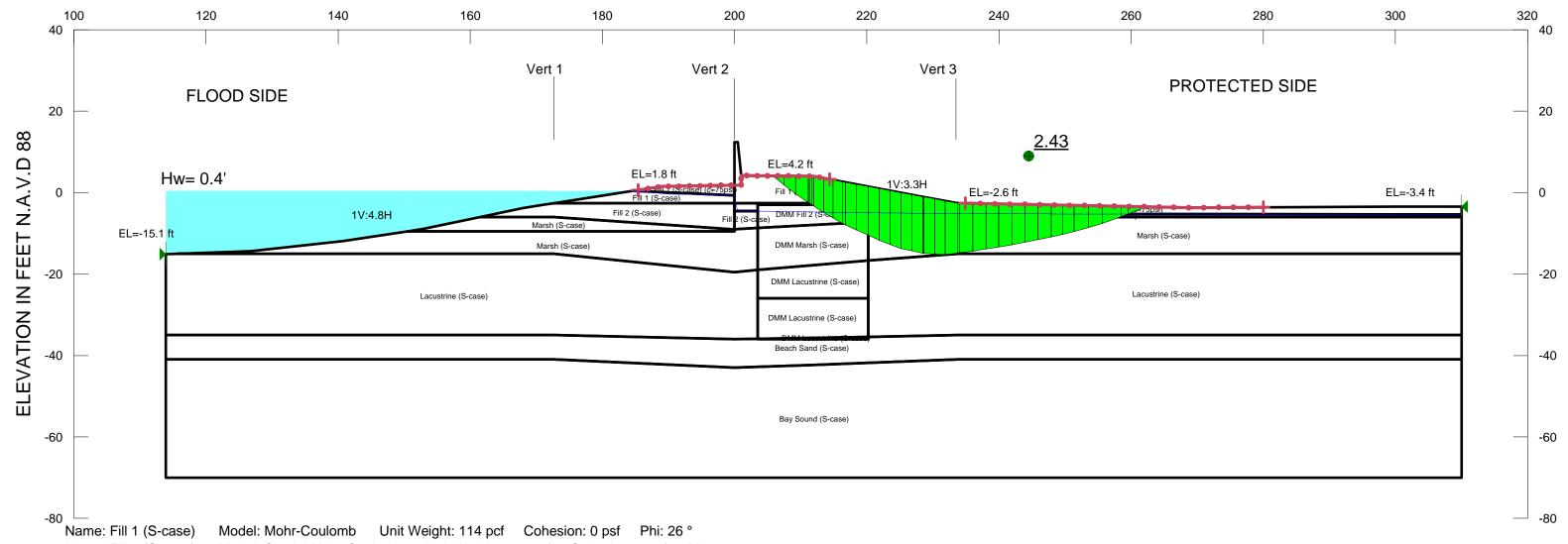




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17th STREET OUTFALL CANAL, REACH 2, STABILITY ANALYSIS. CASE: Slope Stability (Entry/Exit) LWL-S-FS STA. 553+70 - 565+00 WEST ORLEANS PARISH, LOUISIANA



Unit Weight: 110 pcf Cohesion: 0 psf Phi: 26 ° Name: Fill 2 (S-case) Model: Spatial Mohr-Coulomb Model: Spatial Mohr-Coulomb Weight Fn: Marsh Cohesion: 0 psf Phi: 24 ° Name: Marsh (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine Cohesion: 0 psf Phi: 26 ° Name: Lacustrine (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 ° Name: Bay Sound (S-case) Name: DMM Fill 2 (S-case) Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 250 psf Phi: 26 ° Name: DMM Marsh (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 78 pcf Cohesion: 250 psf Phi: 24 ° Name: DMM Lacustrine (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 250 psf Phi: 26 ° Name: Fill 1 (S-case) (c=75psf) Model: Mohr-Coulomb Unit Weight: 114 pcf Cohesion: 75 psf Phi: 26 ° Name: Beach Sand (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34° Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 ° Name: Fill 2 (S-case) (c=75psf)

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-S-PS

File Name: 17thReach02.gsz Last Edited By: Redell, Chris MVS

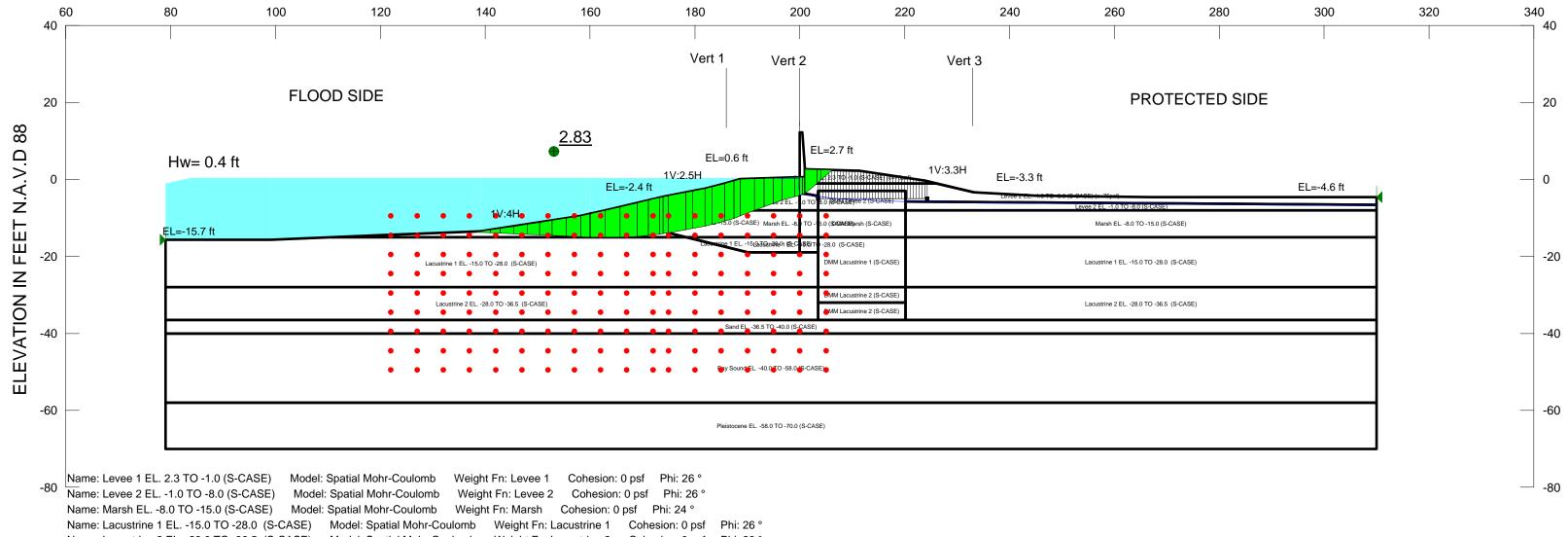




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17th STREET OUTFALL CANAL, REACH 2, STABILITY ANALYSIS. CASE: Slope Stability (Entry/Exit) LWL-S-PS STA. 553+70 - 565+00 WEST ORLEANS PARISH, LOUISIANA



Name: Lacustrine 2 EL. -28.0 TO -36.5 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 0 psf Phi: 26 ° Name: Sand EL. -36.5 TO -40.0 (S-CASE) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: Bay Sound EL. -40.0 TO -58.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion: 0 psf Phi: 26 ° Name: Pleistocene EL. -58.0 TO -70.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 123 pcf Cohesion: 0 psf Phi: 26 ° Name: DMM Levee 2 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Levee 2 Cohesion: 250 psf Phi: 26 ° Name: DMM Lacustrine 1 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 ° Name: DMM Lacustrine 2 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: DMM Lacustrine 2 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: Levee 1 EL. 2.3 TO -1.0 (S-CASE) (c=75psf) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 75 psf Phi: 26 ° Name: Levee 2 EL. -1.0 TO -8.0 (S-CASE) (c=75psf) Model: Spatial Mohr-Coulomb Weight Fn: Levee 2 Cohesion: 75 psf Phi: 26 ° Phi: 26 ° Name: Levee 2 EL. -1.0 TO -8.0 (S-CASE) (c=75psf) Model: Spatial Mohr-Coulomb Weight Fn: Levee 2 Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

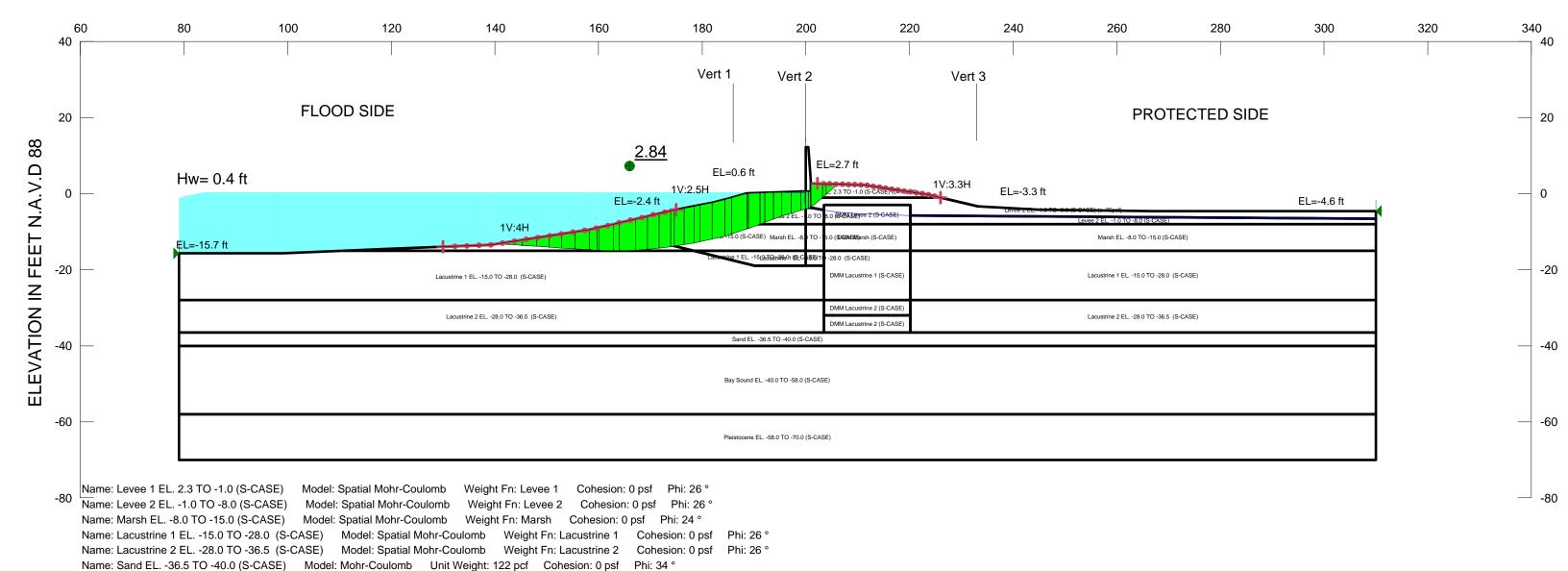
WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-FS-S File Name: 17thReach20.gsz Last Edited By: Redell, Chris MVS



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17th STREET OUTFALL CANAL, REACH 20, STABILITY ANALYSIS
CASE: Slope Stability (Block) LWL-FS-S
STA. 553+58 to 560+10 EAST
ORLEANS PARISH, LOUISIANA



Name: Bay Sound EL. -40.0 TO -58.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion: 0 psf Phi: 26 °
Name: Pleistocene EL. -58.0 TO -70.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 123 pcf Cohesion: 0 psf Phi: 32 °
Name: DMM Levee 2 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Levee 2 Cohesion: 250 psf Phi: 26 °
Name: DMM Marsh (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Marsh Cohesion: 250 psf Phi: 24 °
Name: DMM Lacustrine 1 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 °
Name: DMM Lacustrine 2 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 °
Name: Levee 1 EL. 2.3 TO -1.0 (S-CASE) (c=75psf) Model: Spatial Mohr-Coulomb Weight Fn: Levee 1 Cohesion: 75 psf Phi: 26 °
Name: Levee 2 EL. -1.0 TO -8.0 (S-CASE) (c=75psf) Model: Spatial Mohr-Coulomb Weight Fn: Levee 2 Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

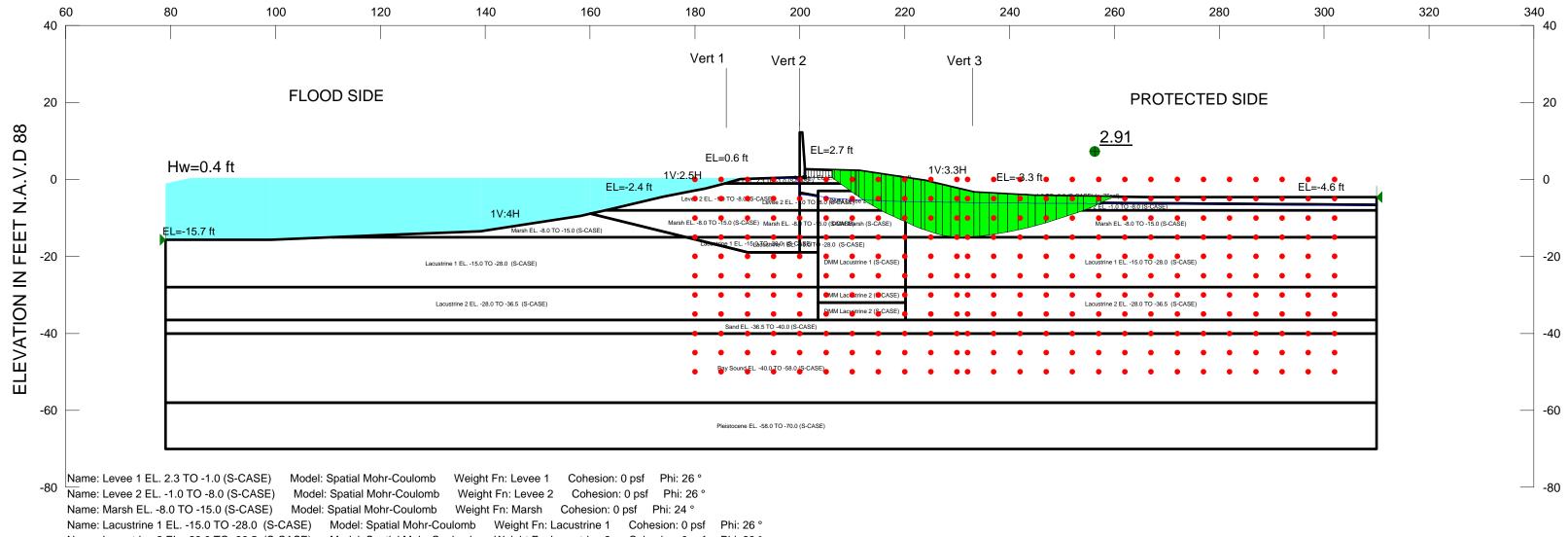
WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-FS-S File Name: 17thReach20.gsz Last Edited By: Redell, Chris MVS



US Army Corps of Engineers® Of Engineers® Saint Louis District New Orleans District

17th STREET OUTFALL CANAL, REACH 20, STABILITY ANALYSIS
CASE: Slope Stability (Entry/Exit) LWL-FS-S
STA. 553+58 to 560+10 EAST
ORLEANS PARISH, LOUISIANA



Name: Lacustrine 2 EL. -28.0 TO -36.5 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 0 psf Phi: 26 ° Name: Sand EL. -36.5 TO -40.0 (S-CASE) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: Bay Sound EL. -40.0 TO -58.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion: 0 psf Phi: 26 ° Name: Pleistocene EL. -58.0 TO -70.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 123 pcf Cohesion: 0 psf Phi: 26 ° Name: DMM Levee 2 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Levee 2 Cohesion: 250 psf Phi: 26 ° Name: DMM Lacustrine 1 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 ° Name: DMM Lacustrine 2 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: DMM Lacustrine 2 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: Levee 1 EL. 2.3 TO -1.0 (S-CASE) (c=75psf) Model: Spatial Mohr-Coulomb Weight Fn: Levee 1 Cohesion: 75 psf Phi: 26 ° Name: Levee 2 EL. -1.0 TO -8.0 (S-CASE) (c=75psf) Model: Spatial Mohr-Coulomb Weight Fn: Levee 2 Cohesion: 75 psf Phi: 26 ° Phi: 26 ° Name: Levee 2 EL. -1.0 TO -8.0 (S-CASE) (c=75psf) Model: Spatial Mohr-Coulomb Weight Fn: Levee 2 Cohesion: 75 psf Phi: 26 ° Phi: 26 ° Name: Levee 2 EL. -1.0 TO -8.0 (S-CASE) (c=75psf) Model: Spatial Mohr-Coulomb Weight Fn: Levee 2 Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

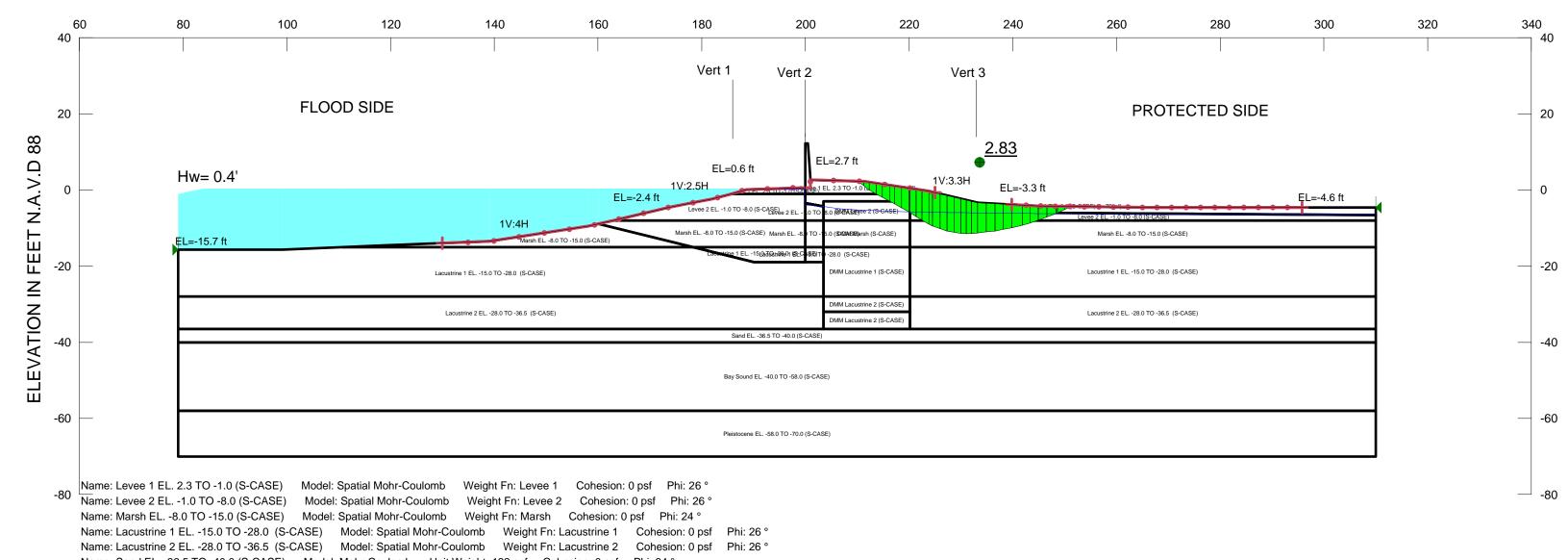
Name: Slope Stability (Block) LWL-PS-S File Name: 17thReach20.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 20, STABILITY ANALYSIS
CASE: Slope Stability (Block) LWL-PS-S
STA. 553+58 to 560+10 EAST
ORLEANS PARISH, LOUISIANA



Name: Sand EL. -36.5 TO -40.0 (S-CASE) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: Bay Sound EL. -40.0 TO -58.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion: 0 psf Phi: 26 ° Name: Pleistocene EL. -58.0 TO -70.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 123 pcf Cohesion: 0 psf Phi: 32 ° Name: DMM Levee 2 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Levee 2 Cohesion: 250 psf Phi: 26 ° Name: DMM Marsh (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Marsh Cohesion: 250 psf Phi: 24 ° Name: DMM Lacustrine 1 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 ° Name: DMM Lacustrine 2 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: Levee 1 EL. 2.3 TO -1.0 (S-CASE) (c=75psf) Model: Spatial Mohr-Coulomb Weight Fn: Levee 1 Cohesion: 75 psf Phi: 26 ° Name: Levee 2 EL. -1.0 TO -8.0 (S-CASE) (c=75psf) Model: Spatial Mohr-Coulomb Weight Fn: Levee 2 Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

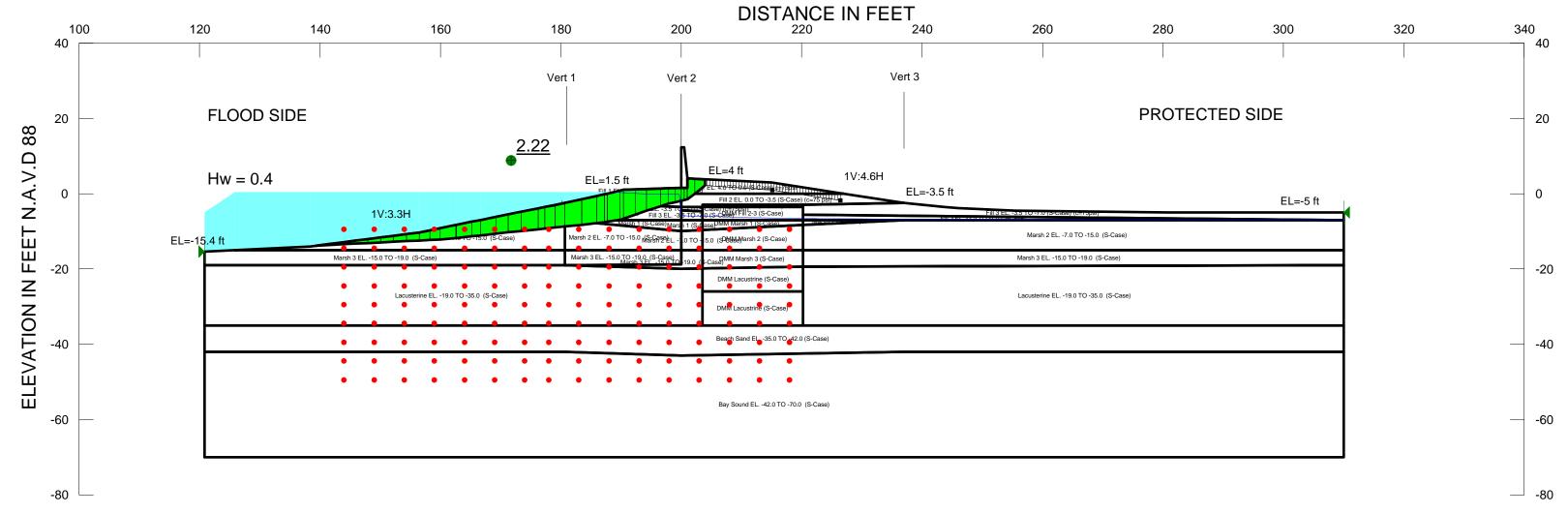
WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-PS-S File Name: 17thReach20.gsz Last Edited By: Redell, Chris MVS





17th STREET OUTFALL CANAL, REACH 20, STABILITY ANALYSIS CASE: Slope Stability (Entry/Exit) LWL-PS-S STA. 553+58 to 560+10 EAST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

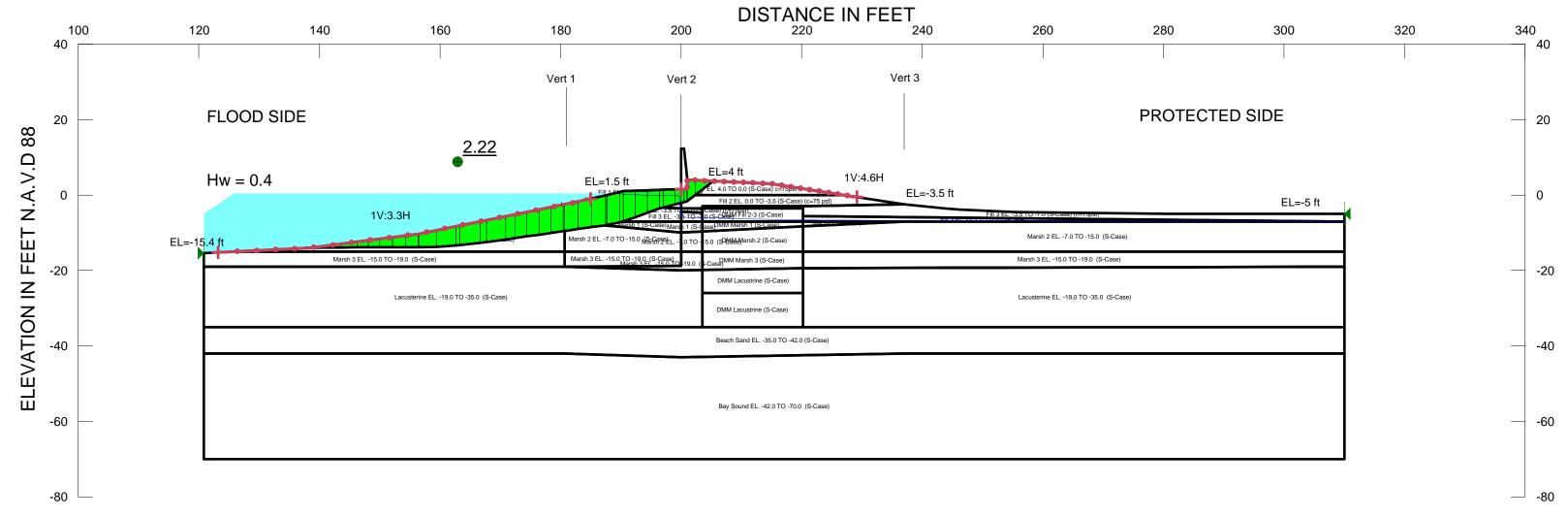
Name: Slope Stability (Block) LWL-FS-S File Name: 17thReach21.gsz Last Edited By: Redell, Chris MVS





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District New Orleans District

17th STREET OUTFALL CANAL, REACH 21, STABILITY ANALYSIS CASE: Slope Stability (Block) LWL-FS-S STA. 566+00 to 570+73 EAST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

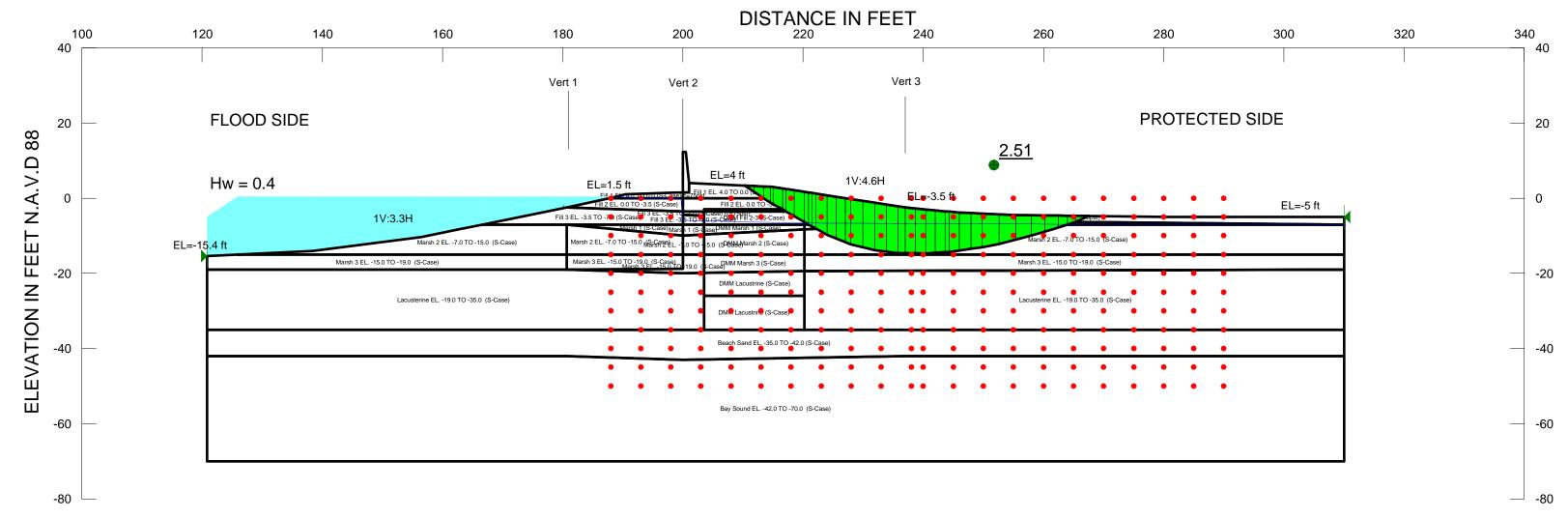
Name: Slope Stability (Entry/Exit) LWL-FS-S File Name: 17thReach21.gsz Last Edited By: Redell, Chris MVS



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17th STREET OUTFALL CANAL, REACH 21, STABILITY ANALYSIS CASE: Slope Stability (Entry/Exit) LWL-FS-S STA. 566+00 to 570+73 EAST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-PS-S File Name: 17thReach21.gsz Last Edited By: Redell, Chris MVS

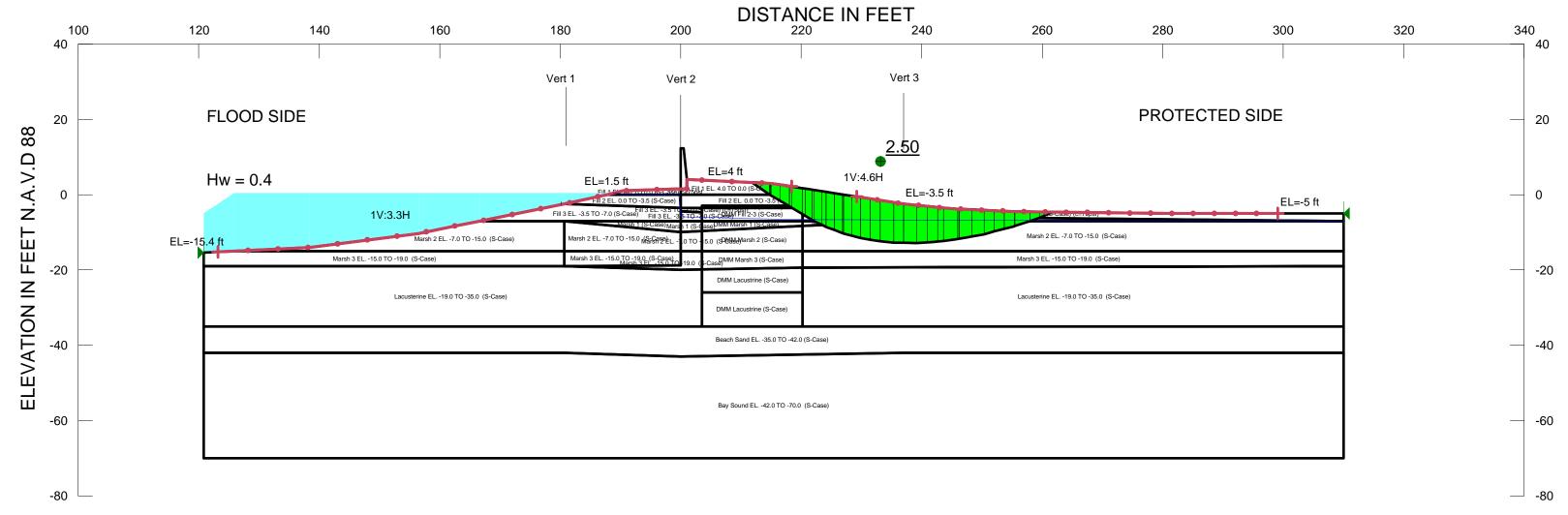




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17th STREET OUTFALL CANAL, REACH 21, STABILITY ANALYSIS CASE: Slope Stability (Block) LWL-PS-S STA. 566+00 to 570+73 EAST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-PS-S File Name: 17thReach21.gsz Last Edited By: Redell, Chris MVS

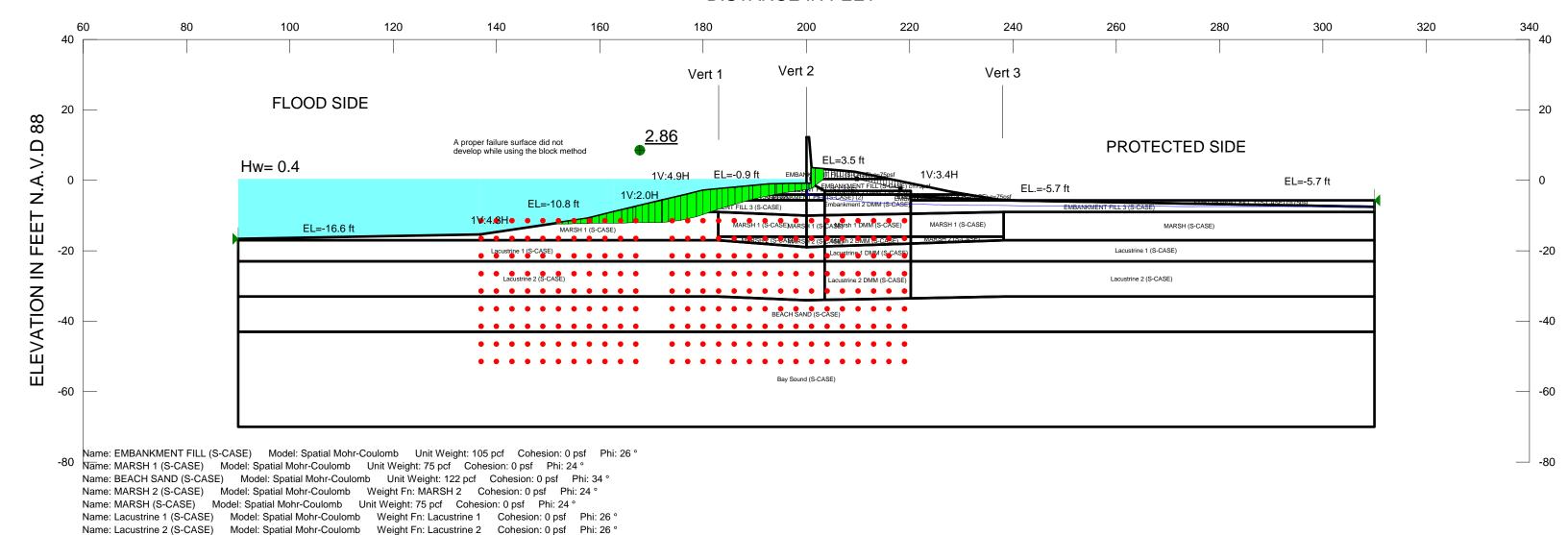




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17th STREET OUTFALL CANAL, REACH 21, STABILITY ANALYSIS CASE: Slope Stability (Entry/Exit) LWL-PS-S STA. 566+00 to 570+73 EAST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Bay Sound (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL 3 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 0 psf Phi: 26 ° Name: Embankment 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 250 psf Phi: 26 ° Name: Marsh 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 75 pcf Cohesion: 250 psf Phi: 24 ° Name: Marsh 2 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 250 psf Phi: 24 ° Name: Lacustrine 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 ° Name: Lacustrine 2 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: Embankment 2 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 250 psf Phi: 26 °

Name: EMBANKMENT FILL (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL 2 (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL (S-CASE) (2) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL 3 (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 75 psf Phi: 26 °

Name: Slope Stability (Block) LWL-S-FS (thru) File Name: 17thReach22.gsz Last Edited By: Redell, Chris MVS



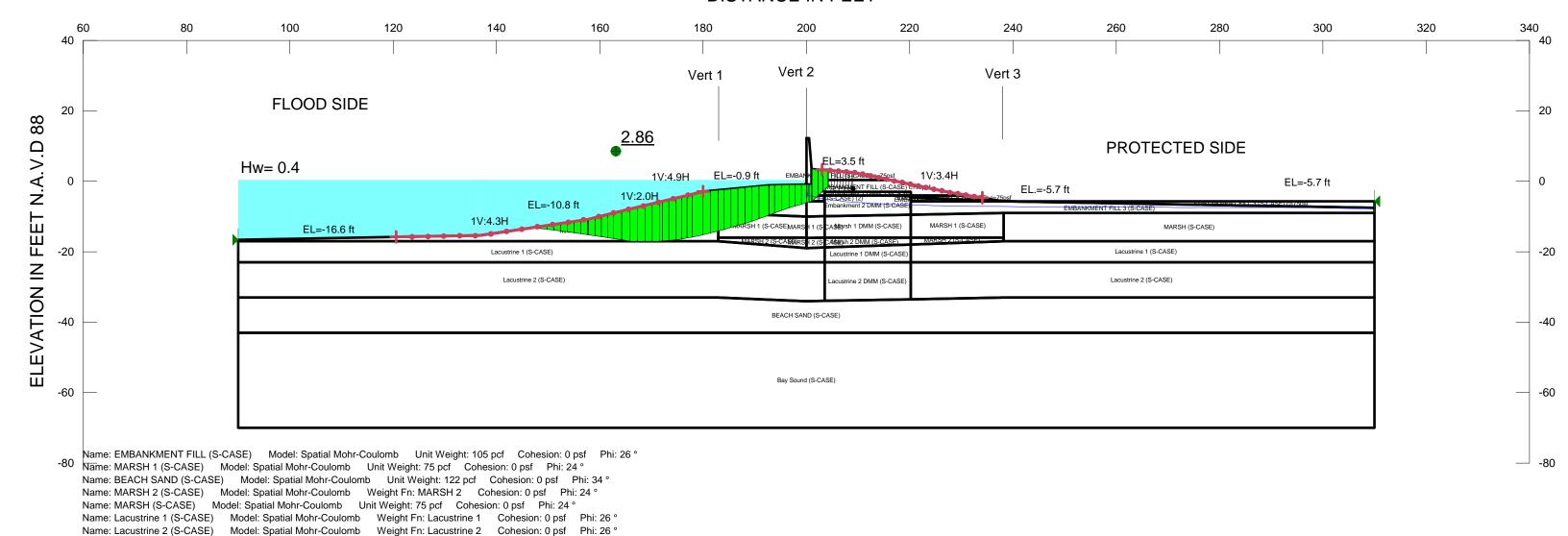


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17th STREET OUTFALL CANAL, REACH 22, STABILITY ANALYSIS. CASE: Slope Stability (Block) LWL-S-FS (thru) STA. 570+73 - 581+50 EAST

ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Bay Sound (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL 3 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 0 psf Phi: 26 ° Name: Embankment 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 250 psf Phi: 26 ° Name: Marsh 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 75 pcf Cohesion: 250 psf Phi: 24 ° Name: Marsh 2 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 250 psf Phi: 24 ° Name: Lacustrine 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 ° Name: Lacustrine 2 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: Embankment 2 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 250 psf Phi: 26 °

Name: EMBANKMENT FILL (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL 2 (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL (S-CASE) (2) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL 3 (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 75 psf Phi: 26 °

Name: Slope Stability (Entry/Exit) LWL-S-FS File Name: 17thReach22.gsz Last Edited By: Redell, Chris MVS

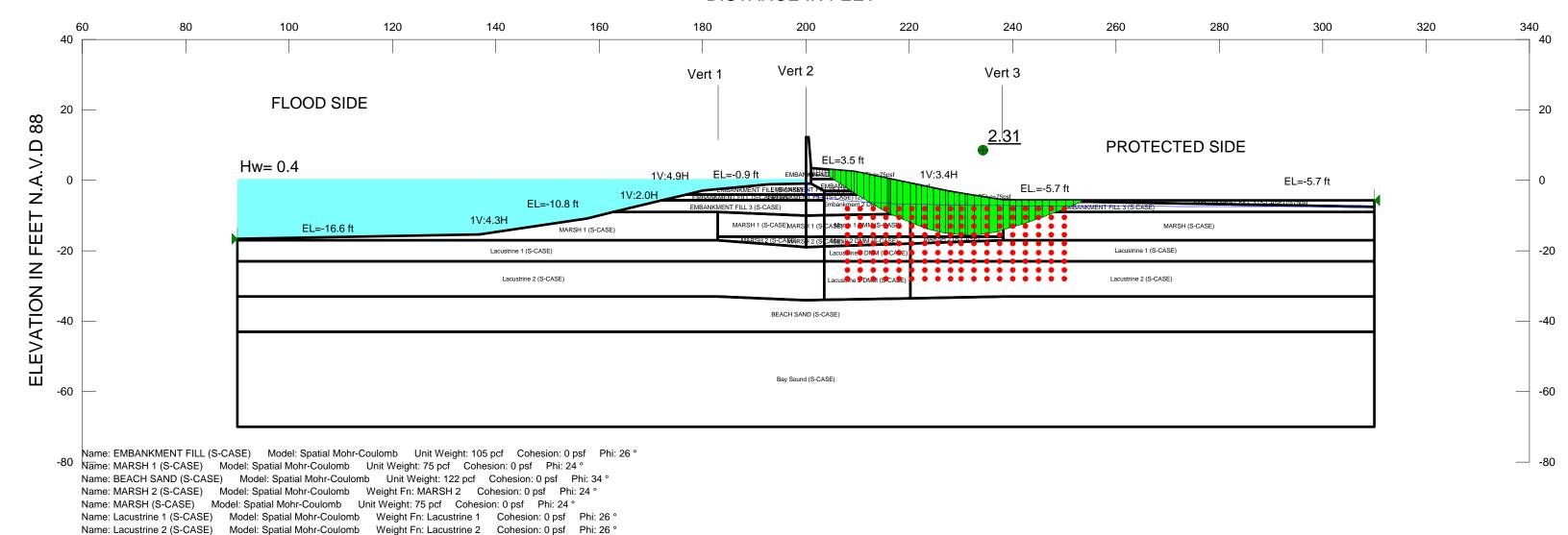




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17th STREET OUTFALL CANAL, REACH 22, STABILITY ANALYSIS. CASE: Slope Stability (Entry/Exit) LWL-S-FS STA. 570+73 - 581+50 EAST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Bay Sound (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL 3 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 0 psf Phi: 26 ° Name: Embankment 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 250 psf Phi: 26 ° Name: Marsh 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 75 pcf Cohesion: 250 psf Phi: 24 ° Name: Marsh 2 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 250 psf Phi: 24 ° Name: Lacustrine 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 ° Name: Lacustrine 2 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: Embankment 2 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 250 psf Phi: 26 °

Name: EMBANKMENT FILL (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL 2 (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL (S-CASE) (2) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL 3 (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 75 psf Phi: 26 °

Name: Slope Stability (Block) LWL-S-PS File Name: 17thReach22.gsz Last Edited By: Redell, Chris MVS

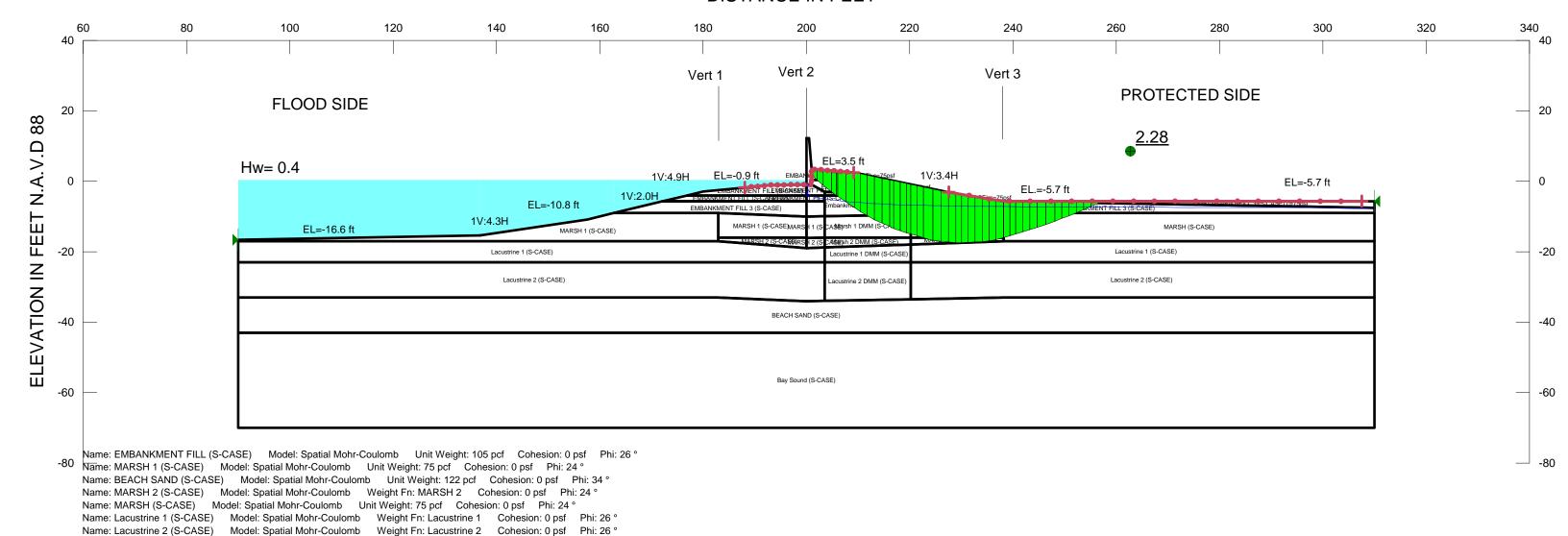




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17th STREET OUTFALL CANAL, REACH 22, STABILITY ANALYSIS. CASE: Slope Stability (Block) LWL-S-PS STA. 570+73 - 581+50 EAST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Bay Sound (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL 3 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 0 psf Phi: 26 ° Name: Embankment 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 250 psf Phi: 26 ° Name: Marsh 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 75 pcf Cohesion: 250 psf Phi: 24 ° Name: Marsh 2 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 250 psf Phi: 24 ° Name: Lacustrine 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 ° Name: Lacustrine 2 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: Embankment 2 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 250 psf Phi: 26 °

Name: EMBANKMENT FILL (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL 2 (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL (S-CASE) (2) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL 3 (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Fill Cohesion: 75 psf Phi: 26 °

Name: Slope Stability (Entry/Exit) LWL-S-PS File Name: 17thReach22.gsz Last Edited By: Redell, Chris MVS



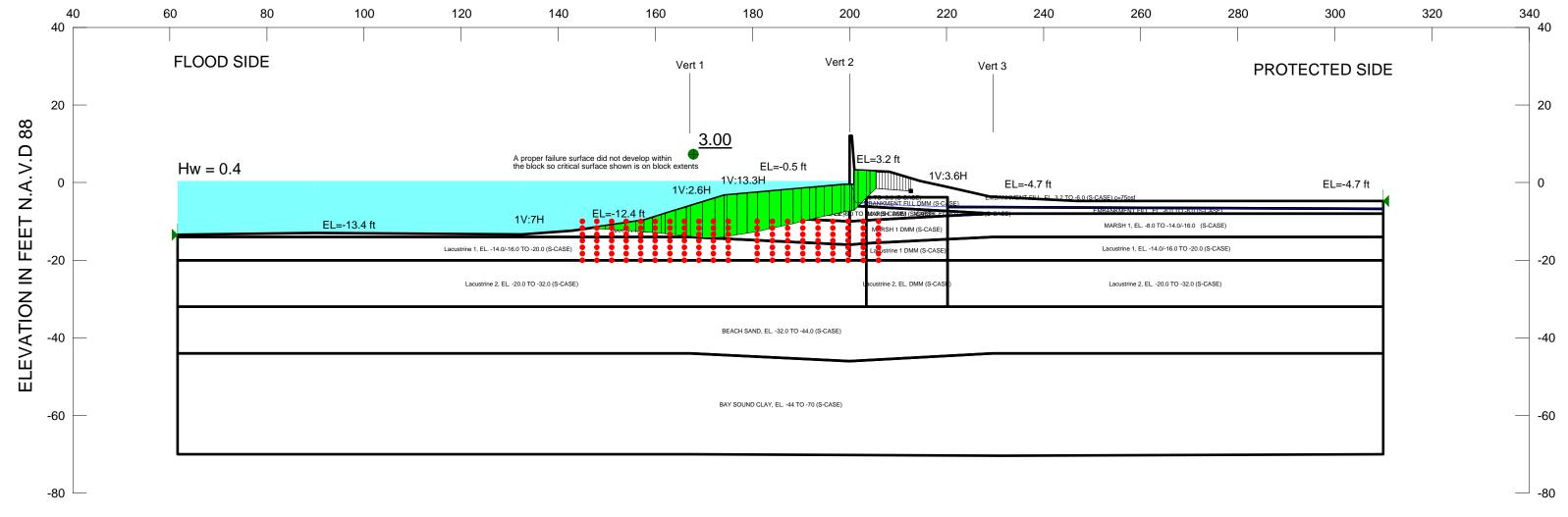


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US Army Corps of Engineers® Saint Louis District New Orleans District

17th STREET OUTFALL CANAL, REACH 22, STABILITY ANALYSIS. CASE: Slope Stability (Entry/Exit) LWL-S-PS STA. 570+73 - 581+50 EAST

ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. -6.0 TO -8.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 26 °
Name: BEACH SAND, EL. -32.0 TO -44.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: MARSH, EL -6.0 TO -10.0 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion: 0 psf Phi: 24 °
Name: Lacustrine 1, EL. -14.0/-16.0 TO -20.0 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °
Name: MARSH 1, EL. -8.0 TO -14.0/-16.0 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion: 0 psf Phi: 26 °
Name: EMBANKMENT FILL, EL 0.5 TO -8.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 26 °
Name: BAY SOUND CLAY, EL. -44 TO -70 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °
Name: Lacustrine 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 °
Name: MARSH 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion: 250 psf Phi: 24 °
Name: MARSH DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion: 250 psf Phi: 24 °
Name: EMBANKMENT FILL DMM (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 250 psf Phi: 26 °
Name: Lacustrine 2, EL. DMM (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 250 psf Phi: 26 °
Name: EMBANKMENT FILL DMM (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 250 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. 3.2 TO -6.0 (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach23.gsz Last Edited By: Redell, Chris MVS



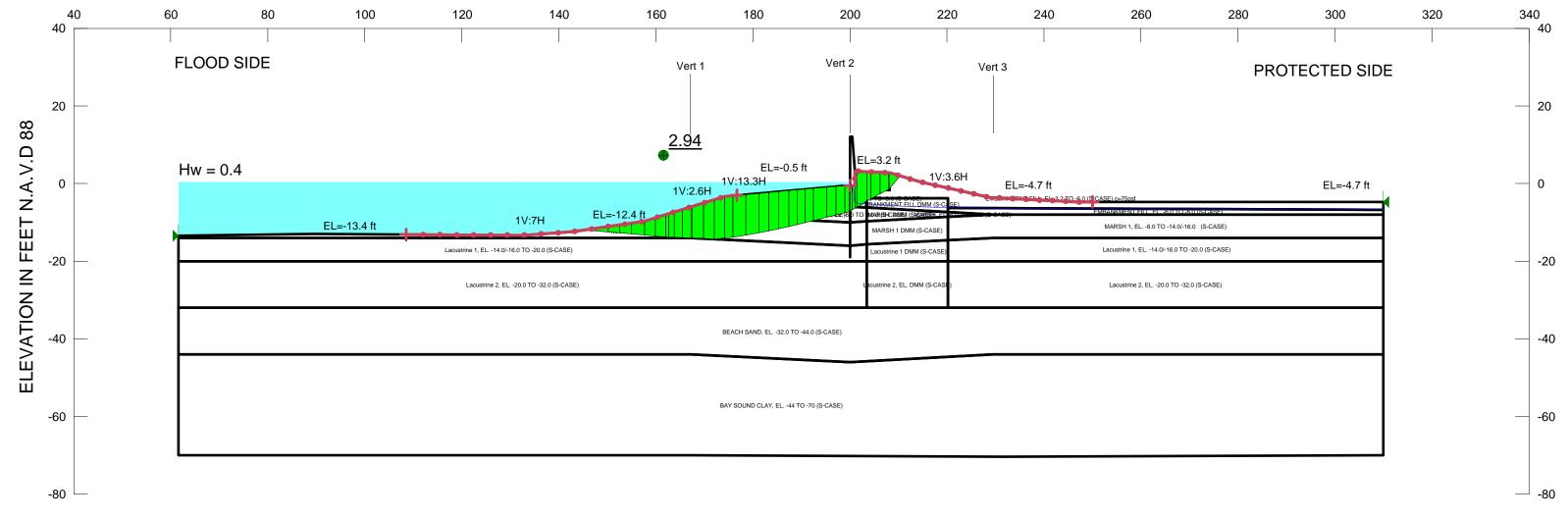


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17th STREET OUTFALL CANAL, REACH 23, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS

STA. 581+50 to 588+67 EAST
ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. -6.0 TO -8.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 26 °
Name: BEACH SAND, EL. -32.0 TO -44.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: MARSH, EL -6.0 TO -10.0 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion: 0 psf Phi: 24 °
Name: Lacustrine 1, EL. -14.0/-16.0 TO -20.0 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °
Name: MARSH 1, EL. -8.0 TO -14.0/-16.0 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion: 0 psf Phi: 26 °
Name: EMBANKMENT FILL, EL 0.5 TO -8.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 26 °
Name: Lacustrine 2, EL. -20.0 TO -32.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 °
Name: BAY SOUND CLAY, EL. -44 TO -70 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 °
Name: Lacustrine 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 °
Name: MARSH 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion: 250 psf Phi: 24 °
Name: MARSH DMM (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 250 psf Phi: 26 °
Name: EMBANKMENT FILL DMM (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 250 psf Phi: 26 °
Name: Lacustrine 2, EL. DMM (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 250 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. 3.2 TO -6.0 (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-S- FS File Name: 17thReach23.gsz Last Edited By: Redell, Chris MVS



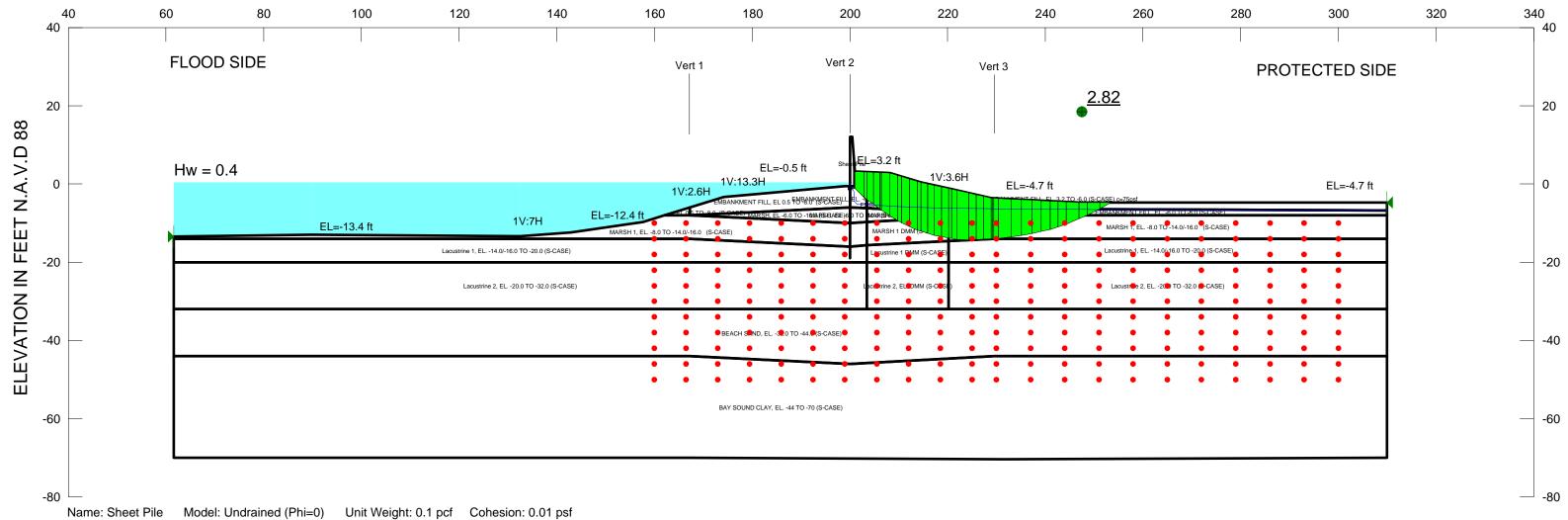


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17th STREET OUTFALL CANAL, REACH 23, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) LWL-S- FS STA. 581+50 to 588+67 EAST ORLEANS PARISH, LOUISIANA



Name: Sheet Pile Model: Unit Weight: 0.1 pct Conesion: 0.01 pst
Name: EMBANKMENT FILL, EL. -6.0 TO -8.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 26 °
Name: BEACH SAND, EL. -32.0 TO -44.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: MARSH, EL -6.0 TO -10.0 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion: 0 psf Phi: 24 °
Name: Lacustrine 1, EL. -14.0/-16.0 TO -20.0 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °
Name: MARSH 1, EL. -8.0 TO -14.0/-16.0 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion: 0 psf Phi: 26 °
Name: EMBANKMENT FILL, EL 0.5 TO -8.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 26 °
Name: BAY SOUND CLAY, EL. -44 TO -70 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 °
Name: Lacustrine 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 °
Name: MARSH 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 250 psf Phi: 24 °
Name: MARSH 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 250 psf Phi: 24 °
Name: EMBANKMENT FILL DMM (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 250 psf Phi: 26 °
Name: Lacustrine 2, EL. DMM (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 250 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. 3.2 TO -6.0 (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 75 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. 3.2 TO -6.0 (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-S-PS File Name: 17thReach23.gsz Last Edited By: Redell, Chris MVS



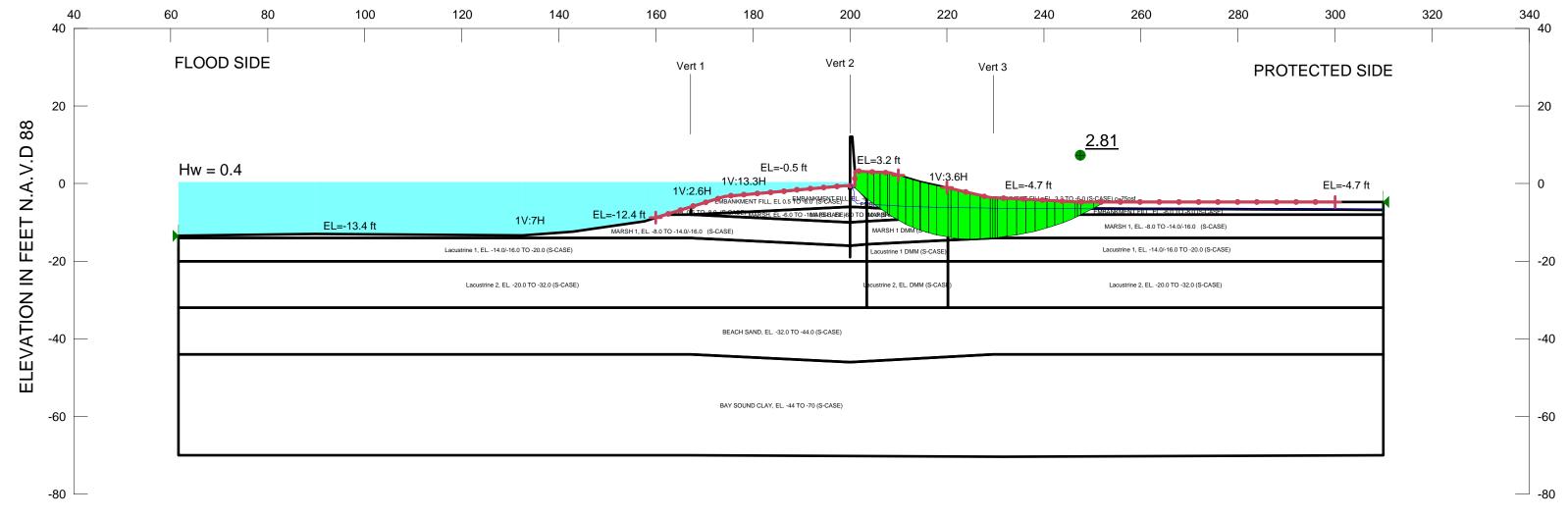


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District New Orleans District

17th STREET OUTFALL CANAL, REACH 23, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS STA. 581+50 to 588+67 EAST

STA. 581+50 to 588+67 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. -6.0 TO -8.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 26 °
Name: BEACH SAND, EL. -32.0 TO -44.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: MARSH, EL -6.0 TO -10.0 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion: 0 psf Phi: 24 °
Name: Lacustrine 1, EL. -14.0/-16.0 TO -20.0 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °
Name: MARSH 1, EL. -8.0 TO -14.0/-16.0 (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion: 0 psf Phi: 26 °
Name: EMBANKMENT FILL, EL 0.5 TO -8.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 26 °
Name: Lacustrine 2, EL. -20.0 TO -32.0 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 °
Name: BAY SOUND CLAY, EL. -44 TO -70 (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 °
Name: Lacustrine 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 °
Name: MARSH 1 DMM (S-CASE) Model: Spatial Mohr-Coulomb Weight Fn: MARSH Cohesion: 250 psf Phi: 24 °
Name: MARSH DMM (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 250 psf Phi: 26 °
Name: EMBANKMENT FILL DMM (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 250 psf Phi: 26 °
Name: Lacustrine 2, EL. DMM (S-CASE) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 250 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. 3.2 TO -6.0 (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

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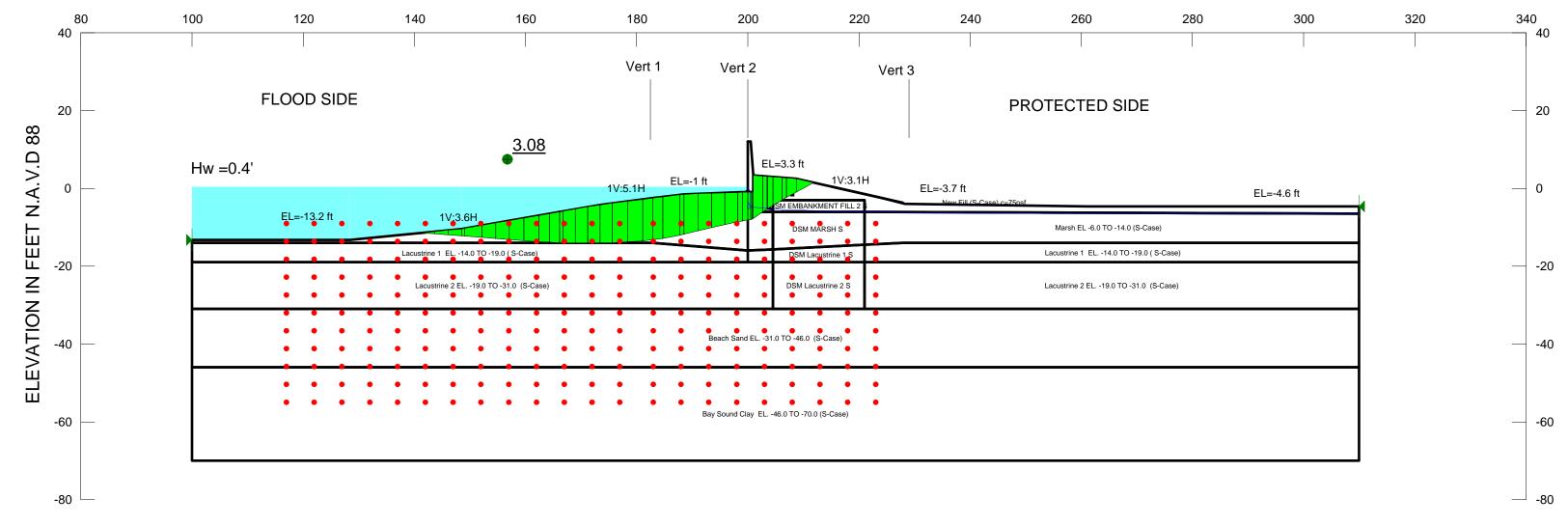
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17th STREET OUTFALL CANAL, REACH 23, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) LWL-S-PS STA. 581+50 to 588+67 EAST ORLEANS PARISH, LOUISIANA

MARCH 2013 LAKE PONTCHARTRAIN, LA. AND VICINITY

HURRICANE PROTECTION PROJECT



Name: Bay Sound Clay EL. -46.0 TO -70.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Clay Cohesion: 0 psf Phi: 26 ° Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Name: Beach Sand EL. -31.0 TO -46.0 (S-Case) Name: Lacustrine 2 EL. -19.0 TO -31.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 0 psf Phi: 26 ° Name: Lacustrine 1 EL. -14.0 TO -19.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: lacustrine -14 to -19 Cohesion: 0 psf Phi: 26 ° Name: Marsh EL -6.0 TO -14.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh Cohesion: 0 psf Phi: 24 ° Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: Embankment EL. -2.5 TO -6.0(S-case) Name: DSM EMBANKMENT FILL 2 S Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 250 psf Phi: 26 ° Name: DSM MARSH S Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh Cohesion: 250 psf Phi: 24 ° Name: DSM Lacustrine 1 S Model: Spatial Mohr-Coulomb Weight Fn: lacustrine -14 to -19 Cohesion: 250 psf Phi: 26 ° Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: New Fill (S-Case) c=75psf Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

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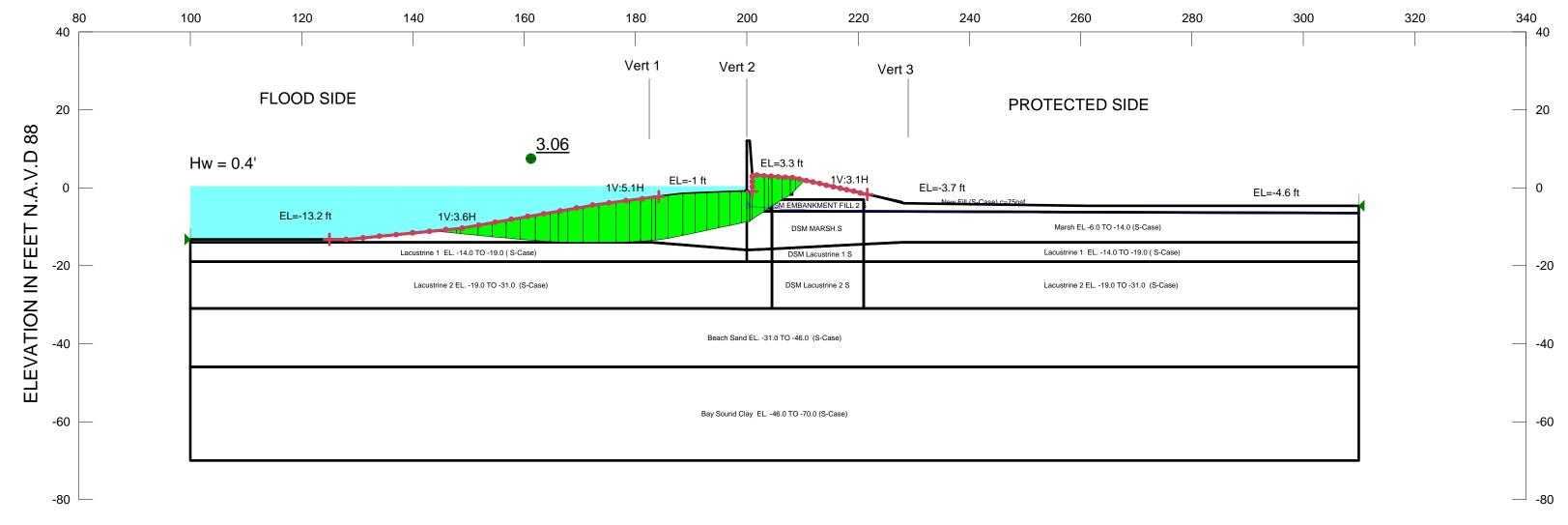




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17th STREET OUTFALL CANAL, REACH 24, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S FS STA. 588+67 to 598+24 EAST ORLEANS PARISH, LOUISIANA



Name: Bay Sound Clay EL. -46.0 TO -70.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Clay Cohesion: 0 psf Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Name: Beach Sand EL. -31.0 TO -46.0 (S-Case) Name: Lacustrine 2 EL. -19.0 TO -31.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 0 psf Phi: 26 ° Name: Lacustrine 1 EL. -14.0 TO -19.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: lacustrine -14 to -19 Cohesion: 0 psf Phi: 26 ° Name: Marsh EL -6.0 TO -14.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh Cohesion: 0 psf Phi: 24 ° Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: Embankment EL. -2.5 TO -6.0(S-case) Name: DSM EMBANKMENT FILL 2 S Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 250 psf Phi: 26 ° Name: DSM MARSH S Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh Cohesion: 250 psf Phi: 24 ° Name: DSM Lacustrine 1 S Model: Spatial Mohr-Coulomb Weight Fn: lacustrine -14 to -19 Cohesion: 250 psf Phi: 26 ° Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: New Fill (S-Case) c=75psf Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

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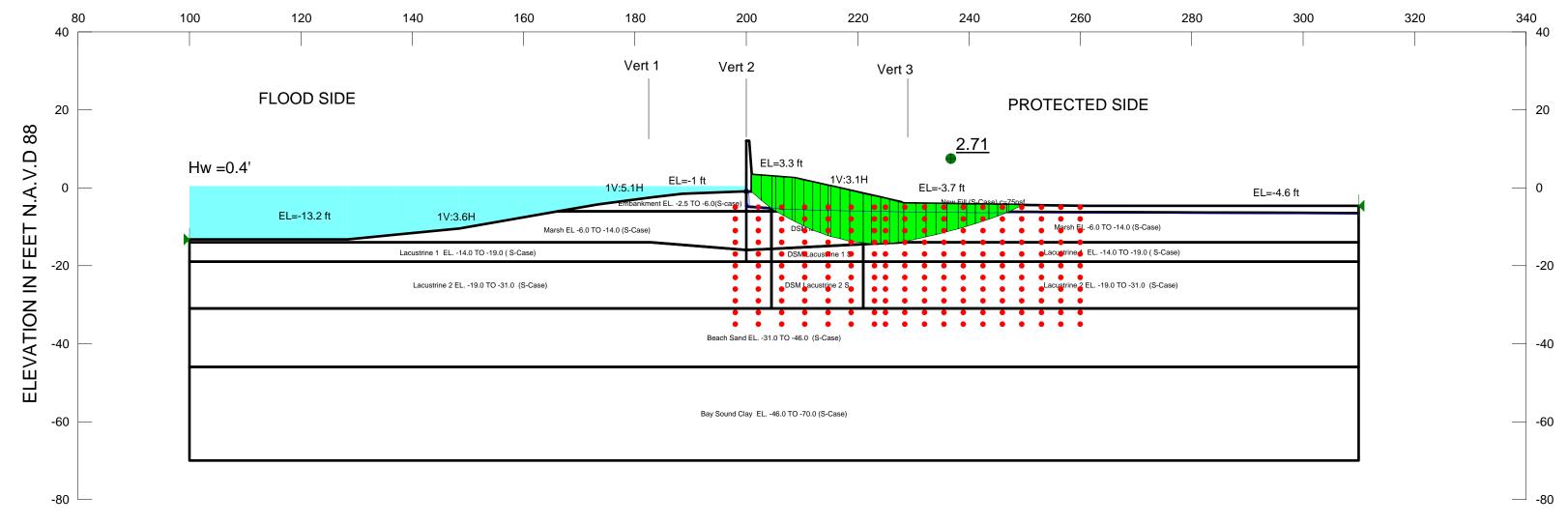


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17th STREET OUTFALL CANAL, REACH 24, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S FS

STA. 588+67 to 598+24 EAST ORLEANS PARISH, LOUISIANA



Name: Bay Sound Clay EL. -46.0 TO -70.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Clay Cohesion: 0 psf Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Name: Beach Sand EL. -31.0 TO -46.0 (S-Case) Name: Lacustrine 2 EL. -19.0 TO -31.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 0 psf Phi: 26 ° Name: Lacustrine 1 EL. -14.0 TO -19.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: lacustrine -14 to -19 Cohesion: 0 psf Phi: 26 ° Name: Marsh EL -6.0 TO -14.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh Cohesion: 0 psf Phi: 24 ° Name: Embankment EL. -2.5 TO -6.0(S-case) Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: DSM EMBANKMENT FILL 2 S Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 250 psf Phi: 26 ° Name: DSM MARSH S Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh Cohesion: 250 psf Phi: 24 ° Name: DSM Lacustrine 1 S Model: Spatial Mohr-Coulomb Weight Fn: lacustrine -14 to -19 Cohesion: 250 psf Phi: 26 ° Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: New Fill (S-Case) c=75psf Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

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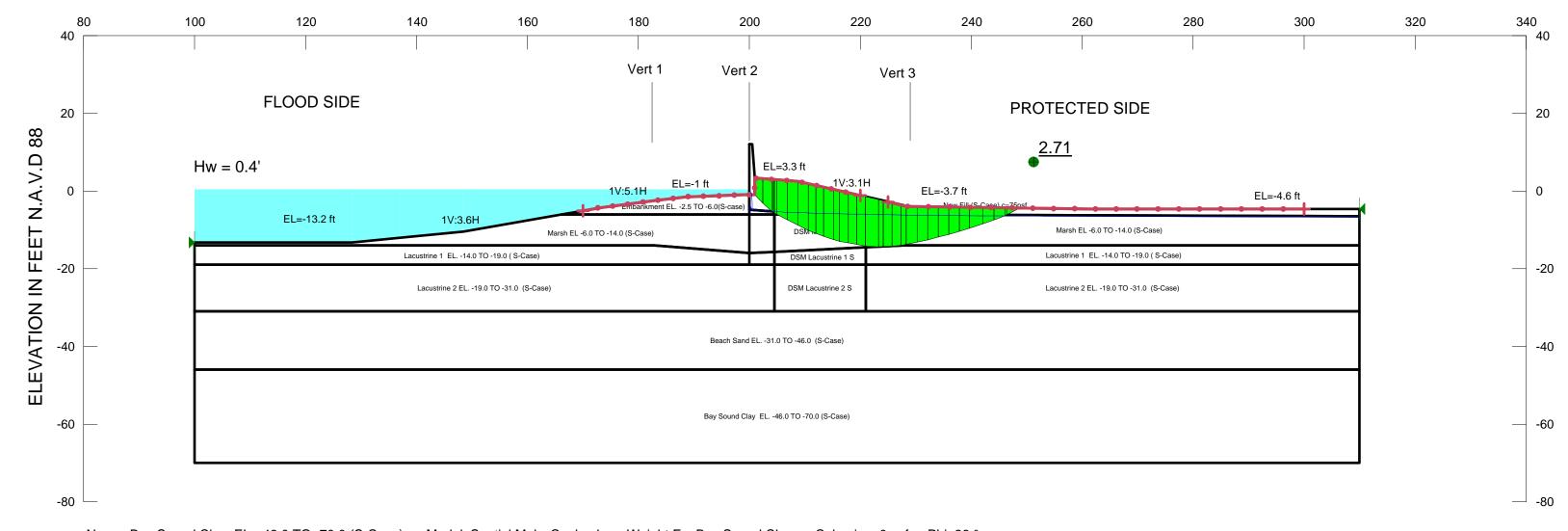




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17th STREET OUTFALL CANAL, REACH 24, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S PS STA. 588+67 to 598+24 EAST ORLEANS PARISH, LOUISIANA



Name: Bay Sound Clay EL. -46.0 TO -70.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Clay Cohesion: 0 psf Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Name: Beach Sand EL. -31.0 TO -46.0 (S-Case) Name: Lacustrine 2 EL. -19.0 TO -31.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 0 psf Phi: 26 ° Name: Lacustrine 1 EL. -14.0 TO -19.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: lacustrine -14 to -19 Cohesion: 0 psf Phi: 26 ° Name: Marsh EL -6.0 TO -14.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh Cohesion: 0 psf Phi: 24 ° Name: Embankment EL. -2.5 TO -6.0(S-case) Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: DSM EMBANKMENT FILL 2 S Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 250 psf Phi: 26 ° Name: DSM MARSH S Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh Cohesion: 250 psf Phi: 24 ° Name: DSM Lacustrine 1 S Model: Spatial Mohr-Coulomb Weight Fn: lacustrine -14 to -19 Cohesion: 250 psf Phi: 26 ° Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: New Fill (S-Case) c=75psf Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

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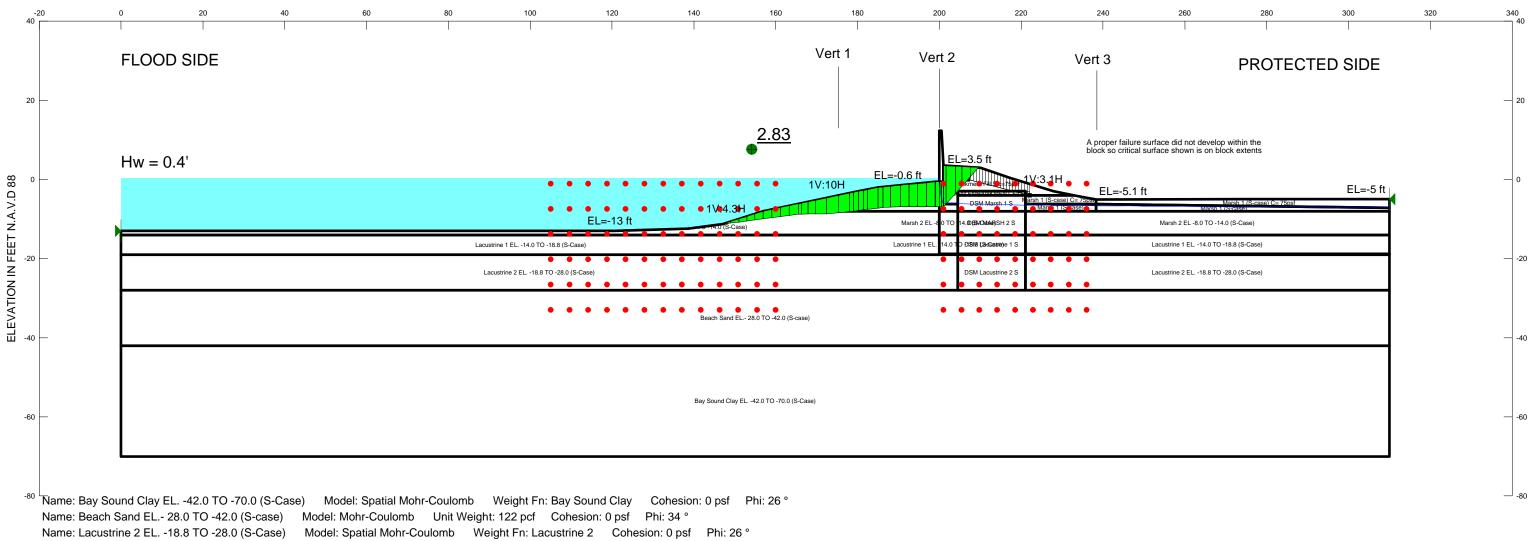


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17th STREET OUTFALL CANAL, REACH 24, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S PS

STA. 588+67 to 598+24 EAST ORLEANS PARISH, LOUISIANA



Name: Lacustrine 1 EL. -14.0 TO -18.8 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 ° Name: Marsh 2 EL -8.0 TO -14.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 0 psf Phi: 24 ° Name: Marsh 1 (S-case) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 24 ° Name: Embankment Fill (S-Case) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 ° Name: DSM EMBANKMENT FILL S Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 250 psf Phi: 26 ° Name: DSM Marsh 1 S Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 250 psf Phi: 24 ° Name: DSM MARSH 2 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 250 psf Phi: 24 ° Name: DSM Lacustrine 1 S Model: Spatial Mohr-Coulomb Unit Weight: 102 pcf Cohesion: 250 psf Phi: 26 ° Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: Embankment Fill S c=75psf Model: Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 75 psf Phi: 26 °

Name: Marsh 1 (S-case) C= 75psf Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

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Name: Slope Stability (Block) FS LWL-S File Name: 17thReach25.gsz Last Edited By: Redell, Chris MVS

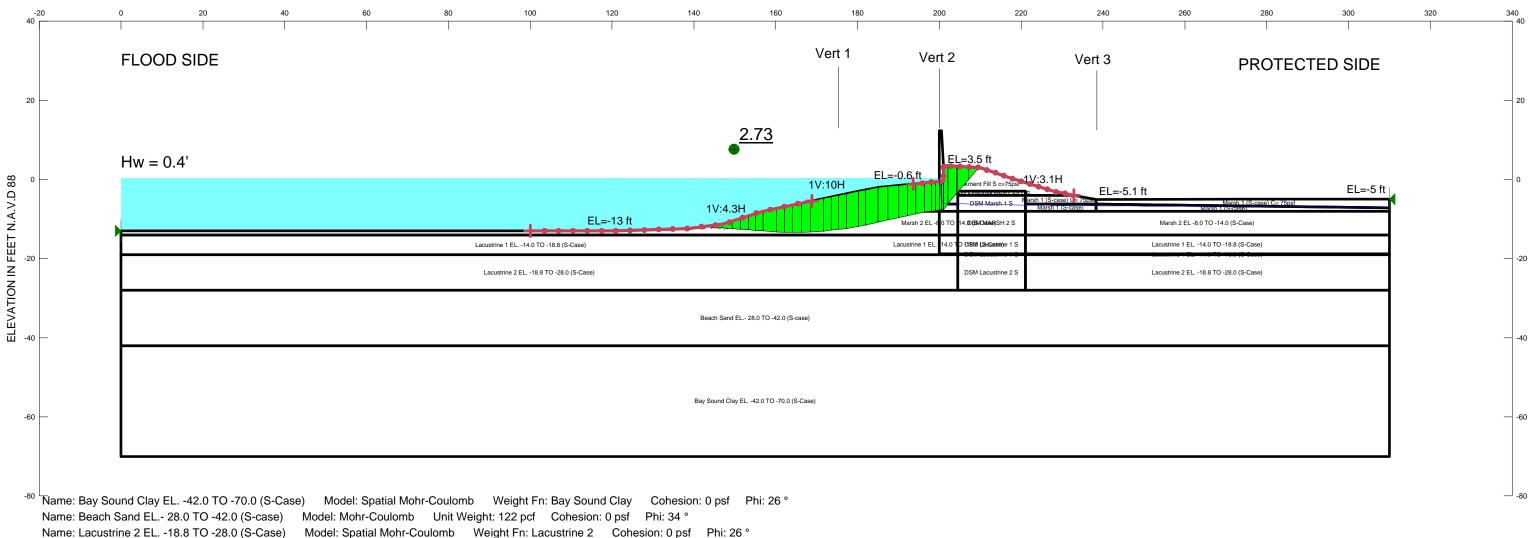




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17th STREET OUTFALL CANAL, REACH 25, STABILITY ANALYSIS, CASE: Slope Stability (Block) FS LWL-S STA. 598+24-608+00 EAST ORLEANS PARISH, LOUISIANA



Name: Lacustrine 1 EL. -14.0 TO -18.8 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 ° Name: Marsh 2 EL -8.0 TO -14.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 0 psf Phi: 24 ° Name: Marsh 1 (S-case) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 24 ° Name: Embankment Fill (S-Case) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 ° Name: DSM EMBANKMENT FILL S Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 250 psf Phi: 26 ° Name: DSM Marsh 1 S Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 250 psf Phi: 24 ° Name: DSM MARSH 2 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 250 psf Phi: 24 ° Name: DSM Lacustrine 1 S Model: Spatial Mohr-Coulomb Unit Weight: 102 pcf Cohesion: 250 psf Phi: 26 °

Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: Embankment Fill S c=75psf Model: Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 75 psf Phi: 26 ° Name: Marsh 1 (S-case) C= 75psf Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

W/O Sheet Pile FoS= 1.46 W/O Sheet Pile/ PS Soil Removal= 2.41 With Sheet Pile FoS= 1.62

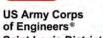
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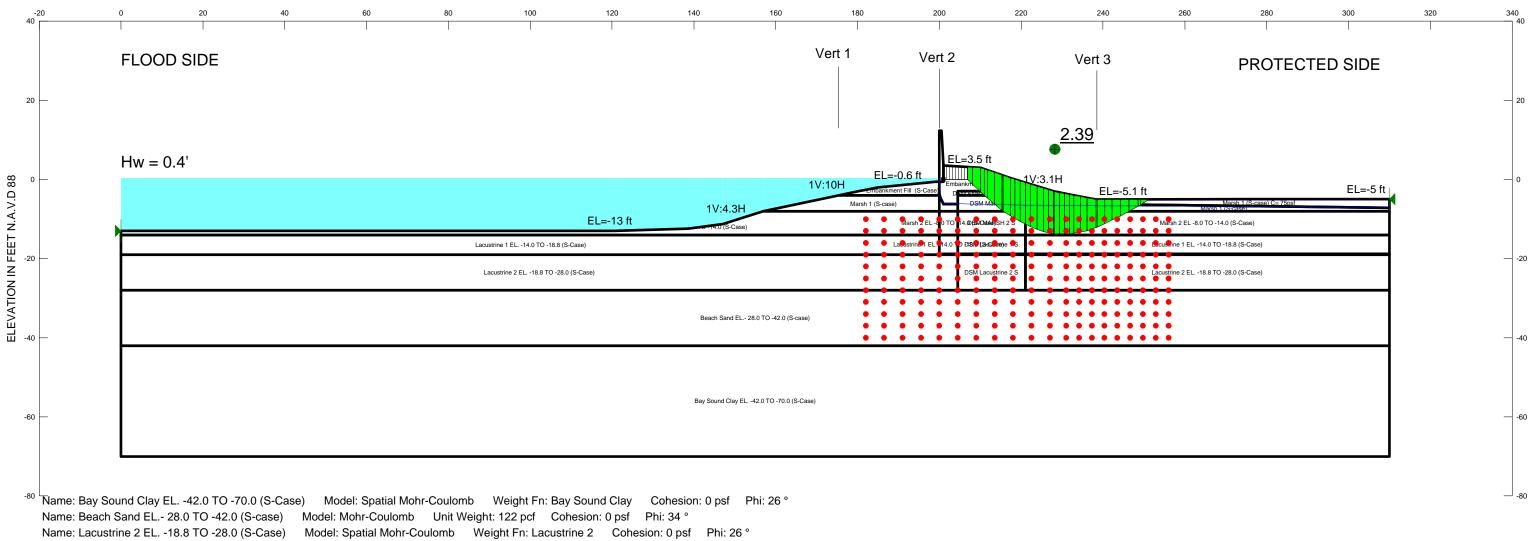
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17th STREET OUTFALL CANAL, REACH 25, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) FS LWL-S STA. 598+24-608+00 EAST ORLEANS PARISH, LOUISIANA



Name: Lacustrine 1 EL. -14.0 TO -18.8 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 ° Name: Marsh 2 EL -8.0 TO -14.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 0 psf Phi: 24 ° Name: Marsh 1 (S-case) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 24 ° Name: Embankment Fill (S-Case) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 ° Name: DSM EMBANKMENT FILL S Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 250 psf Phi: 26 ° Name: DSM Marsh 1 S Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 250 psf Phi: 24 ° Name: DSM MARSH 2 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 250 psf Phi: 24 ° Name: DSM Lacustrine 1 S Model: Spatial Mohr-Coulomb Unit Weight: 102 pcf Cohesion: 250 psf Phi: 26 ° Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 °

Name: Embankment Fill S c=75psf Model: Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 75 psf Phi: 26 ° Name: Marsh 1 (S-case) C= 75psf Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

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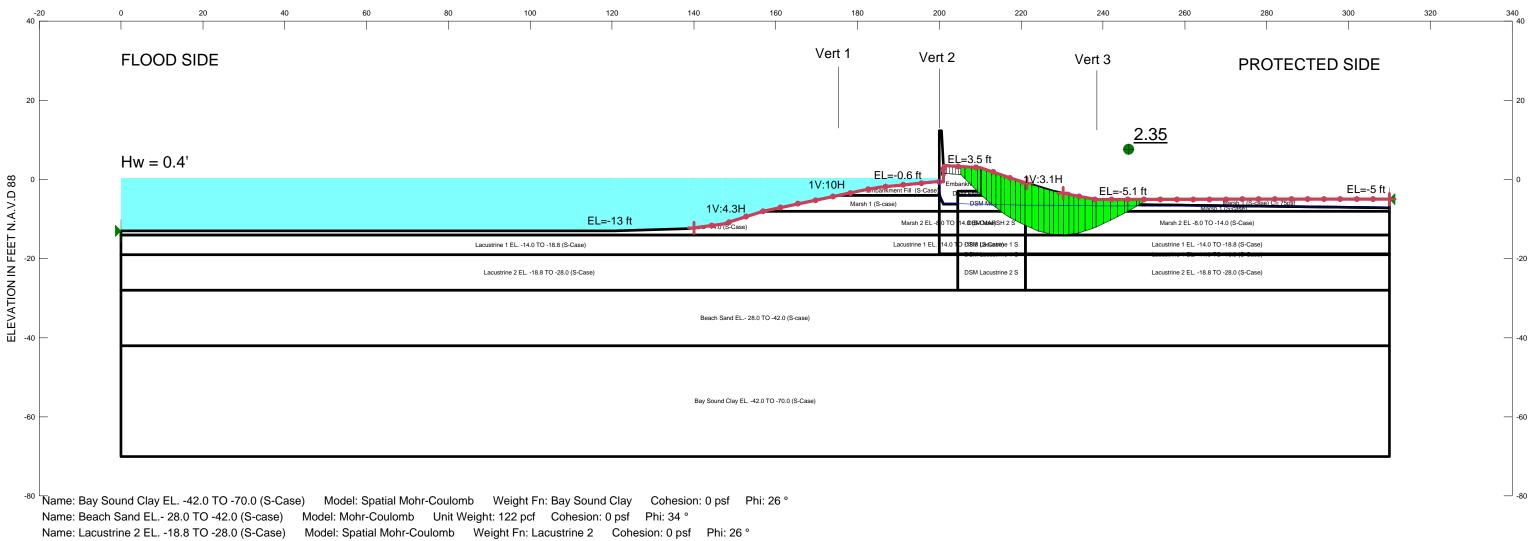




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17th STREET OUTFALL CANAL, REACH 25, STABILITY ANALYSIS, CASE: Slope Stability (Block) PS LWL-S STA. 598+24-608+00 EAST ORLEANS PARISH, LOUISIANA



Name: Lacustrine 1 EL. -14.0 TO -18.8 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 ° Name: Marsh 2 EL -8.0 TO -14.0 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 0 psf Phi: 24 ° Name: Marsh 1 (S-case) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 24 ° Name: Embankment Fill (S-Case) Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 ° Name: DSM EMBANKMENT FILL S Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 250 psf Phi: 26 ° Name: DSM Marsh 1 S Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 250 psf Phi: 24 ° Name: DSM MARSH 2 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 250 psf Phi: 24 ° Name: DSM Lacustrine 1 S Model: Spatial Mohr-Coulomb Unit Weight: 102 pcf Cohesion: 250 psf Phi: 26 ° Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 °

Name: Embankment Fill S c=75psf Model: Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 75 psf Phi: 26 ° Name: Marsh 1 (S-case) C= 75psf Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) PS LWL-S

File Name: 17thReach25.gsz Last Edited By: Redell, Chris MVS

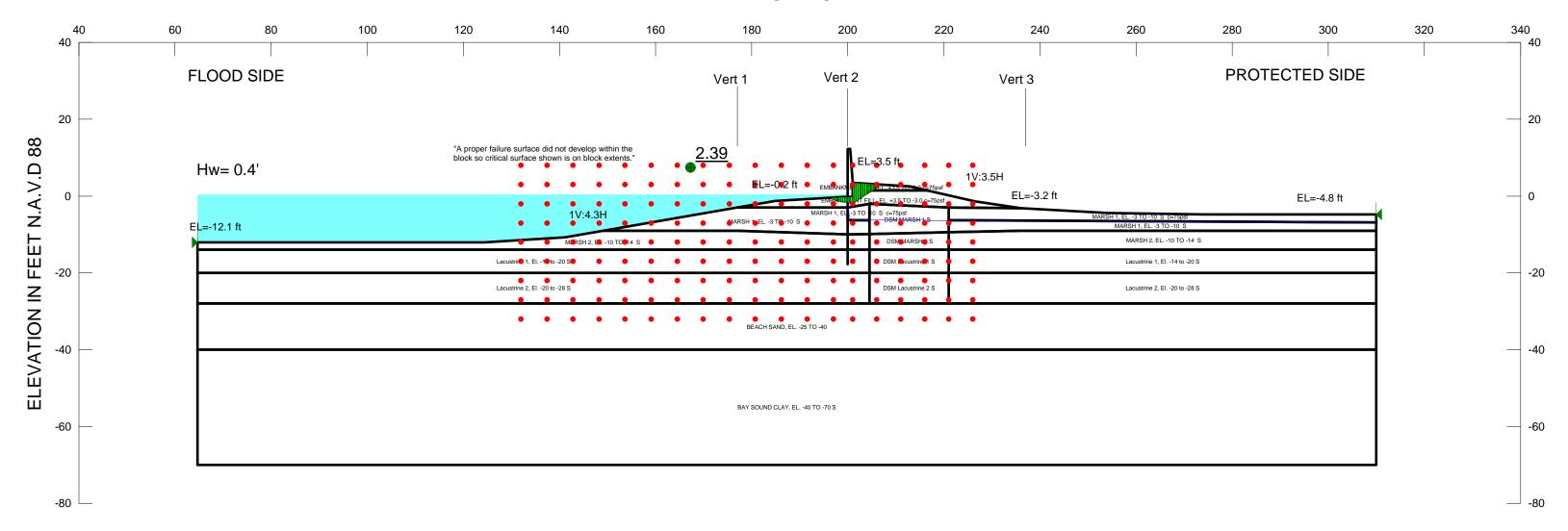




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17th STREET OUTFALL CANAL, REACH 25, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) PS LWL-S STA. 598+24-608+00 EAST ORLEANS PARISH, LOUISIANA



Name: BEACH SAND, EL. -25 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: MARSH 1, EL. -3 TO -10 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 0 psf Phi: 24 °
Name: BAY SOUND CLAY, EL. -40 TO -70 S Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 °
Name: MARSH 2, EL. -10 TO -14 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 0 psf Phi: 24 °
Name: Lacustrine 1, El. -14 to -20 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °
Name: Lacustrine 2, El. -20 to -28 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 0 psf Phi: 26 °
Name: DSM MARSH 1 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 250 psf Phi: 24 °
Name: DSM Lacustrine 1 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 250 psf Phi: 26 °
Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 °
Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. +3.5 TO -3.0 c=75psf Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 75 psf Phi: 24 °
Name: MARSH 1, EL. -3 TO -10 S c=75psf Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-S FS File Name: 17thReach26.gsz Last Edited By: Redell, Chris MVS

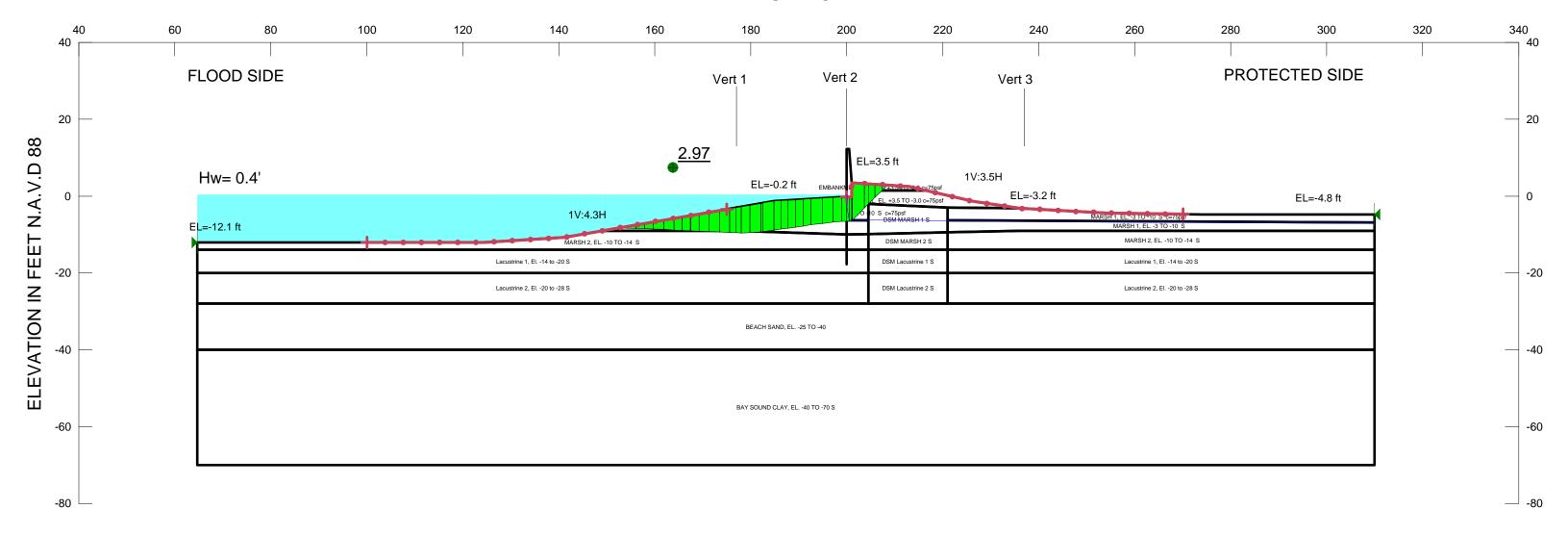




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17th STREET OUTFALL CANAL, REACH 26, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S FS STA. 608+00- 612+92 EAST ORLEANS PARISH, LOUISIANA



Name: BEACH SAND, EL. -25 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: MARSH 1, EL. -3 TO -10 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 0 psf Phi: 24 °
Name: BAY SOUND CLAY, EL. -40 TO -70 S Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 °
Name: MARSH 2, EL. -10 TO -14 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 0 psf Phi: 24 °
Name: Lacustrine 1, El. -14 to -20 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °
Name: Lacustrine 2, El. -20 to -28 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 0 psf Phi: 26 °
Name: DSM MARSH 1 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 250 psf Phi: 24 °
Name: DSM Lacustrine 1 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 250 psf Phi: 26 °
Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 °
Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. +3.5 TO -3.0 c=75psf Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 75 psf Phi: 24 °
Name: MARSH 1, EL. -3 TO -10 S c=75psf Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

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Name: Slope Stability (Entry/Exit) LWL-S FS File Name: 17thReach26.gsz

Last Edited By: Redell, Chris MVS

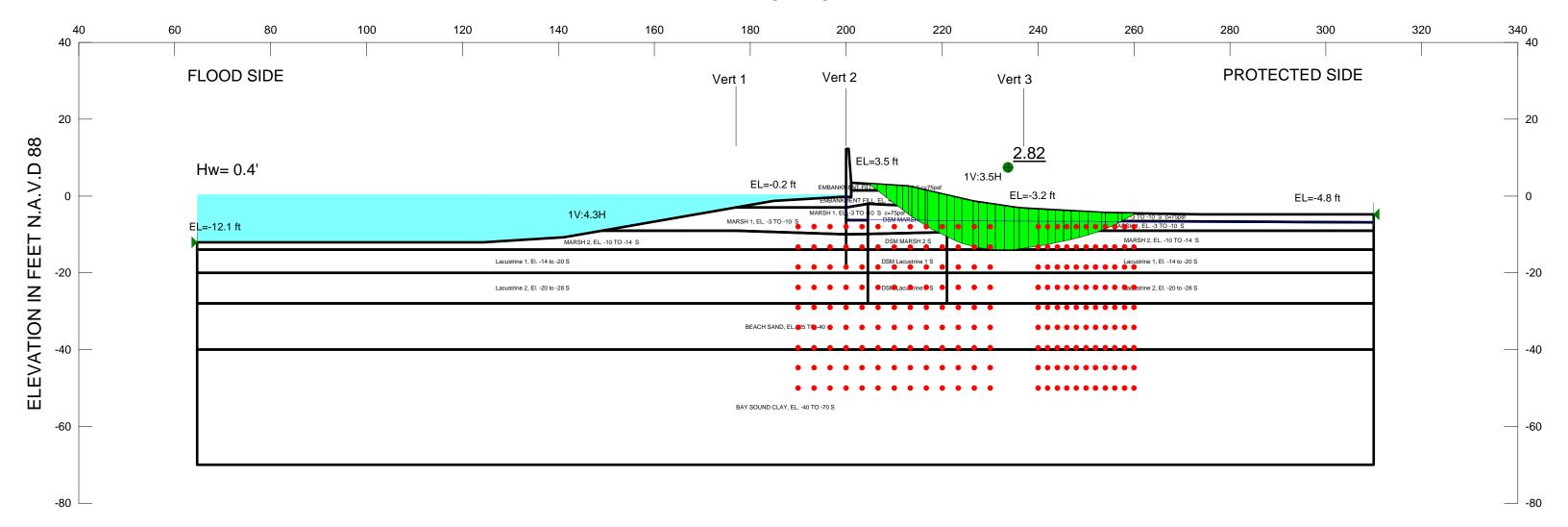




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17th STREET OUTFALL CANAL, REACH 26, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S FS STA. 608+00- 612+92 EAST ORLEANS PARISH, LOUISIANA



Name: BEACH SAND, EL. -25 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: MARSH 1, EL. -3 TO -10 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 0 psf Phi: 24 °
Name: BAY SOUND CLAY, EL. -40 TO -70 S Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 °
Name: MARSH 2, EL. -10 TO -14 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 0 psf Phi: 24 °
Name: Lacustrine 1, El. -14 to -20 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °
Name: Lacustrine 2, El. -20 to -28 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 0 psf Phi: 26 °
Name: DSM MARSH 1 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 250 psf Phi: 24 °
Name: DSM Lacustrine 1 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 250 psf Phi: 26 °
Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 °
Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. +3.5 TO -3.0 c=75psf Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 75 psf Phi: 24 °
Name: MARSH 1, EL. -3 TO -10 S c=75psf Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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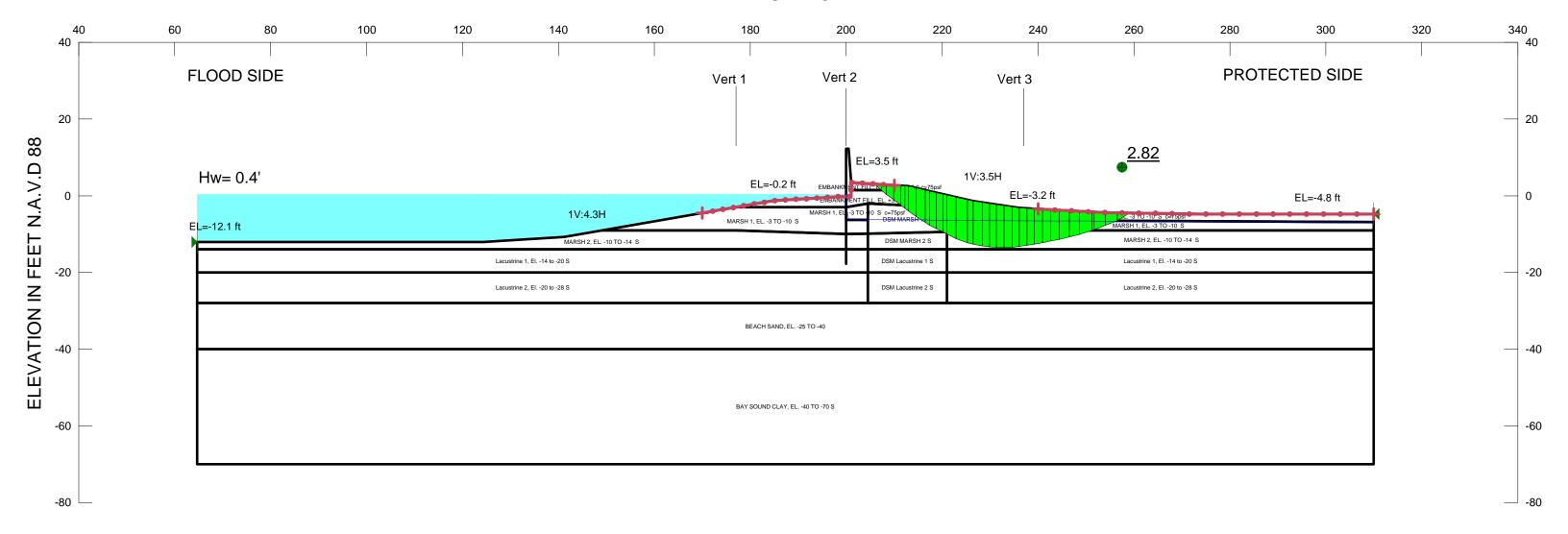




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17th STREET OUTFALL CANAL, REACH 26, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S PS STA. 608+00- 612+92 EAST ORLEANS PARISH, LOUISIANA



Name: BEACH SAND, EL. -25 TO -40 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: MARSH 1, EL. -3 TO -10 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 0 psf Phi: 24 °
Name: BAY SOUND CLAY, EL. -40 TO -70 S Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 °
Name: MARSH 2, EL. -10 TO -14 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 0 psf Phi: 24 °
Name: Lacustrine 1, El. -14 to -20 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °
Name: Lacustrine 2, El. -20 to -28 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 0 psf Phi: 26 °
Name: DSM MARSH 1 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 250 psf Phi: 24 °
Name: DSM Lacustrine 1 S Model: Spatial Mohr-Coulomb Weight Fn: MARSH 2 Cohesion: 250 psf Phi: 26 °
Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 °
Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. +3.5 TO -3.0 c=75psf Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 75 psf Phi: 24 °
Name: MARSH 1, EL. -3 TO -10 S c=75psf Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 75 psf Phi: 24 °

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Name: Slope Stability (Entry/Exit) LWL-S PS File Name: 17thReach26.gsz Last Edited By: Redell, Chris MVS

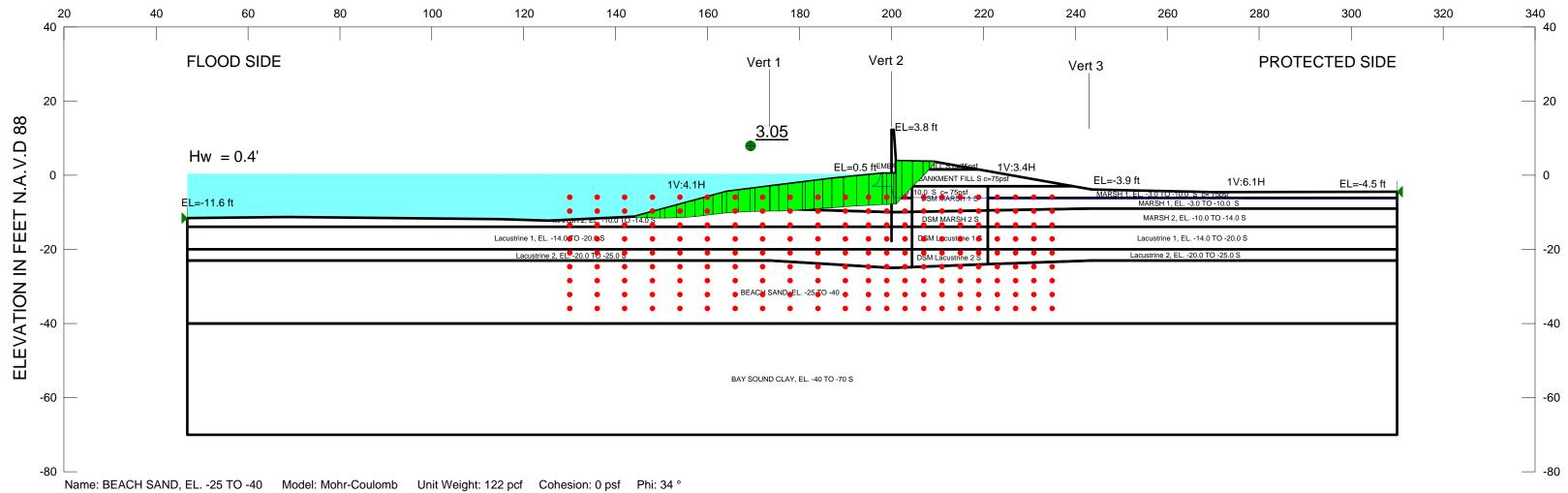




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17th STREET OUTFALL CANAL, REACH 26, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S PS STA. 608+00- 612+92 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 26 ° Name: MARSH 1, EL. -3.0 TO -10.0 S Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 ° Name: BAY SOUND CLAY, EL. -40 TO -70 S Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL S Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 ° Name: MARSH 2, EL. -10.0 TO -14.0 S Model: Spatial Mohr-Coulomb Unit Weight: 81 pcf Cohesion: 0 psf Phi: 24 ° Name: Lacustrine 2, EL. -20.0 TO -25.0 S Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 0 psf Phi: 26 ° Name: Lacustrine 1, EL. -14.0 TO -20.0 S Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: DSM MARSH 1 S Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 250 psf Phi: 24 ° Name: DSM MARSH 2 S Model: Spatial Mohr-Coulomb Unit Weight: 81 pcf Cohesion: 250 psf Phi: 24 ° Name: DSM Lacustrine 1 S Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 250 psf Phi: 26 ° Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 250 psf Phi: 26 ° Name: MARSH 1. EL. -3.0 TO -10.0 S c= 75psf Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

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Name: Slope Stability (Block) LWL- S FS File Name: 17thReach27.gsz Last Edited By: Redell, Chris MVS

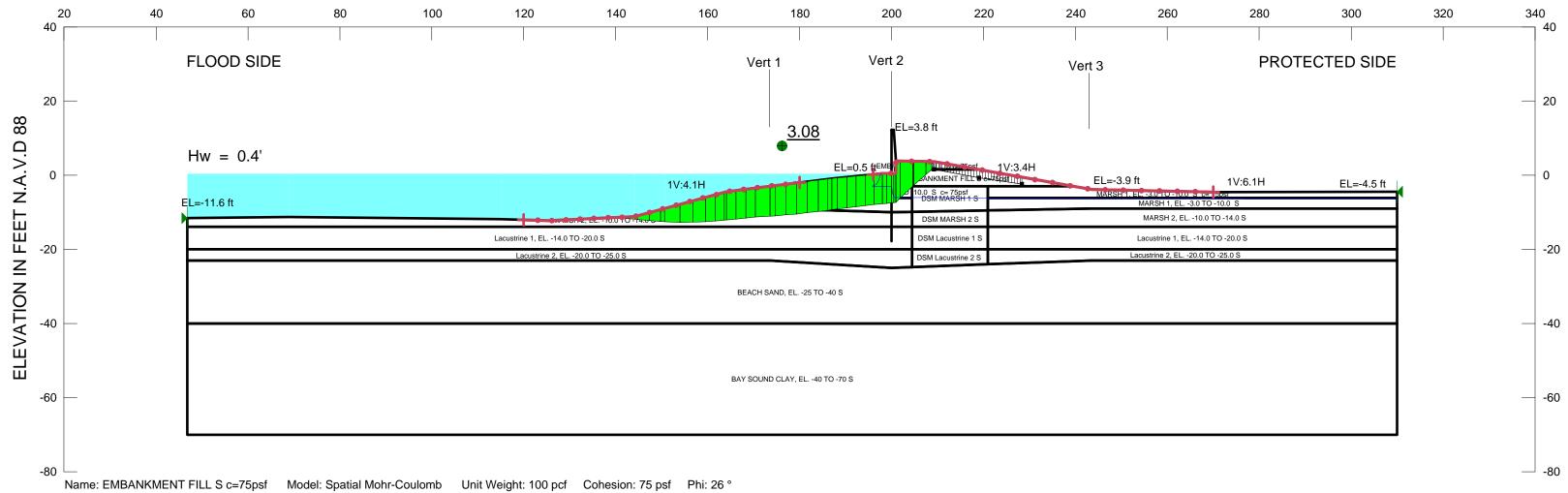




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17th STREET OUTFALL CANAL, REACH 27, STABILITY ANALYSIS. CASE: Slope Stability (Block) LWL- S FS STA. 614+30-617+81 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -3.0 TO -10.0 S Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 ° Name: BAY SOUND CLAY, EL. -40 TO -70 S Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL S Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 ° Name: MARSH 2, EL. -10.0 TO -14.0 S Model: Spatial Mohr-Coulomb Unit Weight: 81 pcf Cohesion: 0 psf Phi: 24 ° Name: Lacustrine 2, EL. -20.0 TO -25.0 S Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 0 psf Phi: 26 ° Name: Lacustrine 1, EL. -14.0 TO -20.0 S Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: DSM MARSH 1 S Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 250 psf Phi: 24 ° Name: DSM MARSH 2 S Model: Spatial Mohr-Coulomb Unit Weight: 81 pcf Cohesion: 250 psf Phi: 24 ° Name: DSM Lacustrine 1 S Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 250 psf Phi: 26 ° Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 250 psf Phi: 26 ° Name: BEACH SAND, EL. -25 TO -40 S Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: MARSH 1, EL, -3.0 TO -10.0 S c= 75psf Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED. SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

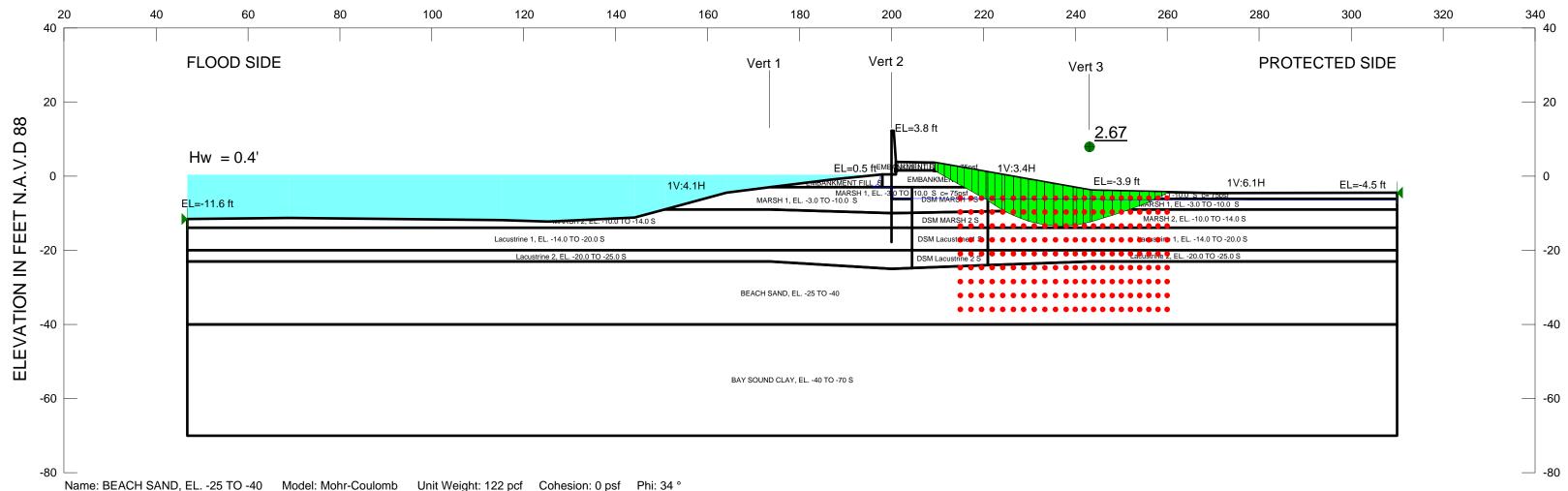
Name: Slope Stability (Entry/Exit) LWL-S FS File Name: 17thReach27.gsz Last Edited By: Redell, Chris MVS



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17th STREET OUTFALL CANAL, REACH 27, STABILITY ANALYSIS. CASE: Slope Stability (Entry/Exit) LWL-S FS STA. 614+30-617+81 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 26 ° Name: MARSH 1, EL. -3.0 TO -10.0 S Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 ° Name: BAY SOUND CLAY, EL. -40 TO -70 S Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL S Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 ° Name: MARSH 2, EL. -10.0 TO -14.0 S Model: Spatial Mohr-Coulomb Unit Weight: 81 pcf Cohesion: 0 psf Phi: 24 ° Name: Lacustrine 2, EL. -20.0 TO -25.0 S Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 0 psf Phi: 26 ° Name: Lacustrine 1, EL. -14.0 TO -20.0 S Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: DSM MARSH 1 S Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 250 psf Phi: 24 ° Name: DSM MARSH 2 S Model: Spatial Mohr-Coulomb Unit Weight: 81 pcf Cohesion: 250 psf Phi: 24 ° Name: DSM Lacustrine 1 S Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 250 psf Phi: 26 ° Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 250 psf Phi: 26 ° Name: MARSH 1, EL, -3.0 TO -10.0 S c= 75psf Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

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Name: Slope Stability (Block) LWL- S PS File Name: 17thReach27.gsz Last Edited By: Redell, Chris MVS

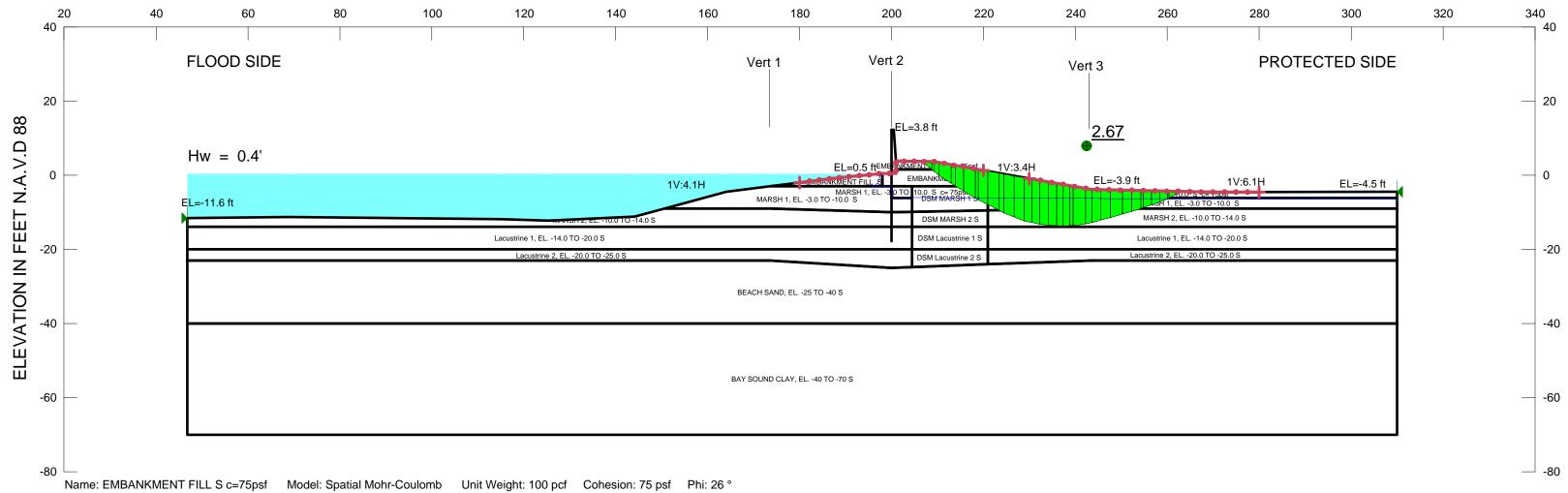




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17th STREET OUTFALL CANAL, REACH 27, STABILITY ANALYSIS. CASE: Slope Stability (Block) LWL- S PS STA. 614+30-617+81 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -3.0 TO -10.0 S Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 ° Name: BAY SOUND CLAY, EL. -40 TO -70 S Model: Spatial Mohr-Coulomb Unit Weight: 103 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL S Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 ° Name: MARSH 2, EL. -10.0 TO -14.0 S Model: Spatial Mohr-Coulomb Unit Weight: 81 pcf Cohesion: 0 psf Phi: 24 ° Name: Lacustrine 2, EL. -20.0 TO -25.0 S Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 0 psf Phi: 26 ° Name: Lacustrine 1, EL. -14.0 TO -20.0 S Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: DSM MARSH 1 S Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 250 psf Phi: 24 ° Name: DSM MARSH 2 S Model: Spatial Mohr-Coulomb Unit Weight: 81 pcf Cohesion: 250 psf Phi: 24 ° Name: DSM Lacustrine 1 S Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 250 psf Phi: 26 ° Name: DSM Lacustrine 2 S Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 250 psf Phi: 26 ° Name: BEACH SAND, EL. -25 TO -40 S Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: MARSH 1, EL, -3.0 TO -10.0 S c= 75psf Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

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Name: Slope Stability (Entry/Exit) LWL-S PS File Name: 17thReach27.gsz Last Edited By: Redell, Chris MVS

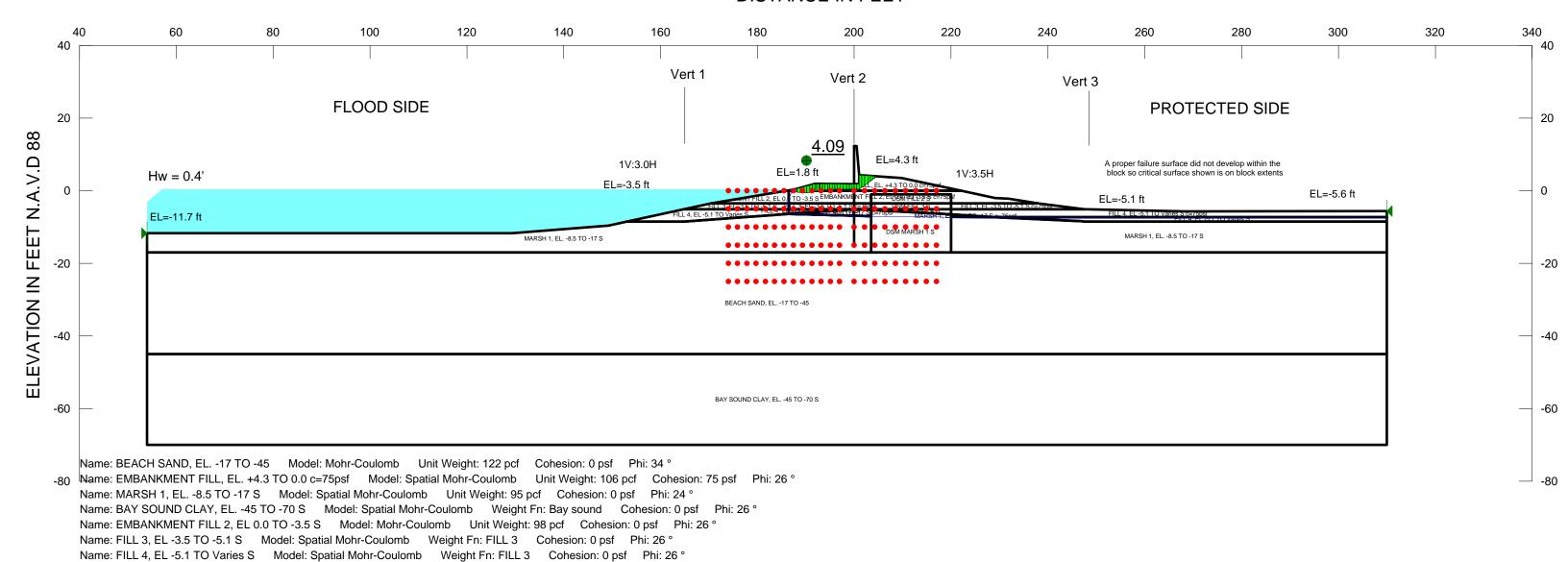




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17th STREET OUTFALL CANAL, REACH 27, STABILITY ANALYSIS. CASE: Slope Stability (Entry/Exit) LWL-S PS STA. 614+30-617+81 EAST ORLEANS PARISH, LOUISIANA



Name: DSM MARSH 1 S Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion: 250 psf Phi: 24 ° Name: MARSH 1, EL. -8.5 TO -17 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion: 75 psf Phi: 24 ° Name: FILL 4, EL -5.1 TO Varies S c=75psf Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL 2, EL 0.0 TO -3.5 S c=75psf Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 75 psf Phi: 26 ° Name: FILL 3, EL -3.5 TO -5.1 S c=75psf Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 75 psf Phi: 26 °

Name: DSM FILL 2 S Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 250 psf Phi: 26 ° Name: DSM FILL 3 S Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 250 psf Phi: 26 ° Name: DSM FILL 4 S Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 250 psf Phi: 26 °

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Name: Slope Stability (Block) LWL-S FS File Name: 17thReach28.gsz Last Edited By: Redell, Chris MVS

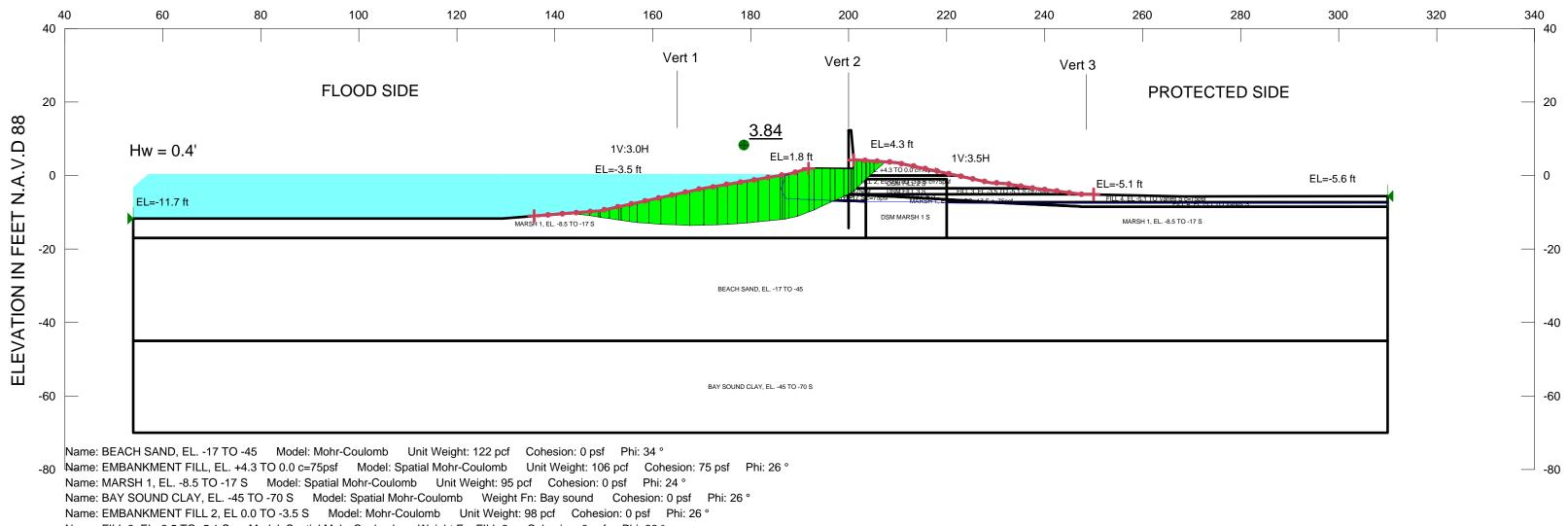




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17th STREET OUTFALL CANAL, REACH 28, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S FS STA. 615+03-620+30 EAST ORLEANS PARISH, LOUISIANA



Name: FILL 3, EL -3.5 TO -5.1 S Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 0 psf Phi: 26 ° Name: FILL 4, EL -5.1 TO Varies S Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 0 psf Phi: 26 ° Name: DSM FILL 2 S Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 250 psf Phi: 26 ° Name: DSM FILL 3 S Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 250 psf Phi: 26 ° Name: DSM FILL 4 S Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 250 psf Phi: 26 ° Name: DSM MARSH 1 S Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion: 250 psf Phi: 24 ° Name: MARSH 1, EL. -8.5 TO -17 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion: 75 psf Phi: 24 ° Name: FILL 4, EL -5.1 TO Varies S c=75psf Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL 2, EL 0.0 TO -3.5 S c=75psf Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 75 psf Phi: 26 ° Name: FILL 3, EL -3.5 TO -5.1 S c=75psf Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry & Exit) LWL-S FS File Name: 17thReach28.gsz Last Edited By: Redell, Chris MVS

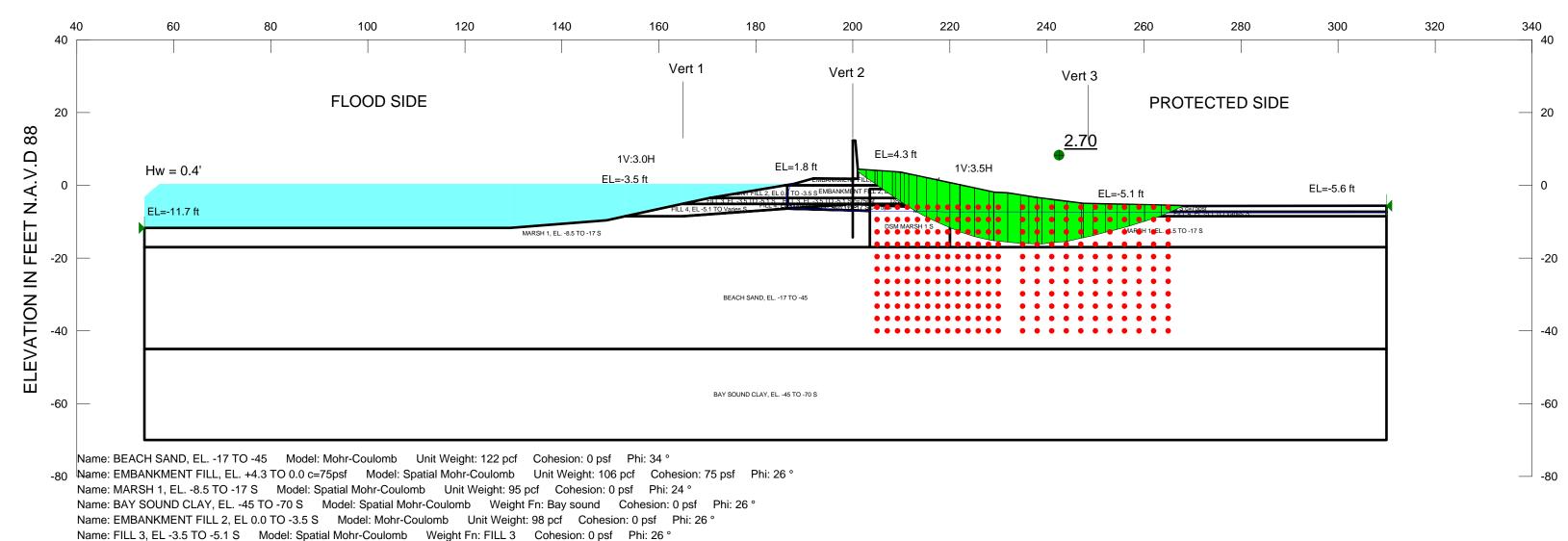




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17th STREET OUTFALL CANAL, REACH 28, STABILITY ANALYSIS, CASE: Slope Stability (Entry & Exit) LWL-S FS STA. 615+03-620+30 EAST ORLEANS PARISH, LOUISIANA



Name: FILL 4, EL -5.1 TO Varies S Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 0 psf Phi: 26 ° Name: DSM FILL 2 S Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 250 psf Phi: 26 ° Name: DSM FILL 3 S Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 250 psf Phi: 26 ° Name: DSM FILL 4 S Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 250 psf Phi: 26 ° Name: DSM MARSH 1 S Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion: 250 psf Phi: 24 ° Name: MARSH 1, EL. -8.5 TO -17 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion: 75 psf Phi: 24 ° Name: FILL 4, EL -5.1 TO Varies S c=75psf Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL 2, EL 0.0 TO -3.5 S c=75psf Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 75 psf Phi: 26 ° Name: FILL 3, EL -3.5 TO -5.1 S c=75psf Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

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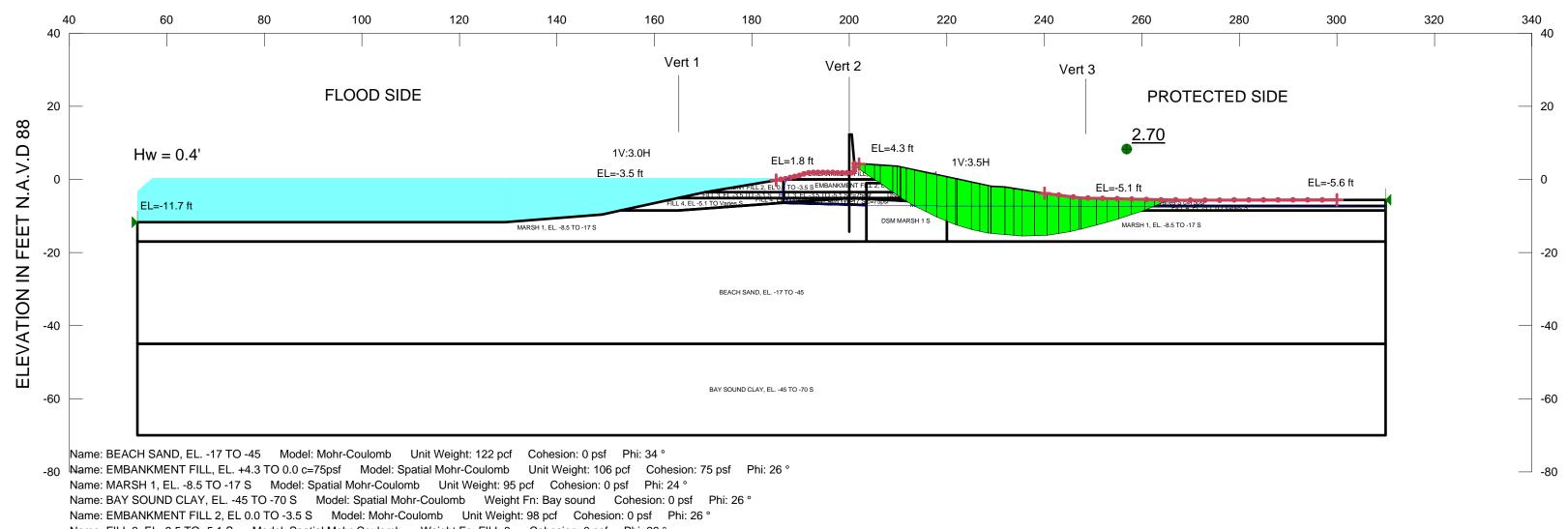




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17th STREET OUTFALL CANAL, REACH 28, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S PS STA. 615+03-620+30 EAST ORLEANS PARISH, LOUISIANA



Name: FILL 3, EL -3.5 TO -5.1 S Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 0 psf Phi: 26 ° Name: FILL 4, EL -5.1 TO Varies S Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 0 psf Phi: 26 ° Name: DSM FILL 2 S Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 250 psf Phi: 26 ° Name: DSM FILL 3 S Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 250 psf Phi: 26 ° Name: DSM FILL 4 S Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 250 psf Phi: 26 ° Name: DSM MARSH 1 S Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion: 250 psf Phi: 24 ° Name: MARSH 1, EL. -8.5 TO -17 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 95 pcf Cohesion: 75 psf Phi: 24 ° Name: FILL 4, EL -5.1 TO Varies S c=75psf Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL 2, EL 0.0 TO -3.5 S c=75psf Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 75 psf Phi: 26 ° Name: FILL 3, EL -3.5 TO -5.1 S c=75psf Model: Spatial Mohr-Coulomb Weight Fn: FILL 3 Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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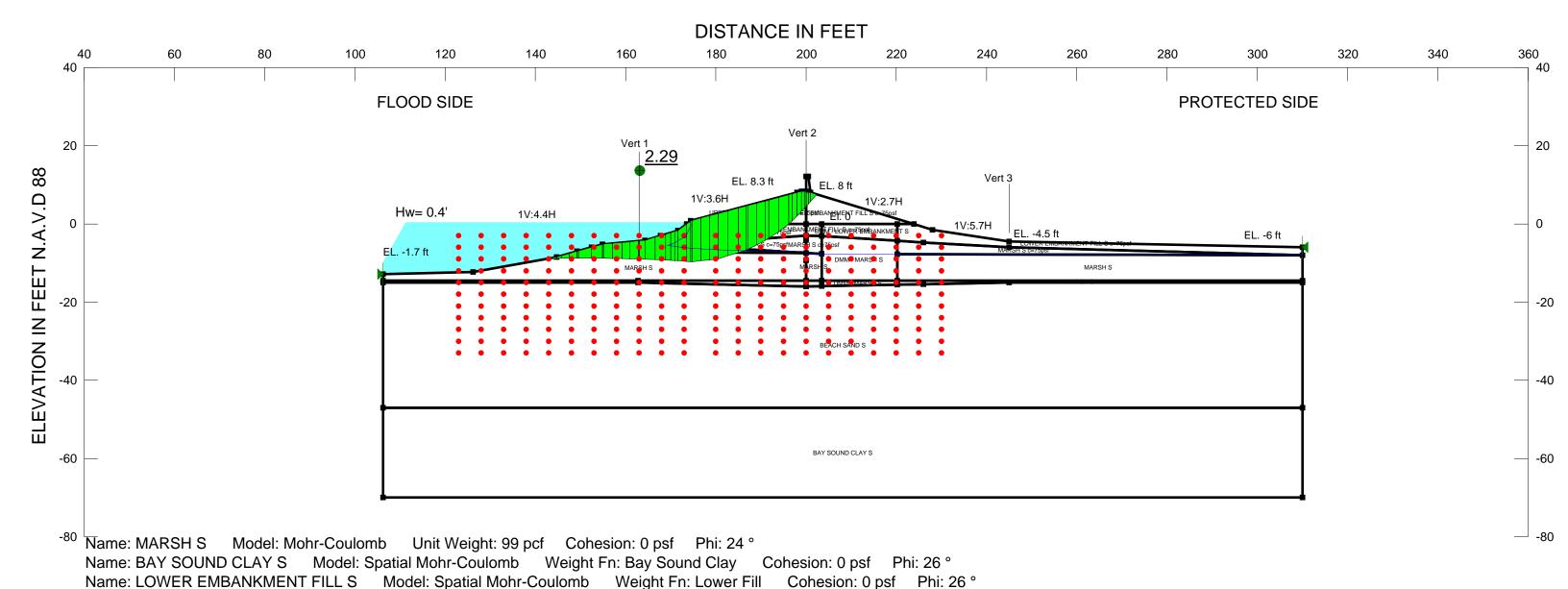




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17th STREET OUTFALL CANAL, REACH 28, STABILITY ANALYSIS, CASE: Slope Stability (Entry & Exit) LWL-S PS STA. 615+03-620+30 EAST ORLEANS PARISH, LOUISIANA



Cohesion: 75 psf

Phi: 26 °

GENERAL NOTES

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WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: DMM - MARSH S Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 250 psf Phi: 24 °

Name: BEACH SAND S Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: LOWER EMBANKMENT FILL S c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill

Name: MARSH S c=75psf Model: Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 75 psf Phi: 24 °

Name: DMM - LOWER EMBANKMENT S Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion: 250 psf Phi: 26 ° Name: UPPER EMBANKMENT FILL S c=75psf Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 75 psf Phi: 26 °

Name: Slope Stability (Block) LWL-S FS File Name: 17thReach29.gsz Last Edited By: Redell, Chris MVS

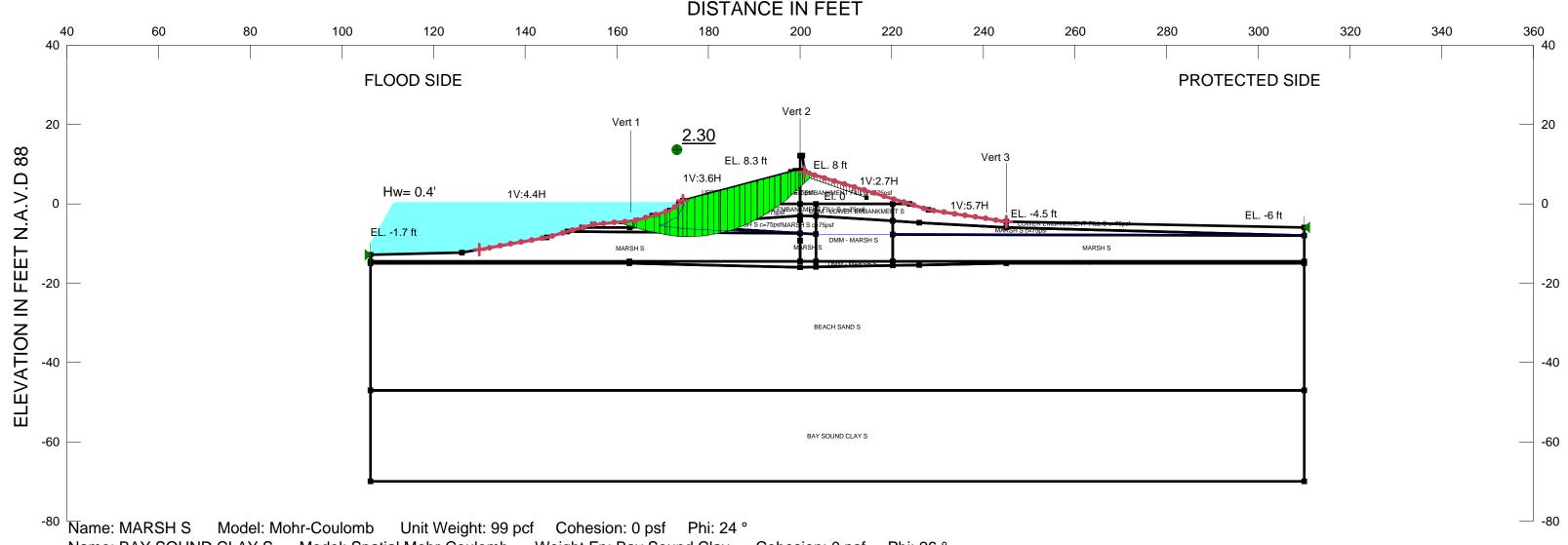




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17th STREET OUTFALL CANAL, REACH 29 STABILITY ANALYSIS CASE: Slope Stability (Block) LWL-S FS STA. 620+30 - 624+88 EAST ORLEANS PARISH, LOUISIANA



Name: BAY SOUND CLAY S Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Clay Cohesion: 0 psf Phi: 26 °

Name: LOWER EMBANKMENT FILL S Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion: 0 psf Phi: 26 °

Name: DMM - MARSH S Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 250 psf Phi: 24 °

Name: DMM - LOWER EMBANKMENT S Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion: 250 psf Phi: 26 ° Name: UPPER EMBANKMENT FILL S c=75psf Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 75 psf Phi: 26 °

Name: BEACH SAND S Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: LOWER EMBANKMENT FILL S c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion: 75 psf Phi: 26 °

Name: MARSH S c=75psf Model: Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

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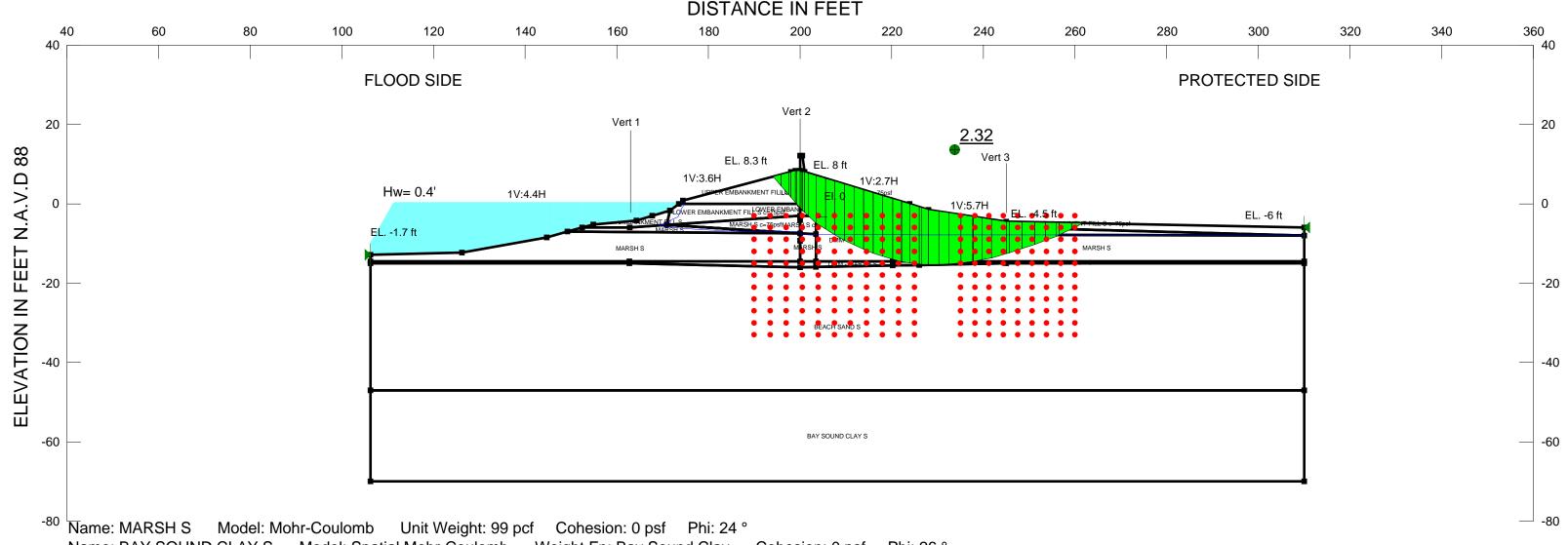
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17th STREET OUTFALL CANAL, REACH 29 STABILITY ANALYSIS CASE: Slope Stability (Entry/Exit) LWL-S FS STA. 620+30 - 624+88 EAST ORLEANS PARISH, LOUISIANA



Name: BAY SOUND CLAY S Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Clay Cohesion: 0 psf Phi: 26 °

Name: LOWER EMBANKMENT FILL S Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion: 0 psf Phi: 26 °

Name: DMM - MARSH S Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 250 psf Phi: 24 °

Name: DMM - LOWER EMBANKMENT S Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion: 250 psf Phi: 26 ° Name: UPPER EMBANKMENT FILL S c=75psf Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 75 psf Phi: 26 °

Name: BEACH SAND S Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: LOWER EMBANKMENT FILL S c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion: 75 psf Phi: 26 °

Name: MARSH S c=75psf Model: Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 75 psf Phi: 24 °

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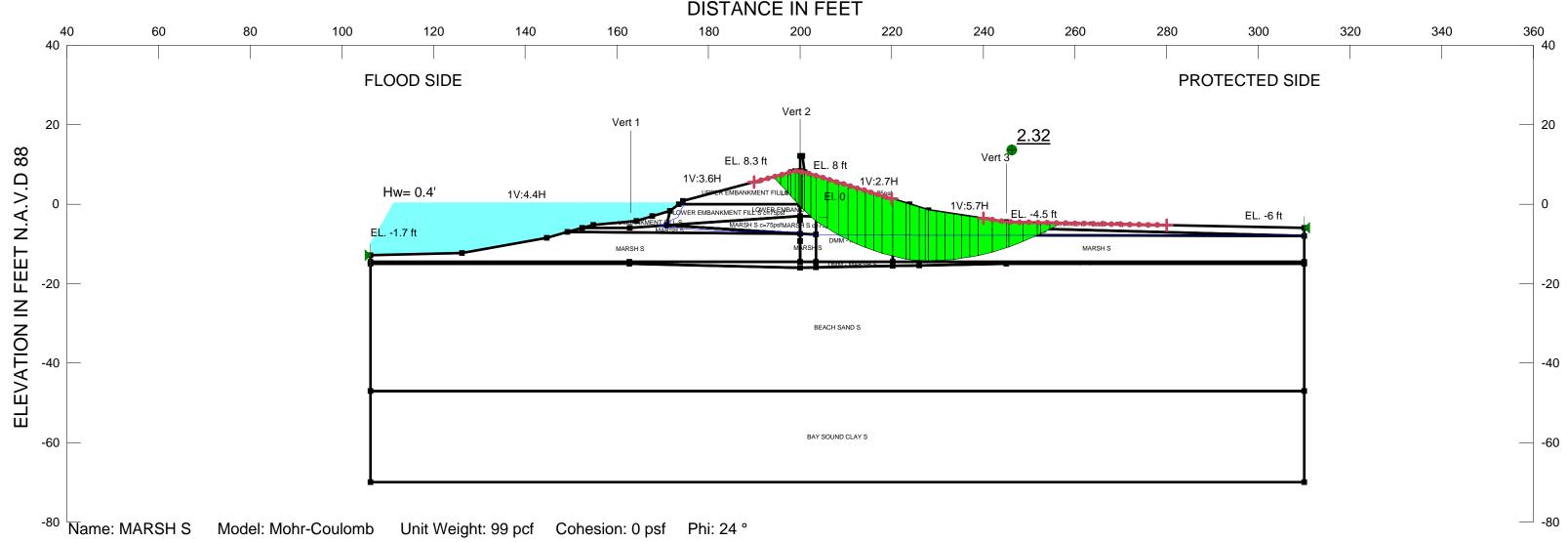
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US Army Corps of Engineers® of Engineers® Saint Louis District New Orleans District

17th STREET OUTFALL CANAL, REACH 29 STABILITY ANALYSIS CASE: Slope Stability (Block) LWL-S PS STA. 620+30 - 624+88 EAST ORLEANS PARISH, LOUISIANA



Name: BAY SOUND CLAY S Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Clay Cohesion: 0 psf Phi: 26 °

Name: LOWER EMBANKMENT FILL S Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion: 0 psf Phi: 26 °

Name: DMM - MARSH S Model: Spatial Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 250 psf Phi: 24 °

Name: DMM - LOWER EMBANKMENT S Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion: 250 psf Phi: 26 °

Name: UPPER EMBANKMENT FILL S c=75psf Model: Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 75 psf Phi: 26 °

Name: BEACH SAND S Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: LOWER EMBANKMENT FILL S c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion: 75 psf Phi: 26 °

Name: MARSH S c=75psf Model: Mohr-Coulomb Unit Weight: 99 pcf Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

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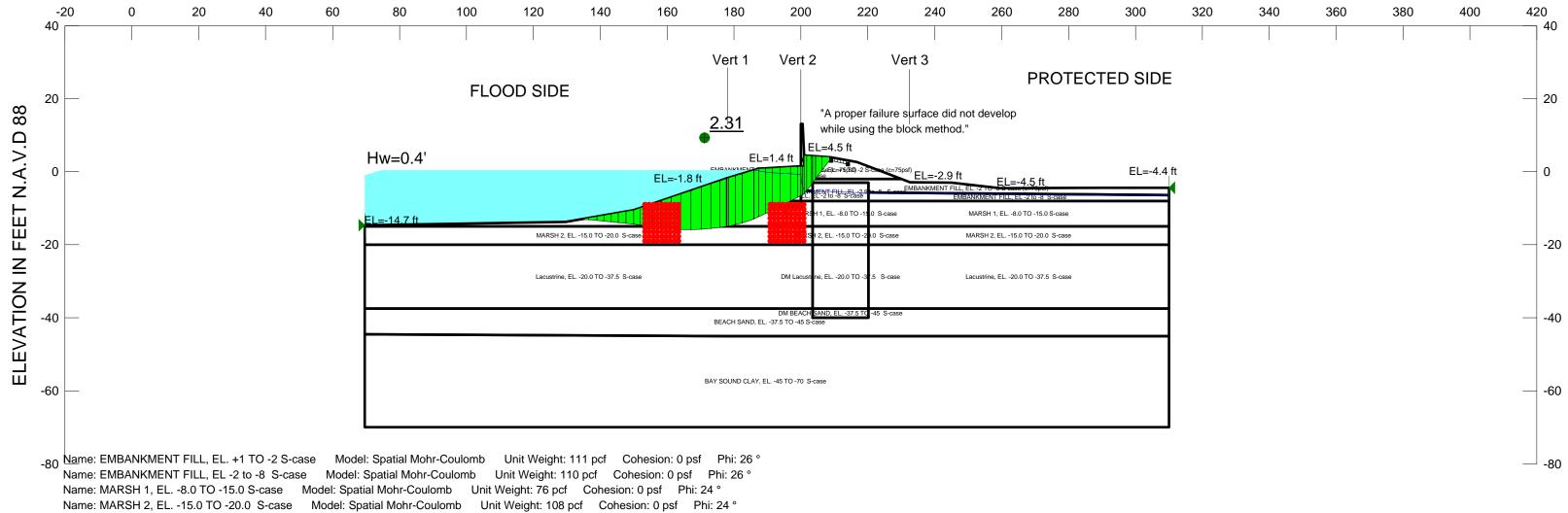
WHERE INDICATED. SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

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17th STREET OUTFALL CANAL, REACH 29 STABILITY ANALYSIS CASE: Slope Stability (Entry/Exit) LWL-S PS STA. 620+30 - 624+88 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -8.0 TO -15.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 76 pcf Cohesion: 0 psf Phi: 24 °
Name: MARSH 2, EL. -15.0 TO -20.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 24 °
Name: Lacustrine, EL. -20.0 TO -37.5 S-case Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °
Name: BEACH SAND, EL. -37.5 TO -45 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: BAY SOUND CLAY, EL. -45 TO -70 S-case Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 °
Name: DM EMBANKMENT FILL, EL -2.9 to -8 S-case Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 250 psf Phi: 26 °
Name: DM MARSH 1, EL. -8.0 TO -15.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 76 pcf Cohesion: 250 psf Phi: 24 °
Name: DM MARSH 2, EL. -15.0 TO -20.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 250 psf Phi: 24 °
Name: DM Lacustrine, EL. -20.0 TO -37.5 S-case Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 250 psf Phi: 26 °
Name: DM BEACH SAND, EL. -37.5 TO -45 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 34 °
Name: EMBANKMENT FILL, EL. +1 TO -2 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 75 psf Phi: 26 Name: EMBANKMENT FILL, EL. -2 TO -8 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 Name: EMBANKMENT FILL, EL. -2 TO -8 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 Name: EMBANKMENT FILL, EL. -2 TO -8 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 Name: EMBANKMENT FILL, EL. -2 TO -8 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 Name: EMBANKMENT FILL, EL. -2 TO -8 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 Name: EMBANKMENT FILL, EL. -2 TO -8 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach03A.gsz Last Edited By: Redell, Chris MVS



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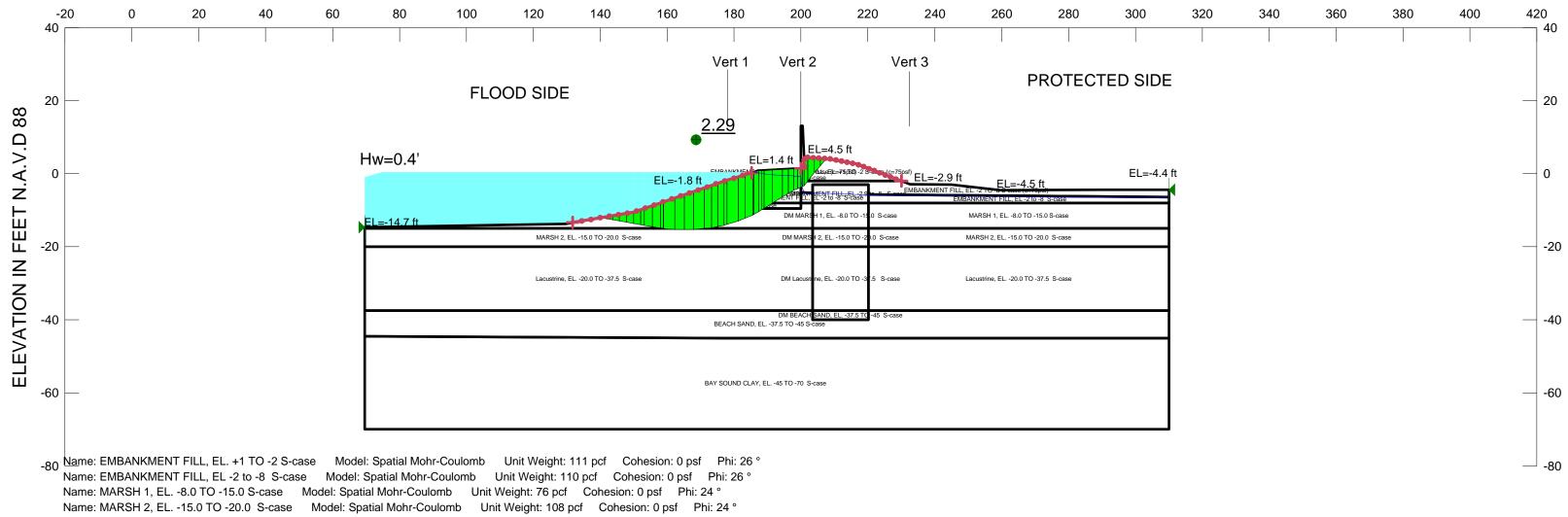


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Saint Louis District New Orleans District

17th STREET OUTFALL CANAL, REACH 03A,

US Army Corps

STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS STA. 565+00 to 570+00 WEST ORLEANS PARISH, LOUISIANA



Name: Lacustrine, EL. -20.0 TO -37.5 S-case Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 ° Name: BEACH SAND, EL. -37.5 TO -45 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: BAY SOUND CLAY, EL. -45 TO -70 S-case Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 ° Name: DM EMBANKMENT FILL, EL -2.9 to -8 S-case Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 250 psf Phi: 26 ° Name: DM MARSH 1, EL. -8.0 TO -15.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 76 pcf Cohesion: 250 psf Phi: 24 ° Name: DM MARSH 2, EL. -15.0 TO -20.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 250 psf Phi: 24 ° Name: DM Lacustrine, EL. -20.0 TO -37.5 S-case Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 250 psf Phi: 26 ° Name: DM BEACH SAND, EL. -37.5 TO -45 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 34 ° Name: EMBANKMENT FILL, EL. +1 TO -2 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 75 psf Name: EMBANKMENT FILL, EL. -2 TO -8 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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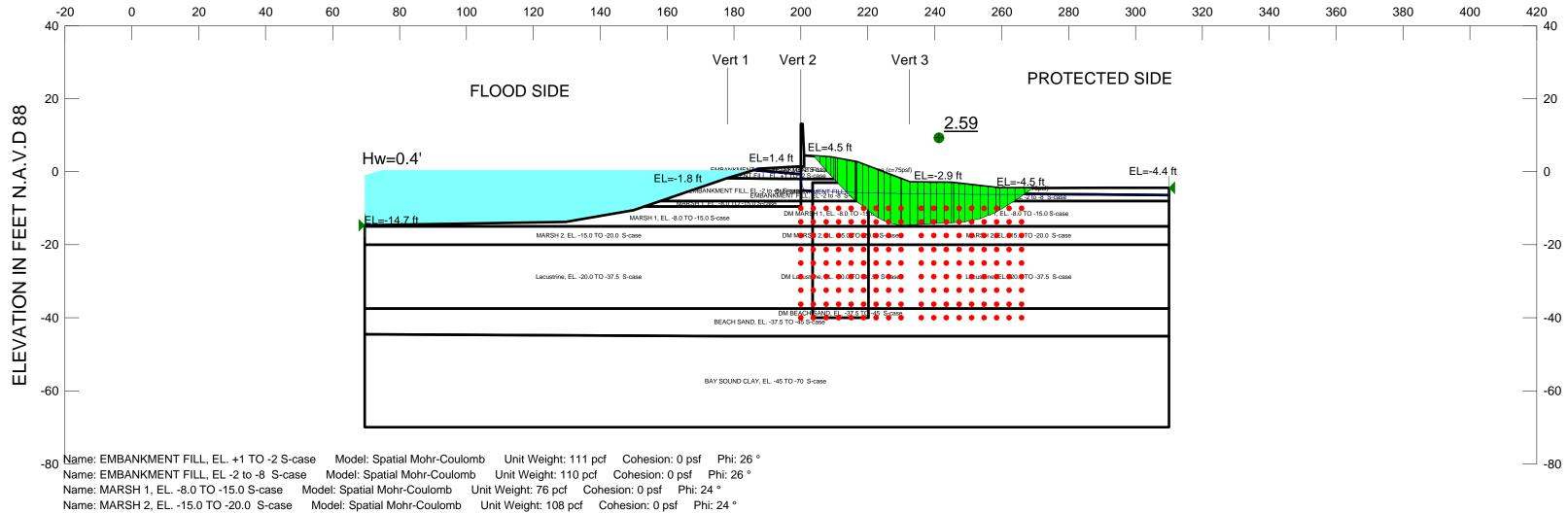


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of Engineers® Saint Louis District New Orleans District 17th STREET OUTFALL CANAL, REACH 03A,

STABILITY ANALYSIS. CASE: Slope Stability (Entry/Exit) LWL-S-FS

STA. 565+00 to 570+00 WEST ORLEANS PARISH, LOUISIANA



Name: Lacustrine, EL. -20.0 TO -37.5 S-case Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 ° Name: BEACH SAND, EL. -37.5 TO -45 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: BAY SOUND CLAY, EL. -45 TO -70 S-case Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 ° Name: DM EMBANKMENT FILL, EL -2.9 to -8 S-case Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 250 psf Phi: 26 ° Name: DM MARSH 1, EL. -8.0 TO -15.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 76 pcf Cohesion: 250 psf Phi: 24 ° Name: DM MARSH 2, EL. -15.0 TO -20.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 250 psf Phi: 24 ° Name: DM Lacustrine, EL. -20.0 TO -37.5 S-case Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 250 psf Phi: 26 ° Name: DM BEACH SAND, EL. -37.5 TO -45 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 34 ° Name: EMBANKMENT FILL, EL. +1 TO -2 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 75 psf Name: EMBANKMENT FILL, EL. -2 TO -8 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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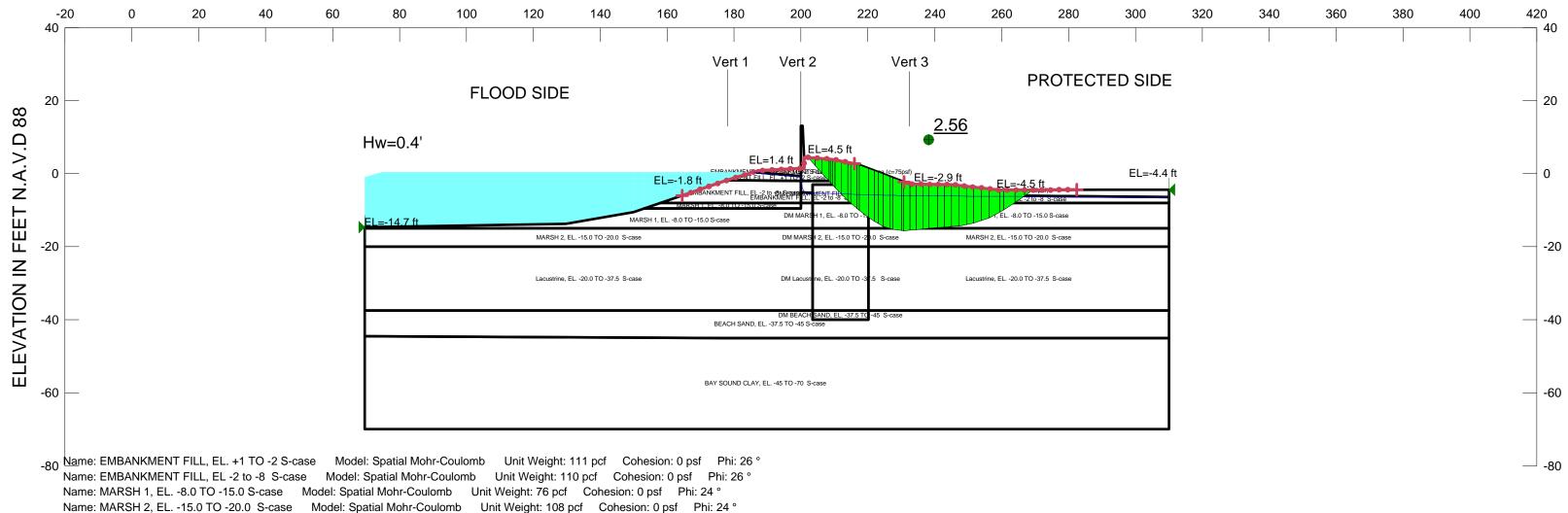
US Army Corps of Engineers®



of Engineers® Saint Louis District New Orleans District 17th STREET OUTFALL CANAL, REACH 03A,

STABILITY ANALYSIS. CASE: Slope Stability (Block) LWL-S-PS STA. 565+00 to 570+00 WEST

ORLEANS PARISH, LOUISIANA



Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 0 psf Phi: 24 ° Name: MARSH 2, EL. -15.0 TO -20.0 S-case Name: Lacustrine, EL. -20.0 TO -37.5 S-case Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 ° Name: BEACH SAND, EL. -37.5 TO -45 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: BAY SOUND CLAY, EL. -45 TO -70 S-case Model: Spatial Mohr-Coulomb Weight Fn: Bay Sound Cohesion: 0 psf Phi: 26 ° Name: DM EMBANKMENT FILL, EL -2.9 to -8 S-case Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 250 psf Phi: 26 ° Name: DM MARSH 1, EL. -8.0 TO -15.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 76 pcf Cohesion: 250 psf Phi: 24 ° Name: DM MARSH 2, EL. -15.0 TO -20.0 S-case Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 250 psf Phi: 24 ° Name: DM Lacustrine, EL. -20.0 TO -37.5 S-case Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 250 psf Phi: 26 ° Name: DM BEACH SAND, EL. -37.5 TO -45 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 34 ° Name: EMBANKMENT FILL, EL. +1 TO -2 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 75 psf Name: EMBANKMENT FILL, EL. -2 TO -8 S-case (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf

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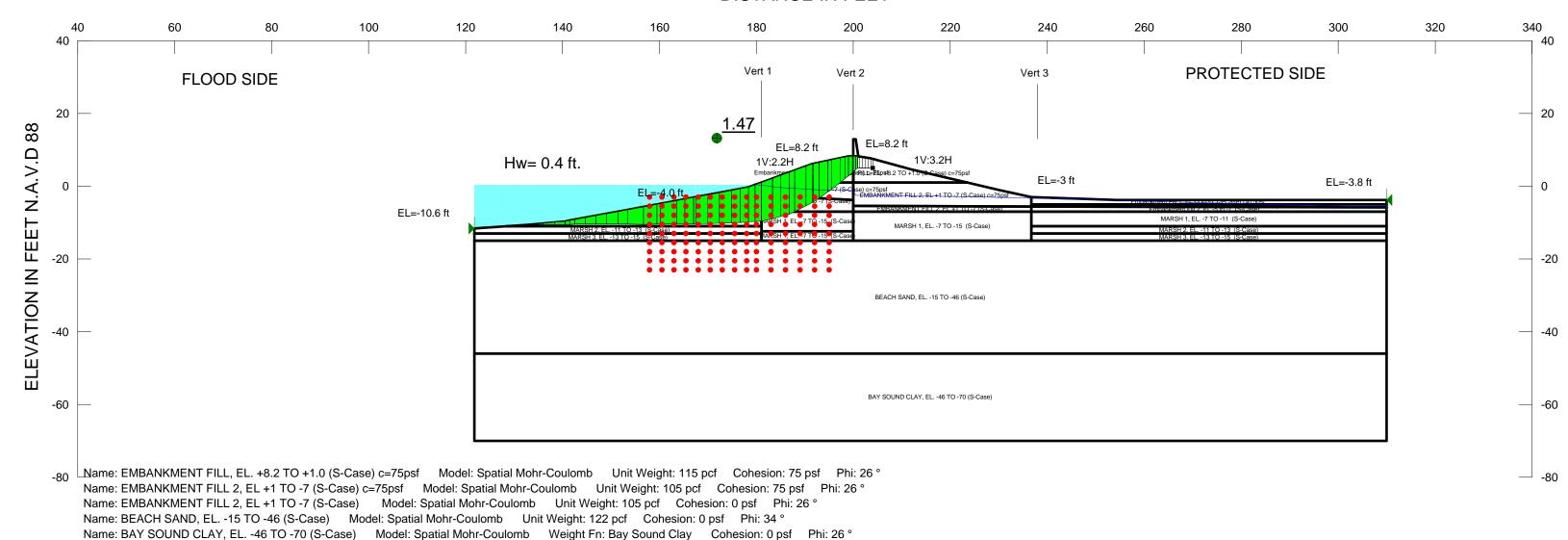


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17th STREET OUTFALL CANAL, REACH 03A, STABILITY ANALYSIS.

CASE: Slope Stability (Entry/Exit) LWL-S-PS STA. 565+00 to 570+00 WEST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -7 TO -11 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 ° Name: MARSH 2, EL. -11 TO -13 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 ° Name: MARSH 3, EL. -13 TO -15 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 ° Name: Embankment Fill 1, El. -3 to -5 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 ° Name: Embankment Fill 2, El. -5 to -7 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 ° Name: Embankment Fill 1, El. -3 to -5 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 26 ° Name: MARSH 1, EL. -7 TO -15 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 ° Name: Embankment Fill 2, El. -5 to -7 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach30.gsz Last Edited By: Redell, Chris MVS

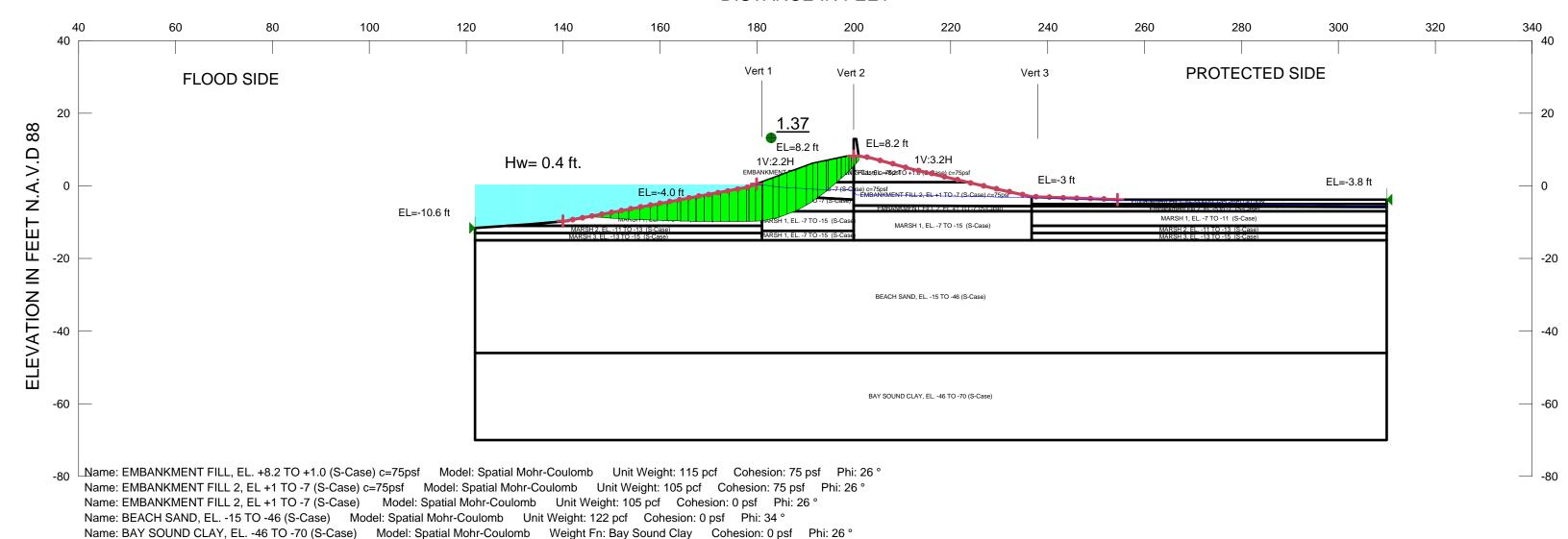




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17th STREET OUTFALL CANAL, REACH 30, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS STA. 626+73 to 634+09 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 3, EL. -13 TO -15 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 ° Name: Embankment Fill 1, El. -3 to -5 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 ° Name: Embankment Fill 2, El. -5 to -7 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 ° Name: Embankment Fill 1, El. -3 to -5 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 26 ° Name: MARSH 1, EL. -7 TO -15 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 ° Name: Embankment Fill 2, El. -5 to -7 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 26 °

Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 °

Name: MARSH 1, EL. -7 TO -11 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: MARSH 2, EL. -11 TO -13 (S-Case) Model: Spatial Mohr-Coulomb

Name: Slope Stability (Entry/Exit) LWL-S-FS File Name: 17thReach30.gsz Last Edited By: Redell, Chris MVS





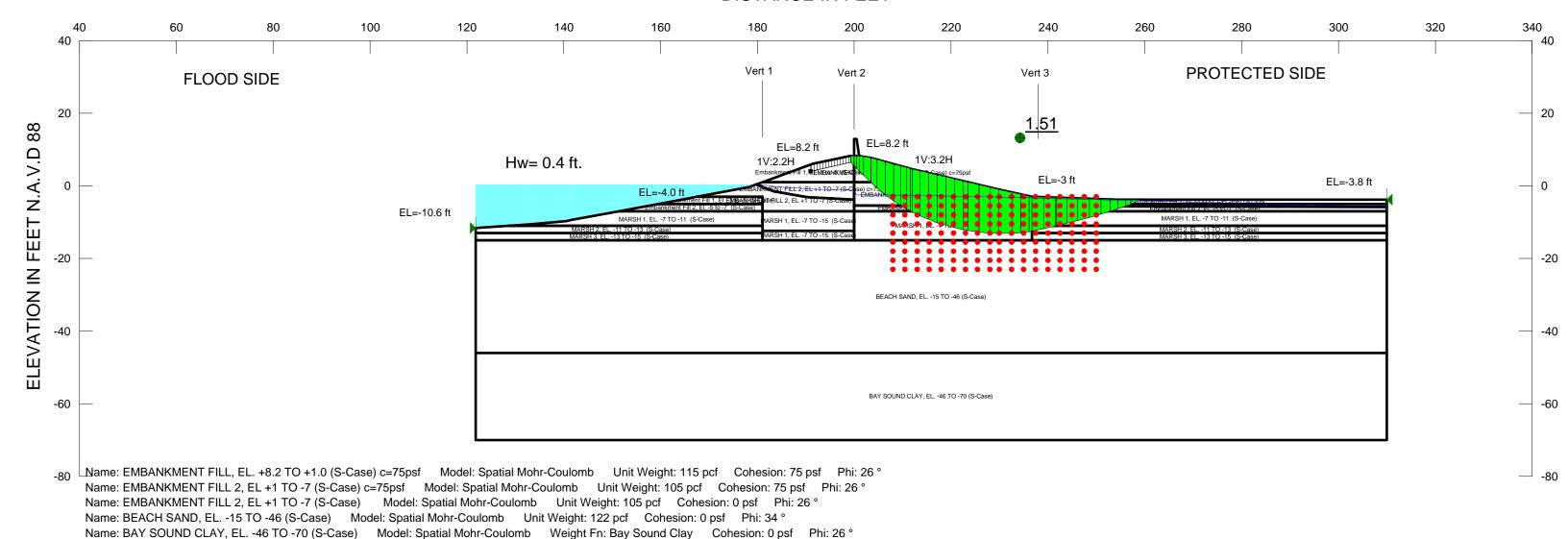
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17th STREET OUTFALL CANAL, REACH 30, STABILITY ANALYSIS. CASE: Slope Stability (Entry/Exit) LWL-S-FS STA. 626+73 to 634+09 EAST

ORLEANS PARISH, LOUISIANA

MARCH 2013



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: MARSH 2, EL. -11 TO -13 (S-Case) Model: Spatial Mohr-Coulomb

Name: MARSH 3, EL. -13 TO -15 (S-Case) Model: Spatial Mohr-Coulomb

Name: MARSH 1, EL. -7 TO -11 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 °

Name: MARSH 1, EL. -7 TO -15 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 °

Name: Embankment Fill 1, El. -3 to -5 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 ° Name: Embankment Fill 2, El. -5 to -7 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 °

Name: Embankment Fill 1, El. -3 to -5 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 26 °

Name: Embankment Fill 2, El. -5 to -7 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 26 °

Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 °

Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 °

Name: Slope Stability (Block) LWL-S-PS File Name: 17thReach30.gsz Last Edited By: Redell, Chris MVS

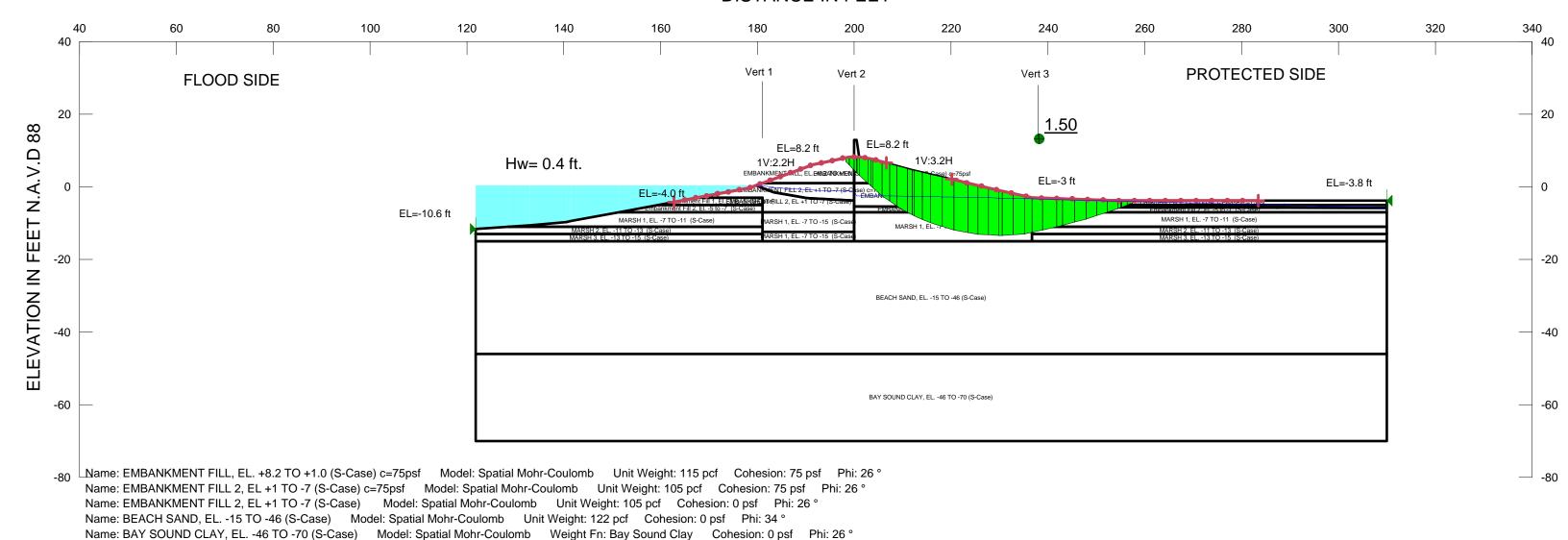




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17th STREET OUTFALL CANAL, REACH 30, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS STA. 626+73 to 634+09 EAST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

Name: MARSH 3, EL. -13 TO -15 (S-Case)

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: MARSH 2, EL. -11 TO -13 (S-Case) Model: Spatial Mohr-Coulomb

Name: MARSH 1, EL. -7 TO -11 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 °

Name: MARSH 1, EL. -7 TO -15 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 °

Name: Embankment Fill 1, El. -3 to -5 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 ° Name: Embankment Fill 2, El. -5 to -7 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 0 psf Phi: 26 °

Name: Embankment Fill 1, El. -3 to -5 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 26 °

Name: Embankment Fill 2, El. -5 to -7 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 26 °

Model: Spatial Mohr-Coulomb

Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 °

Unit Weight: 90 pcf Cohesion: 0 psf Phi: 24 °

Name: Slope Stability (Entry/Exit) LWL-S-PS File Name: 17thReach30.gsz Last Edited By: Redell, Chris MVS





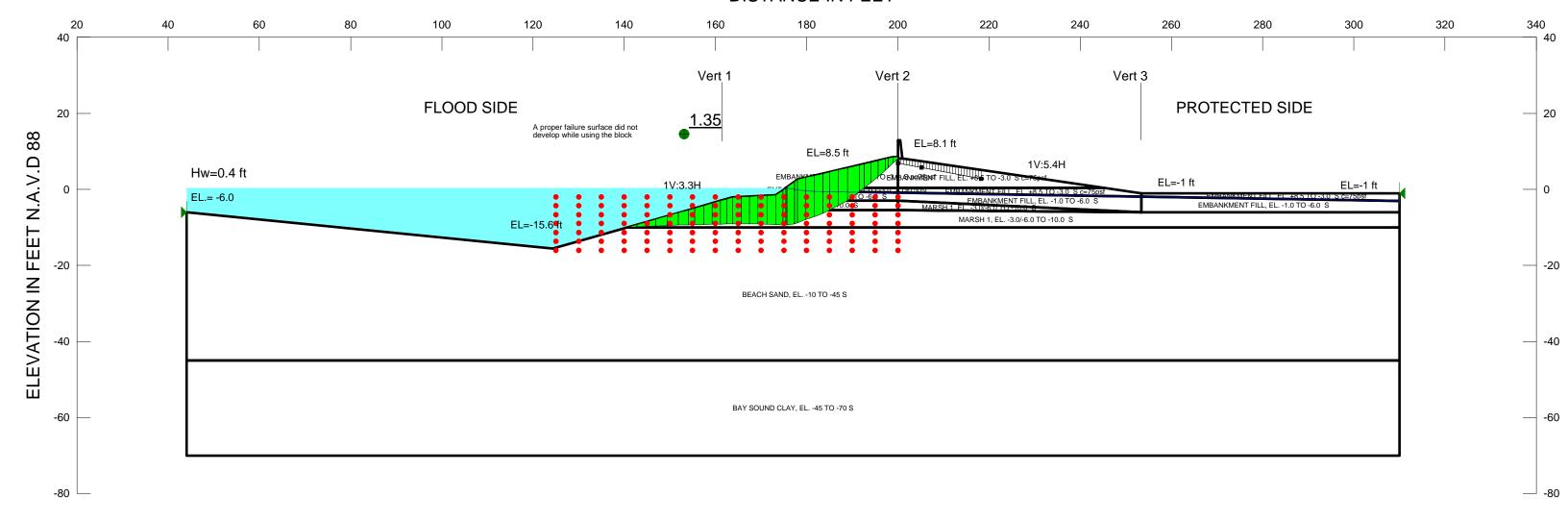
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17th STREET OUTFALL CANAL, REACH 30, STABILITY ANALYSIS. CASE: Slope Stability (Entry/Exit) LWL-S-PS STA. 626+73 to 634+09 EAST

ORLEANS PARISH, LOUISIANA

MARCH 2013



Name: MARSH 1, EL. -3.0/-6.0 TO -10.0 S Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion: 0 psf Phi: 24 ° Name: BEACH SAND, EL. -10 TO -45 S Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: BAY SOUND CLAY, EL. -45 TO -70 S Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL, EL. -1.0 TO -6.0 S Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL, EL. +8.5 TO -3.0 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) FS File Name: 17thReach31.gsz Last Edited By: Redell, Chris MVS

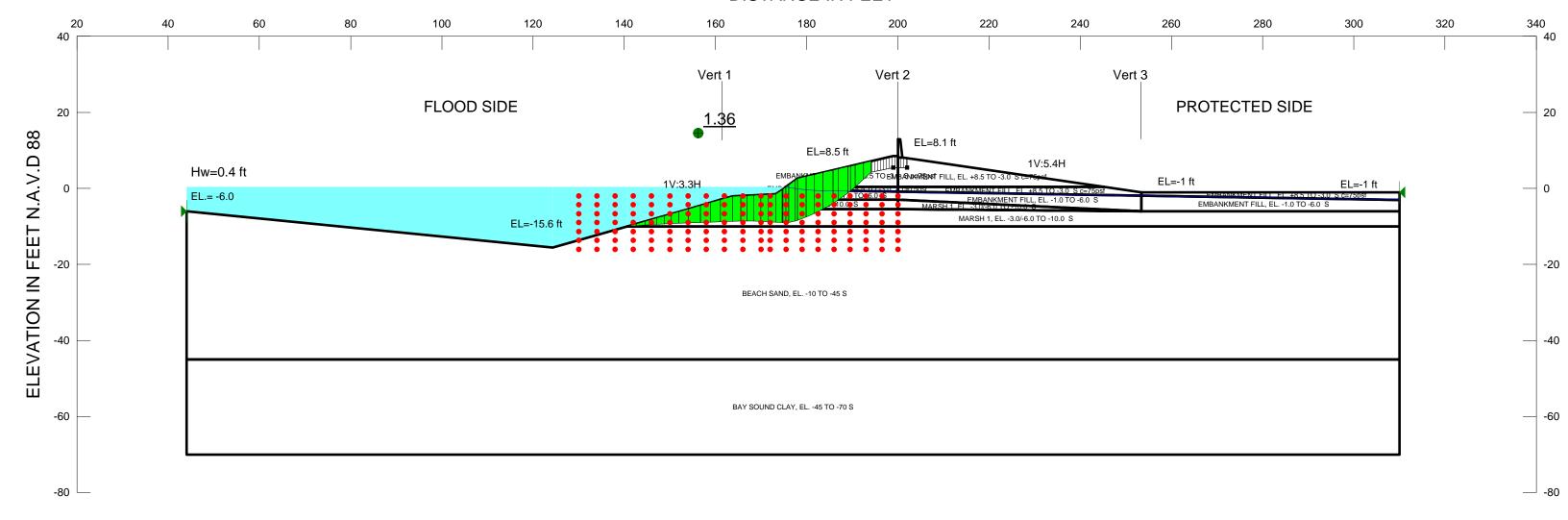




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17th STREET OUTFALL CANAL, REACH 31, STABILITY ANALYSIS, CASE: Slope Stability (Block) FS STA. 634+09 to 637+00 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -3.0/-6.0 TO -10.0 S Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion: 0 psf Phi: 24 ° Name: BEACH SAND, EL. -10 TO -45 S Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: BAY SOUND CLAY, EL. -45 TO -70 S Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL, EL. -1.0 TO -6.0 S Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL, EL. +8.5 TO -3.0 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

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WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) FS, floodside sheetpile File Name: 17thReach31.gsz Last Edited By: Redell, Chris MVS

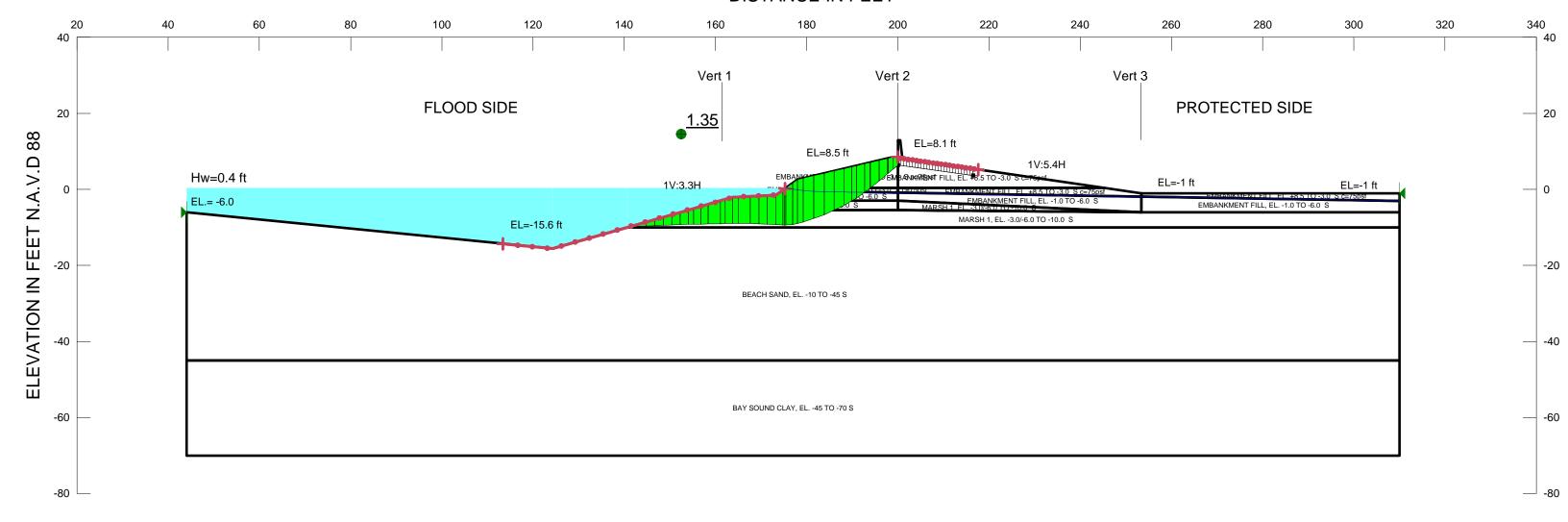




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17th STREET OUTFALL CANAL, REACH 31, STABILITY ANALYSIS, CASE: Slope Stability (Block) FS, floodside sheetpile STA. 634+09 to 637+00 EAST

ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -3.0/-6.0 TO -10.0 S Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion: 0 psf Phi: 24 ° Name: BEACH SAND, EL. -10 TO -45 S Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: BAY SOUND CLAY, EL. -45 TO -70 S Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL, EL. -1.0 TO -6.0 S Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL, EL. +8.5 TO -3.0 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 75 psf Phi: 26 °

> W/O Sheet Pile FoS= 1.25 W/O Sheet Pile/ PS Soil Removal FoS= 1.26 With Sheet Pile FoS= 1.67

GENERAL NOTES

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Name: Slope Stability (Entry/Exit) FS File Name: 17thReach31.gsz Last Edited By: Redell, Chris MVS



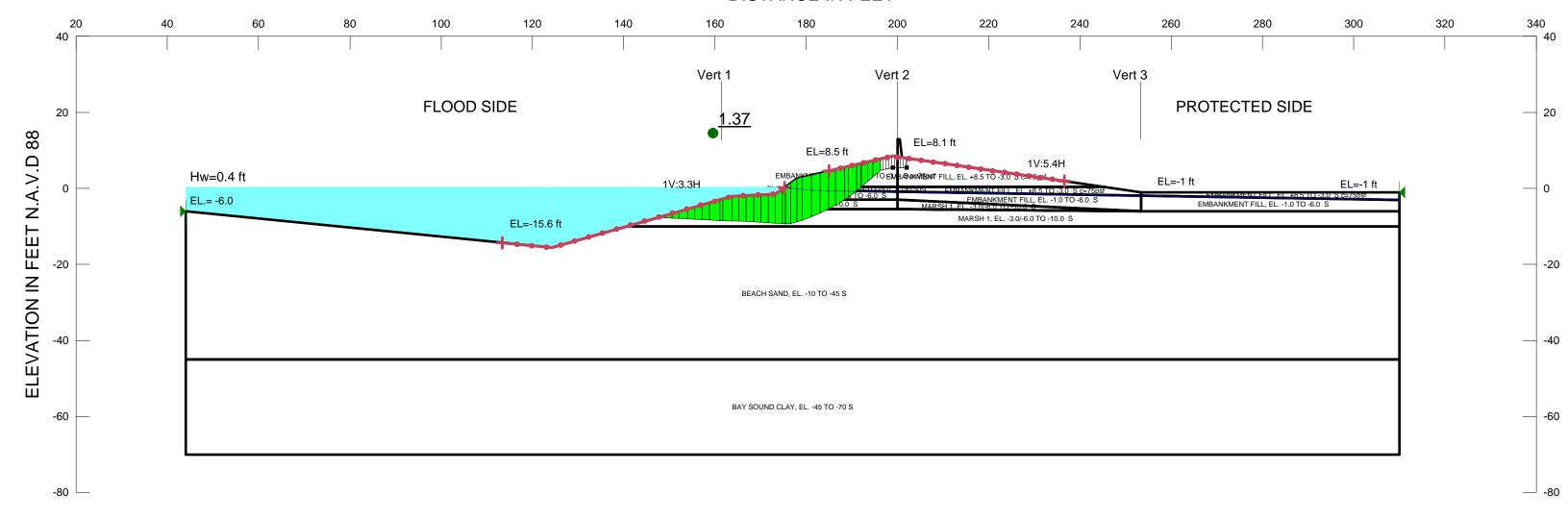


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17th STREET OUTFALL CANAL, REACH 31, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) FS

STA. 634+09 to 637+00 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -3.0/-6.0 TO -10.0 S Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion: 0 psf Phi: 24 ° Name: BEACH SAND, EL. -10 TO -45 S Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: BAY SOUND CLAY, EL. -45 TO -70 S Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL, EL. -1.0 TO -6.0 S Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL, EL. +8.5 TO -3.0 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 75 psf Phi: 26 °

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Name: Slope Stability (Entry/Exit) FS, floodside sheetpile File Name: 17thReach31.gsz Last Edited By: Redell, Chris MVS



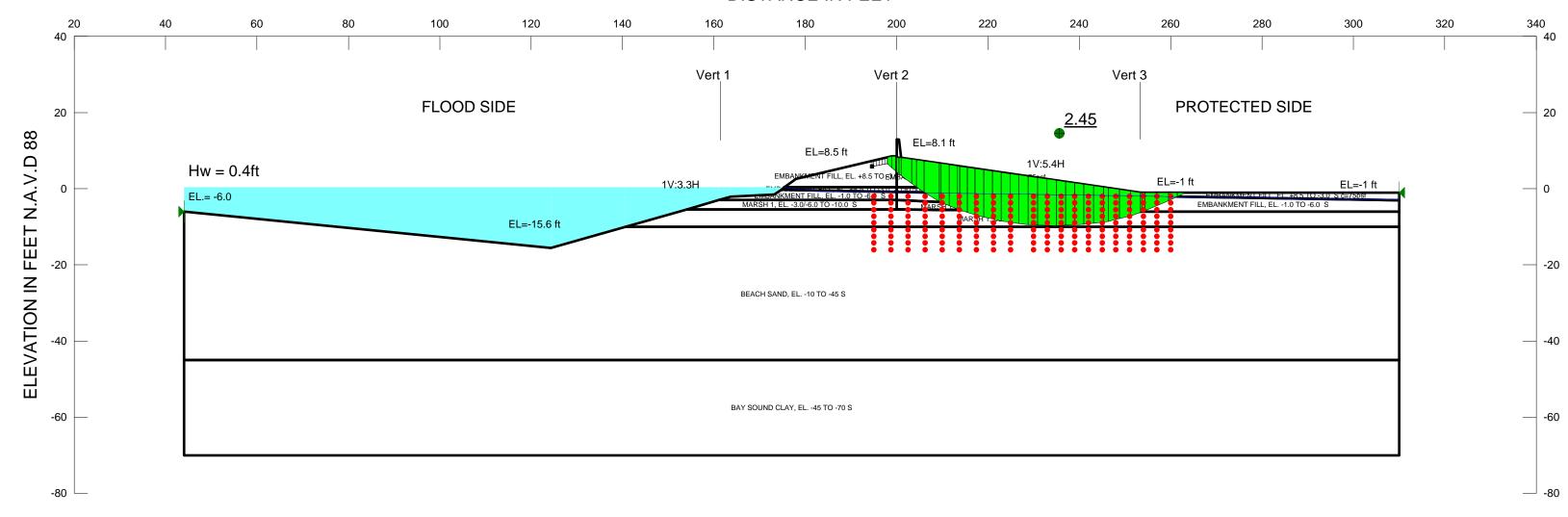


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17th STREET OUTFALL CANAL, REACH 31, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) FS, floodside sheetpile STA. 634+09 to 637+00 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -3.0/-6.0 TO -10.0 S Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion: 0 psf Phi: 24 ° Name: BEACH SAND, EL. -10 TO -45 S Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: BAY SOUND CLAY, EL. -45 TO -70 S Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL, EL. -1.0 TO -6.0 S Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL, EL. +8.5 TO -3.0 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

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Name: Slope Stability (Block) PS File Name: 17thReach31.gsz Last Edited By: Redell, Chris MVS

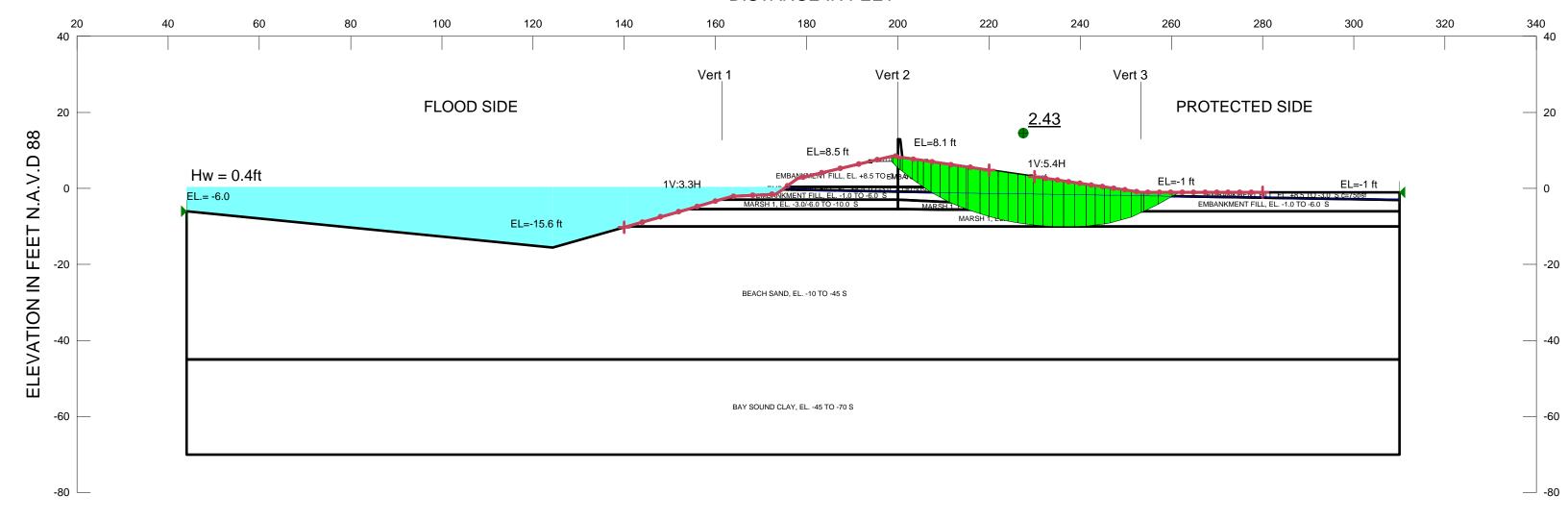




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17th STREET OUTFALL CANAL, REACH 31, STABILITY ANALYSIS, CASE: Slope Stability (Block) PS STA. 634+09 to 637+00 EAST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -3.0/-6.0 TO -10.0 S Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion: 0 psf Phi: 24 ° Name: BEACH SAND, EL. -10 TO -45 S Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: BAY SOUND CLAY, EL. -45 TO -70 S Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL, EL. -1.0 TO -6.0 S Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL, EL. +8.5 TO -3.0 S c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 75 psf Phi: 26 °

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Name: Slope Stability (Entry/Exit) PS File Name: 17thReach31.gsz Last Edited By: Redell, Chris MVS

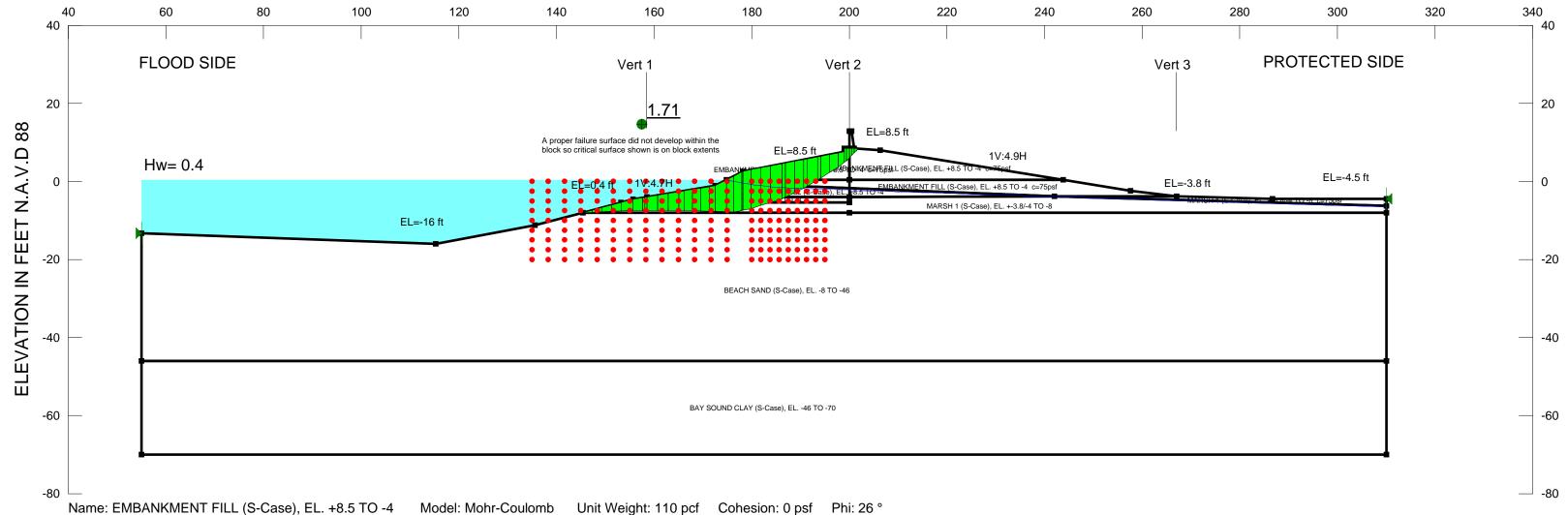




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17th STREET OUTFALL CANAL, REACH 31, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) PS STA. 634+09 to 637+00 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL (S-Case), EL. +8.5 TO -4 Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 26 ° Name: MARSH 1 (S-Case), EL. +-3.8/-4 TO -8 Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 24 ° Name: BEACH SAND (S-Case), EL. -8 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 ° Name: BAY SOUND CLAY (S-Case), EL. -46 TO -70 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL (S-Case), EL. +8.5 TO -4 c=75psf Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 ° Name: MARSH 1 (S-Case), EL. +-3.8/-4 TO -8 c=75psf Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) FS File Name: 17thReach32.gsz Last Edited By: Redell, Chris MVS

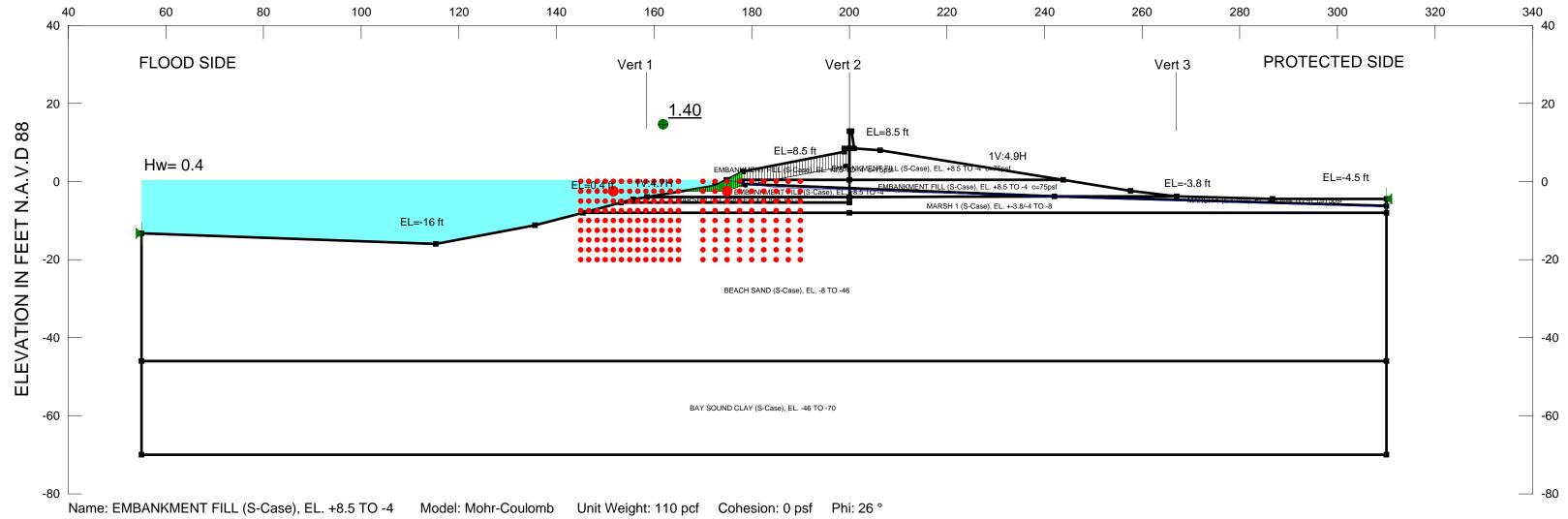




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17th STREET OUTFALL CANAL, REACH 32, STABILITY ANALYSIS, CASE: Slope Stability (Block) FS STA. 637+00 to 638+44 EAST ORLEANS PARISH, LOUISIANA



Name: BEACH SAND (S-Case), EL. +3.8/-4 TO -8 Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 24 °
Name: BEACH SAND (S-Case), EL. -8 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: BAY SOUND CLAY (S-Case), EL. -46 TO -70 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °
Name: EMBANKMENT FILL (S-Case), EL. +8.5 TO -4 c=75psf Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf F

Name: EMBANKMENT FILL (S-Case), EL. +8.5 TO -4 c=75psf Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 ° Name: MARSH 1 (S-Case), EL. +-3.8/-4 TO -8 c=75psf Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

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Name: Slope Stability (Block) FS - floodside sheetpile File Name: 17thReach32.gsz Last Edited By: Redell, Chris MVS



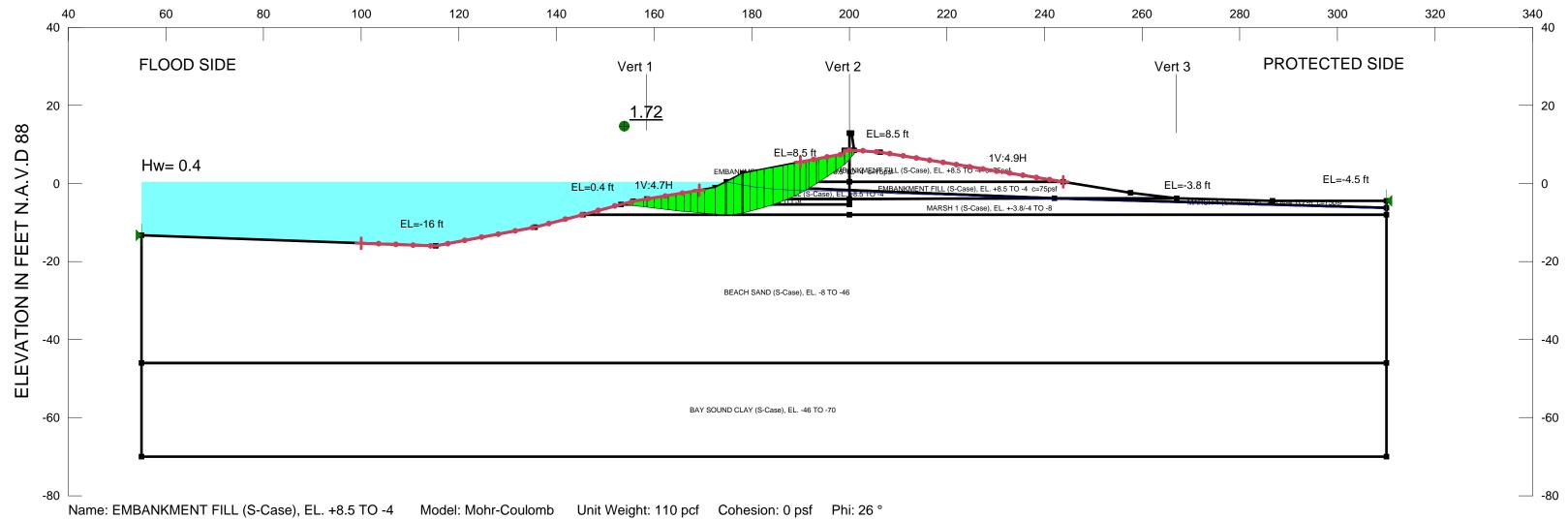


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17th STREET OUTFALL CANAL, REACH 32, STABILITY ANALYSIS,

CASE: Slope Stability (Block) FS - floodside sheetpile STA. 637+00 to 638+44 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL (S-Case), EL. +8.5 TO -4 Model: Monr-Coulomb Unit Weight: 110 pcr Conesion: 0 psr Phi: 26 Name: MARSH 1 (S-Case), EL. +-3.8/-4 TO -8 Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 24 Name: BEACH SAND (S-Case), EL. -8 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 Name: BAY SOUND CLAY (S-Case), EL. -46 TO -70 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 Name: EMBANKMENT FILL (S-Case), EL. -8.5 TO -4.6-75 pcf Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 pcf

Name: EMBANKMENT FILL (S-Case), EL. +8.5 TO -4 c=75psf Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 ° Name: MARSH 1 (S-Case), EL. +-3.8/-4 TO -8 c=75psf Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

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Name: Slope Stability (Entry & Exit) FS File Name: 17thReach32.gsz Last Edited By: Redell, Chris MVS

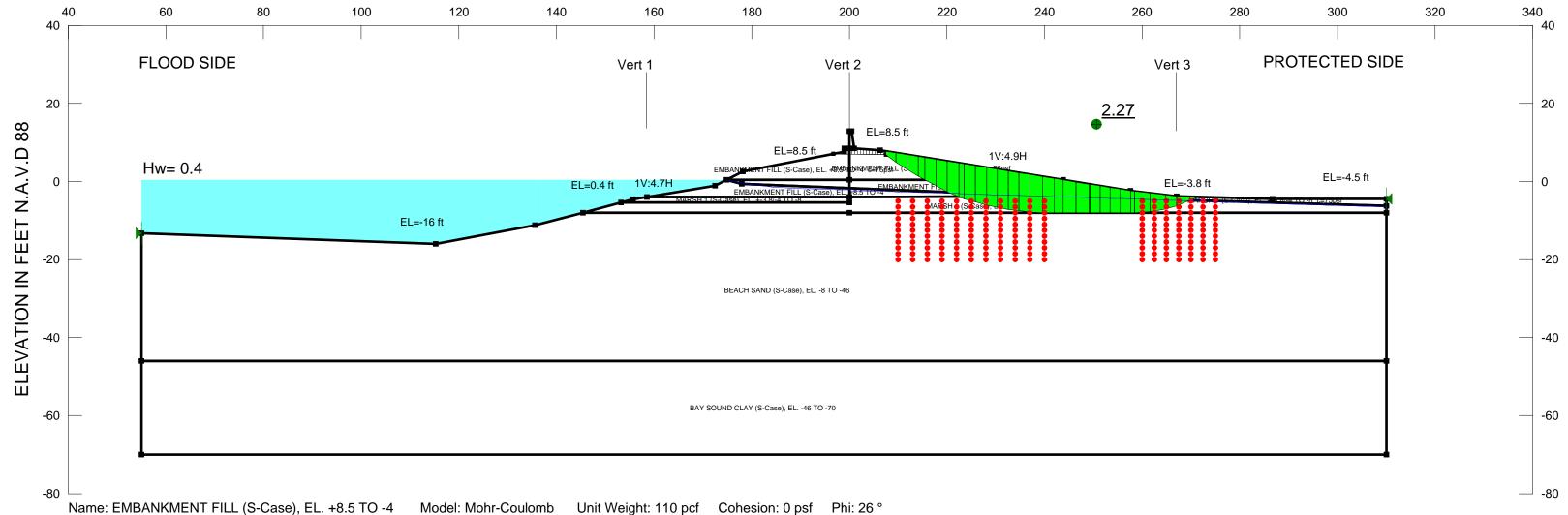




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17th STREET OUTFALL CANAL, REACH 32, STABILITY ANALYSIS, CASE: Slope Stability (Entry & Exit) FS STA. 637+00 to 638+44 EAST ORLEANS PARISH, LOUISIANA



Name: BEACH SAND (S-Case), EL. +3.8/-4 TO -8 Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 24 °
Name: BEACH SAND (S-Case), EL. -8 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: BAY SOUND CLAY (S-Case), EL. -46 TO -70 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °
Name: EMBANKMENT FILL (S-Case), EL. +8.5 TO -4 c=75psf Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf

Name: EMBANKMENT FILL (S-Case), EL. +8.5 TO -4 c=75psf Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 ° Name: MARSH 1 (S-Case), EL. +-3.8/-4 TO -8 c=75psf Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) PS File Name: 17thReach32.gsz Last Edited By: Redell, Chris MVS

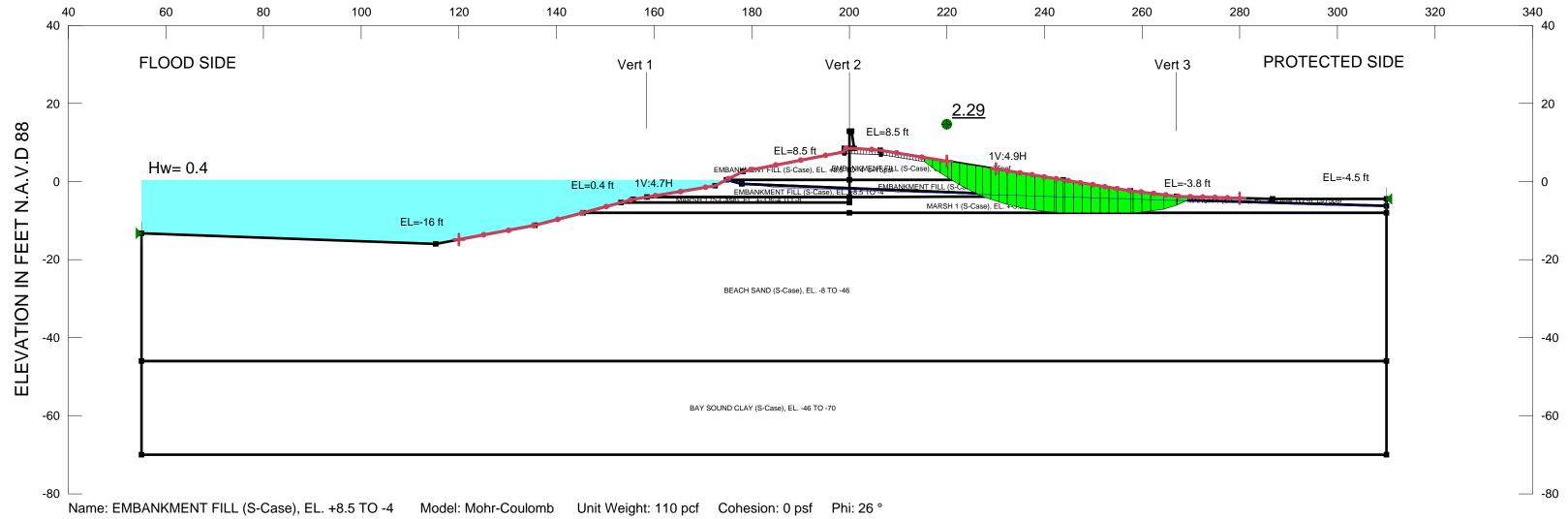




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17th STREET OUTFALL CANAL, REACH 32, STABILITY ANALYSIS, CASE: Slope Stability (Block) PS STA. 637+00 to 638+44 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL (S-Case), EL. +8.5 TO -4 Model: Monr-Coulomb Unit Weight: 110 pcr Conesion: 0 psr Phi: 26 Name: MARSH 1 (S-Case), EL. +-3.8/-4 TO -8 Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 24 Name: BEACH SAND (S-Case), EL. -8 TO -46 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 Name: BAY SOUND CLAY (S-Case), EL. -46 TO -70 Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 Name: EMBANKMENT FILL (S-Case), EL. +8.5 TO 4 c=75psf Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf

Name: EMBANKMENT FILL (S-Case), EL. +8.5 TO -4 c=75psf Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 ° Name: MARSH 1 (S-Case), EL. +-3.8/-4 TO -8 c=75psf Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability (Entry & Exit) PS File Name: 17thReach32.gsz Last Edited By: Redell, Chris MVS

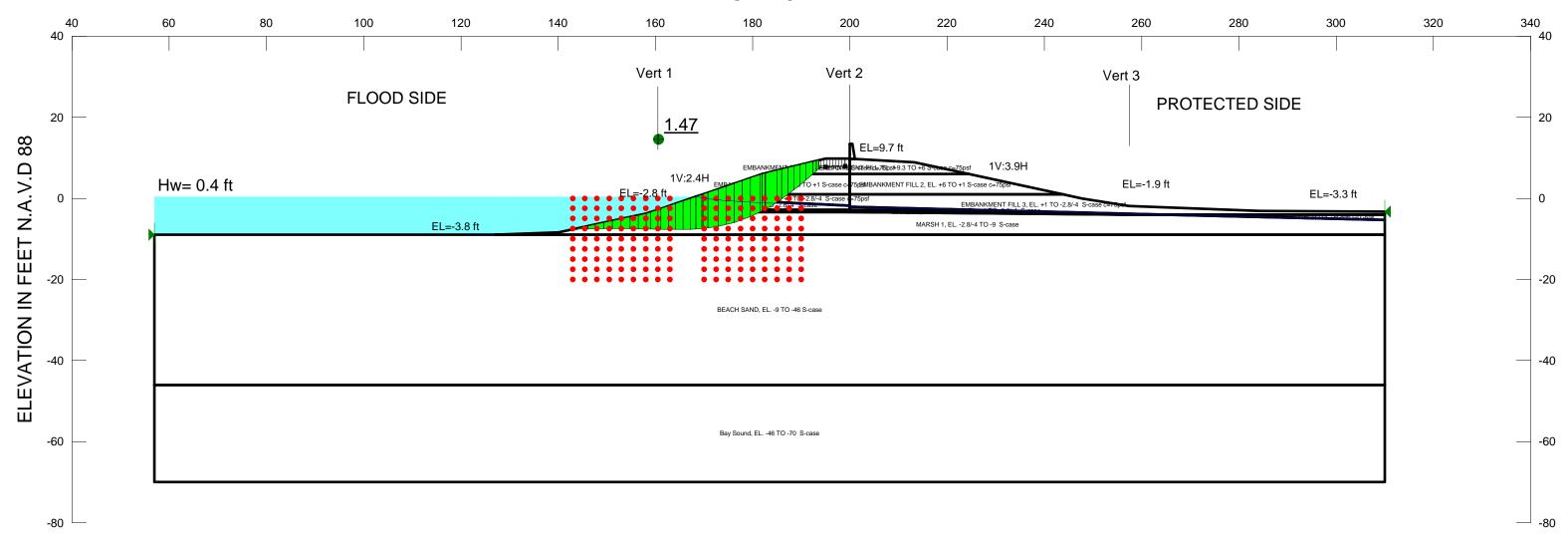




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17th STREET OUTFALL CANAL, REACH 32, STABILITY ANALYSIS, CASE: Slope Stability (Entry & Exit) PS STA. 637+00 to 638+44 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 3, EL. +1 TO -2.8/-4 S-case Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: MARSH 1, EL. -2.8/-4 TO -9 S-case Model: Spatial Mohr-Coulomb Weight Fn: MARSH -2.8 TO -9 Cohesion: 0 psf Phi: 24 °

Name: BEACH SAND, EL. -9 TO -46 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: Bay Sound, EL. -46 TO -70 S-case Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL, EL. +9.3 TO +6 S-case c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL 2, EL. +6 TO +1 S-case c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

Name: EMBANKMENT FILL 3, EL. +1 TO -2.8/-4 S-case c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

Name: MARSH 1, EL. -2.8/-4 TO -9 S-case c=75psf Model: Spatial Mohr-Coulomb Weight Fn: MARSH -2.8 TO -9 Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach33.gsz Last Edited By: Redell, Chris MVS

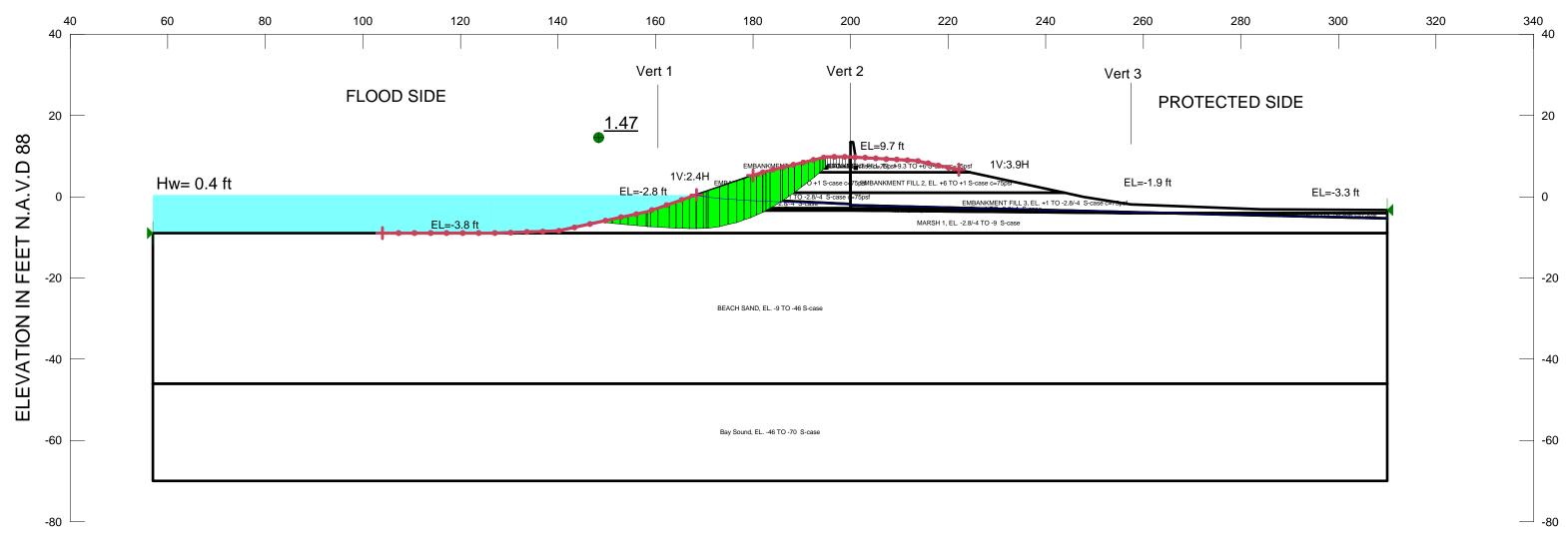




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17th STREET OUTFALL CANAL, REACH 33, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS STA. 643+40 to 658+00 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 3, EL. +1 TO -2.8/-4 S-case Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: MARSH 1, EL. -2.8/-4 TO -9 S-case Model: Spatial Mohr-Coulomb Weight Fn: MARSH -2.8 TO -9 Cohesion: 0 psf Phi: 24 °

Name: BEACH SAND, EL. -9 TO -46 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: Bay Sound, EL. -46 TO -70 S-case Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL, EL. +9.3 TO +6 S-case c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL 2, EL. +6 TO +1 S-case c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

Name: EMBANKMENT FILL 3, EL. +1 TO -2.8/-4 S-case c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

Name: MARSH 1, EL. -2.8/-4 TO -9 S-case c=75psf Model: Spatial Mohr-Coulomb Weight Fn: MARSH -2.8 TO -9 Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability (Entry/Exit) LWL-S-FS File Name: 17thReach33.gsz Last Edited By: Redell, Chris MVS

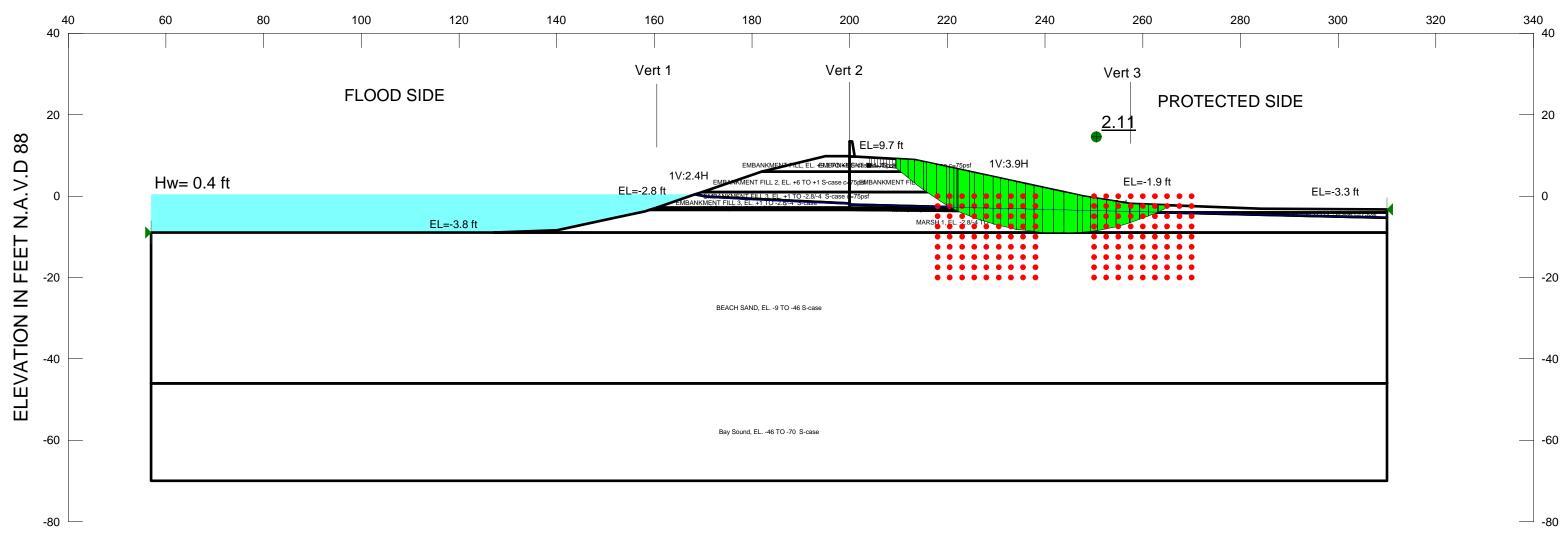




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17th STREET OUTFALL CANAL, REACH 33, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S-FS STA. 643+40 to 658+00 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 3, EL. +1 TO -2.8/-4 S-case Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: MARSH 1, EL. -2.8/-4 TO -9 S-case Model: Spatial Mohr-Coulomb Weight Fn: MARSH -2.8 TO -9 Cohesion: 0 psf Phi: 24 °

Name: BEACH SAND, EL. -9 TO -46 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: Bay Sound, EL. -46 TO -70 S-case Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL, EL. +9.3 TO +6 S-case c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL 2, EL. +6 TO +1 S-case c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

Name: EMBANKMENT FILL 3, EL. +1 TO -2.8/-4 S-case c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

Name: MARSH 1, EL. -2.8/-4 TO -9 S-case c=75psf Model: Spatial Mohr-Coulomb Weight Fn: MARSH -2.8 TO -9 Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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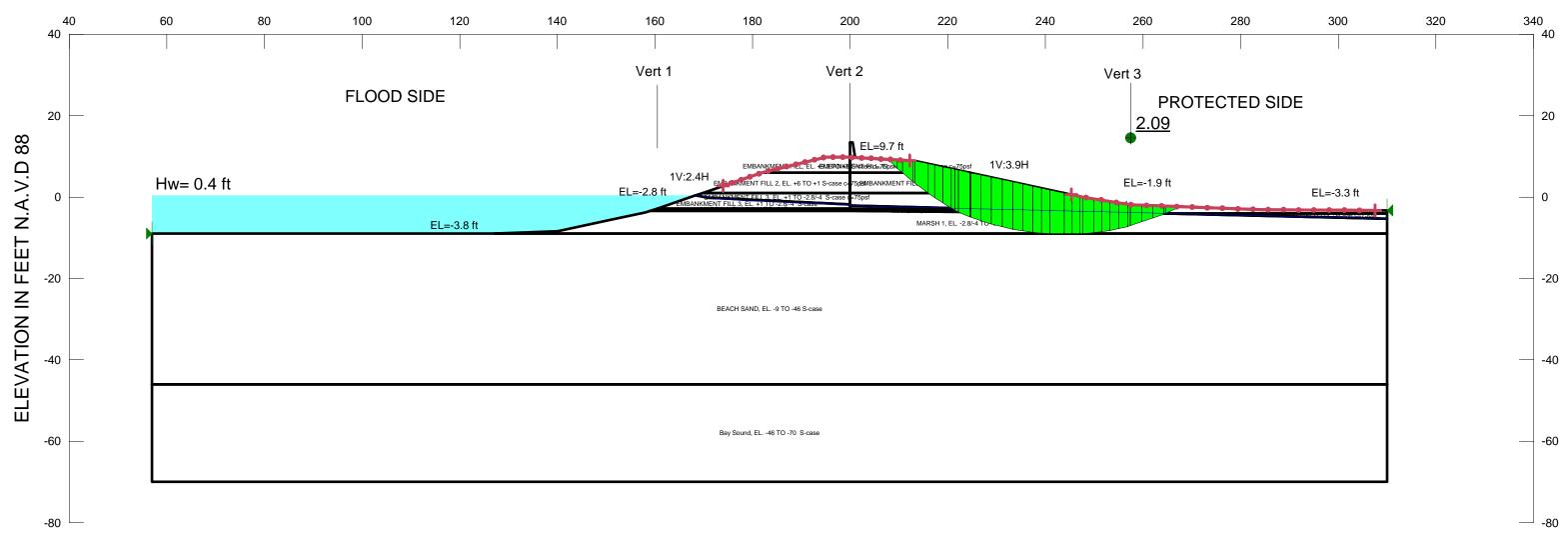




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17th STREET OUTFALL CANAL, REACH 33, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS STA. 643+40 to 658+00 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 3, EL. +1 TO -2.8/-4 S-case Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: MARSH 1, EL. -2.8/-4 TO -9 S-case Model: Spatial Mohr-Coulomb Weight Fn: MARSH -2.8 TO -9 Cohesion: 0 psf Phi: 24 °

Name: BEACH SAND, EL. -9 TO -46 S-case Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: Bay Sound, EL. -46 TO -70 S-case Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL, EL. +9.3 TO +6 S-case c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL 2, EL. +6 TO +1 S-case c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

Name: EMBANKMENT FILL 3, EL. +1 TO -2.8/-4 S-case c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

Name: MARSH 1, EL. -2.8/-4 TO -9 S-case c=75psf Model: Spatial Mohr-Coulomb Weight Fn: MARSH -2.8 TO -9 Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability (Entry/Exit) LWL-S-PS File Name: 17thReach33.gsz Last Edited By: Redell, Chris MVS

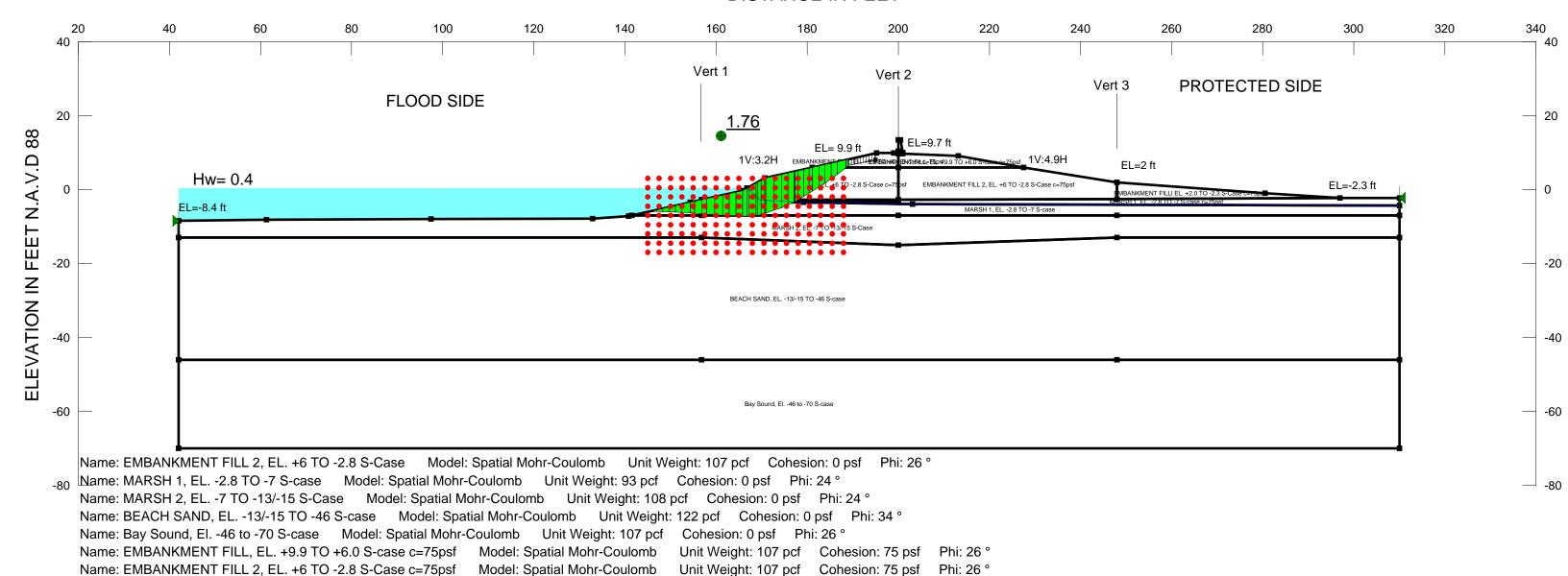




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17th STREET OUTFALL CANAL, REACH 33, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S-PS STA. 643+40 to 658+00 EAST ORLEANS PARISH, LOUISIANA



Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: EMBANKMENT FILLI EL. +2.0 TO -2.3 S-Case c=75psf

Name: MARSH 1, EL. -2.8 TO -7 S-case c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion: 75 psf Phi: 24 °

Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach34.gsz Last Edited By: Goltz, Amanda MVS

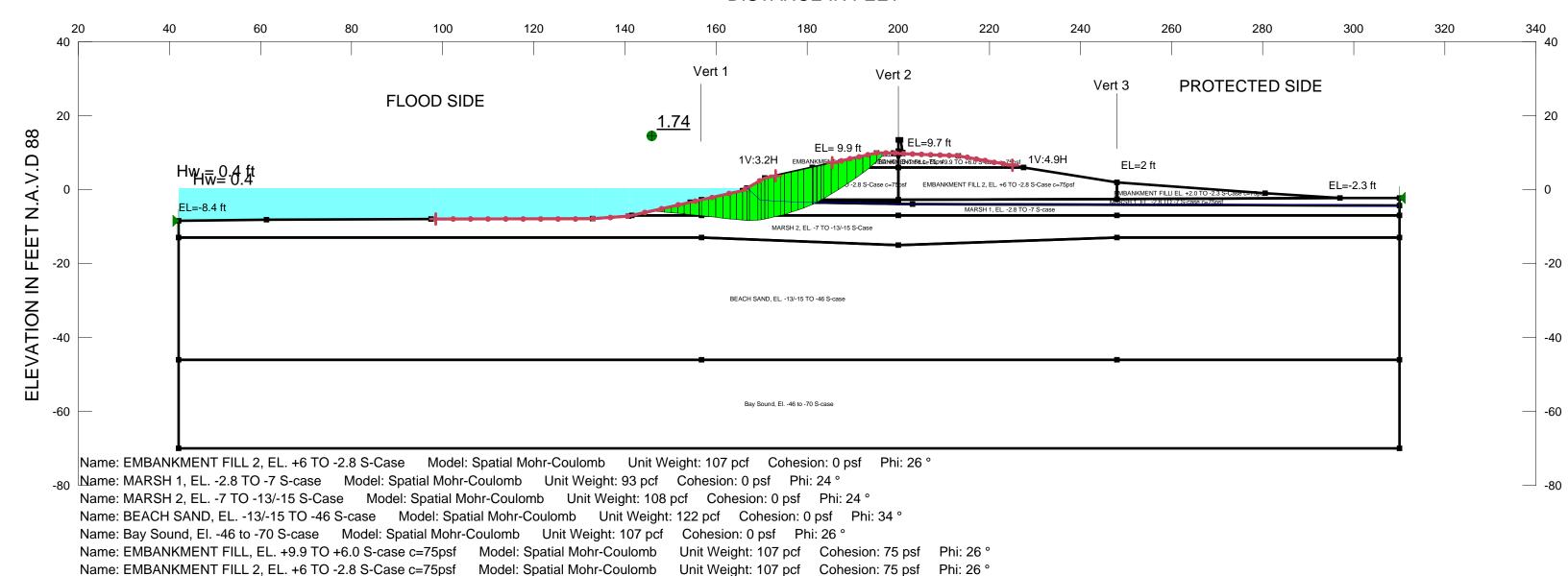




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17th STREET OUTFALL CANAL, REACH 34, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS STA. 658+00-662+87 EAST ORLEANS PARISH, LOUISIANA



Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN
VERTICALS WERE ASSUMED TO VARY LINEARLY
BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: EMBANKMENT FILLI EL. +2.0 TO -2.3 S-Case c=75psf

Name: MARSH 1, EL. -2.8 TO -7 S-case c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion: 75 psf Phi: 24 °

Name: Slope Stability (Entry &Exit) LWL-S-FS

File Name: 17thReach34.gsz Last Edited By: Goltz, Amanda MVS

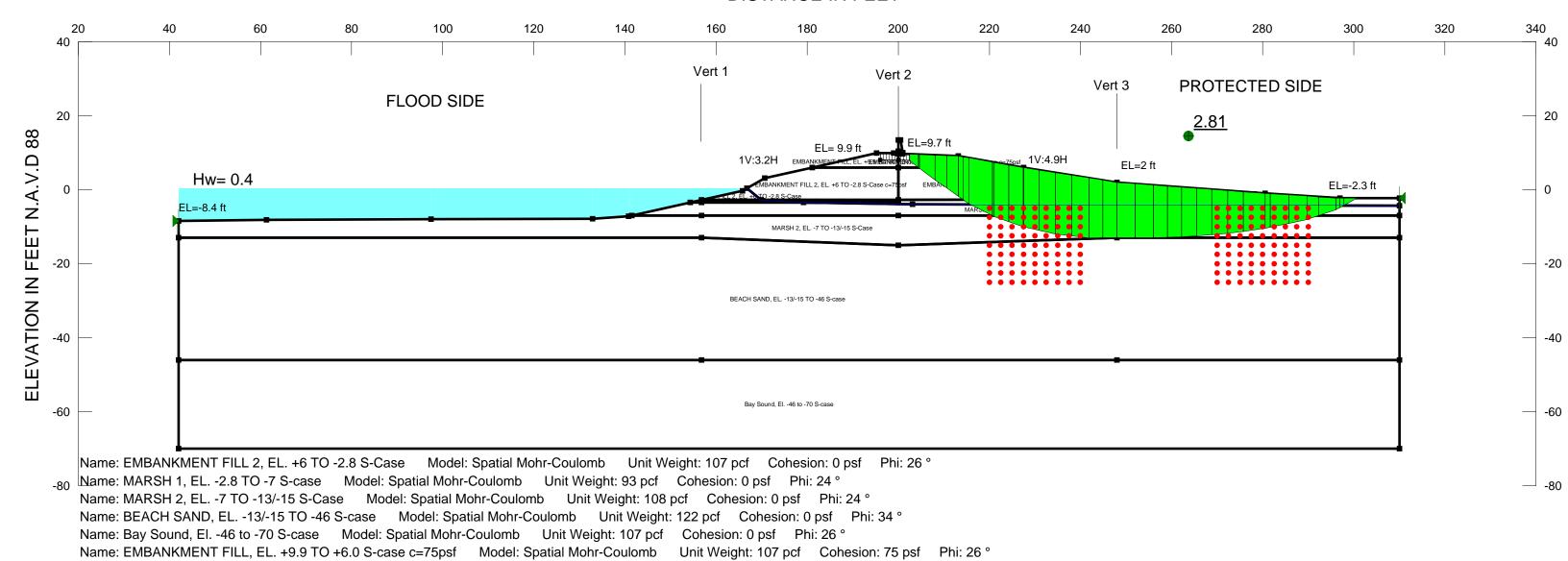


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17th STREET OUTFALL CANAL, REACH 34, STABILITY ANALYSIS, CASE: Slope Stability (Entry &Exit) LWL-S-FS STA. 658+00- 662+87 EAST ORLEANS PARISH, LOUISIANA



Model: Spatial Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 75 psf

Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 75 psf Phi: 26 °

Name: MARSH 1, EL. -2.8 TO -7 S-case c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion: 75 psf Phi: 24 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: EMBANKMENT FILL 2, EL. +6 TO -2.8 S-Case c=75psf

Name: EMBANKMENT FILLI EL. +2.0 TO -2.3 S-Case c=75psf

Name: Slope Stability (Block) LWL-S-PS

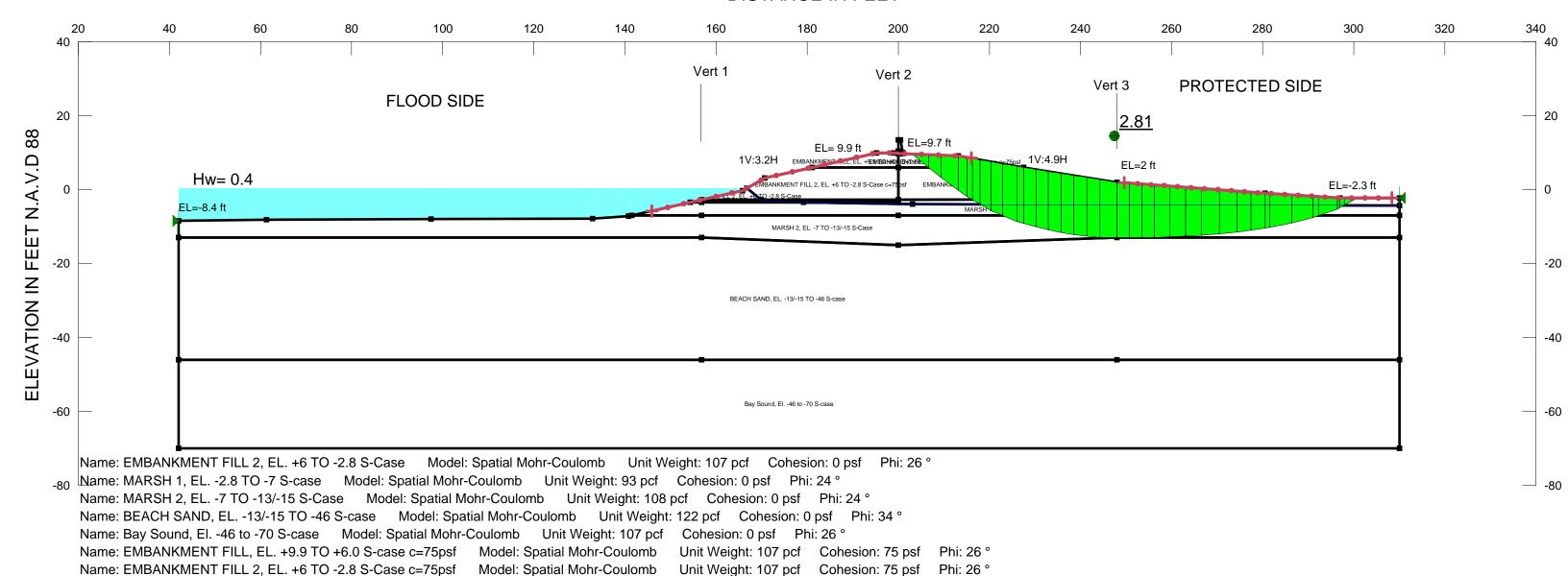
File Name: 17thReach34.gsz Last Edited By: Goltz, Amanda MVS



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17th STREET OUTFALL CANAL, REACH 34, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS STA. 658+00-662+87 EAST ORLEANS PARISH, LOUISIANA



Model: Mohr-Coulomb Unit Weight: 107 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: EMBANKMENT FILLI EL. +2.0 TO -2.3 S-Case c=75psf

Name: MARSH 1, EL. -2.8 TO -7 S-case c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 93 pcf Cohesion: 75 psf Phi: 24 °

Name: Slope Stability (Entry &Exit) LWL-S-PS

File Name: 17thReach34.gsz Last Edited By: Goltz, Amanda MVS

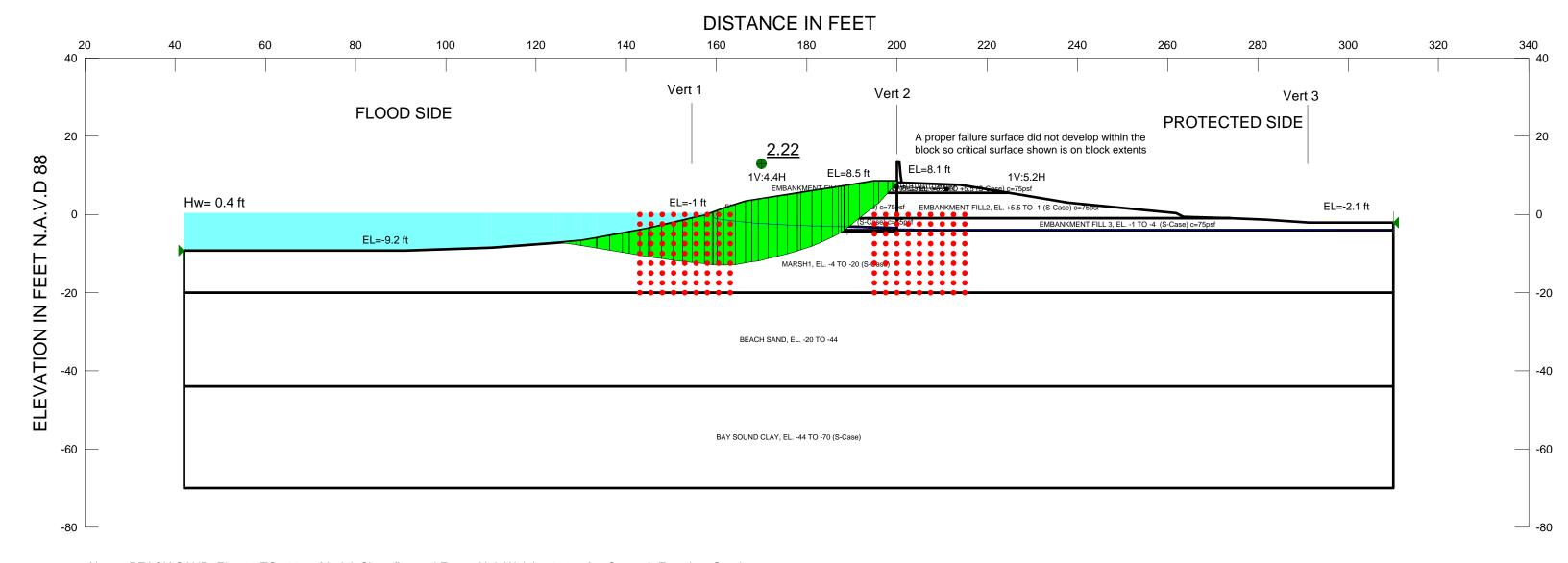


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17th STREET OUTFALL CANAL, REACH 34, STABILITY ANALYSIS, CASE: Slope Stability (Entry &Exit) LWL-S-PS STA. 658+00-662+87 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 3, EL. -1 TO -4 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 °

Name: MARSH1, EL. -4 TO -20 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 24 °

Name: BAY SOUND CLAY, EL. -44 TO -70 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL, EL. +8.5 TO +5.5 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL2, EL. +5.5 TO -1 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 75 psf Phi: 26 °

Name: EMBANKMENT FILL 3, EL. -1 TO -4 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

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Name: Slope Stability (Block) LWL-S-FS (Thru) File Name: 17thReach35.gsz Last Edited By: Redell, Chris MVS





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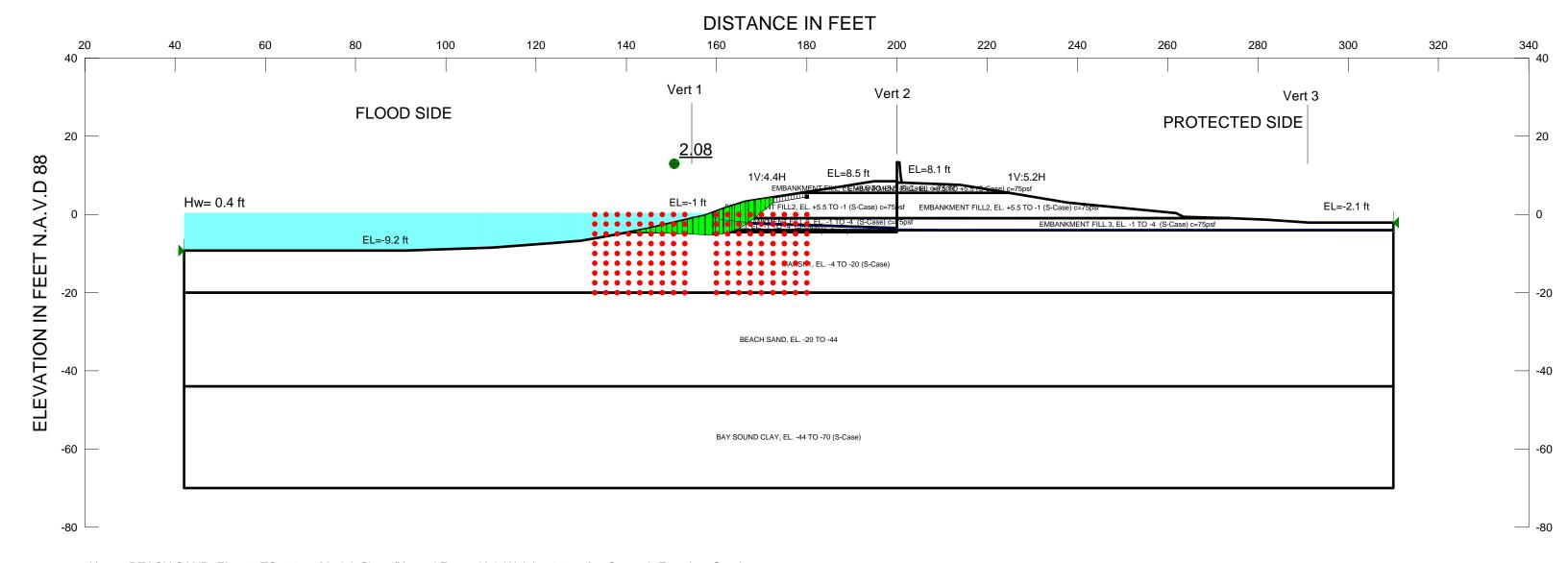
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17th STREET OUTFALL CANAL, REACH 35, STABILITY ANALYSIS,

CASE: Slope Stability (Block) LWL-S-FS (Thru) STA. 662+87 to 670+63 EAST

ORLEANS PARISH, LOUISIANA

MARCH 2013



Name: EMBANKMENT FILL 3, EL. -1 TO -4 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 °

Name: MARSH1, EL. -4 TO -20 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 24 °

Name: BAY SOUND CLAY, EL. -44 TO -70 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL, EL. +8.5 TO +5.5 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL2, EL. +5.5 TO -1 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 75 psf Phi: 26 °

Name: EMBANKMENT FILL 3, EL. -1 TO -4 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

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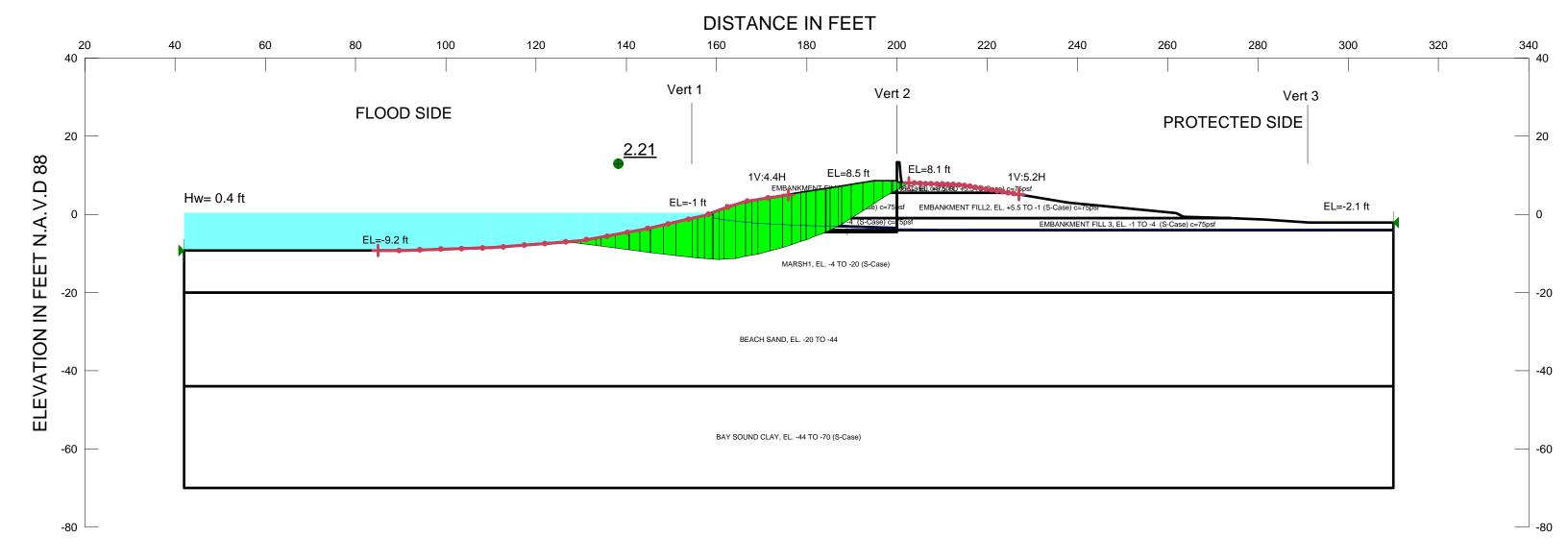


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17th STREET OUTFALL CANAL, REACH 35, STABILITY ANALYSIS,

CASE: Slope Stability (Block) LWL-S-FS STA. 662+87 to 670+63 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 3, EL. -1 TO -4 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 °

Name: MARSH1, EL. -4 TO -20 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 24 °

Name: BAY SOUND CLAY, EL. -44 TO -70 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL, EL. +8.5 TO +5.5 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL2, EL. +5.5 TO -1 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 75 psf Phi: 26 °

Name: EMBANKMENT FILL 3, EL. -1 TO -4 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

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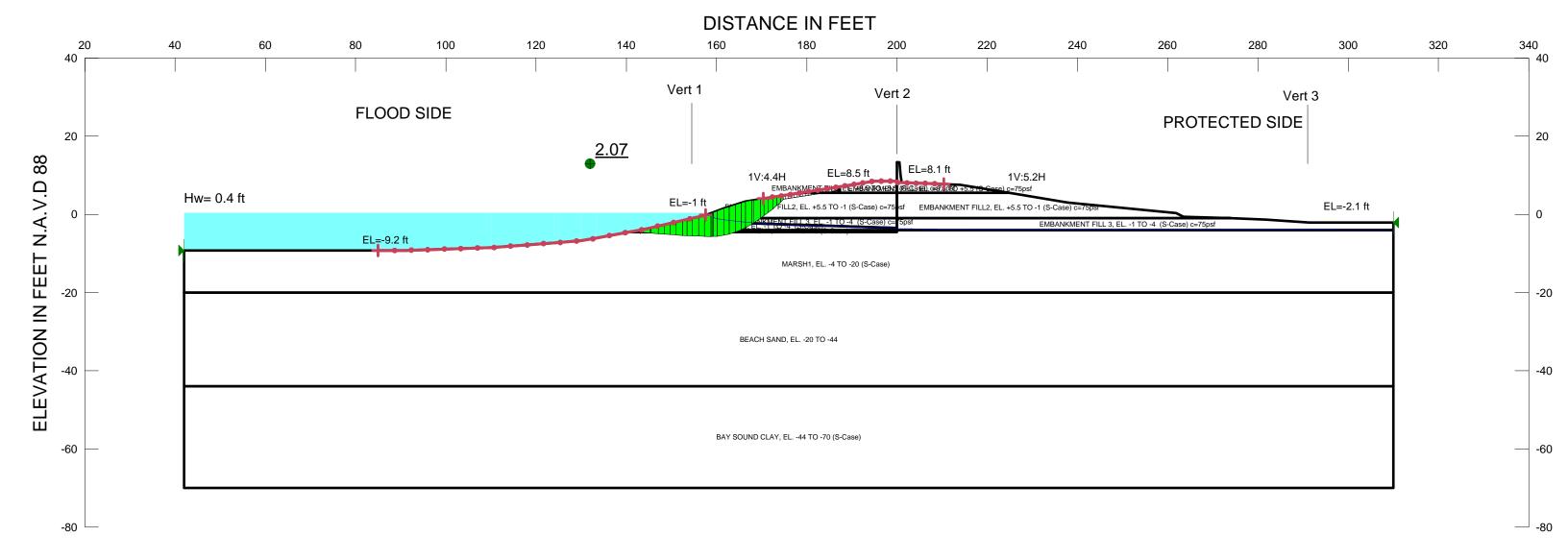


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17th STREET OUTFALL CANAL, REACH 35, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) LWL-S-FS (Thru) STA. 662+87 to 670+63 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 3, EL. -1 TO -4 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 °

Name: MARSH1, EL. -4 TO -20 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 24 °

Name: BAY SOUND CLAY, EL. -44 TO -70 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL, EL. +8.5 TO +5.5 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL2, EL. +5.5 TO -1 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 75 psf Phi: 26 °

Name: EMBANKMENT FILL 3, EL. -1 TO -4 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-S-FS File Name: 17thReach35.gsz Last Edited By: Redell, Chris MVS



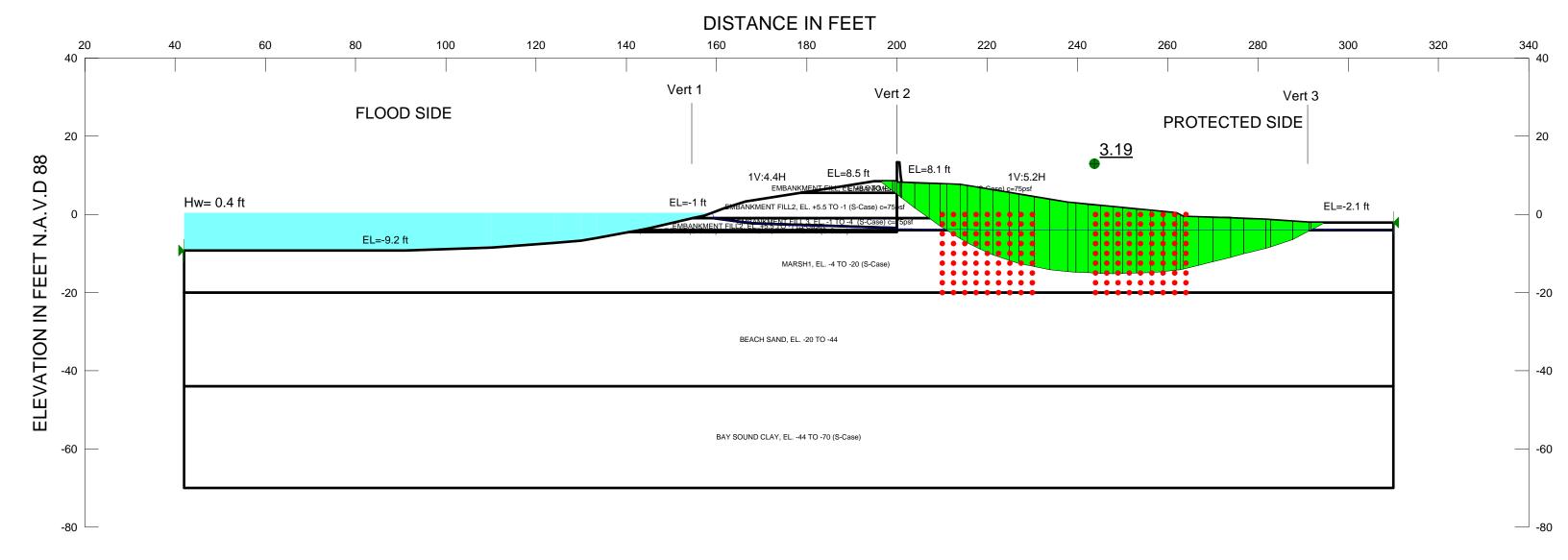


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17th STREET OUTFALL CANAL, REACH 35, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) LWL-S-FS STA. 662+87 to 670+63 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL2, EL. +5.5 TO -1 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 0 psf Phi: 26 °

Name: MARSH1, EL. -4 TO -20 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 24 °

Name: BAY SOUND CLAY, EL. -44 TO -70 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL, EL. +8.5 TO +5.5 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL2, EL. +5.5 TO -1 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 75 psf Phi: 26 °

Name: EMBANKMENT FILL 3, EL. -1 TO -4 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability (Block) LWL-S-PS File Name: 17thReach35.gsz Last Edited By: Redell, Chris MVS



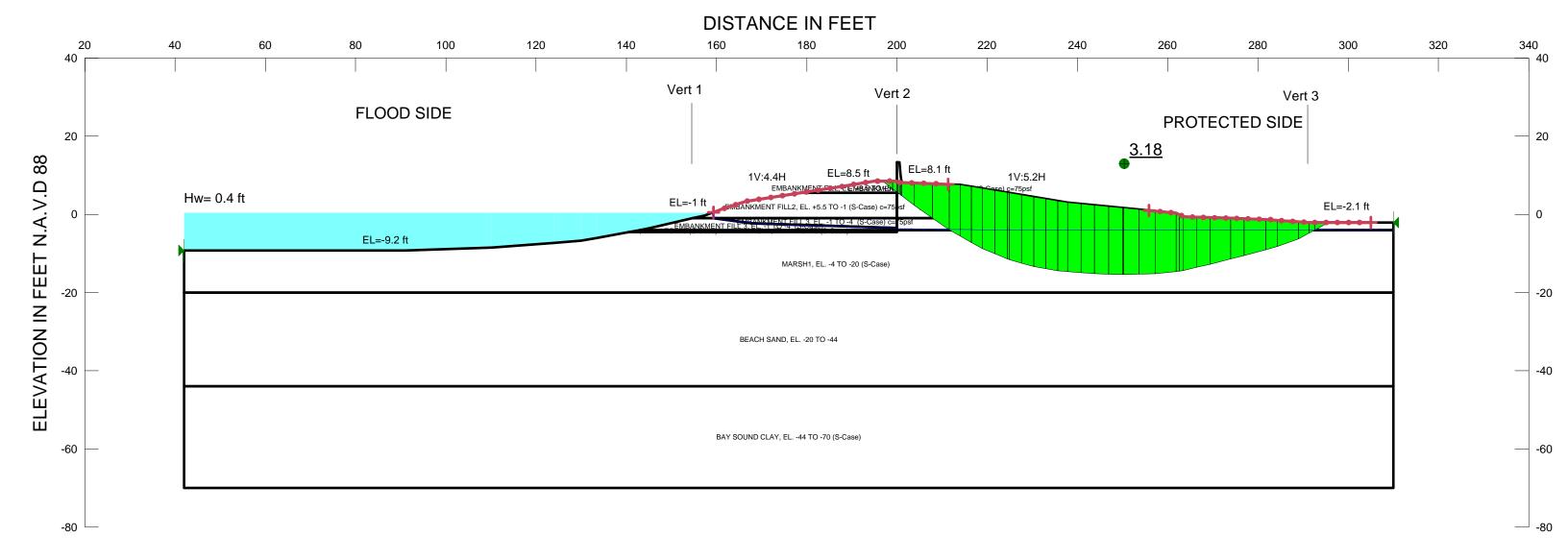


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17th STREET OUTFALL CANAL, REACH 35, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS

STA. 662+87 to 670+63 EAST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL 3, EL. -1 TO -4 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 °

Name: MARSH1, EL. -4 TO -20 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 24 °

Name: BAY SOUND CLAY, EL. -44 TO -70 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 26 °

Name: EMBANKMENT FILL, EL. +8.5 TO +5.5 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 112 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL2, EL. +5.5 TO -1 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 75 psf Phi: 26 °

Name: EMBANKMENT FILL 3, EL. -1 TO -4 (S-Case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

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WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

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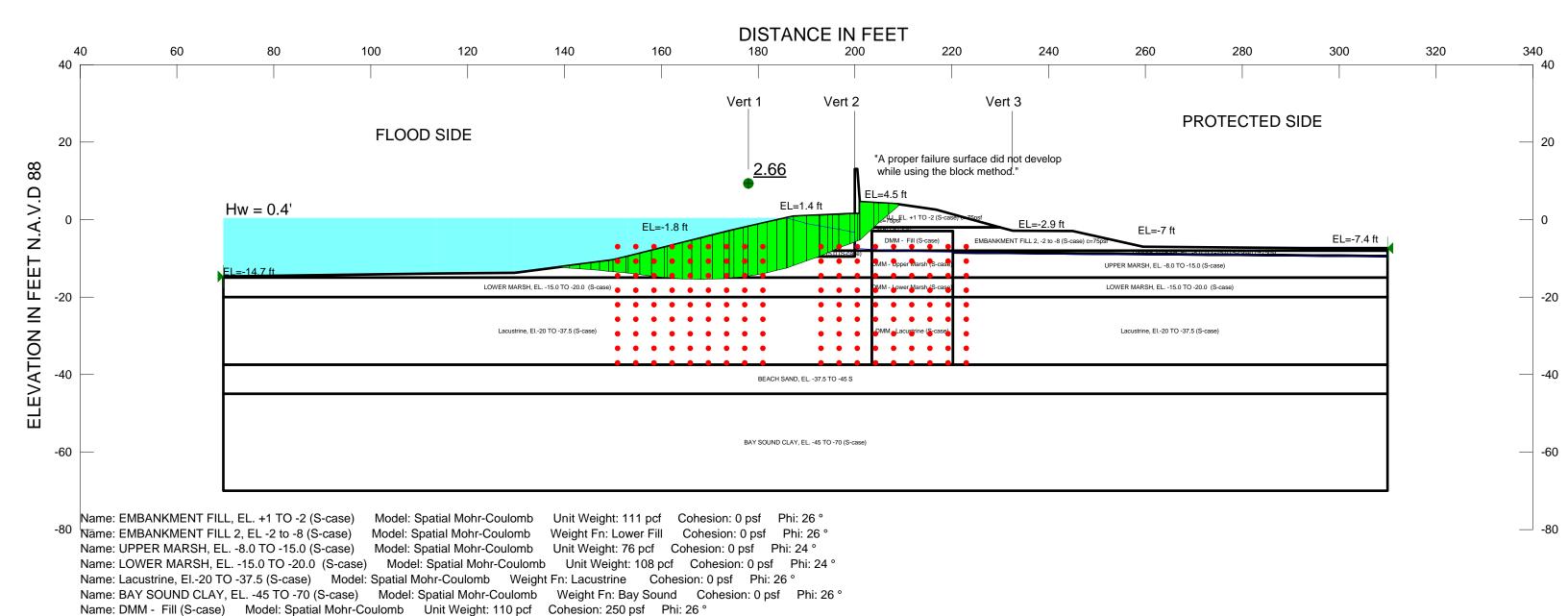


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17th STREET OUTFALL CANAL, REACH 35, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) LWL-S-PS STA. 662+87 to 670+63 EAST ORLEANS PARISH, LOUISIANA



CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: DMM - Upper Marsh (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 76 pcf Cohesion: 250 psf Phi: 24 °
Name: DMM - Lower Marsh (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 250 psf Phi: 24 °
Name: DMM - Lacustrine (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 250 psf Phi: 26 °
Name: BEACH SAND, EL. -37.5 TO -45 S Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: EMBANKMENT FILL, EL. +1 TO -2 (S-case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL 2, -2 to -8 (S-case) c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion: 75 psf Phi: 26 ° Name: UPPER MARSH, EL. -8.0 TO -15.0 (S-case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 76 pcf Cohesion: 75 psf Phi: 24 °

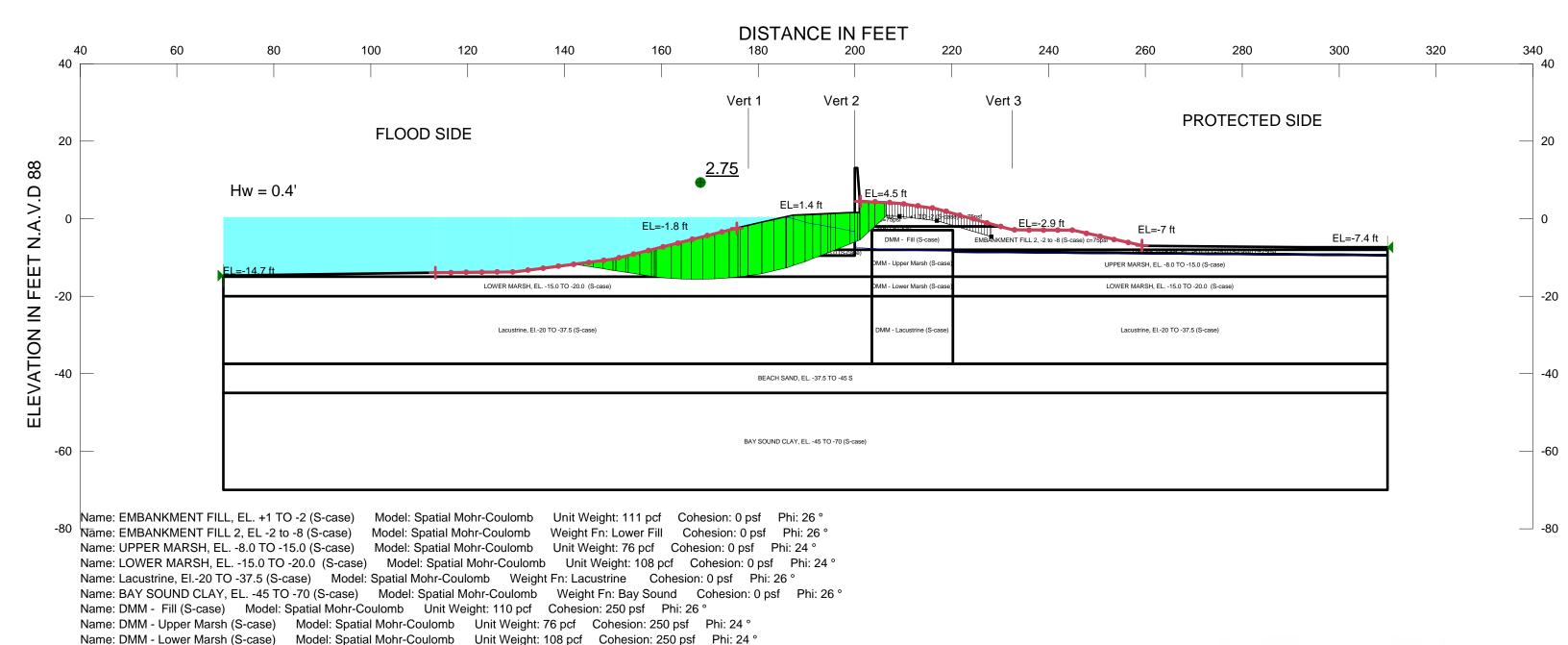
Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach03B.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 3B STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS STA. 570+00 to 571+45 WEST ORLEANS PARISH, LOUISIANA



CLASSIFICATION STRATIFICATION
SHEAR STRENGTHS AND UNIT WEIGHTS OF
THE SOIL WERE BASED ON THE RESULTS OF
UNDISTURBED BORINGS AND CPT DATA. SEE
BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: DMM - Lacustrine (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 250 psf Phi: 26 °
Name: BEACH SAND, EL. -37.5 TO -45 S Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: EMBANKMENT FILL, EL. +1 TO -2 (S-case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL 2, -2 to -8 (S-case) c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion: 75 psf Phi: 26 ° Name: UPPER MARSH, EL. -8.0 TO -15.0 (S-case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 76 pcf Cohesion: 75 psf Phi: 24 °

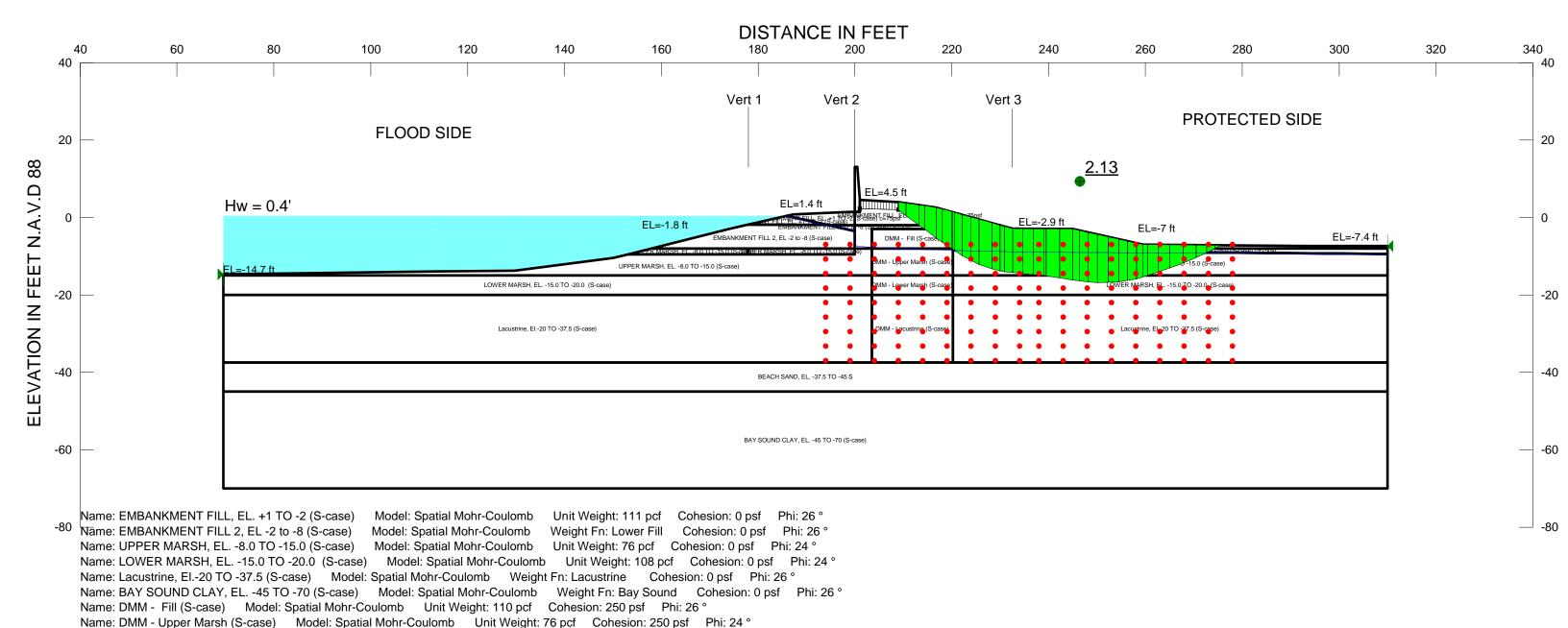
Name: Slope Stability (Entry/Exit) LWL-S-FS File Name: 17thReach03B.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 3B STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S-FS STA. 570+00 to 571+45 WEST ORLEANS PARISH, LOUISIANA



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WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: DMM - Lower Marsh (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 250 psf Phi: 24 °
Name: DMM - Lacustrine (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 250 psf Phi: 26 °
Name: BEACH SAND, EL. -37.5 TO -45 S Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: EMBANKMENT FILL, EL. +1 TO -2 (S-case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL 2, -2 to -8 (S-case) c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion: 75 psf Phi: 26 ° Name: UPPER MARSH, EL. -8.0 TO -15.0 (S-case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 76 pcf Cohesion: 75 psf Phi: 24 °

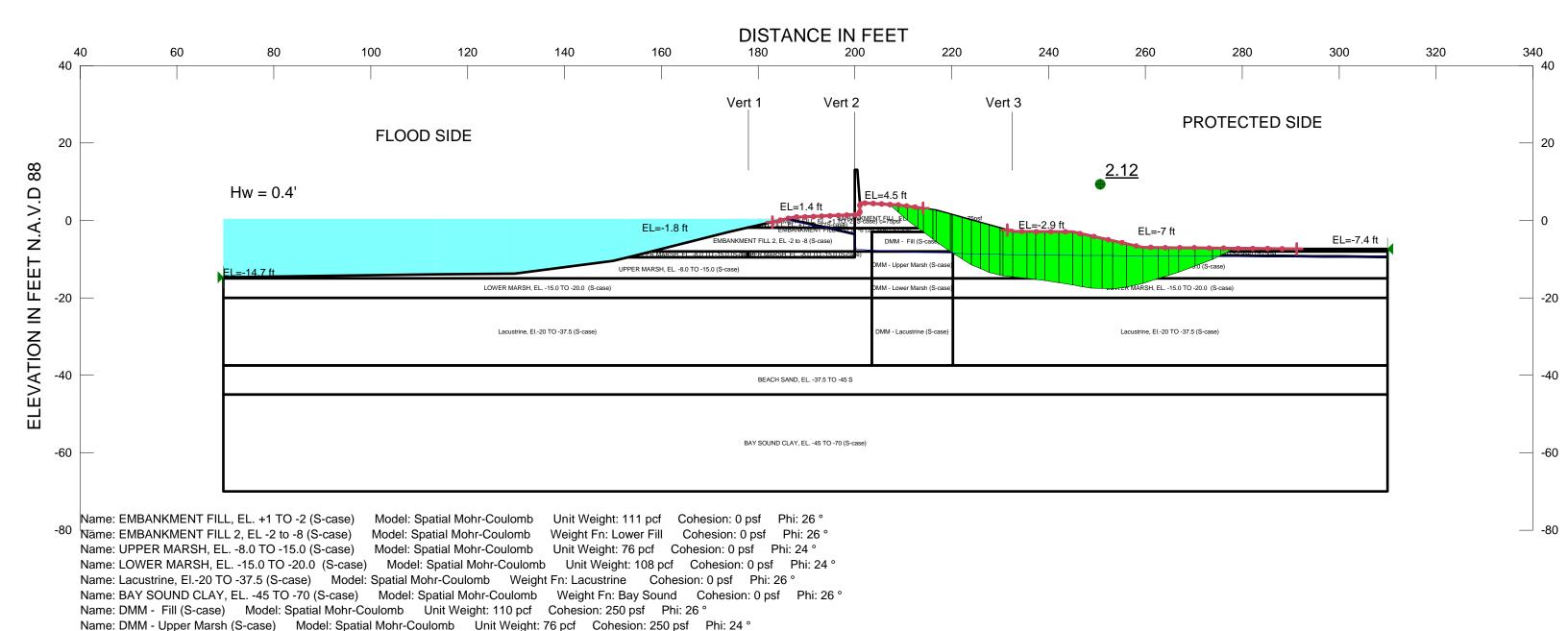
Name: Slope Stability (Block) LWL-S-PS File Name: 17thReach03B.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 3B STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS STA. 570+00 to 571+45 WEST ORLEANS PARISH, LOUISIANA



CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: DMM - Lower Marsh (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 108 pcf Cohesion: 250 psf Phi: 24 °
Name: DMM - Lacustrine (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 250 psf Phi: 26 °
Name: BEACH SAND, EL. -37.5 TO -45 S Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: EMBANKMENT FILL, EL. +1 TO -2 (S-case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 111 pcf Cohesion: 75 psf Phi: 26 ° Name: EMBANKMENT FILL 2, -2 to -8 (S-case) c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Lower Fill Cohesion: 75 psf Phi: 26 ° Name: UPPER MARSH, EL. -8.0 TO -15.0 (S-case) c=75psf Model: Spatial Mohr-Coulomb Unit Weight: 76 pcf Cohesion: 75 psf Phi: 24 °

Name: Slope Stability (Entry/Exit) LWL-S-PS File Name: 17thReach03B.gsz Last Edited By: Redell, Chris MVS

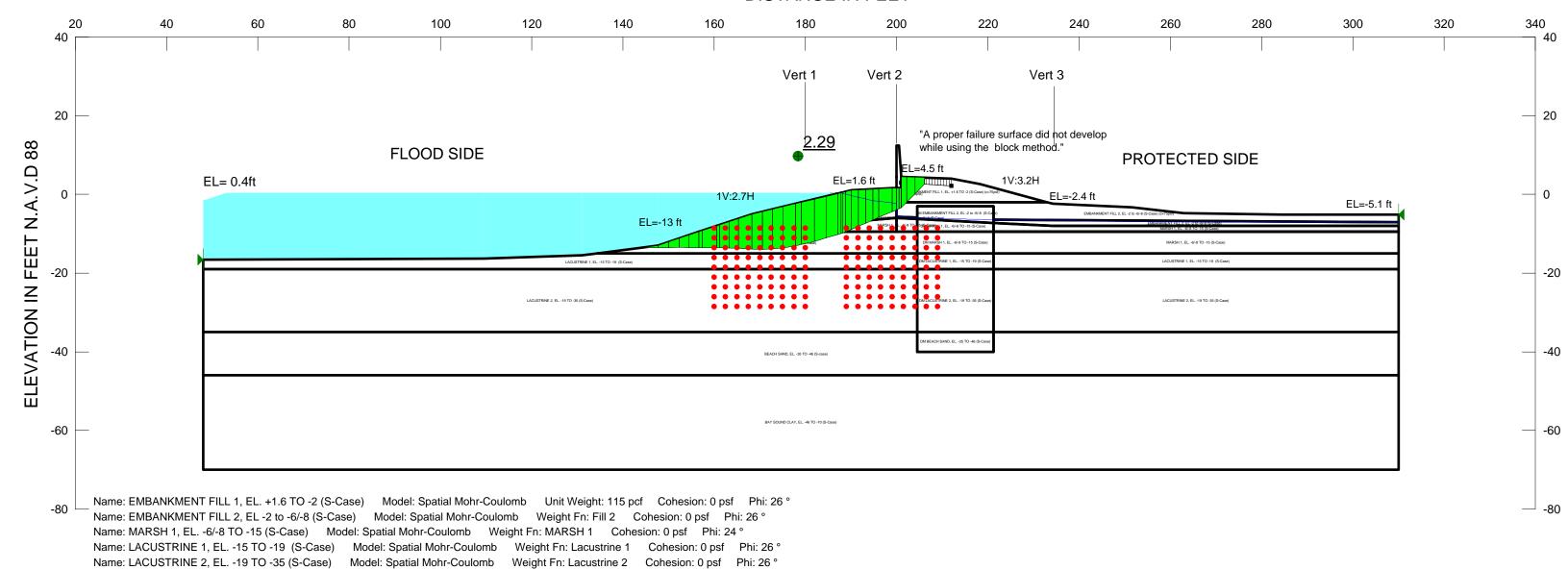




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17th STREET OUTFALL CANAL, REACH 3B STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S-PS STA. 570+00 to 571+45 WEST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED. SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: BAY SOUND CLAY, EL. -46 TO -70 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 °

Name: DM BEACH SAND, EL. -35 TO -46 (S-Case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 34 °

Name: BEACH SAND, EL. -35 TO -46 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: DM EMBANKMENT FILL 2, EL -2 to -6/-8 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 250 psf Phi: 26 ° Name: DM MARSH 1, EL. -6/-8 TO -15 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 250 psf Phi: 24 ° Name: DM LACUSTRINE 1, EL. -15 TO -19 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 ° Name: DM LACUSTRINE 2, EL. -19 TO -35 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 °

Name: EMBANKMENT FILL 1, EL. +1.6 TO -2 (S-Case) (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 75 psf Phi: 26 °

Name: EMBANKMENT FILL 2, EL -2 to -6/-8 (S-Case) (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 75 psf Phi: 26°

Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach04.gsz Last Edited By: Redell, Chris MVS

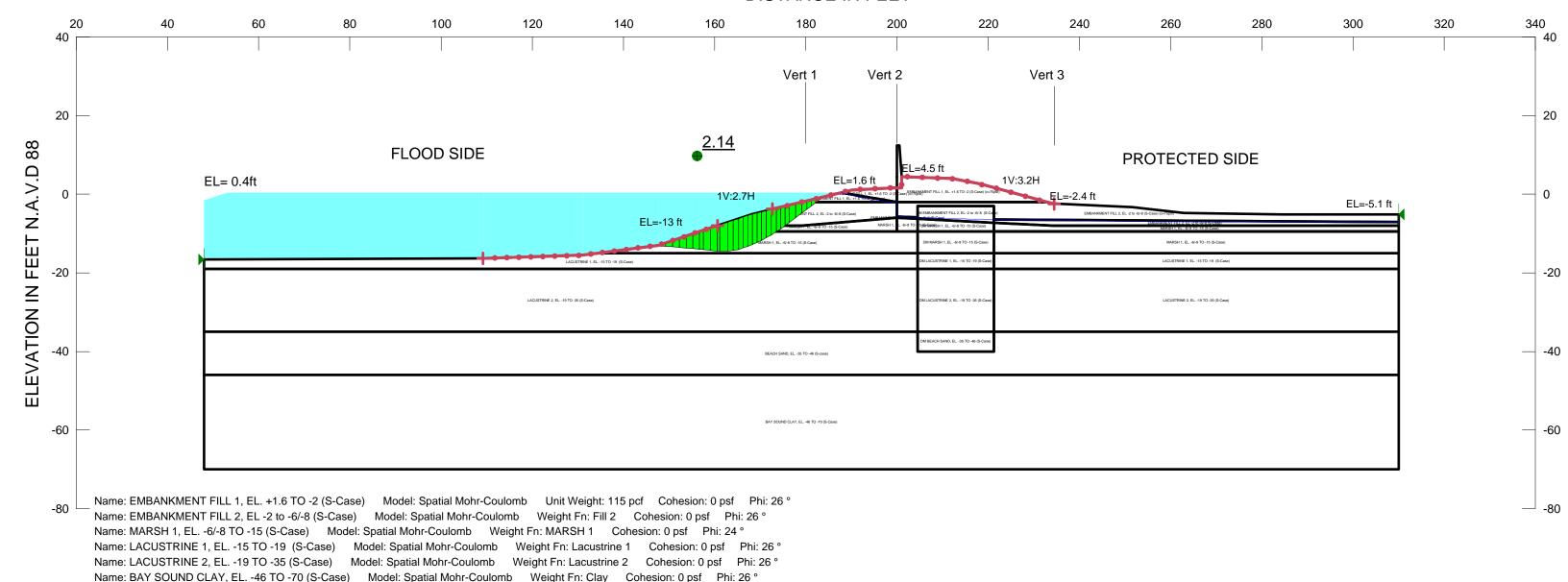




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17th STREET OUTFALL CANAL, REACH 04, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS STA. 571+45 - 575+45 WEST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: DM EMBANKMENT FILL 2, EL -2 to -6/-8 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 250 psf Phi: 26 ° Name: DM MARSH 1, EL. -6/-8 TO -15 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 250 psf Phi: 24 ° Name: DM LACUSTRINE 1, EL. -15 TO -19 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 ° Name: DM LACUSTRINE 2, EL. -19 TO -35 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 °

Name: EMBANKMENT FILL 1, EL. +1.6 TO -2 (S-Case) (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 75 psf Phi: 26 °

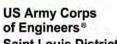
Name: EMBANKMENT FILL 2, EL -2 to -6/-8 (S-Case) (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 75 psf Phi: 26 °

Name: DM BEACH SAND, EL. -35 TO -46 (S-Case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 34 °

Name: BEACH SAND, EL. -35 TO -46 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

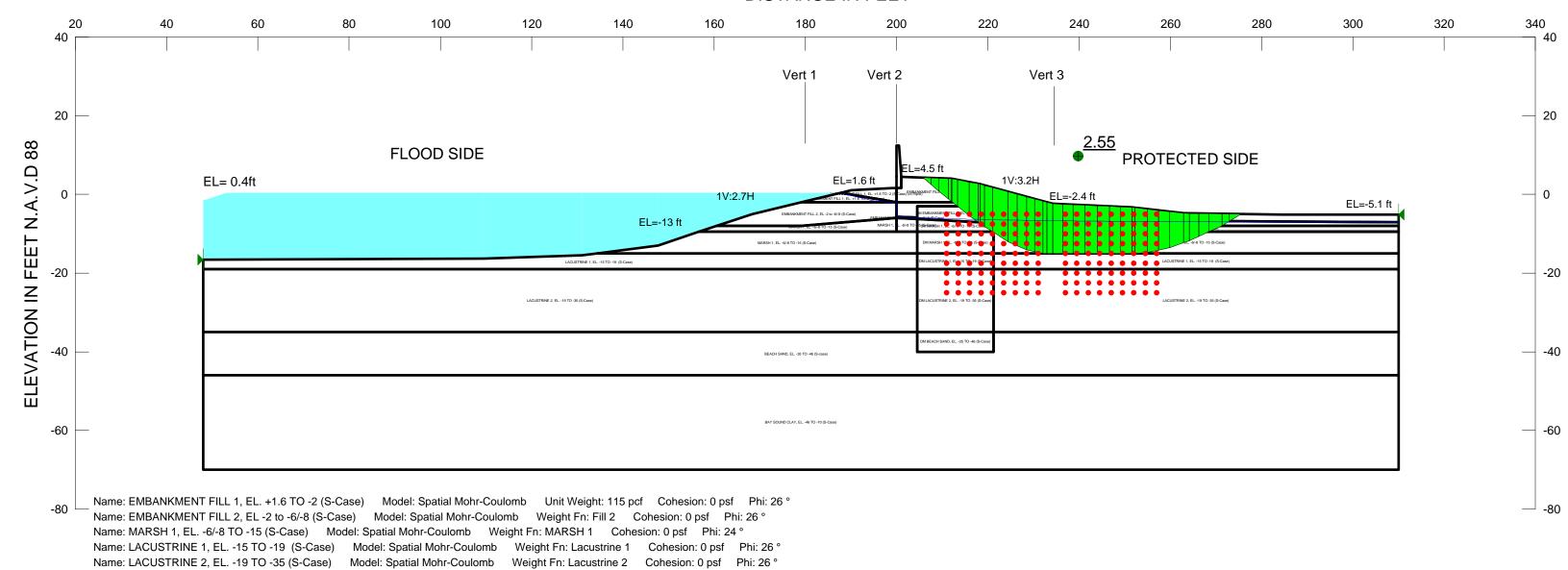
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17th STREET OUTFALL CANAL, REACH 04, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S-FS STA. 571+45 - 575+45 WEST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

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Name: BAY SOUND CLAY, EL. -46 TO -70 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 °

Name: DM BEACH SAND, EL. -35 TO -46 (S-Case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 34 °

Name: BEACH SAND, EL. -35 TO -46 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: DM EMBANKMENT FILL 2, EL -2 to -6/-8 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 250 psf Phi: 26 ° Name: DM MARSH 1, EL. -6/-8 TO -15 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 250 psf Phi: 24 ° Name: DM LACUSTRINE 1, EL. -15 TO -19 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 ° Name: DM LACUSTRINE 2, EL. -19 TO -35 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 °

Name: EMBANKMENT FILL 1, EL. +1.6 TO -2 (S-Case) (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 75 psf Phi: 26 °

Name: EMBANKMENT FILL 2, EL -2 to -6/-8 (S-Case) (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 75 psf Phi: 26 °

Name: Slope Stability (Block) LWL-S-PS File Name: 17thReach04.gsz Last Edited By: Redell, Chris MVS

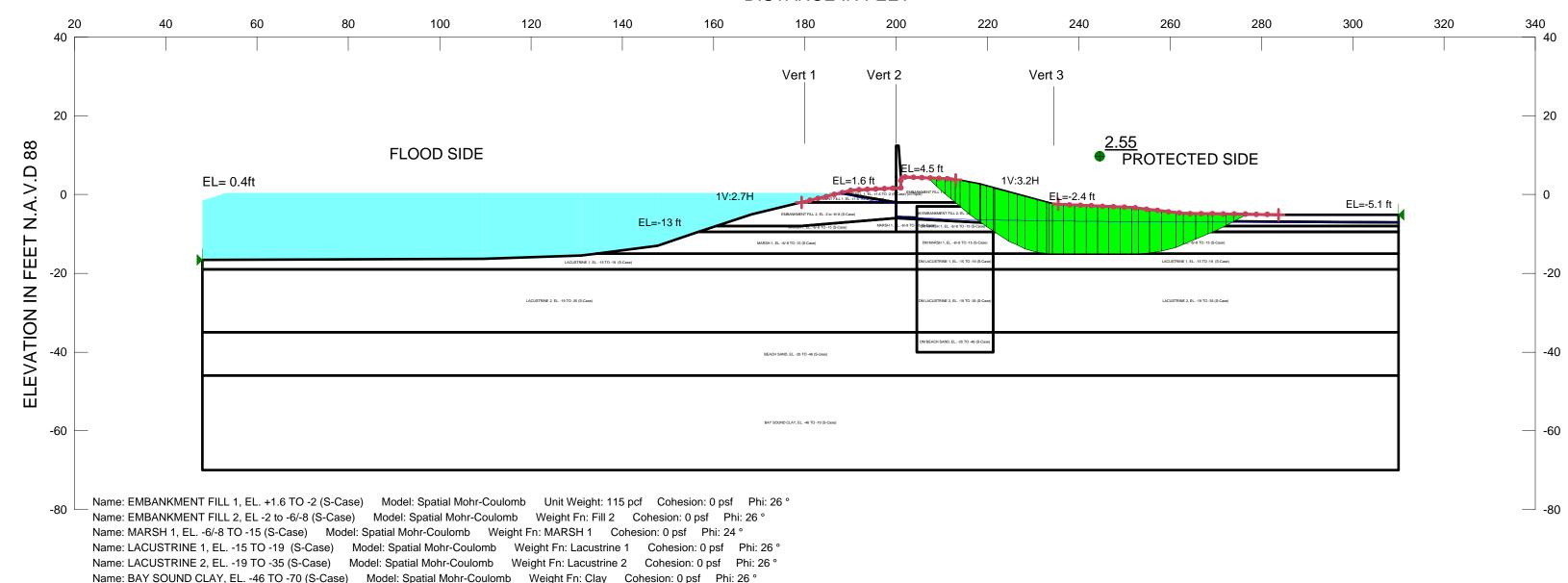




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17th STREET OUTFALL CANAL, REACH 04, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS STA. 571+45 - 575+45 WEST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

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WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: DM EMBANKMENT FILL 2, EL -2 to -6/-8 (S-Case) Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 250 psf Phi: 26 ° Name: DM MARSH 1, EL. -6/-8 TO -15 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 250 psf Phi: 24 ° Name: DM LACUSTRINE 1, EL. -15 TO -19 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 250 psf Phi: 26 ° Name: DM LACUSTRINE 2, EL. -19 TO -35 (S-Case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 °

Name: EMBANKMENT FILL 1, EL. +1.6 TO -2 (S-Case) (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 115 pcf Cohesion: 75 psf Phi: 26 °

Name: EMBANKMENT FILL 2, EL -2 to -6/-8 (S-Case) (c=75psf) Model: Spatial Mohr-Coulomb Unit Weight: 106 pcf Cohesion: 75 psf Phi: 26 °

Name: DM BEACH SAND, EL. -35 TO -46 (S-Case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 34 °

Name: BEACH SAND, EL. -35 TO -46 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

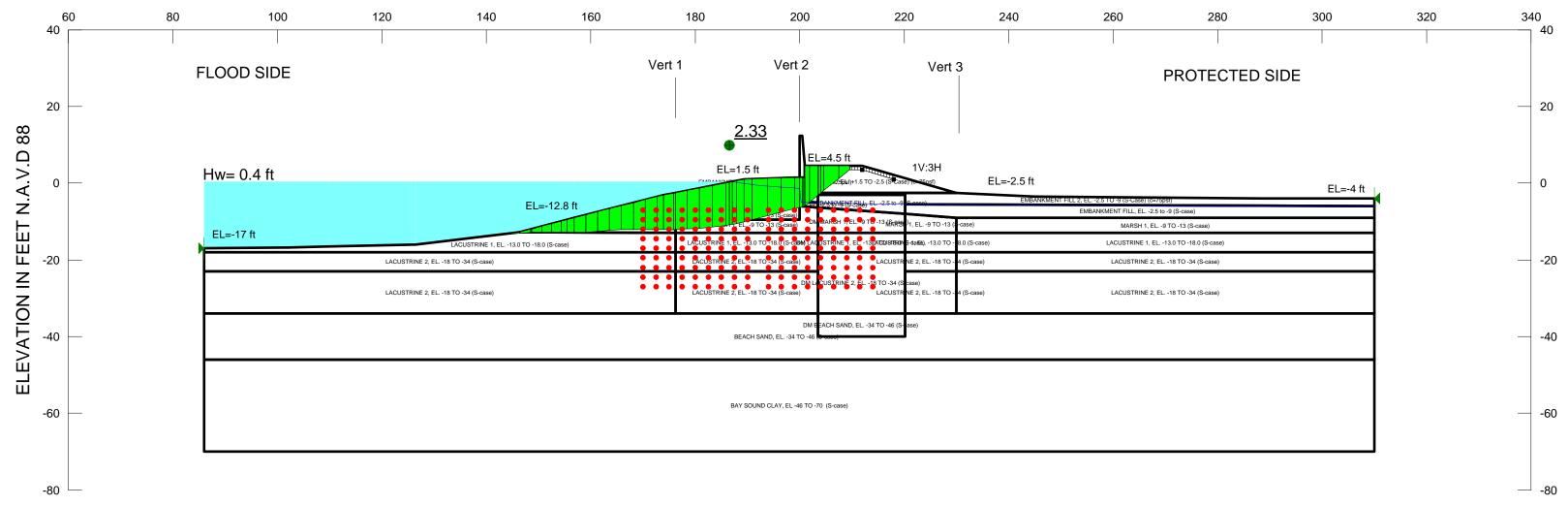
Name: Slope Stability (Entry/Exit) LWL-S-PS File Name: 17thReach04.gsz Last Edited By: Redell, Chris MVS



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17th STREET OUTFALL CANAL, REACH 04, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S-PS STA. 571+45 - 575+45 WEST ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -9 TO -13 (S-case) Model: Mohr-Coulomb Unit Weight: 77 pcf Cohesion: 0 psf Phi: 24 °
Name: EMBANKMENT FILL, EL. -2.5 to -9 (S-case) Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 26 °
Name: LACUSTRINE 1, EL. -13.0 TO -18.0 (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °
Name: LACUSTRINE 2, EL. -18 TO -34 (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2&3 Cohesion: 0 psf Phi: 26 °
Name: BEACH SAND, EL. -34 TO -46 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: BAY SOUND CLAY, EL -46 TO -70 (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 °
Name: DM EMBANKMENT FILL, EL. -2.5 to -9 (S-case) Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 250 psf Phi: 26 °
Name: DM MARSH 1, EL. -9 TO -13 (S-case) Model: Mohr-Coulomb Unit Weight: 77 pcf Cohesion: 250 psf Phi: 26 °
Name: DM LACUSTRINE 1, EL. -13.0 TO -18.0 (S-case) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 250 psf Phi: 26 °
Name: DM LACUSTRINE 2, EL. -18 TO -34 (S-case) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 250 psf Phi: 26 °
Name: DM BEACH SAND, EL. -34 TO -46 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. +1.5 TO -2.5 (S-Case) Model: Mohr-Coulomb Unit Weight: 120 pcf Cohesion: 0 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. +1.5 TO -2.5 (S-Case) (c=75psf) Model: Mohr-Coulomb Unit Weight: 120 pcf Cohesion: 75 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. -1.5 TO -9 (S-Case) (c=75psf) Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

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Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach05.gsz Last Edited By: Redell, Chris MVS

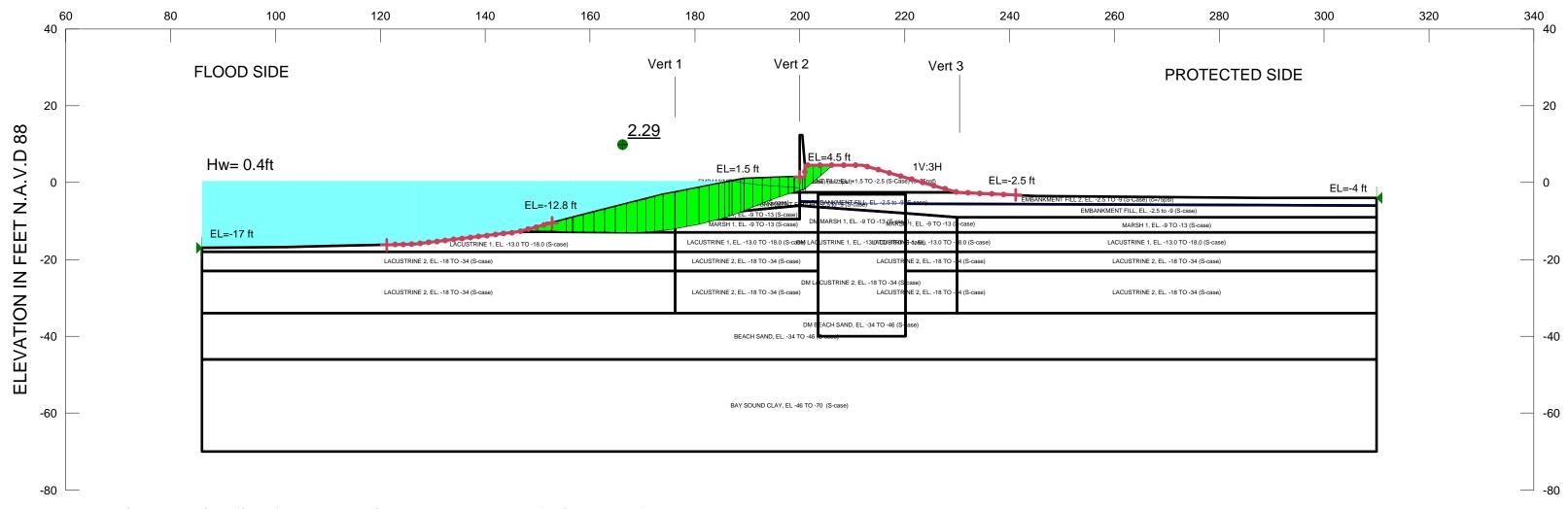




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17th STREET OUTFALL CANAL, REACH 05, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS STA. 575+45 TO 578+22.5 West ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -9 TO -13 (S-case) Model: Mohr-Coulomb Unit Weight: 77 pcf Cohesion: 0 psf Phi: 24 °
Name: EMBANKMENT FILL, EL. -2.5 to -9 (S-case) Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 26 °
Name: LACUSTRINE 1, EL. -13.0 TO -18.0 (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °
Name: LACUSTRINE 2, EL. -18 TO -34 (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2&3 Cohesion: 0 psf Phi: 26 °
Name: BEACH SAND, EL. -34 TO -46 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: BAY SOUND CLAY, EL -46 TO -70 (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 °
Name: DM EMBANKMENT FILL, EL. -2.5 to -9 (S-case) Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 250 psf Phi: 26 °
Name: DM MARSH 1, EL. -9 TO -13 (S-case) Model: Mohr-Coulomb Unit Weight: 77 pcf Cohesion: 250 psf Phi: 26 °
Name: DM LACUSTRINE 1, EL. -13.0 TO -18.0 (S-case) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 250 psf Phi: 26 °
Name: DM LACUSTRINE 2, EL. -18 TO -34 (S-case) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 250 psf Phi: 26 °
Name: DM BEACH SAND, EL. -34 TO -46 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. +1.5 TO -2.5 (S-Case) Model: Mohr-Coulomb Unit Weight: 120 pcf Cohesion: 0 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. +1.5 TO -2.5 (S-Case) (c=75psf) Model: Mohr-Coulomb Unit Weight: 120 pcf Cohesion: 75 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. -1.5 TO -9 (S-Case) (c=75psf) Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

CLASSIFICATION STRATIFICATION SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF UNDISTURBED BORINGS AND CPT DATA. SEE BOTH BORING AND CPT DATA PLATES.

WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: Slope Stability (Entry/Exit) LWL-S-FS File Name: 17thReach05.gsz Last Edited By: Redell, Chris MVS

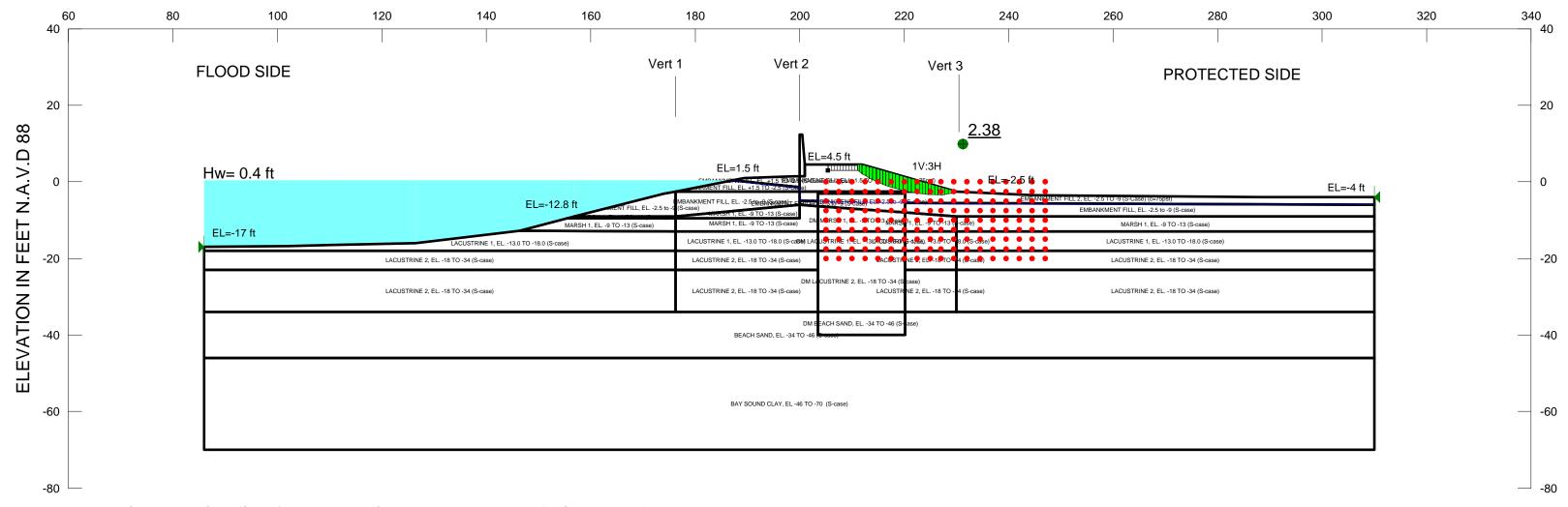


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17th STREET OUTFALL CANAL, REACH 05, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S-FS

CASE: Slope Stability (Entry/Exit) LWL-S-FS STA. 575+45 TO 578+22.5 West ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -9 TO -13 (S-case) Model: Mohr-Coulomb Unit Weight: 77 pcf Cohesion: 0 psf Phi: 24 °
Name: EMBANKMENT FILL, EL. -2.5 to -9 (S-case) Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 26 °
Name: LACUSTRINE 1, EL. -13.0 TO -18.0 (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °
Name: LACUSTRINE 2, EL. -18 TO -34 (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2&3 Cohesion: 0 psf Phi: 26 °
Name: BEACH SAND, EL. -34 TO -46 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: BAY SOUND CLAY, EL -46 TO -70 (S-case) Model: Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 °
Name: DM EMBANKMENT FILL, EL. -2.5 to -9 (S-case) Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 250 psf Phi: 26 °
Name: DM LACUSTRINE 1, EL. -13.0 TO -18.0 (S-case) Model: Mohr-Coulomb Unit Weight: 77 pcf Cohesion: 250 psf Phi: 26 °
Name: DM LACUSTRINE 2, EL. -18 TO -34 (S-case) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 250 psf Phi: 26 °
Name: DM BEACH SAND, EL. -34 TO -46 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. +1.5 TO -2.5 (S-Case) Model: Mohr-Coulomb Unit Weight: 120 pcf Cohesion: 0 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. +1.5 TO -2.5 (S-Case) (c=75psf) Model: Mohr-Coulomb Unit Weight: 120 pcf Cohesion: 75 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. -2.5 TO -9 (S-Case) (c=75psf) Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

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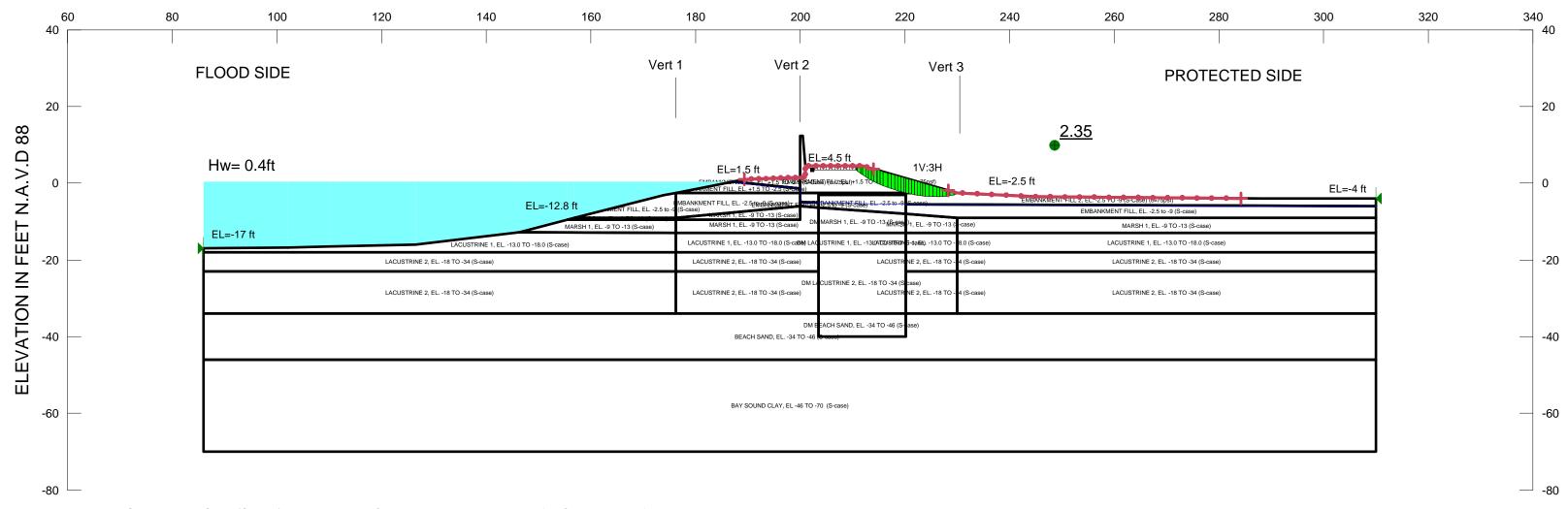
Name: Slope Stability (Block) LWL-S-PS File Name: 17thReach05.gsz Last Edited By: Redell, Chris MVS





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17th STREET OUTFALL CANAL, REACH 05, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS STA. 575+45 TO 578+22.5 West ORLEANS PARISH, LOUISIANA



Name: MARSH 1, EL. -9 TO -13 (S-case) Model: Mohr-Coulomb Unit Weight: 77 pcf Cohesion: 0 psf Phi: 24 °
Name: EMBANKMENT FILL, EL. -2.5 to -9 (S-case) Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 0 psf Phi: 26 °
Name: LACUSTRINE 1, EL. -13.0 TO -18.0 (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Cohesion: 0 psf Phi: 26 °
Name: LACUSTRINE 2, EL. -18 TO -34 (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2&3 Cohesion: 0 psf Phi: 26 °
Name: BEACH SAND, EL. -34 TO -46 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °
Name: BAY SOUND CLAY, EL -46 TO -70 (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 °
Name: DM EMBANKMENT FILL, EL. -2.5 to -9 (S-case) Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 250 psf Phi: 26 °
Name: DM MARSH 1, EL. -9 TO -13 (S-case) Model: Mohr-Coulomb Unit Weight: 77 pcf Cohesion: 250 psf Phi: 26 °
Name: DM LACUSTRINE 1, EL. -13.0 TO -18.0 (S-case) Model: Mohr-Coulomb Unit Weight: 98 pcf Cohesion: 250 psf Phi: 26 °
Name: DM LACUSTRINE 2, EL. -18 TO -34 (S-case) Model: Mohr-Coulomb Unit Weight: 101 pcf Cohesion: 250 psf Phi: 26 °
Name: DM BEACH SAND, EL. -34 TO -46 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. +1.5 TO -2.5 (S-Case) Model: Mohr-Coulomb Unit Weight: 120 pcf Cohesion: 0 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. +1.5 TO -2.5 (S-Case) (c=75psf) Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 °
Name: EMBANKMENT FILL, EL. -1.5 TO -9 (S-Case) (c=75psf) Model: Mohr-Coulomb Unit Weight: 110 pcf Cohesion: 75 psf Phi: 26 °

GENERAL NOTES

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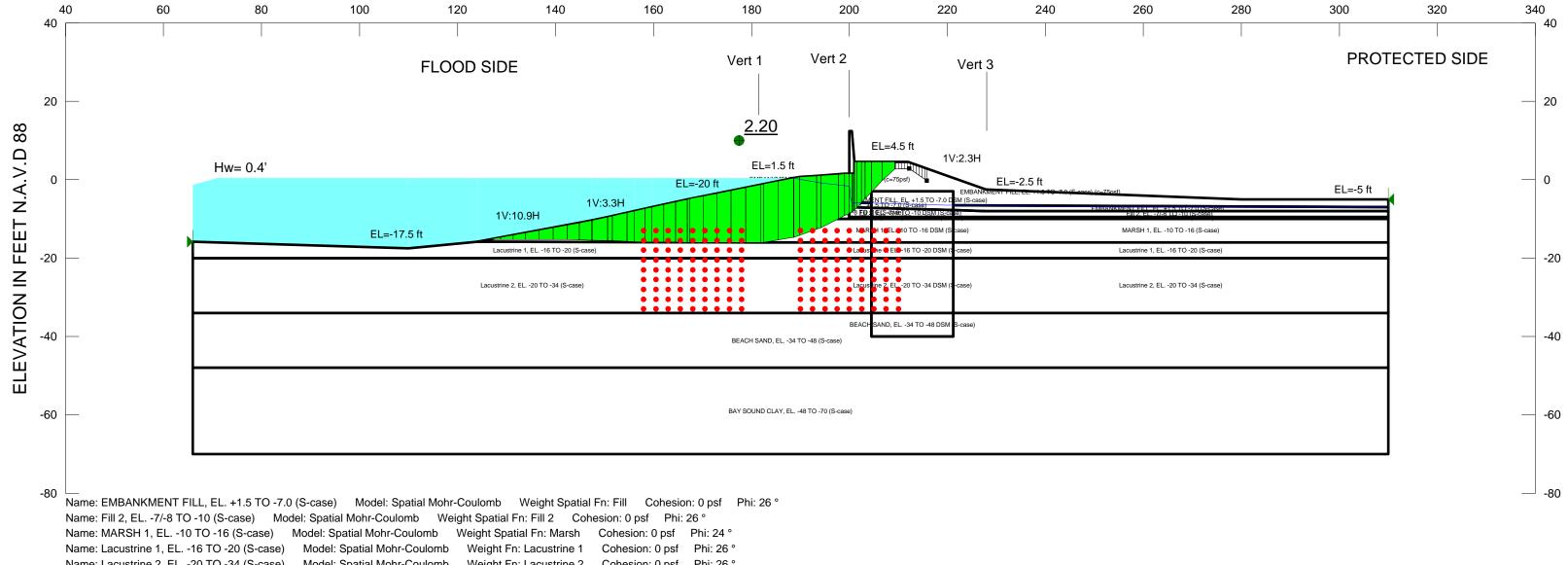




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17th STREET OUTFALL CANAL, REACH 05, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) LWL-S-PS STA. 575+45 TO 578+22.5 West ORLEANS PARISH, LOUISIANA



Name: Lacustrine 2, EL. -20 TO -34 (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 0 psf Phi: 26 ° Name: BAY SOUND CLAY, EL. -48 TO -70 (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Clay Cohesion: 0 psf Phi: 26 ° Name: EMBANKMENT FILL, EL. +1.5 TO -7.0 DSM (S-case) Model: Spatial Mohr-Coulomb Weight Spatial Fn: Fill Cohesion: 250 psf Phi: 26 ° Name: Fill 2, EL. -7/-8 TO -10 DSM (S-case) Model: Spatial Mohr-Coulomb Weight Spatial Fn: Fill 2 Cohesion: 250 psf Phi: 26° Cohesion: 250 psf Phi: 24 ° Name: MARSH 1, EL. -10 TO -16 DSM (S-case) Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh Name: Lacustrine 1, EL. -16 TO -20 DSM (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Name: Lacustrine 2, EL. -20 TO -34 DSM (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: BEACH SAND, EL. -34 TO -48 DSM (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 34 ° Name: EMBANKMENT FILL, EL. +1.5 TO -7.0 (S-case) (c=75psf) Model: Spatial Mohr-Coulomb Weight Spatial Fn: Fill Cohesion: 75 psf Phi: 26 ° Name: BEACH SAND, EL. -34 TO -48 (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

GENERAL NOTES

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Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach06.gsz Last Edited By: Redell, Chris MVS



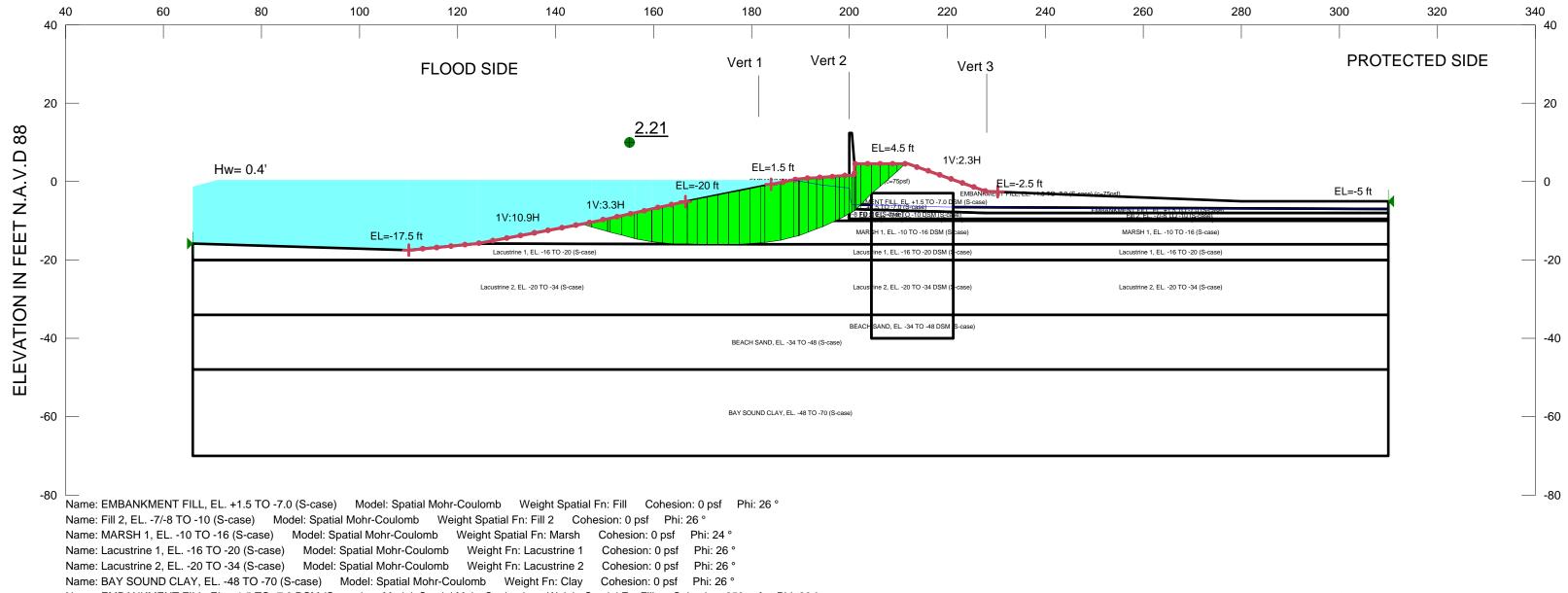


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17th STREET OUTFALL CANAL, REACH 06, STABILITY ANALYSIS,

CASE: Slope Stability (Block) LWL-S-FS STA. 578+22.5 TO 582+60 WEST ORLEANS PARISH, LOUISIANA



Name: EMBANKMENT FILL, EL. +1.5 TO -7.0 DSM (S-case) Model: Spatial Mohr-Coulomb Weight Spatial Fn: Fill Cohesion: 250 psf Phi: 26 ° Name: Fill 2, EL. -7/-8 TO -10 DSM (S-case) Model: Spatial Mohr-Coulomb Weight Spatial Fn: Fill 2 Cohesion: 250 psf Phi: 26° Name: MARSH 1, EL. -10 TO -16 DSM (S-case) Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh Cohesion: 250 psf Phi: 24 ° Name: Lacustrine 1, EL. -16 TO -20 DSM (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Name: Lacustrine 2, EL. -20 TO -34 DSM (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: BEACH SAND, EL. -34 TO -48 DSM (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 34 ° Name: EMBANKMENT FILL, EL. +1.5 TO -7.0 (S-case) (c=75psf) Model: Spatial Mohr-Coulomb Weight Spatial Fn: Fill Cohesion: 75 psf Phi: 26 ° Name: BEACH SAND, EL. -34 TO -48 (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

GENERAL NOTES

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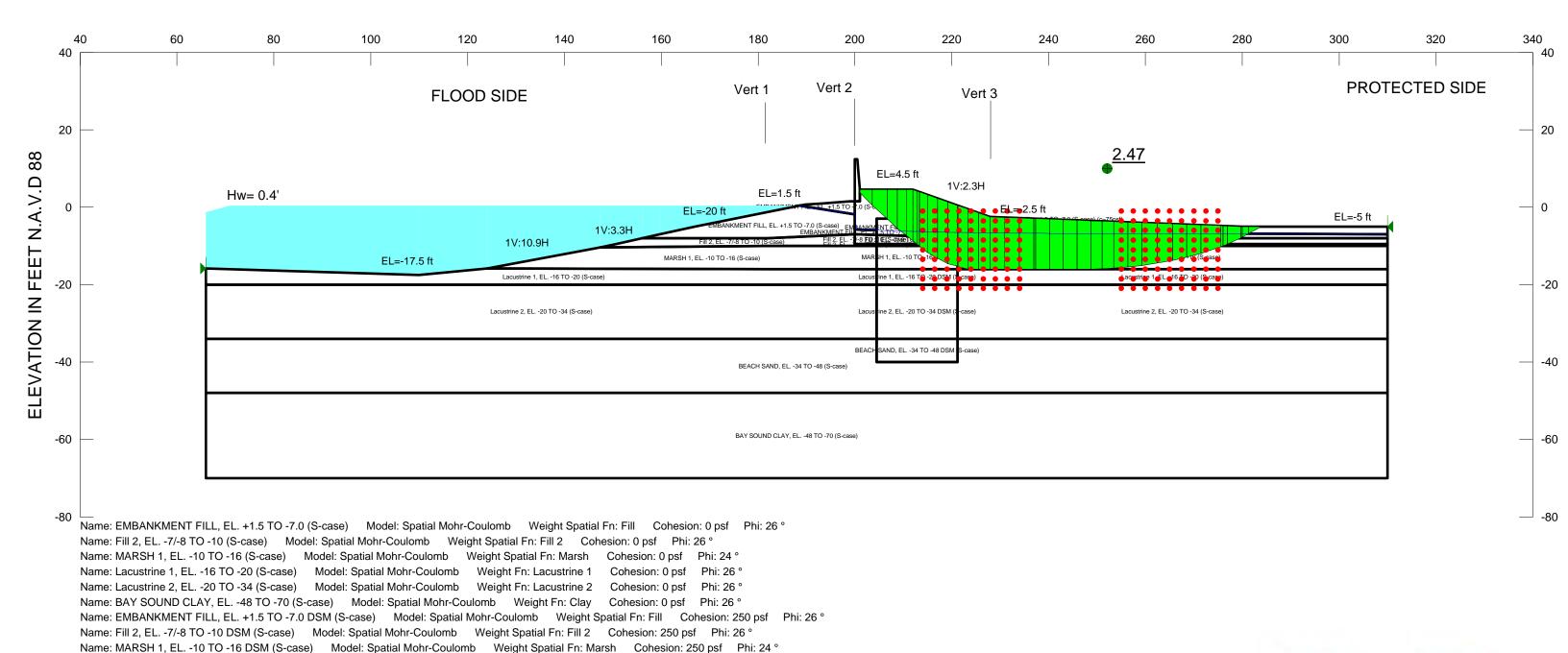


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17th STREET OUTFALL CANAL, REACH 06, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) LWL-S-FS STA. 578+22.5 TO 582+60 WEST ORLEANS PARISH, LOUISIANA



GENERAL NOTES

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Name: Lacustrine 1, EL. -16 TO -20 DSM (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1

Name: Lacustrine 2, EL. -20 TO -34 DSM (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: BEACH SAND, EL. -34 TO -48 DSM (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 34 °

Name: BEACH SAND, EL. -34 TO -48 (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: EMBANKMENT FILL, EL. +1.5 TO -7.0 (S-case) (c=75psf) Model: Spatial Mohr-Coulomb Weight Spatial Fn: Fill Cohesion: 75 psf Phi: 26 °

Name: Slope Stability (Block) LWL-S-PS File Name: 17thReach06.gsz Last Edited By: Redell, Chris MVS



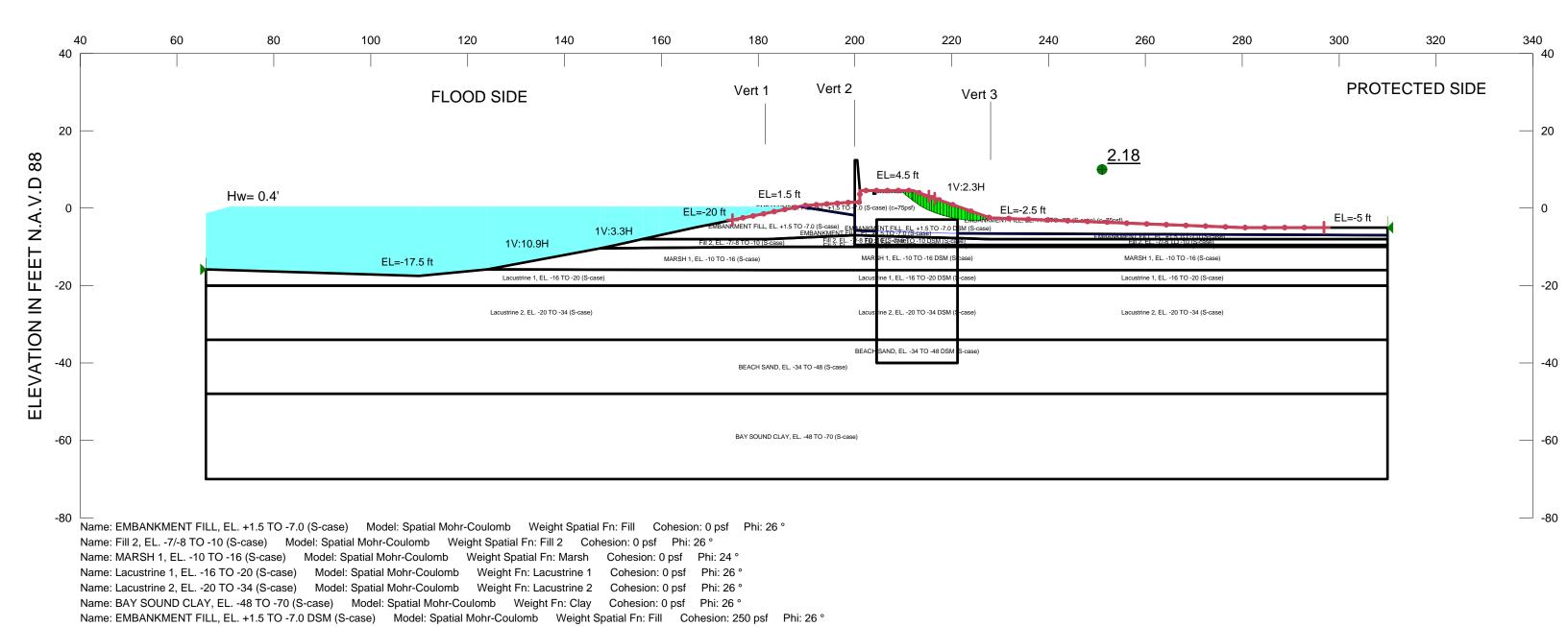


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17th STREET OUTFALL CANAL, REACH 06, STABILITY ANALYSIS,

CASE: Slope Stability (Block) LWL-S-PS STA. 578+22.5 TO 582+60 WEST ORLEANS PARISH, LOUISIANA



Name: Fill 2, EL. -7/-8 TO -10 DSM (S-case) Model: Spatial Mohr-Coulomb Weight Spatial Fn: Fill 2 Cohesion: 250 psf Phi: 26° Name: MARSH 1, EL. -10 TO -16 DSM (S-case) Model: Spatial Mohr-Coulomb Weight Spatial Fn: Marsh Cohesion: 250 psf Phi: 24 ° Name: Lacustrine 1, EL. -16 TO -20 DSM (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 1 Name: Lacustrine 2, EL. -20 TO -34 DSM (S-case) Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: BEACH SAND, EL. -34 TO -48 DSM (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 34 ° Name: EMBANKMENT FILL, EL. +1.5 TO -7.0 (S-case) (c=75psf) Model: Spatial Mohr-Coulomb Weight Spatial Fn: Fill Cohesion: 75 psf Phi: 26 ° Name: BEACH SAND, EL. -34 TO -48 (S-case) Model: Spatial Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

GENERAL NOTES

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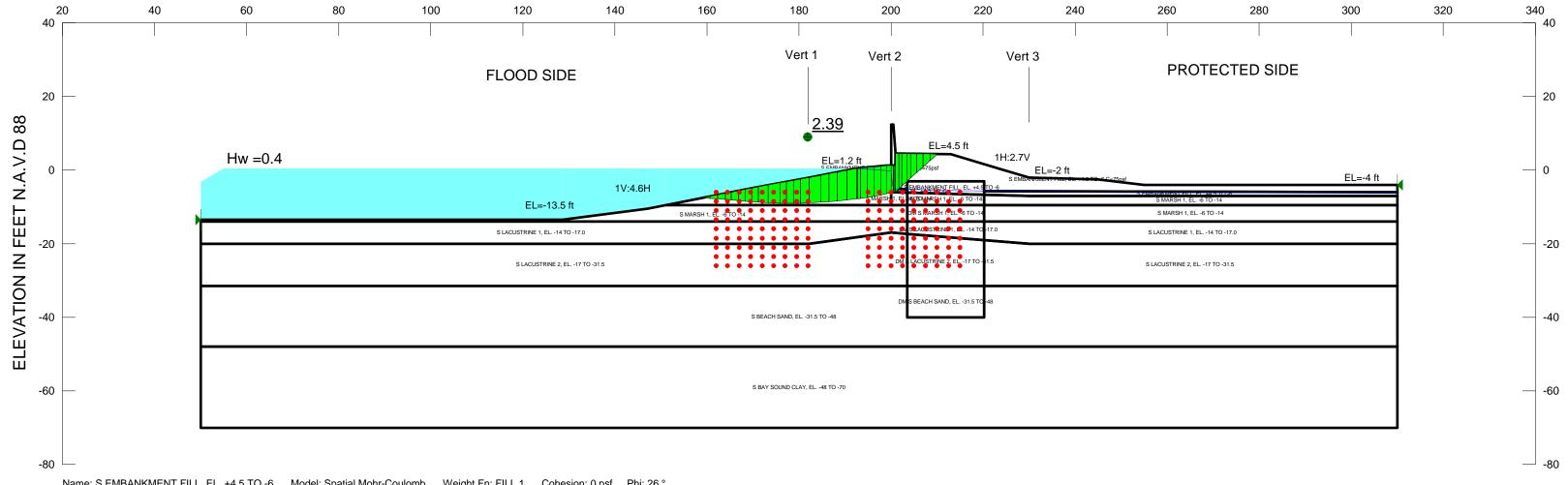


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17th STREET OUTFALL CANAL, REACH 06, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) LWL-S-PS STA. 578+22.5 TO 582+60 WEST ORLEANS PARISH, LOUISIANA



Name: S EMBANKMENT FILL, EL. +4.5 TO -6 Model: Spatial Mohr-Coulomb Weight Fn: FILL 1 Cohesion: 0 psf Phi: 26 ° Name: S MARSH 1, EL. -6 TO -14 Model: Spatial Mohr-Coulomb Unit Weight: 78 pcf Cohesion: 0 psf Phi: 24 ° Name: S LACUSTRINE 1, EL. -14 TO -17.0 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 26 ° Name: S LACUSTRINE 2, EL. -17 TO -31.5 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 0 psf Phi: 26 ° Name: S BAY SOUND CLAY, EL. -48 TO -70 Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: DM S EMBANKMENT FILL, EL. +4.5 TO -6 Model: Spatial Mohr-Coulomb Weight Fn: FILL 1 Cohesion: 250 psf Phi: 26 ° Name: DM S MARSH 1, EL. -6 TO -14 Model: Spatial Mohr-Coulomb Unit Weight: 78 pcf Cohesion: 250 psf Phi: 24 ° Name: DM S LACUSTRINE 1, EL. -14 TO -17.0 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 250 psf Phi: 26 ° Name: DM S LACUSTRINE 2, EL. -17 TO -31.5 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: DM S BEACH SAND, EL. -31.5 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 34 ° Name: S EMBANKMENT FILL, EL. +4.5 TO -6 C=75psf Model: Spatial Mohr-Coulomb Weight Fn: FILL 1 Cohesion: 75 psf Phi: 26 ° Name: S BEACH SAND, EL. -31.5 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

GENERAL NOTES

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Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach07.gsz Last Edited By: Redell, Chris MVS



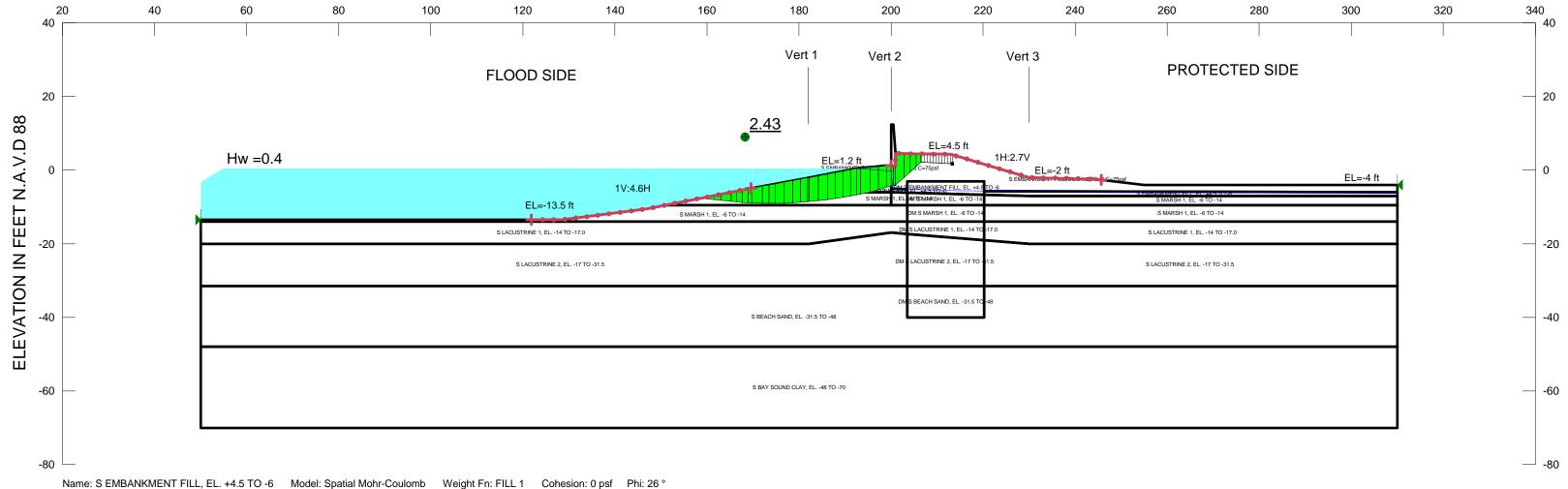


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17th STREET OUTFALL CANAL, REACH 7, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS

STA. 582+60 to 585+55 WEST ORLEANS PARISH, LOUISIANA



Name: S MARSH 1, EL. -6 TO -14 Model: Spatial Mohr-Coulomb Unit Weight: 78 pcf Cohesion: 0 psf Phi: 24 ° Name: S LACUSTRINE 1, EL. -14 TO -17.0 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 26 ° Name: S LACUSTRINE 2, EL. -17 TO -31.5 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 0 psf Phi: 26 ° Name: S BAY SOUND CLAY, EL. -48 TO -70 Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: DM S EMBANKMENT FILL, EL. +4.5 TO -6 Model: Spatial Mohr-Coulomb Weight Fn: FILL 1 Cohesion: 250 psf Phi: 26 ° Name: DM S MARSH 1, EL. -6 TO -14 Model: Spatial Mohr-Coulomb Unit Weight: 78 pcf Cohesion: 250 psf Phi: 24 ° Name: DM S LACUSTRINE 1, EL. -14 TO -17.0 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 250 psf Phi: 26 ° Name: DM S LACUSTRINE 2, EL. -17 TO -31.5 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: DM S BEACH SAND, EL. -31.5 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 34 ° Name: S EMBANKMENT FILL, EL. +4.5 TO -6 C=75psf Model: Spatial Mohr-Coulomb Weight Fn: FILL 1 Cohesion: 75 psf Phi: 26 ° Name: S BEACH SAND, EL. -31.5 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

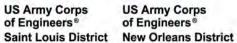
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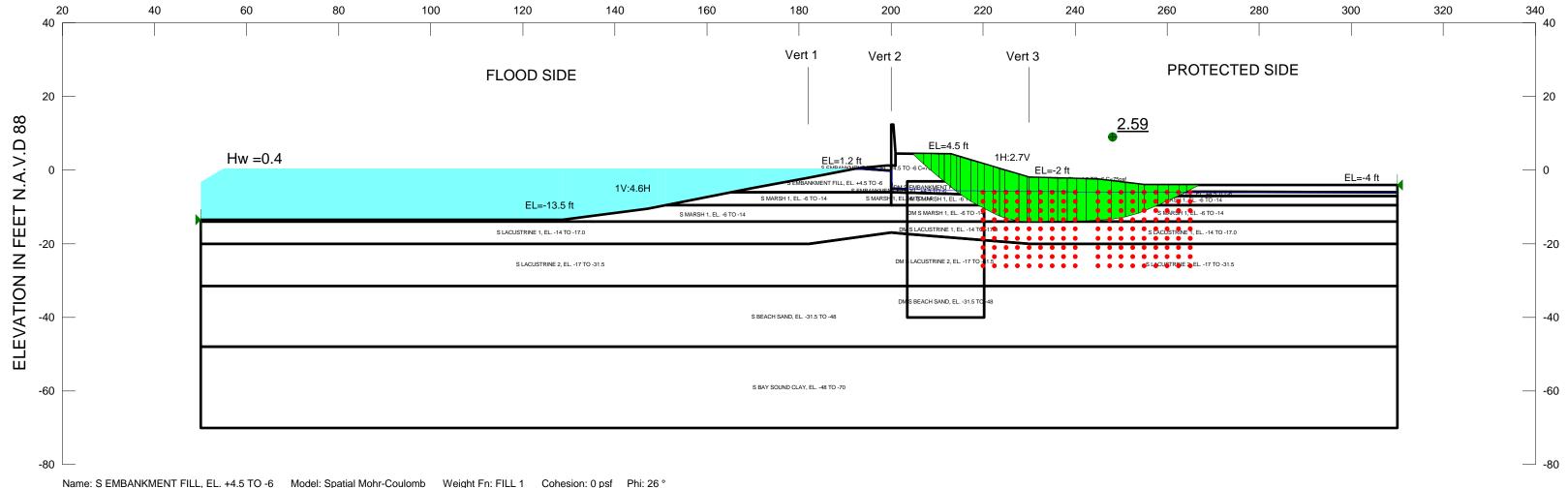




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17th STREET OUTFALL CANAL, REACH 7, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) LWL-S-FS STA. 582+60 to 585+55 WEST ORLEANS PARISH, LOUISIANA



Name: S MARSH 1, EL. -6 TO -14 Model: Spatial Mohr-Coulomb Unit Weight: 78 pcf Cohesion: 0 psf Phi: 24 ° Name: S LACUSTRINE 1, EL. -14 TO -17.0 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 26 ° Name: S LACUSTRINE 2, EL. -17 TO -31.5 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 0 psf Phi: 26 ° Name: S BAY SOUND CLAY, EL. -48 TO -70 Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: DM S EMBANKMENT FILL, EL. +4.5 TO -6 Model: Spatial Mohr-Coulomb Weight Fn: FILL 1 Cohesion: 250 psf Phi: 26 ° Name: DM S MARSH 1, EL. -6 TO -14 Model: Spatial Mohr-Coulomb Unit Weight: 78 pcf Cohesion: 250 psf Phi: 24 ° Name: DM S LACUSTRINE 1, EL. -14 TO -17.0 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 250 psf Phi: 26 ° Name: DM S LACUSTRINE 2, EL. -17 TO -31.5 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: DM S BEACH SAND, EL. -31.5 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 34 ° Name: S EMBANKMENT FILL, EL. +4.5 TO -6 C=75psf Model: Spatial Mohr-Coulomb Weight Fn: FILL 1 Cohesion: 75 psf Phi: 26 ° Name: S BEACH SAND, EL. -31.5 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

GENERAL NOTES

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Name: Slope Stability (Block) LWL-S-PS File Name: 17thReach07.gsz Last Edited By: Redell, Chris MVS



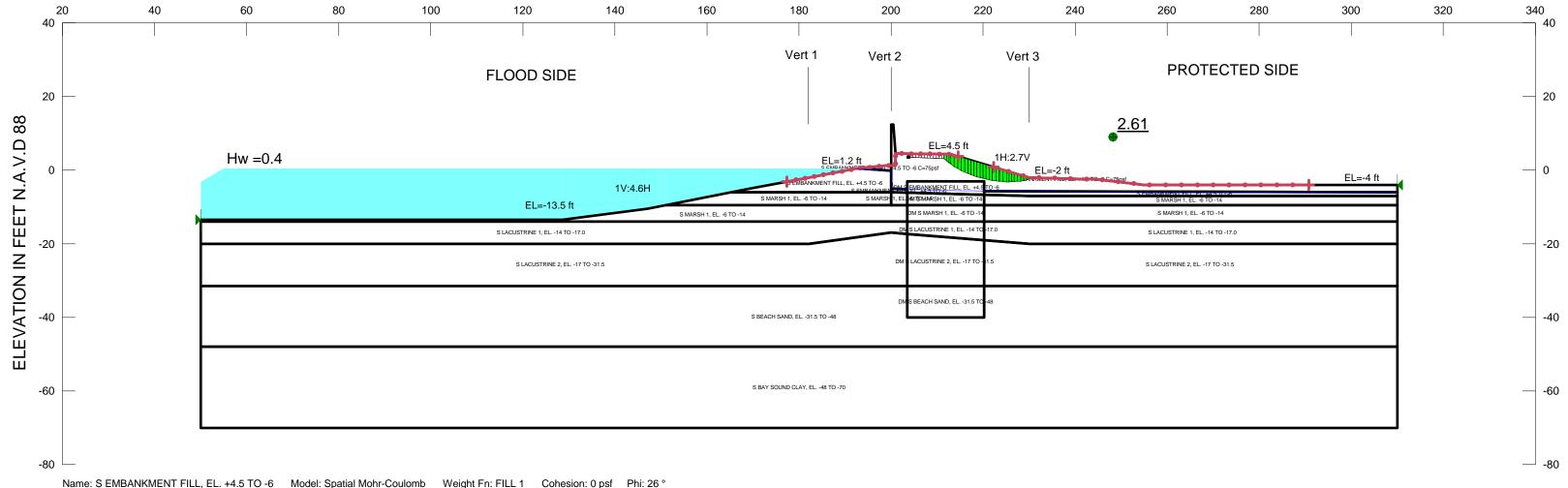


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17th STREET OUTFALL CANAL, REACH 7, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS

STA. 582+60 to 585+55 WEST ORLEANS PARISH, LOUISIANA



Name: S MARSH 1, EL. -6 TO -14 Model: Spatial Mohr-Coulomb Unit Weight: 78 pcf Cohesion: 0 psf Phi: 24 ° Name: S LACUSTRINE 1, EL. -14 TO -17.0 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 0 psf Phi: 26 ° Name: S LACUSTRINE 2, EL. -17 TO -31.5 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 0 psf Phi: 26 ° Name: S BAY SOUND CLAY, EL. -48 TO -70 Model: Mohr-Coulomb Unit Weight: 105 pcf Cohesion: 0 psf Phi: 26 ° Name: DM S EMBANKMENT FILL, EL. +4.5 TO -6 Model: Spatial Mohr-Coulomb Weight Fn: FILL 1 Cohesion: 250 psf Phi: 26 ° Name: DM S MARSH 1, EL. -6 TO -14 Model: Spatial Mohr-Coulomb Unit Weight: 78 pcf Cohesion: 250 psf Phi: 24 ° Name: DM S LACUSTRINE 1, EL. -14 TO -17.0 Model: Spatial Mohr-Coulomb Unit Weight: 109 pcf Cohesion: 250 psf Phi: 26 ° Name: DM S LACUSTRINE 2, EL. -17 TO -31.5 Model: Spatial Mohr-Coulomb Weight Fn: Lacustrine 2 Cohesion: 250 psf Phi: 26 ° Name: DM S BEACH SAND, EL. -31.5 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 34 ° Name: S EMBANKMENT FILL, EL. +4.5 TO -6 C=75psf Model: Spatial Mohr-Coulomb Weight Fn: FILL 1 Cohesion: 75 psf Phi: 26 ° Name: S BEACH SAND, EL. -31.5 TO -48 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

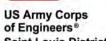
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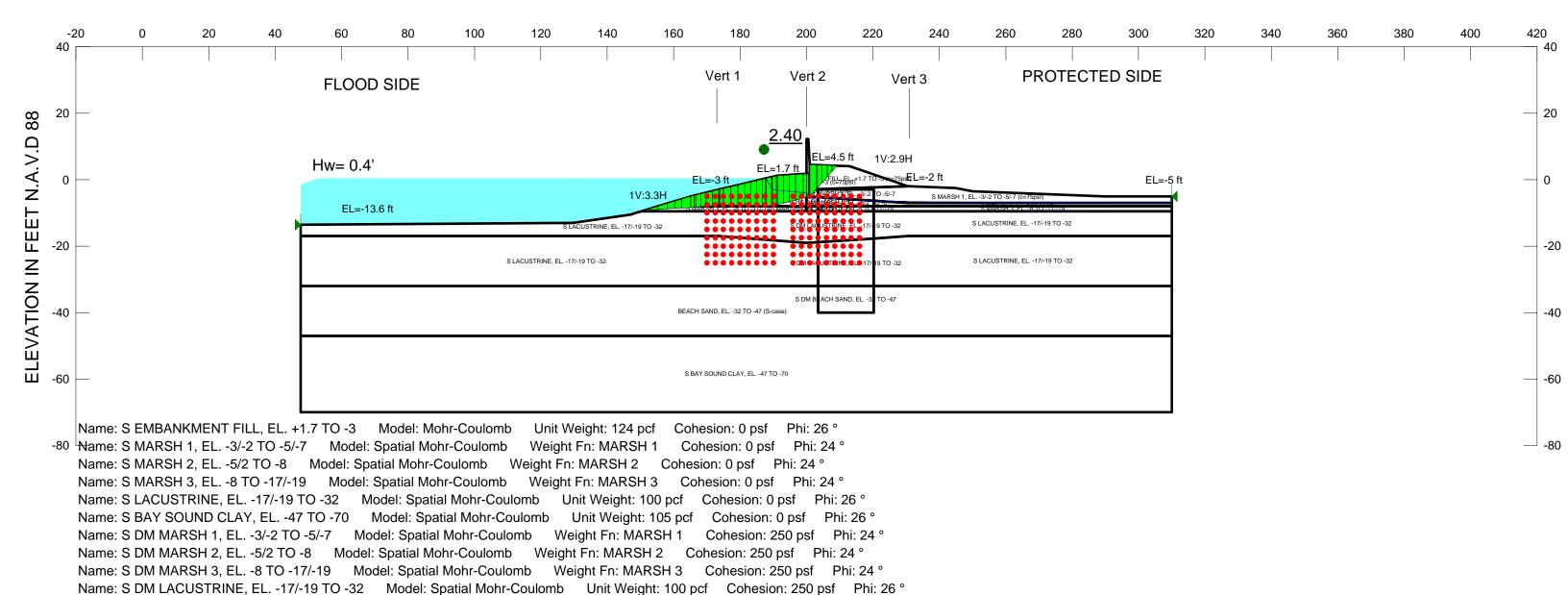




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17th STREET OUTFALL CANAL, REACH 7, STABILITY ANALYSIS, CASE: Slope Stability (Entry/Exit) LWL-S-PS

STA. 582+60 to 585+55 WEST ORLEANS PARISH, LOUISIANA



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WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALSWERE ASSUMED TO VARY LINEARLY BETWEENTHE VALUES INDICATED FOR THESE LOCATIONS.

Name: S MARSH 1, EL. -3/-2 TO -5/-7 (c=75psf)

Name: S DM BEACH SAND, EL. -32 TO -47 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 34 °

Name: BEACH SAND, EL. -32 TO -47 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: S EMBANKMENT FILL, EL. +1.7 TO -3 (c=75psf) Model: Mohr-Coulomb Unit Weight: 124 pcf Cohesion: 75 psf Phi: 26 °

Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 75 psf Phi: 24 °

Name: Slope Stability (Block) LWL-S-FS File Name: 17thReach08.gsz Last Edited By: Redell, Chris MVS

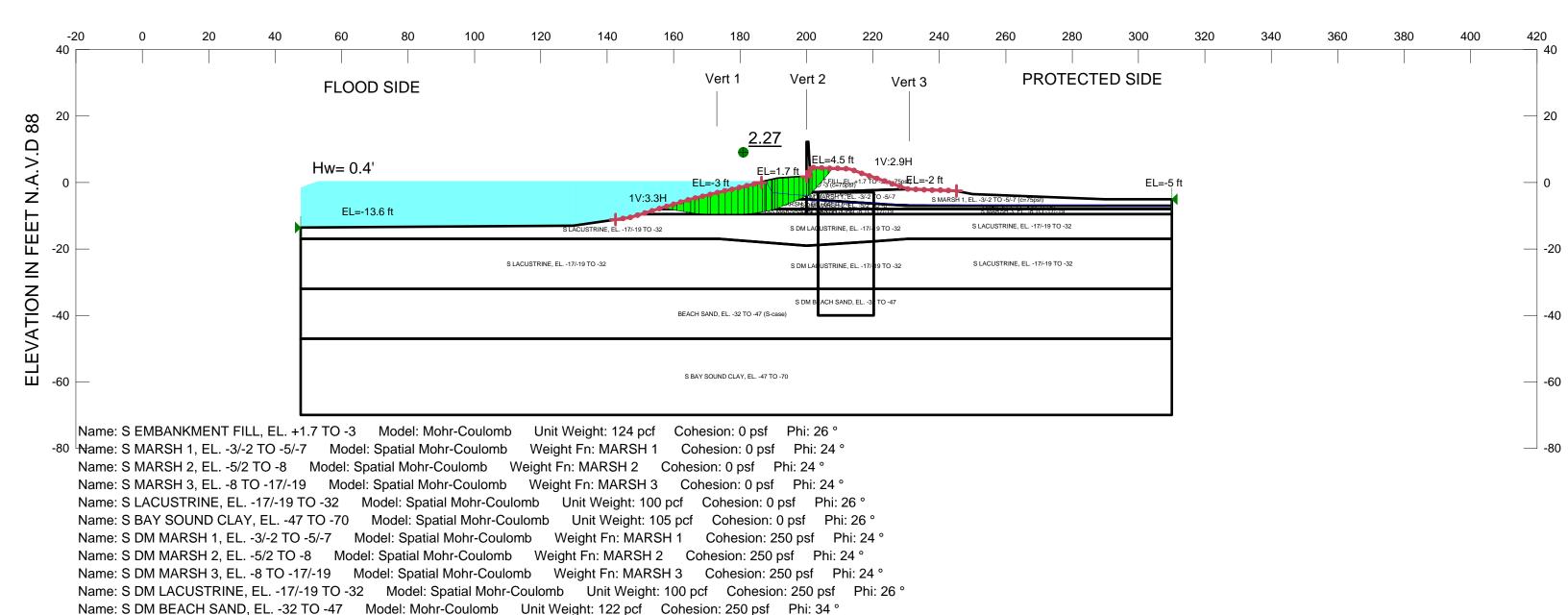




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17th STREET OUTFALL CANAL, REACH 08, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS STA. 585+55 TO 588+70 WEST ORLEANS PARISH, LOUISIANA



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Name: S MARSH 1, EL. -3/-2 TO -5/-7 (c=75psf)

Name: S EMBANKMENT FILL, EL. +1.7 TO -3 (c=75psf) Model: Mohr-Coulomb Unit Weight: 124 pcf Cohesion: 75 psf Phi: 26 °

Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 75 psf Phi: 24 °

Name: BEACH SAND, EL. -32 TO -47 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: Slope Stability (Entry/Exit) LWL-S-FS File Name: 17thReach08.gsz Last Edited By: Redell, Chris MVS



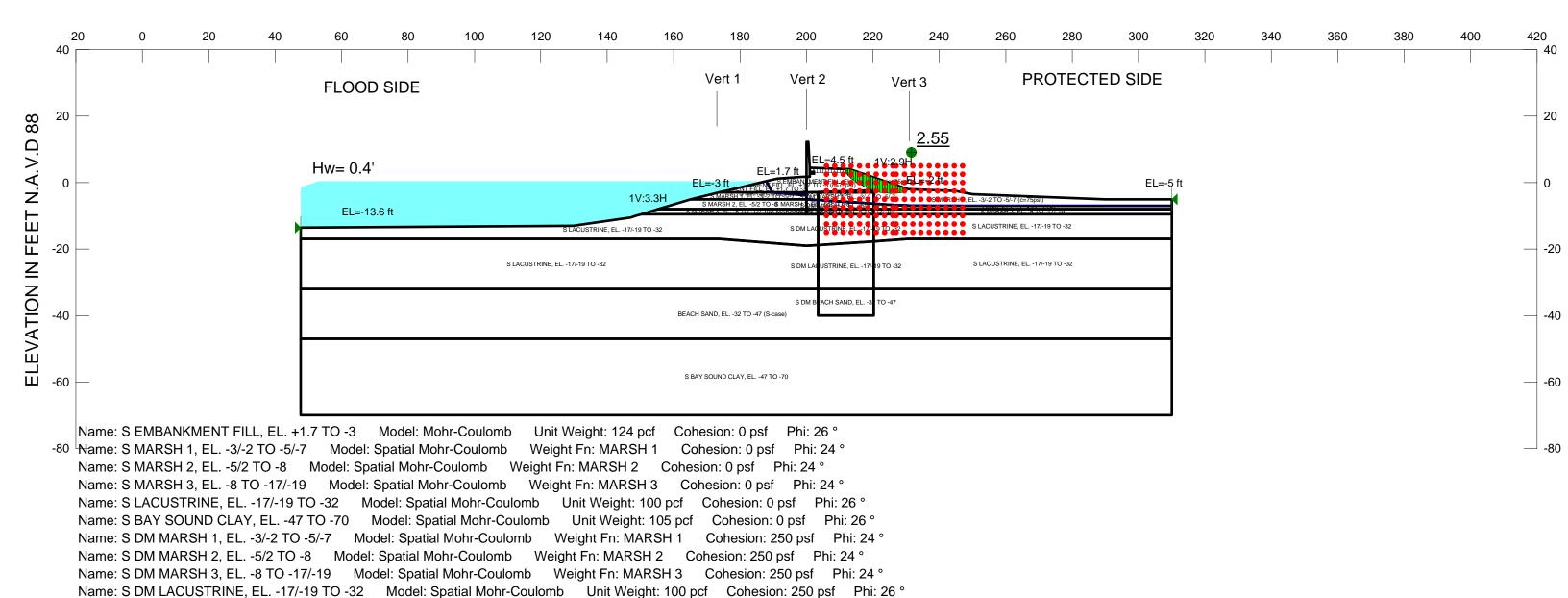


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17th STREET OUTFALL CANAL, REACH 08, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) LWL-S-FS STA. 585+55 TO 588+70 WEST ORLEANS PARISH, LOUISIANA



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Name: S MARSH 1, EL. -3/-2 TO -5/-7 (c=75psf)

Name: S DM BEACH SAND, EL. -32 TO -47 Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 250 psf Phi: 34 °

Name: BEACH SAND, EL. -32 TO -47 (S-case) Model: Mohr-Coulomb Unit Weight: 122 pcf Cohesion: 0 psf Phi: 34 °

Name: S EMBANKMENT FILL, EL. +1.7 TO -3 (c=75psf) Model: Mohr-Coulomb Unit Weight: 124 pcf Cohesion: 75 psf Phi: 26 °

Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 75 psf Phi: 24 °

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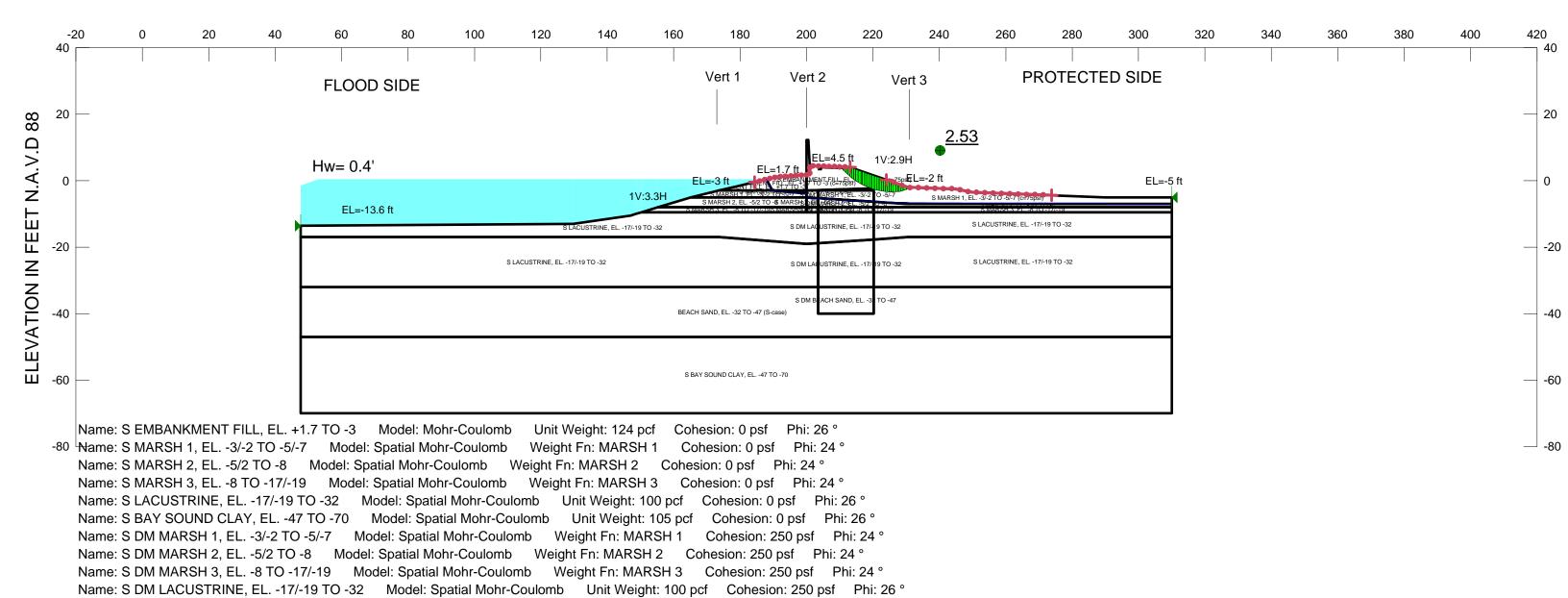




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17th STREET OUTFALL CANAL, REACH 08, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS STA. 585+55 TO 588+70 WEST ORLEANS PARISH, LOUISIANA



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Name: S EMBANKMENT FILL, EL. +1.7 TO -3 (c=75psf) Model: Mohr-Coulomb Unit Weight: 124 pcf Cohesion: 75 psf Phi: 26 °

Model: Spatial Mohr-Coulomb Weight Fn: MARSH 1 Cohesion: 75 psf Phi: 24 °

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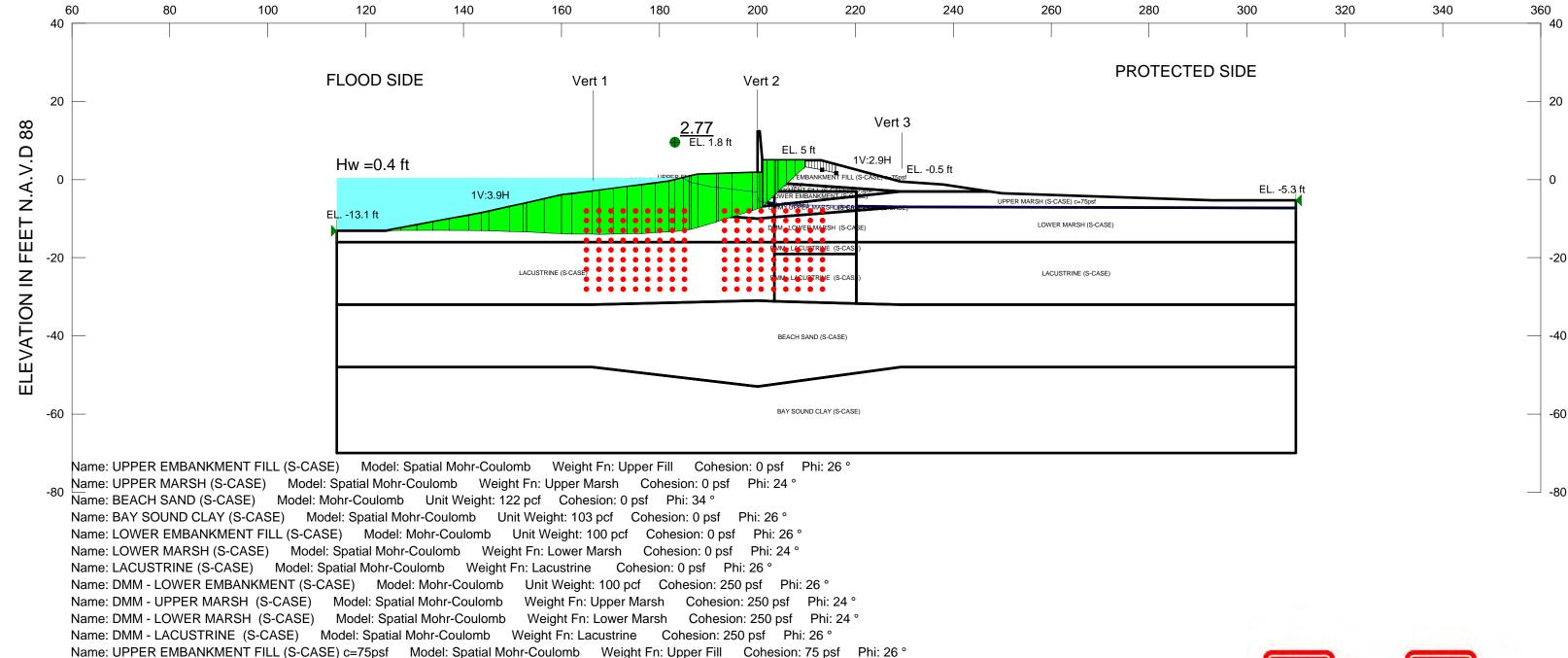


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17th STREET OUTFALL CANAL, REACH 08, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) LWL-S-PS STA. 585+55 TO 588+70 WEST ORLEANS PARISH, LOUISIANA



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Name: LOWER EMBANKMENT FILL (S-CASE) c=75psf Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 26 ° Name: UPPER MARSH (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion: 75 psf Phi: 24 °

Name: Slope Stability (Block) LWL-S-FS

File Name: 17thReach09.gsz Last Edited By: Redell, Chris MVS



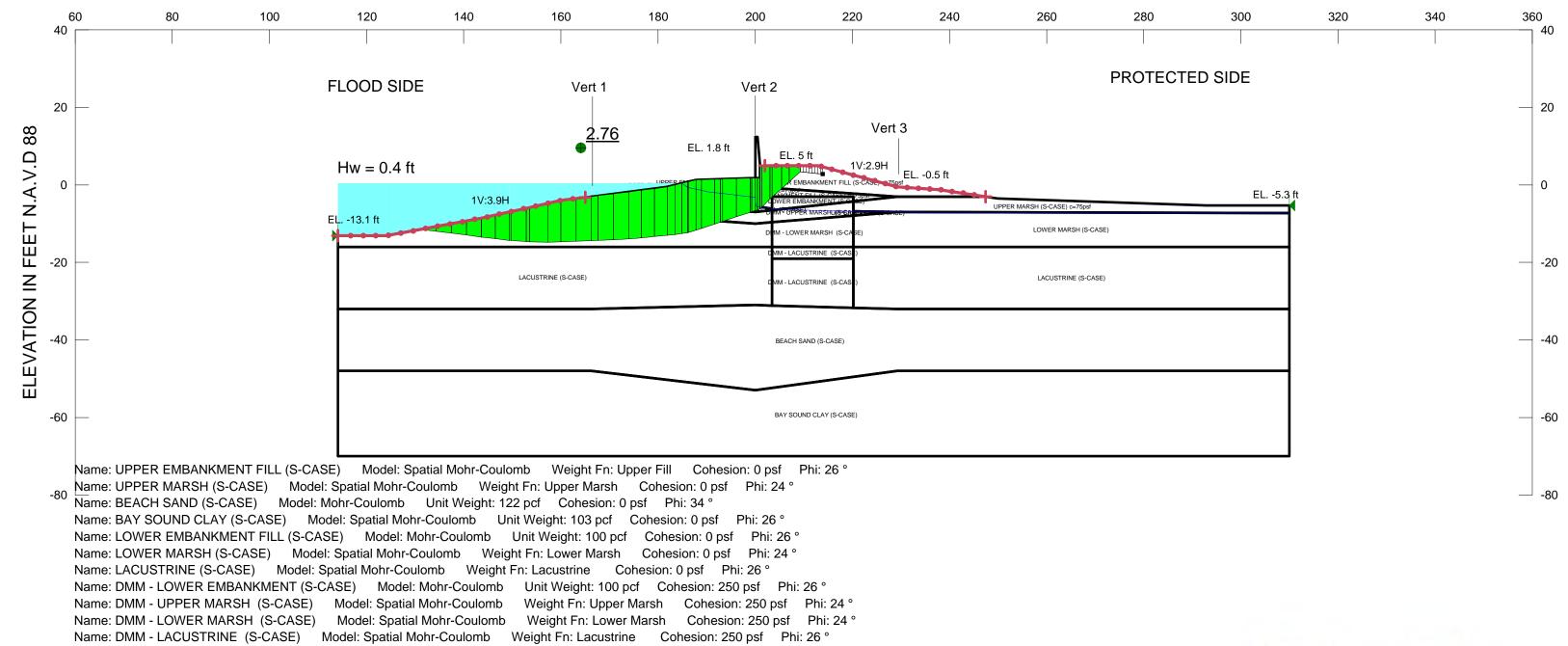


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17th STREET OUTFALL CANAL, REACH 09, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-FS STA. 588+70 - 593+00 WEST

ORLEANS PARISH, LOUISIANA



GENERAL NOTES

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WHERE INDICATED, SHEAR STRENGTHS BETWEEN VERTICALS WERE ASSUMED TO VARY LINEARLY BETWEEN THE VALUES INDICATED FOR THESE LOCATIONS.

Name: UPPER EMBANKMENT FILL (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Upper Fill Cohesion: 75 psf Phi: 26 °

Name: LOWER EMBANKMENT FILL (S-CASE) c=75psf Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 26 ° Name: UPPER MARSH (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion: 75 psf Phi: 24 °

Name: Slope Stability (Entry/Exit) LWL-S-FS

File Name: 17thReach09.gsz Last Edited By: Redell, Chris MVS





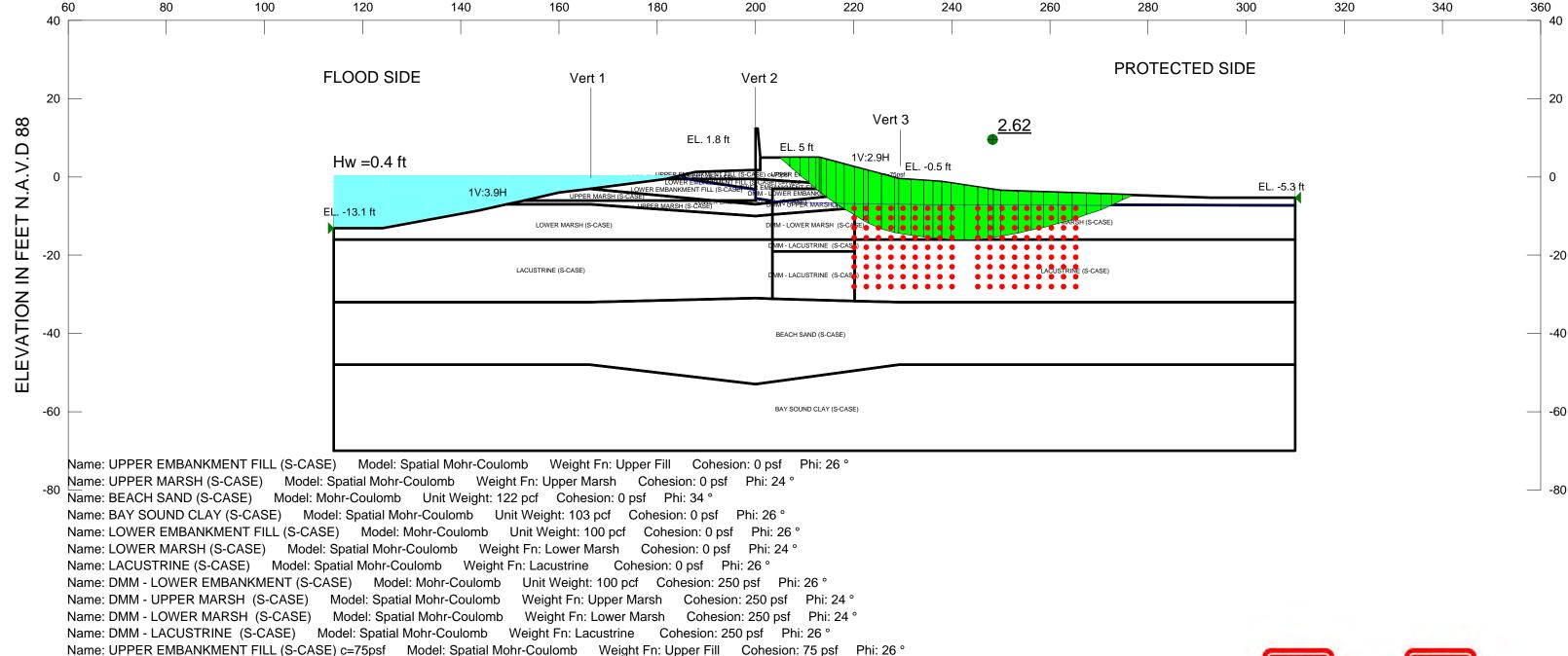
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17th STREET OUTFALL CANAL, REACH 09, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) LWL-S-FS STA. 588+70 - 593+00 WEST ORLEANS PARISH, LOUISIANA

DISTANCE IN FEET



GENERAL NOTES

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Name: LOWER EMBANKMENT FILL (S-CASE) c=75psf Model: Mohr-Coulomb Unit Weight: 100 pcf Cohesion: 75 psf Phi: 26 ° Name: UPPER MARSH (S-CASE) c=75psf Model: Spatial Mohr-Coulomb Weight Fn: Upper Marsh Cohesion: 75 psf Phi: 24 °

Name: Slope Stability (Block) LWL-S-PS

File Name: 17thReach09.gsz Last Edited By: Redell, Chris MVS



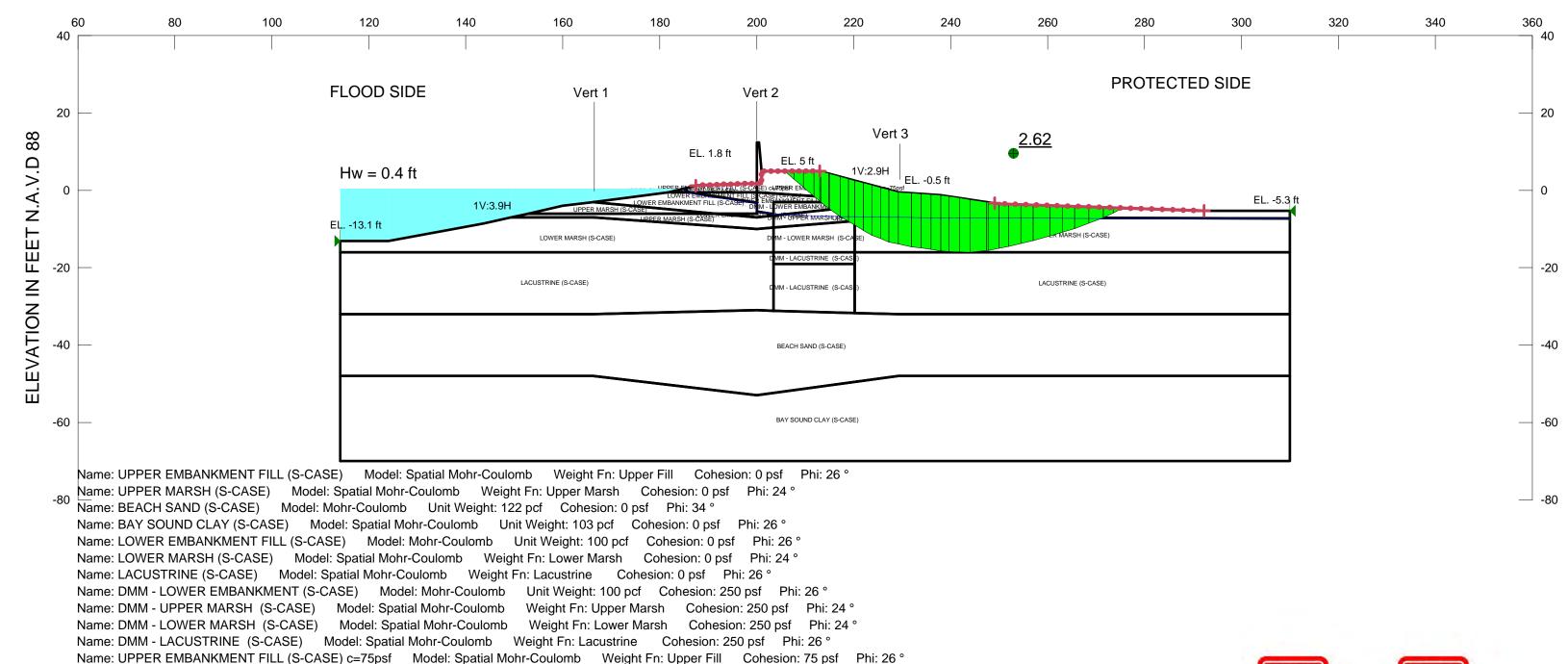


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17th STREET OUTFALL CANAL, REACH 09, STABILITY ANALYSIS, CASE: Slope Stability (Block) LWL-S-PS STA. 588+70 - 593+00 WEST ORLEANS PARISH, LOUISIANA

MARCH 2013 LAKE PONTCHARTRAIN, LA. AND VICINITY HURRICANE PROTECTION PROJECT

DISTANCE IN FEET



GENERAL NOTES

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Name: Slope Stability (Entry/Exit) LWL-S-PS

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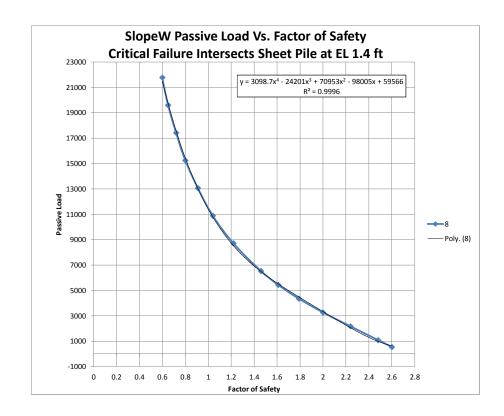
17th STREET OUTFALL CANAL, REACH 09, STABILITY ANALYSIS,

CASE: Slope Stability (Entry/Exit) LWL-S-PS STA. 588+70 - 593+00 WEST ORLEANS PARISH, LOUISIANA

MARCH 2013 LAKE PONTCHARTRAIN, LA. AND VICINITY HURRICANE PROTECTION PROJECT

Appendix E- Rotational Analyses (CWAI	LSHT)	

	SlopeW	
Surcharge load (pcf)	Passive Load (lbs)	FS
25	544	2.6
50	1089	2.48
100	2178	2.24
150	3267	2
200	4356	1.79
250	5445	1.61
300	6533	1.46
400	8711	1.22
500	10889	1.04
600	13067	0.91
700	15245	0.8
800	17423	0.72
900	19600	0.65
1000	21778	0.6



Iteration = 1	Applie	d Uniform I	oad (PSF) =	615		Pile Tip =	-1.51		Cohesion = Unchanged	Analysis Method = Sweep Search
	NET ELEV.	WATER	<lefts< td=""><td>IDE></td><td><ni (SOIL+V</ni </td><td>ET> WATER)</td><td><right< td=""><td>SIDE></td><td></td><td></td></right<></td></lefts<>	IDE>	<ni (SOIL+V</ni 	ET> WATER)	<right< td=""><td>SIDE></td><td></td><td></td></right<>	SIDE>		
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)		
	10	0	0	0	0	0	0	0		
	9	0	0	0	0	0	0	0		
	8	0	0	0	0	0	0	0		
Protected Side	7	62.5	0	0	62.5	62.5	0	0		•
Ground Surface Elevation	6.8	75	0		75		0	0	PASSIVE LOAD	
	6.8	75	0	-	75		0	540		
	6.6	87.5	0	-	87.5	637.8	0	550.3		
	6.6	87.5	540	0	162.5	1252.8	0	550.3		
	6	125	608.4		131.6		0	581.2		
	5.6	150	654	0	111	1366.8	0	601.8		
	5	187.5	722.4 836.4		80.1	1435.2 1549.2	0	632.7		
	2.4	250 284.7	899.7		28.6	1612.5	0	684.2		
	3.4	312.5	950.4	0	0 -22.9		0	712.8 735.7		
Entry failure at this	2	375	1064.4	0	-74.4	1777.2	0	787.2		
elevation per SlopeW	1.4	412.5	1132.8	0		1845.6	0	818.1		
(see graph title above)	1.4	412.5	1132.8				0	818.1	11923	
(oce graph the above)	1	437.5	1178.4	0		1276.2	0	838.7	Equivalent passive force calc	ulated from pressures
	0	500	1292.4	0	-792.4		0	890.2		
	-1	562.5	1396	0	-833.5	1504.2	0	941.7		
	-1.5	562.5	1281.7	0	-719.2	1379.5	0	817		
	-2	562.5	1145.9	0	-583.4	1243.7	0	681.2		
	Note: Table	from CWA	LSHT design	mode out	put file				•	4th Degree Polynomial Trendline Coefficients

		4th De	gree Polyn	omial Tren	dline Coeff	
CWALSHT PASSIVE FORCE=	4346.73	а	b	С	d	
CWALSHT FS=	2	3098.7	-24201	70953	-98005	ı
GEOSTUDIO PASSIVE FORCE=	3339.2	Note: Coefficie	ents used for c	alculating FS fr	om graph	
PASSIVE FORCE DIFFERENCE=	1007.5					
SHEET PILE LENGTH=	5.2					
UNIFORM PRESSURE=	194					

ETL 1110-2-575

59566

59566

Iteration = 2	Applie	d Uniform L	oad (PSF) =	450		Pile Tip =	-1.49		Cohesion = Unchanged Analysis Method = Sweep Search
	NET ELEV.	WATER	<leftsi< td=""><td>DE></td><td><ne (SOIL+V</ne </td><td></td><td><right< td=""><td>SIDE></td><td></td></right<></td></leftsi<>	DE>	<ne (SOIL+V</ne 		<right< td=""><td>SIDE></td><td></td></right<>	SIDE>	
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	
	10	0	0	0	0	0	0	0	
	9	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0
Protected Side	7	62.5	0	0	62.5	62.5	0	0	0
Ground Surface Elevation	6.8		0	0	75	75	0	0	D PASSIVE
	6.8		0	0	75	462.1	0	387.1	
	6.6		0	0	87.5	484.9	0	397.4	
	6.6	87.5	387.1	0	150.4	934.9	0	397.4	
	6	125	455.5	0	119.5	1003.3	0	428.3	
	5.6		501.1	0	98.9	1048.9	0	448.9	
	5	187.5	569.5	0	68	1117.3	0	479.8	
	4	250	683.5	0	16.5	1231.3	0	531.3	
	3.7	270	720	0	0	1267.8	0	547.8	
E	3	312.5	797.5	0	-35	1345.3	0	582.8	
Entry failure at this	2	375	911.5	0	-86.5	1459.3	0	634.3	
elevation per SlopeW	1.4	412.5	979.9	0	-117.4	1527.7	0	665.2	
(see graph title above)	1.4	412.5	979.9	0	-567.4	1077.7	0	665.2	
	1	437.5	1025.5	0	-588	1123.3	0	685.8	
	0	500	1139.5	0	-639.5	1237.3	0	737.3	
	-1	562.5	1243.1	0	-680.6	1351.3	0	788.8	
	-1.5 -2	562.5 562.5	1169.8 1075.1	0	-607.3 -512.6	1267.6 1172.9	0	705.1	
						1172.9	0	610.4	
	Note: Table	rrom CWA	LSHT design ı	moae outp	out file		_		4th Degree Polynomial Trendline Coefficients

0.101.1							
		4th De	gree Polynomial Trendline C				
CWALSHT PASSIVE FORCE=	3555.35	а	b	С	d		
CWALSHT FS=	2.79	3098.7	-24201	70953	-9800		
GEOSTUDIO PASSIVE FORCE=	605.8	Note: Coefficie	ents used for c	alculating FS fr	om graph		
PASSIVE FORCE DIFFERENCE=	2949.5						
SHEET PILE LENGTH=	5.2						
UNIFORM PRESSURE=	567						

Iteration = 3	Applied	d Uniform L	oad (PSF) =	509	ſ	Pile Tip =	-1.52		Cohesion = Unchanged Analysis Method = Sweep Search
	NET ELEV.	WATER	<leftsi< td=""><td>DE></td><td></td><td colspan="2"><net> (SOIL+WATER)</net></td><td>SIDE></td><td>]</td></leftsi<>	DE>		<net> (SOIL+WATER)</net>		SIDE>]
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	
	10	0	0	0	0	0	0	C	
	9	0	0	0	0	0	0	C	P
	8	0	0	0	0	0	0	C	
Protected Side	7	62.5	0	0	62.5	62.5	0	C	
Ground Surface Elevation	6.8	75	0	0	75	75	0		PASSIVE
	6.8	75	0	0	75	515.8	0		
	6.6	87.5	0	0	87.5	538.6	0	451.1	
	6.6	87.5	440.8	0	155.7	1047.6	0	451.1	
	6	125	509.2	0	124.8	1116	0	482	
	5.6	150	554.8 623.2	0	104.2	1161.6 1230	0	502.6	
	5	187.5 250	737.2	0	73.3 21.8	1344	0	533.5 585	
	3.6	276.4	785.4	0	21.0	1392.2	0	606.8	
	3.0	312.5	851.2	0	-29.7	1458	0	636.5	
Entry failure at this	2	375	965.2	0	-81.2	1572	0	688	
elevation per SlopeW	1.4	412.5	1033.6	0	-112.1	1640.4	0		
(see graph title above)	1.4	412.5	1033.6	0		1131.4	0		
(222 9.24.1 2.22 2.22.2)	1	437.5	1079.2	0	-641.7	1177	0	739.5	
	0	500	1193.2	0	-693.2	1291	0	791	
	-1	562.5	1296.8	0	-734.3	1405	0	842.5	
	-1.5	562.5	1209.1	0	-646.6	1306.9	0	744.4	
	-2	562.5	1100	0	-537.5	1197.8	0	635.3	
	Note: Table	from CWA	LSHT design	mode outp	out file				4th Degree Polynomial Trendline Coefficients

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59566

Iteration = 4	Applie	d Uniform I	_oad (PSF) =	519		Pile Tip =	-1.53		Cohesion = Unchanged Analysis Method = Sweep Search
	NET ELEV.	WATER	<lefts< td=""><td>IDE></td><td><ne (SOIL+V</ne </td><td></td><td><right< td=""><td>SIDE></td><td></td></right<></td></lefts<>	IDE>	<ne (SOIL+V</ne 		<right< td=""><td>SIDE></td><td></td></right<>	SIDE>	
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	
	10	0	0	0	0	0	0	0	
	9		0	0	0	0	0	0	
D 4 4 400	8		0	-	0	0	0	0	
Protected Side		02.0	0	0	62.5	62.5	0	0	PASSIVE
Ground Surface Elevation	6.8 6.8		0		75 75	75 525	0	450	
			0			547.8	0		
	6.6 6.6		0 450		87.5 156.5	1066.8	0	460.3 460.3	
	6.6		518.4			1135.2	0	491.2	
	5.6		564		105	1180.8	0	511.8	
	5		632.4			1249.2	0	542.7	
	4	250	746.4			1363.2	0	594.2	
	3.6		796.4		0	1413.2	0	616.8	
	3		860.4			1477.2	0	645.7	
Entry failure at this	2	375	974.4	0	-80.4	1591.2	0	697.2	974.4 605.16
elevation per SlopeW	1.4	412.5	1042.8	0	-111.3	1659.6	0	728.1	1042.8 0
(see graph title above)	1.4	412.5	1042.8	0	-630.3	1140.6	0	728.1	
	1	437.5	1088.4	0	-650.9	1186.2	0	748.7	
	0		1202.4		-702.4	1300.2	0	800.2	
	-1	562.5	1306		-743.5	1414.2	0	851.7	
	-1.5		1215.8			1313.6	0	751.1	
	-2		1104.2		-541.7	1202	0	639.5	
	Note: Tabl	e from CWA	LSHT design	mode out	put file		_		4th Degree Polynomial Trendline Coefficients

000.0						
		4th De	gree Polyn	omial Tren	dline Coeff	icients
CWALSHT PASSIVE FORCE=	3883.48	а	b	С	d	е
CWALSHT FS=	2.4	3098.7	-24201	70953	-98005	59566
GEOSTUDIO PASSIVE FORCE=	1296.1	Note: Coefficie	ents used for c	alculating FS fr	om graph	
PASSIVE FORCE DIFFERENCE=	2587.4					
SHEET PILE LENGTH=	5.2					
UNIFORM PRESSURE=	498					

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Applied Uniform Load (PSF) = 513 Pile Tip = -1.47 Analysis Method = Iteration = 5 Cohesion = Unchanged Sweep Search <---NET---> NET <---LEFTSIDE---> <--RIGHTSIDE---> (SOIL+WATER) WATER ELEV. (PSF) PASSIVE ACTIVE ACTIVE PASSIVE ACTIVE PASSIVE (FT) (PSF) (PSF) (PSF) (PSF) (PSF) (PSF) 10 9 0 0 0 0 0 0 8 0 0 0 0 0 Ω Protected Side 62.5 0 62.5 62.5 0 Ground Surface Elevation 6.8 75 0 0 75 75 0 PASSIVE 6.8 75 0 75 521.3 446.3 PSF LBS 6.6 87.5 0 87.5 544.1 456.6 456.6 6.6 87.5 446.3 0 154.2 1057.1 0 446.3 288.3 6 125 0 123.3 1125.5 487.5 514.7 514.7 0 215 5.6 150 560.3 0 102.7 1171.1 0 508. 560.3 356.7 5 187.5 628.7 0 71.8 1239.5 0 539 628.7 685.7 1353.5 590.5 742.7 306.08 4 250 742.7 0 20.3 0 787.7 493.32 3.6 274.7 787.7 0 0 1398.5 0 610.8 3 312.5 856.7 -31.2 1467.5 856.7 913.7 0 0 642 Entry failure at this 2 375 970.7 0 -82.7 1581.5 0 693.5 970.7 602.94 412.5 elevation per SlopeW 1.4 1039.1 0 -113.6 1649.9 0 724.4 1039.1 0 (see graph title above) 1.4 412.5 1039.1 0 -626.6 1136.9 0 724.4 437.5 1084.7 0 -647.2 1182.5 0 745 Equivalent passive force calculated from pressures 0 500 1198.7 0 -698.7 1296.5 0 796.5 -1 562.5 1302.3 0 -739.8 1410.5 0 848 -1.5 562.5 1213.1 0 -650.6 1310.9 0 748.4 562.5 1102.5 -540 1200.3 0 637.8 Ω

Note: Table from CWALSHT design mode output file

		4th Degree Polynomial Trendline Coefficients							
CWALSHT PASSIVE FORCE=	3861.74	а	b	С	d	е			
CWALSHT FS=	2.42	3098.7	-24201	70953	-98005	59566			
GEOSTUDIO PASSIVE FORCE=	1212.1	Note: Coefficients used for calculating FS from graph							
PASSIVE FORCE DIFFERENCE=	2649.7								
SHEET PILE LENGTH=	5.2								
UNIFORM PRESSURE=	510								

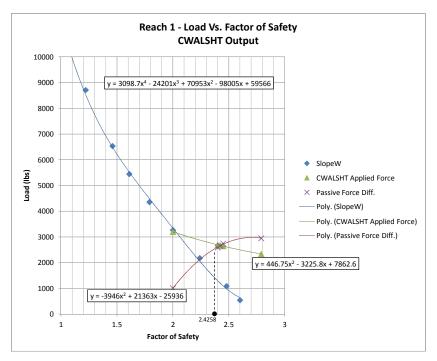
ETL 1110-2-575

Applied Uniform Load (PSF) = 512 Pile Tip = -1.47 Analysis Method = Iteration = 6 Cohesion = Unchanged Sweep Search <---NET---> NET <---LEFTSIDE---> <--RIGHTSIDE---> (SOIL+WATER) WATER ELEV. (PSF) PASSIVE ACTIVE ACTIVE PASSIVE ACTIVE PASSIVE (FT) (PSF) (PSF) (PSF) (PSF) (PSF) (PSF) 10 9 0 0 0 0 0 0 0 0 0 0 0 8 Ω Protected Side 62.5 0 0 62.5 62.5 0 Ground Surface Elevation 6.8 75 0 0 75 75 0 PASSIVE 6.8 75 0 75 520.5 445.5 PSF LBS 6.6 87.5 0 87.5 543.3 455.8 0 6.6 87.5 445.5 0 154 1055.3 0 455.8 445.5 287.82 6 125 0 123.1 1123.7 486.7 513.9 513.9 0 214.68 5.6 150 559.5 0 102.5 1169.3 0 507. 559.5 356.22 5 187.5 627.9 0 71.6 1237.7 0 538. 627.9 684.9 741.9 305.64 4 250 741.9 0 20.1 1351.7 0 589. 786.3 492.66 3.6 274.3 786.3 0 0 1396.1 0 609.8 3 312.5 855.9 -31.4 1465.7 641.2 855.9 912.9 0 0 Entry failure at this 2 375 969.9 0 -82.9 1579.7 0 692. 969.9 602.46 412.5 elevation per SlopeW 1.4 1038.3 0 -113.8 1648.1 0 723.6 1038.3 0 (see graph title above) 1.4 412.5 1038.3 0 -625.8 1136.1 0 723.6 437.5 1083.9 0 -646.4 1181.7 0 744.2 Equivalent passive force calculated from pressures 0 500 1197.9 0 -697.9 1295.7 0 795.7 -1 562.5 1301.5 0 -739 1409.7 0 847.2 -1.5 562.5 1212.6 0 -650.1 1310.4 0 747.9 562.5 1102.2 Ω -539.7 1200 0 637.5

Note: Table from CWALSHT design mode output file

	-	4th Degree Polynomial Trendline Coefficients							
CWALSHT PASSIVE FORCE=	3857.28	а	q	C	d	е			
CWALSHT FS=	2.42	3098.7	-24201	70953	-98005	59566			
GEOSTUDIO PASSIVE FORCE=	1195.7	Note: Coefficie	ents used for ca	alculating FS fr	om graph				
PASSIVE FORCE DIFFERENCE=	2661.6								
SHEET PILE LENGTH=	5.2								
UNIFORM PRESSURE=	512	*Resulting pressure per foot of wall (passive force difference/sheet pile length) matches applied pressure, therefore iterations are complete							
		Tength) matche	es applied pres	sure, therefore	iterations are of	complete			

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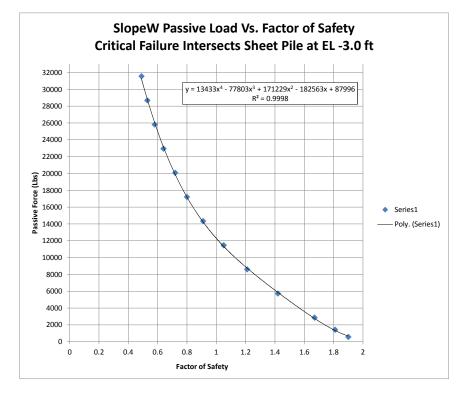
ETL 1110-2-575

Analysis

Note: Graphical verification of factor of safety by solving for the intersection between trendlines 'CWALSHT Applied Force' and 'Passive Force Diff.'

Analyses by:	Reach	FLOOD SIDE CREST ELEVATION NAVD88	PROTECTED SIDE CREST ELEVATION NAVD89	SHEET PILE TIP ELEVATION NAVD88	SHEET PILE PENETRATION (D) (FT)	WATER LEVEL ELEVATION LEFT SIDE NAVD88 (Right in CWALSHT)	WATER LEVEL ELEVATION RIGHT SIDE NAVD88 (Left in CWALSHT)	Resulting Factor of Safety	Net Pressure Zero @ EL (ft) ² [Crossover Point]	Modified Slip Surface Elevation	ORIGINAL NOTES	FLAC FS RESULTS	slip surface distance above the sheet pile
CD	10	2.5	5.5	-6	8.5	8	-4.9	1.6	-4.9	-3	n/a	1.41	3

SlopeW										
Surcharge load (pcf)	Passive Load (lbs)	FS								
10	574	1.9								
25	1434	1.81								
50	2869	1.67								
100	5738	1.42								
150	8606	1.21								
200	11475	1.05								
250	14344	0.91								
300	17212	0.8								
350	20081	0.72								
400	22950	0.64								
450	25819	0.58								
500	28687	0.53								
550	31556	0.49								



0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

-6.00

PASSIVE

(PSF)

1000

1014.

1037.

1060.

1106.

1152.6

943.

734.

780.

780.

826.6

868.1

872.7

918.8

Iteration = Applied Uniform Pressure = 902 Pile Tip (EL) = <---NET---> NET <---LEFTSIDE---> <--RIGHTSIDE---> WATER (SOIL+WATER) ELEV. (PSF) **PASSIVE** ACTIVE ACTIVE ACTIVE **PASSIVE** (FT) (PSF) (PSF) (PSF) (PSF) (PSF) 10 9 0 0 0 0 0 8 0 0 0 0 62.5 0 0 62.5 62.5 Protected Side 125 0 0 125 125 Ground Surface Elevation 156.3 0 0 156.3 156.3 5.5 156.3 1000 58.2 1058.3 5 187.5 1011.7 0 77.8 1089.5 4 250 1116.1 0 35.9 1152 3 312.5 1220.4 0 -5.9 1214.5 2.5 343.8 1272.6 0 -26.8 1245.8 2.5 343.8 1272.6 0 -26.8 2245.8 2 375 1324.7 0 -47.7 2291.4 1.5 406.3 1376.9 0 -68.7 2345.7 437.5 1429.1 0 -89.6 2399.9 0 500 1533.4 0 -131.4 2508.5 -1 562.5 1637.8 0 -173.3 2617.1 -1.5 593.8 1457.2 0 38.5 2439.3 Entry failure at this -2 625 1276.7 0 250.3 2261.4 elevation per SlopeW -3 687.5 1381 0 208.5 2370 (see graph title above) -3 687.5 1381 0 -693.5 1468 -4 750 1485.4 0 -735.4 1576.6

Cohesion = Unchanged

Analysis Method = Sweep Search Method

PASSIVE 1000 502.925 1011.7 1063.9 1168.25 1116.1 1220.4 623.25 1272.6 0 1272.6 649.325 1324.7 675.4 1376.9 701.5 1429.1 1481.25 1533.4 1585.6 1637.8 773.75 1457.2 683.475 1276.7 1328.85 1381 0

Equivalent passive force calculated from pressures

Note: Table from CWALSHT design mode output file

806.3

806.3

806.3

1576.4

1412.8

1184.8

-770.2

-606.5

-378.5

0

0

0

1674.4

1725.1

1679

		4th De	gree Poly	nomial Tre	endline Coef	ficients	
CWALSHT PASSIVE FORCE=	11237.475	а	b	С	d	е	
CWALSHT FS=	1.4	13433	-77803	171229	-182563	87996	
GEOSTUDIO PASSIVE FORCE=	6129.4	Note: Coefficients used for calculating FS from graph					
PASSIVE FORCE DIFFERENCE=	5108.1						
SHEET PILE LENGTH=	8.5						
UNIFORM PRESSURE=	601						

Notes:

-4.9

-5

I was able to use the full 700psf cohesion in combination with the applied lateral load and achieve the required -6 pile tip depth. Also, a quartic trendline was used for the SlopeW passive force versus factor of safety plot since it provided a better fit (R²=0.9998). I started with a 1.4 factor of safety, since this was the FLAC solution; the ETL analysis method should be close to this value. Thus, it provided a better starting point for the iterations.

Iteration = 2 Applied Uniform Pressure = 608 Pile Tip EL = -5.98

Cohesion = Unchanged

Analysis Method = Sweep Search Method

Protected Side Ground Surface Elevation

Entry failure at this elevation per SlopeW (see graph title above)

NET	WATER	<left< th=""><th>SIDE></th><th><ne (SOIL+V</ne </th><th></th><th><righ< th=""><th>ITSIDE></th></righ<></th></left<>	SIDE>	<ne (SOIL+V</ne 		<righ< th=""><th>ITSIDE></th></righ<>	ITSIDE>
ELEV. (FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
10	0	0	0	0	0	0	(
9		0	0	0	0	0	(
8	0	0	0	0	0	0	(
7	62.5	0	0	62.5	62.5	0	(
6	125	0	0	125	125	0	(
5.5	156.3	0	0	156.3	156.3	0	(
5.5	156.3	689.7	0	74.6	764.3	0	(
5	187.5	713.9	0	81.6	795.5	0	(
4	250	818.3	0	39.7	858	0	(
3	312.5	922.6	0	-2.1	920.5	0	(
2.5	343.8	974.8	0	-23	951.8	0	(
2.5	343.8	974.8	0	-23	1641.4	0	689.7
2	375	1027	0	-44	1689.7	0	706.
1.5	406.3	1079.1	0	-64.9	1744	0	729.8
1	437.5	1131.3	0	-85.8	1798.3	0	752.8
0	500	1235.6	0	-127.6	1906.9	0	798.9
-1	562.5	1340	0	-169.5	2015.5	0	84
-1.5	593.8	1231.6	0	-29.9	1909.7	0	707.9
-2	625	1123.3	0	109.7	1803.9	0	570.9
-3	687.5	1227.7	0	67.8	1912.5	0	617
-3	687.5	1227.7	0	-540.2	1304.5	0	617
-4	750	1332	0	-582	1413.1	0	663.
-4.9	806.3	1423.1	0	-616.8	1510.8	0	704.6
-5	806.3	1209	0	-402.8	1515.4	0	709.2
-6	806.3	1184.8	0	-378.5	1561.5	0	755.3
Note: Table	e from CWA	LSHT design	n mode out	put file			

PASSIVE 689.7 350.9 713.9 766.1 870.45 818.3 922.6 474.35 974.8 0 974.8 500.45 1027 526.525 1079.1 552.6 1131.3 1183.45 1235.6 1287.8 1340 642.9 1231.6 588.725 1123.3 1175.5 1227.7 0

Equivalent passive force calculated from pressures

Note: Table from CWALSHT design mode output file

		4th De	gree Poly	nomial Tre	endline Coef	ficients		
CWALSHT PASSIVE FORCE=	8919.75	а	p	С	d	е		
CWALSHT FS=	2.03	13433	-77803	171229	-182563	87996		
GEOSTUDIO PASSIVE FORCE=	272.1	Note: Coefficients used for calculating FS from graph						
PASSIVE FORCE DIFFERENCE=	8647.6							
SHEET PILE LENGTH=	8.5	1						
UNIFORM PRESSURE=	1017							

Notes:

Uniform pressures do not converge onto the FS, since the new uniform pressure of 1017 is larger than the first iteration applied uniform pressure of 902psf. Therefore, a uniform pressure between the values of 608 and 1017psf will be chosen for the next run.

Iteration = 3 Applied Uniform Pressure = 839 Pile Tip EL = -6.00 <---NET---> NET <---LEFTSIDE---> <--RIGHTSIDE---> WATER (SOIL+WATER) ELEV. (PSF) **PASSIVE** ACTIVE ACTIVE ACTIVE PASSIVE **PASSIVE** (FT) (PSF) (PSF) (PSF) (PSF) (PSF) (PSF) 10 9 0 0 0 0 0 0 8 0 0 0 0 0 62.5 0 0 62.5 62.5 0 Protected Side 125 0 0 125 125 Ground Surface Elevation 156.3 0 0 156.3 156.3 0 5.5 156.3 933.3 61.9 995.3 5 187.5 947.8 0 78.7 1026.5 0 1052.1 0 4 250 36.9 1089 0 3 312.5 1156.4 0 -4.9 1151.5 0 2.5 343.8 1208.6 0 -25.9 1182.8 0 2.5 343.8 1208.6 0 -25.9 2116.1 0 933. 2 375 1260.8 0 -46.8 2162.3 0 948.3 406.3 1312.9 -67.7 2216.6 971.3 1.5 0 0 437.5 1365.1 0 -88.6 2270.9 994. 0 0 500 1469.5 0 -130.5 2379.5 1040.5 -1 562.5 1573.8 0 -172.3 2488.1 0 1086.6 593.8 1408.8 2325.7 892. -1.5 0 24 0 Entry failure at this -2 625 1243.7 0 220.3 2163.3 0 699. elevation per SlopeW -3 687.5 1348.1 0 178.4 2271.9 0 745. (see graph title above) -3 687.5 1348.1 0 -660.6 1432.9 0 745.4 -4 750 1452.4 0 -702.4 1541.5 0 791.5 -4.9 1543.5 -737.3 1639.2 833 806.3 0 0 -5 806.3 1369 0 -562.8 1643.9 0 837.6 806.3 1184.8 0 -378.5 1689.9 0 883.7 Cohesion = Unchanged

Analysis Method = Sweep Search Method

PASSIVE LBS 933.3 470.275 947.8 999.95 1052.1 1104.25 1156.4 591.25 1208.6 0 1208.6 617.35 1260.8 643.425 1312.9 669.5 1365.1 1417.3 1469.5 1521.65 1573.8 745.65 1408.8 663.125 1243.7 1295.9 1348.1 0

Equivalent passive force calculated from pressures

Note: Table from CWALSHT design mode output file

		4th De	gree Poly	nomial Tre	endline Coef	ficients					
CWALSHT PASSIVE FORCE=	10739.625	а	b	С	d	е					
CWALSHT FS=	1.5	13433	-77803	171229	-182563	8799					
GEOSTUDIO PASSIVE FORCE=	4836.2	Note: Coeffici	ents used for	calculating FS	from graph						
PASSIVE FORCE DIFFERENCE=	5903.4										
SHEET PILE LENGTH=	8.5	1									
UNIFORM PRESSURE=	695	1									

Notes:

Similarly to the previous iteration, a new applied uniform pressure between 695psf and 839 psf shall be used in the next iteration.

Iteration = 4

Protected Side
Ground Surface Elevation

Entry failure at this elevation per SlopeW (see graph title above)

Applied Uniform Pressure = **784** Pile Tip EL = **-6.01**

1									
	NET ELEV.	WATER	<left< th=""><th>SIDE></th><th></th><th>ET> WATER)</th><th><righ< th=""><th>ITSIDE></th></righ<></th></left<>	SIDE>		ET> WATER)	<righ< th=""><th>ITSIDE></th></righ<>	ITSIDE>	
		(PSF)	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE	
	(FT)		(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	
	10	0	0	0	0	0	0	0	
	9	0	0	0	0	0	0	0	
	8	0	0	0	0	0	0	0	
	7	62.5	0	0	62.5	62.5	0	0	
	6	125	0	0	125	125	0	0	
	5.5	156.3	0	0	156.3	156.3	0	0	
	5.5	156.3	875	0	65.3	940.3	0	0	
	5	187.5	891.8	0	79.7	971.5	0	0	
	4	250	996.1	0	37.9	1034	0	0	
	3	312.5	1100.5	0	-4	1096.5	0	0	
	2.5	343.8	1152.6	0	-24.9	1127.8	0	0	
	2.5	343.8	1152.6	0	-24.9	2002.8	0	875	
	2	375	1204.8	0	-45.8	2049.4	0	890.4	
	1.5	406.3	1257	0	-66.7	2103.7	0	913.5	
	1	437.5	1309.1	0	-87.6	2158	0	936.5	
	0	500	1413.5	0	-129.5	2266.6	0	982.6	
	-1	562.5	1517.8	0	-171.3	2375.2	0	1028.7	
	-1.5	593.8	1366.4	0	11.4	2226.4	0	848.6	
	-2	625	1214.9	0	194.1	2077.6	0	668.6	
	-3	687.5	1319.3	0	152.2	2186.2	0	714.7	
	-3	687.5	1319.3	0	-631.8	1402.2	0	714.7	
	-4	750	1423.6	0	-673.6	1510.8	0	760.8	
	-4.9	806.3	1514.7	0	-708.4		0	802.2	
	-5	806.3	1330.7	0	-524.5	1613.1	0	806.9	
	-6	806.3	1184.8	0	-378.5	1659.2	0	853	

Cohesion = Unchanged

Analysis Method = Sweep Search Method

PASSIVE 875 441.7 891.8 943.95 1048.3 996.1 1100.5 563.275 1152.6 0 1152.6 589.35 1204.8 615.45 1257 641.525 1309.1 1361.3 1465.65 1413.5 1517.8 721.05 1366.4 645.325 1214.9 1267.1 1319.3 0

Equivalent passive force calculated from pressures

Note: Table from CWALSHT design mode output file

		4th De	gree Poly	nomial Tre	endline Coef	ficients		
CWALSHT PASSIVE FORCE=	10303.975	а	b	С	d	е		
CWALSHT FS=	1.6	13433	-77803	171229	-182563	87996		
GEOSTUDIO PASSIVE FORCE=	3594.9	Note: Coefficients used for calculating FS from graph						
PASSIVE FORCE DIFFERENCE=	6709.1							
SHEET PILE LENGTH=	8.5							
UNIFORM PRESSURE=	789							

Notes:

The uniorm pressure resulting from the SlopeW and CWALSHT passive force difference is approximately equal to the applied uniform pressure. Therefore, an FS of 1.6 is very close to the answer. Verify with a couple more iterations to see if it can be fine-tuned.

Iteration = 5 Applied Uniform Pressure = 735 Pile Tip EL = -6.00 Cohesion = Unchanged Analysis Method = Sweep Search Method <---NET---> NET <---LEFTSIDE---> <--RIGHTSIDE---> WATER (SOIL+WATER) ELEV. PASSIVE ACTIVE (PSF) ACTIVE **PASSIVE** ACTIVE PASSIVE (FT) (PSF) (PSF) (PSF) (PSF) (PSF) (PSF) 10 9 0 0 0 0 0 0 8 0 0 0 0 0 0 62.5 0 0 62.5 62.5 0 PASSIVE Protected Side 125 0 0 125 125 LBS Ground Surface Elevation 5.5 156.3 0 156.3 156.3 0 5.5 156.3 823.5 67.7 891.3 823.5 416.475 5 187.5 842.4 0 80.1 922.5 0 842.4 894.55 946.7 946.7 998.9 4 250 0 38.3 985 0 3 312.5 1051.1 0 -3.6 1047.5 0 1051.1 538.575 2.5 343.8 1103.2 0 -24.5 1078.8 0 1103.2 0 564.65 2.5 343.8 1103.2 0 -24.5 1902.3 0 823.5 1103.2 2 375 1155.4 0 -45.4 1949.4 0 839.4 1155.4 590.75 406.3 1207.6 -66.3 2003.7 862. 1207.6 616.85 1.5 0 0 437.5 1259.8 0 -87.3 2058 885.5 1259.8 1311.95 1 0 0 500 1364.1 0 -129.1 2166.6 931.6 1364.1 1416.25 1468.4 -1 562.5 1468.4 0 -170.9 2275.2 0 977.7 699.35 593.8 0 809.6 1329 629.625 -1.5 1329 -0.2 2138.3 0 Entry failure at this -2 625 1189.5 0 170.5 2001.4 0 641. 1189.5 1241.65 elevation per SlopeW -3 687.5 1293.8 0 128.7 2110 0 687. 1293.8 0 (see graph title above) -3 687.5 1293.8 0 -606.3 1375 0 687.5 -4 750 1398.2 0 -648.2 1483.6 0 733.6 Equivalent passive force calculated from pressures -4.9 806.3 1489.2 -683 775.1 0 1581.4 0

1586

1632.1

0

0

779.7

825.8

Note: Table from CWALSHT design mode output file

1296.9

1184.8

0

-490.7

-378.5

806.3

806.3

-5

			4th Degree Polynomial Trendline Coefficier							
CWAL	SHT PASSIVE FORCE=	9919.575	а	b	С	d	е			
	CWALSHT FS=	1.7	13433	-77803	171229	-182563	87996			
GEOST	JDIO PASSIVE FORCE=	2438.3	Note: Coefficients used for calculating FS from graph							
PASSIVE	FORCE DIFFERENCE=	7481.2								
	SHEET PILE LENGTH=	8.5								
	UNIFORM PRESSURE=	880								

Iteration = 6	Applic	ed Uniform F	Pressure =	779	1 '	Pile	e Tip EL =	-6.02
					·			
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><ne (SOIL+V</ne </td><td>NATER)</td><td>_</td><td>HTSIDE></td></left<>	SIDE>	<ne (SOIL+V</ne 	NATER)	_	HTSIDE>
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
	10	0	` /	, /	. /	. /	` /	` ′
	9	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0
	7	62.5	0	0	62.5	62.5	0	0
Protected Side	6	125	0	0	125	125	0	0
Ground Surface Elevation	5.5	156.3	0	0	156.3	156.3	0	0
	5.5	156.3	869.6	0	65.7	935.3	0	0
	5	187.5	886.6	0	79.9	966.5	0	0
	4			0			0	0
	3			0			0	0
	2.5							
	2.5							
	2						0	
	1.5			0				
	1			0				
	0			0				
	-1							
	-1.5			0				
Entry failure at this	-2							
elevation per SlopeW	-3							
(see graph title above)	-3							
	-4			0				
	-4.9							
	-5			0				
	-6	806.3	1184.8	0	-378.5	1656.3	0	850.1

Cohesion = Unchanged

Analysis Method = Sweep Search Method

PASSIVE 869.6 439.05 886.6 938.75 990.9 1043.1 1095.3 560.675 1147.4 0 1147.4 586.75 1199.6 612.85 1251.8 638.925 1303.9 1356.1 1408.3 1460.45 1512.6 718.75 1362.4 643.65 1212.2 1264.4 1316.6 0

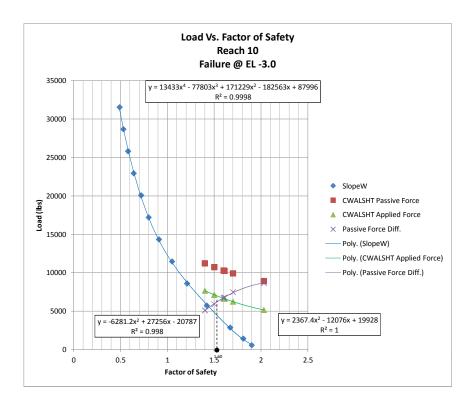
Equivalent passive force calculated from pressures

Note: Table from CWALSHT design mode output file

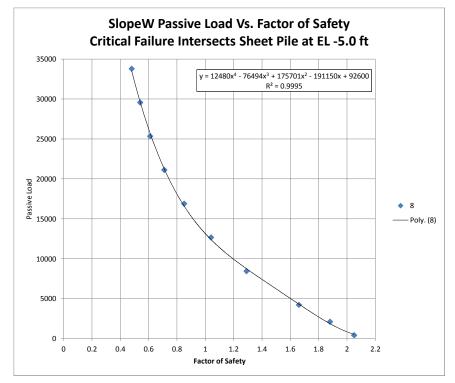
		4th De	egree Poly	nomial Tre	endline Coef	ficients		
CWALSHT PASSIVE FORCE=	10263.45	а	b	С	d	е		
CWALSHT FS=	1.61	13433	-77803	171229	-182563	87996		
GEOSTUDIO PASSIVE FORCE=	3474.6	Note: Coefficients used for calculating FS from graph						
PASSIVE FORCE DIFFERENCE=	6788.9							
SHEET PILE LENGTH=	8.5	1						
UNIFORM PRESSURE=	799	1						

SOLUTION: FS = 1.60

Note - see graph on next sheet.



2: :::											
	SlopeW										
Surcharg	Passive										
e load	Load	FS									
5	422	2.05									
25	2112	1.88									
50	4225	1.66									
100	8449	1.29									
150	12674	1.04									
200	16898	0.85									
250	21123	0.71									
300	25348	0.61									
350	29572	0.54									
400	33797	0.48									



Let's look at a failure closer to the tip of the pile, at EL -5.0, and compare the results with that from a -3.0 failure elevation.

Iteration = 1	Applied	Uniform I	Pressure =	861.2	l	Pile	Tip (EL) =	-6.00		Cohesion =	Unchanged		Analysis	Method =	Sweep Sea	arch Method
	NET ELEV.	WATER	<lefts< td=""><td>SIDE></td><td><ne (SOIL+V</ne </td><td></td><td><righ< td=""><td>TSIDE></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></righ<></td></lefts<>	SIDE>	<ne (SOIL+V</ne 		<righ< td=""><td>TSIDE></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></righ<>	TSIDE>								
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)								
	10	0	0	0	0	0	0	0								
	9	0	0	0	0	0	0	0								
	8	0	0	0	0	0	0	0								
	7	62.5	0	0	62.5	62.5	0	0	Corrected	PAS	SSIVE			Iterations	i	
	6	125	0	0	125	125	0	0	H2O	PSF	LBS	FS	Uniform Load	Result	Tip (ft)	Message
	5.5	156.3	0	0	156.3	156.3	0	0		0	0	1.4	864	crash	n/a	
Protected Side Ground	5.5	156.3	1000	0	17.4	1017.5	0	0		1000	502.925	1.4	866	crash	n/a	
Surface Elevation	5	187.5	1011.7	0	37	1048.7	0	0		1011.7	1063.9	1.4	868	runs	-7.12	
	4	250	1116.1	0	-4.9	1111.2	0	0		1116.1	1168.25	1.4	860	runs	-5.73	
	3	312.5	1220.4	0	-46.7	1173.7	0	0		1220.4	623.25	1.4	861	Error	n/a	(1)
	2.5	343.8	1272.6	0	-67.6	1205	0	0		1272.6	0	1.4	862	runs	-6.18	
	2.5	343.8	1272.6	0	-67.6	2205	0	1000		1272.6	649.325	1.4	861.5	runs	-6.07	
	2	375	1324.7	0	-88.5	2250.6	0	1014.4		1324.7	675.4	1.4	861.2	runs	-6	
	1.5	406.3	1376.9	0	-109.5	2304.9	0	1037.4		1376.9	701.5	(1) Desigr	n bottom of cantile	ever wall ap	pears to be o	scillating
	1	437.5	1429.1	0	-130.4	2359.1	0	1060.4		1429.1	1481.25					
	0	500	1533.4	0	-172.2	2467.7	0	1106.5		1533.4	1585.6					
	-1	562.5	1637.8	0	-214.1	2576.3	0	1152.6		1637.8	773.75					
	-1.5	593.8	1457.2	0	-2.3	2398.5	0	943.5		1457.2	683.475					
	-2	625	1276.7	0	209.5	2220.6	0	734.4		1276.7	1328.85					
	-3	687.5	1381	0	167.7	2329.2	0	780.5		1381	1433.2					
	-4	750	1485.4	0	125.8	2437.8	0	826.6		1485.4	1377.81					
Entry failure at this	-4.9	806.3	1576.4	0	91	2535.6	0	868.1		1576.4	149.772					
elevation per SlopeW	-5	806.3	1412.8	0	254.7	2540.2	0	872.7	6.24	1419.04	0					
(see graph title above)	-5	806.3	1412.8	0	-606.5	1679	0	872.7								
	-6	806.3	1184.8	0	-378.5	1725.1	0	918.8		Equivalent pass	ive force calculated	from pressu	res			
	Note: Tab	le from C\	VALSHT des	sign mode	output file											

		4t	h Degree Poly	momial Tre	ndline Coeffic	ients
CWALSHT PASSIVE FORCE=	14198.257	а	b	С	d	е
CWALSHT FS=	1.4	12480	-76494	175701	-191150	92600
GEOSTUDIO PASSIVE FORCE=	7407.6	Note: Coefficie	ents used for calcul	ating FS from	graph	
PASSIVE FORCE DIFFERENCE=	6790.7					
SHEET PILE LENGTH=	10.5					
UNIFORM PRESSURE=	647					

Notes: Multiple iterations were run in order to achieve a pile tip at EL -6.0. The iterations are shown above under "iterations".

Iteration = 2	Applied	Uniform	Pressure =	801.4		Pile	Tip (EL) =	-6.03]	Cohesion =	Unchanged]	Analysis	Method =	Sweep Sea	arch Method
	NET ELEV.	WATER	<lefts< td=""><td>SIDE></td><td><nl (SOIL+V</nl </td><td></td><td><righ< td=""><td>TSIDE></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></righ<></td></lefts<>	SIDE>	<nl (SOIL+V</nl 		<righ< td=""><td>TSIDE></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></righ<>	TSIDE>								
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)								
	10	0	. /	0	, ,	. /	0	0	1							
	9	0	0	0	0	0	0	0								
	8	0	0	0	0	0	0	0								
	7	62.5	0	0	62.5	62.5	0	0	Corrected	PAS	SSIVE			Iterations		
	6	125	0	0	125	125	0	0	H2O	PSF	LBS	FS	Uniform Load	Result	Tip (ft)	Message
	5.5	156.3	0	0	156.3	156.3	0	0		0	0	1.5	700	Error		(1)
Protected Side Ground	5.5	156.3	933.3	0	24.3	957.7	0	0		933.3	470.275	1.5	800	Runs	-5.77	
Surface Elevation	5	187.5	947.8	0	41.1	988.9	0	0		947.8	999.95	1.5	805	Runs	-6.63	
	4	250	1052.1	0	-0.7	1051.4	0	0		1052.1	1104.25	1.5	802	Runs	-6.15	
	3	312.5	1156.4	0		1113.9	0	0		1156.4	591.25	1.5	801	Error		(2)
	2.5	343.8	1208.6	0	-63.5	1145.2	0	0		1208.6	0	1.5	801.2	Error		(3)
	2.5	343.8	1208.6	0	-63.5	2078.5	0	933.3		1208.6	617.35	1.5	801.4	Runs	-6.03	
	2	375	1260.8	0	-84.4	2124.7	0	948.3		1260.8	643.425		tions encountered			
	1.5	406.3	1312.9	0	-105.3	2179	0	971.3		1312.9	669.5		r wall is clockwise			
	1	437.5	1365.1	0	-126.2	2233.3	0	994.4		1365.1	1417.3		n bottom of cantile			scillating
	0	500	1469.5	0	-168.1	2341.9	0	1040.5		1469.5	1521.65		-5.94 (FT). Unabl			
	-1	562.5	1573.8	0	-209.9	2450.5	0	1086.6		1573.8	745.65		n bottom of cantile			scillating
	-1.5	593.8	1408.8	0	-13.6	2288.1	0	892.9		1408.8	663.125	about EL	-5.99 (FT). Unabl	e to continu	ie.	
	-2	625	1243.7	0	182.7	2125.7	0	699.3		1243.7	1295.9					
	-3	687.5	1348.1	0	140.8	2234.3	0	745.4		1348.1	1400.25					
	-4	750	1452.4	0	99	2342.9	0	791.5		1452.4	1348.155					
Entry failure at this	-4.9	806.3	1543.5	0	64.1	2440.6	0	833		1543.5	145.937					
elevation per SlopeW	-5	806.3	1369	0		2445.3	0	837.6		1375.24	0	J				
(see graph title above)	-5	806.3	1369	0	-562.8	1643.9	0	837.6								
	-6	806.3	1184.8		-378.5	1689.9	0	883.7	1	Equivalent passi	ve force calculate	d from pressu	ires			
	Note: Tab	ie from C\	WALSHT des	sign mode	output file											

		4t	h Degree Poly	nomial Tre	ndline Coeffic	ients
CWALSHT PASSIVE FORCE=	13633.967	а	b	С	d	е
CWALSHT FS=	1.5	12480	-76494	175701	-191150	92600
GEOSTUDIO PASSIVE FORCE=	6215.0	Note: Coefficie	ents used for calcul	ating FS from o	graph	
PASSIVE FORCE DIFFERENCE=	7419.0					
SHEET PILE LENGTH=	10.5					
UNIFORM PRESSURE=	707					

Iteration = 3	Applied	l Uniform I	Pressure =	774.2	l 1	Pile	Tip (EL) =	-6.00		Cohesion =	Unchanged]	Analysis	Method =	Sweep Sea	arch Method
	NET ELEV.	WATER	<left< td=""><td></td><td><nl (SOIL+V</nl </td><td>VATER)</td><td></td><td>SIDE></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></left<>		<nl (SOIL+V</nl 	VATER)		SIDE>								
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)								
	10	0	, ,	(F31)	, ,	` /	` /	(F31)								
	9	0	0	0	0	0	0	0								
	8	0	0	0	0	0	0	0								
	7	62.5	0	0	62.5	62.5	0	0	Corrected	PAS	SSIVE			Iterations	i	
	6	125	0	0	125	125	0	0	H2O	PSF	LBS	FS	Uniform Load	Result	Tip (ft)	Message
	5.5	156.3	0	0	156.3	156.3	0	0		0	0	1.55	780		-6.89	
Protected Side Ground	5.5	156.3	903.2	0			0	0		903.2	455.525	1.55	776		-6.32	
Surface Elevation	5	187.5	918.9	0		961.7	0	0		918.9	971.05	1.55	774	Error		(1)
	4	250	1023.2	0	1	1024.2	0	0		1023.2	1075.4	1.55	774.2		-6	, ,
	3	312.5	1127.6	0	-40.9	1086.7	0	0		1127.6	576.825	(1) Design	bottom of cantil	ever wall ap	pears to be o	scillating
	2.5	343.8	1179.7	0	-61.8	1118	0	0		1179.7	0	about EL	-5.96 (FT). Unab	e to continu	ie.	
	2.5	343.8	1179.7	0	-61.8	2021.2	0	903.2		1179.7	602.9					
	2	375	1231.9	0	-82.7	2067.6	0	918.4		1231.9	629					
	1.5	406.3	1284.1	0	-103.6	2121.9	0	941.5		1284.1	655.075					
	1	437.5	1336.2	0	-124.5	2176.2	0	964.5		1336.2	1388.4					
	0	500	1440.6	0	-166.4	2284.8	0	1010.6		1440.6	1492.75					
	-1	562.5	1544.9	0	-208.2	2393.4	0	1056.7		1544.9	732.95					
	-1.5	593.8	1386.9	0		2238	0	870.1		1386.9	653.95					
	-2	625	1228.9	0	170.3	2082.6	0	683.4		1228.9	1281.05					
	-3	687.5	1333.2	0	128.5	2191.2	0	729.5		1333.2	1385.35					
	-4	750	1437.5	0	86.7	2299.8	0	775.6		1437.5	1334.745					
Entry failure at this	-4.9	806.3	1528.6	0	51.8	2397.6	0	817.1	0.04	1528.6	144.202					
elevation per SlopeW	-5	806.3	1349.2	0		2402.2	0	821.7	6.24	1355.44	0	j				
(see graph title above)	-5	806.3	1349.2	0		1628	0	821.7				. ,				
	-6	806.3	1184.8		-378.5	1674.1	0	867.8		Equivalent passi	ve force calculated	rrom pressui	es			
	inote: i ab	ie from C\	WALSHT des	sign mode	output file											

		4t	h Degree Poly	nomial Tre	ndline Coeffic	ients
CWALSHT PASSIVE FORCE=	13379.172	а	b	С	d	е
CWALSHT FS=	1.55	12480	-76494	175701	-191150	92600
GEOSTUDIO PASSIVE FORCE=	5619.7	Note: Coefficie	ents used for calcul	ating FS from	graph	
PASSIVE FORCE DIFFERENCE=	7759.5					
SHEET PILE LENGTH=	10.5					
UNIFORM PRESSURE=	739					

Iteration = 4	Applied	Uniform I	Pressure =	763.2		Pile	Tip (EL) =	-5.99		Cohesion =	Unchanged		Analysis	Method =	Sweep Sea	arch Method
	NET ELEV.	WATER	<lefts< td=""><td>SIDE></td><td><ne (SOIL+W</ne </td><td>VATER)</td><td><righ< td=""><td>TSIDE></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></righ<></td></lefts<>	SIDE>	<ne (SOIL+W</ne 	VATER)	<righ< td=""><td>TSIDE></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></righ<>	TSIDE>								
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)								
	10	0	0	0	0	0	0	0	1							
	9	0	0	0	0	0	0	0								
	8	0	0	0	0	0	0	0								
	7	62.5	0	0	62.5	62.5	0	0	Corrected		SSIVE			Iterations		
	6	125	0	0	125	125	0	0	H2O	PSF	LBS	FS	Uniform Load	Result	Tip (ft)	Message
	5.5	156.3	0	0	156.3	156.3	0	0		0	0	1.57	750		-2.41	
Protected Side Ground	5.5	156.3	891.7	0	27.7	919.5	0	0		891.7	449.875	1.57	760		-4.07	
Surface Elevation	5	187.5	907.8	0	42.9	950.7	0	0		907.8	960	1.57	770		-6.93	
	4	250	1012.2	0	1	1013.2	0	0		1012.2	1064.35	1.57	763		-5.93	
	3	312.5	1116.5	0	-40.8	1075.7	0	0		1116.5	571.3	1.57	763.2		-5.99	
	2.5	343.8	1168.7	0	-61.7	1107	0	0		1168.7	0					
	2.5	343.8	1168.7	0	-61.7	1998.7	0	891.7		1168.7	597.375					
	2	375	1220.8	0	-82.6	2045.2	0	907		1220.8	623.45					
	1.5	406.3	1273	0	-103.6	2099.5	0	930.1		1273	649.55					
	1	437.5	1325.2	0	-124.5	2153.8	0	953.1		1325.2	1377.35					
	0	500	1429.5	0	-166.3	2262.4 2371	0	999.2		1429.5	1481.7 728.1					
	-1	562.5 593.8	1533.9 1378.5	0	-208.2 -21.6	2371	0	1045.3 861.3		1533.9 1378.5	650.425					
	-1.5 -2	625	1223.2	0	-∠1.6 165	2065.6	0	677.4		1223.2	1275.35					
	-3	687.5	1327.5	0	123.2	2174.2	0	723.5		1327.5	1379.7					
	-4	750	1431.9	0	81.3	2282.8	0	769.6		1431.9	1329.66					
Entry failure at this	-4.9	806.3	1522.9	0	46.5	2380.5	0	811.1		1522.9	143.542					
elevation per SlopeW	-4.9 -5	806.3	1341.7	0	227.8	2385.1	0	815.7	6.24		0					
(see graph title above)	-5	806.3	1341.7	0	-535.4	1621.9	0	815.7	0.24	10-11.04	U					
(see graph title above)	-6	806.3	1184.8	0	-378.5	1668	0	861.8		Equivalent passi	ve force calculated	from pressu	res			
			VALSHT des			1000		001.0	1		Jaiodiatod	z procou				

		4t	th Degree Poly	nomial Tre	endline Coeffic	ients
CWALSHT PASSIVE FORCE=	13281.727	а	b	С	d	е
CWALSHT FS=	1.57	12480	-76494	175701	-191150	92600
GEOSTUDIO PASSIVE FORCE=	5381.4	Note: Coefficie	ents used for calcu	lating FS from	graph	
PASSIVE FORCE DIFFERENCE=	7900.3					
SHEET PILE LENGTH=	10.5					
UNIFORM PRESSURE=	752					

Iteration = 5	Applied	I Uniform I	Pressure =	758.8			Tip (EL) =	-6.01		Cohesion =	Unchanged]	Analysis M	ethod = Sweep S	earch Method
	NET ELEV.	WATER	<lefts< td=""><td>SIDE></td><td><ne (SOIL+V</ne </td><td></td><td><right< td=""><td>SIDE></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></right<></td></lefts<>	SIDE>	<ne (SOIL+V</ne 		<right< td=""><td>SIDE></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></right<>	SIDE>							
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)							
	10	0	0	0	0	0	0	0							
	9	0		0	0	0	0	0							
	8	0	0	0	0	0	0	0							
	7	62.5	0	0	62.5	62.5	0	0	Corrected	PAS	SSIVE		lt	terations	
	6	125	0	0	125	125	0	0	H2O	PSF	LBS	FS	Uniform Load F	Result Tip (ft)	Message
	5.5	156.3	0	0	156.3	156.3	0	0		0	0	1.58	755	-4.2	
Protected Side Ground	5.5	156.3	886.1	0	29	915.1	0	0		886.1	447.125	1.58	757	-5.65	
Surface Elevation	5	187.5	902.4	0	43.9	946.3	0	0		902.4	954.6	1.58	757.5	-5.8	
	4	250	1006.8	0	2	1008.8	0	0		1006.8	1058.95	1.58	758	-5.95	
	3	312.5	1111.1	0	-39.8	1071.3	0	0		1111.1	568.6	1.58	758.1	-5.98	
	2.5	343.8	1163.3	0	-60.7	1102.6	0	0		1163.3	0	1.58	758.2		(1)
	2.5	343.8	1163.3	0	-60.7	1988.6	0	886.1		1163.3	594.675	1.58	758.3		(2)
	2	375	1215.4	0	-81.6	2035.2	0	901.4		1215.4	620.75	1.58	758.4		(3)
	1.5	406.3	1267.6	0	-102.6	2089.5	0	924.5		1267.6	646.85	1.58	758.5		(4)
	1	437.5	1319.8	0	-123.5	2143.8	0	947.5		1319.8	1371.95	1.58	758.6		(1)
	0	500	1424.1	0	-165.3	2252.4	0	993.6		1424.1	1476.25	1.58	758.7		(5)
	-1	562.5	1528.4	0	-207.1	2361	0	1039.7		1528.4	725.7	1.58	758.8	-6.0)1
	-1.5	593.8	1374.4	0	-21.9	2209.6	0	857.1		1374.4	648.7	1.58	758.9	-6.0)3
	-2	625	1220.4	0	163.4	2058.2	0	674.4		1220.4	1272.55	(1) Design	n bottom of cantileve	er wall appears to be	oscillating
	-3	687.5	1324.7	0	121.6	2166.8	0	720.5		1324.7	1376.9	about EL	-5.97 (FT). Unable t	to continue.	-
	-4	750	1429.1	0	79.7	2275.4	0	766.6		1429.1	1327.185	(2) Design	n bottom of cantileve	er wall appears to be	oscillating
Entry failure at this	-4.9	806.3	1520.2	0	44.9	2373.1	0	808.1		1520.2	143.222	about EL	-6.00 (FT). Unable t	to continue.	_
elevation per SlopeW	-5	806.3	1338	0	227.1	2377.7	0	812.7	6.24	1344.24	0			er wall appears to be	oscillating
(see graph title above)	-5	806.3	1338	0	-531.7	1618.9	0	812.7				about EL	-5.93 (FT). Unable t	to continue.	
	-6	806.3	1184.8	0	-378.5	1665	0	858.8		Equivalent pass	ive force	(4) Design	n bottom of cantileve	er wall appears to be	oscillating
•	Note: Tab	le from CV	NALSHT des	sign mode	output file			·		calculated from	pressures	about EL	-5.95 (FT). Unable t	to continue.	
												(5) Design	n bottom of cantileve	er wall appears to be	oscillating
												about EL	-5.99 (FT). Unable t	to continue.	

		4t	h Degree Poly	nomial Tre	ndline Coeffic	ients
CWALSHT PASSIVE FORCE=	13234.007	а	b	С	d	е
CWALSHT FS=	1.58	12480	-76494	175701	-191150	92600
GEOSTUDIO PASSIVE FORCE=	5262.3	Note: Coefficie	ents used for calcul	ating FS from	graph	
PASSIVE FORCE DIFFERENCE=	7971.7					
SHEET PILE LENGTH=	10.5					
UNIFORM PRESSURE=	759					

Note: Due to variability of applied load versus actual tip length, also look at applied load of 758.1 with FS=1.58 to see what passive force difference results.

Iteration = 6	Applied	d Uniform I	Pressure =	758.1	0	Pile	Tip (EL) =	-5.98		Cohesion :	= Unchanged	Analysis Method = Sweep Search Method
	NET ELEV.	WATER	<lefts< td=""><td></td><td><ne (SOIL+N</ne </td><td>/ATER)</td><td><right< td=""><td></td><td></td><td></td><td></td><td></td></right<></td></lefts<>		<ne (SOIL+N</ne 	/ATER)	<right< td=""><td></td><td></td><td></td><td></td><td></td></right<>					
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	(PSF)	ACTIVE (PSF)	PASSIVE (PSF)				
	10	0		0	0	0	0	0				
	9	0	0	0	0	0	0	0				
	8	0	0	0	0	0	0	0				
	7	62.5	0	0	62.5	62.5	0	0	Corrected	PA	SSIVE	
	6	125	0	0	125	125	0	0	H2O	PSF	LBS	
	5.5	156.3		0	156.3	156.3	0	0		0	0	
Protected Side Ground	5.5	156.3		0	28.3	914.4	0	0		886.1	447.125	
Surface Elevation	5	187.5		0	43.2	945.6	0	0		902.4	954.6	
	4	250	1006.8	0	1.3	1008.1	0	0		1006.8	1058.95	
	3	312.5	1111.1	0	-40.5	1070.6	0	0		1111.1	568.6	
	2.5	343.8		0	-61.4	1101.9	0	0		1163.3	0	
	2.5	343.8		0	-61.4	1987.9	0	886.1		1163.3	594.675	
	2	375	1215.4	0	-82.3	2034.5	0	901.4		1215.4	620.75	
	1.5	406.3	1267.6	0	-103.3	2088.8	0	924.5		1267.6	646.85	
	1	437.5		0	-124.2	2143.1	0	947.5		1319.8	1371.95	
	0	500	1424.1	0	-166	2251.7	0	993.6		1424.1	1476.25	
	-1	562.5	1528.4	0	-207.8	2360.3	0	1039.7		1528.4	725.7	
	-1.5	593.8	1374.4	0	-22.6	2208.9	0	857.1		1374.4	648.7	
	-2	625	1220.4	0	162.7	2057.5	0	674.4		1220.4	1272.55	
	-3	687.5		0	120.9	2166.1	0	720.5		1324.7	1376.9	
=	-4	750	1429.1	0	79	2274.7	0	766.6		1429.1	1327.185	
Entry failure at this	-4.9	806.3	1520.2	0	44.2	2372.4	0	808.1		1520.2	143.222	
elevation per SlopeW	-5	806.3		0	226.4	2377	0	812.7	6.24	1344.24	0	
(see graph title above)	-5	806.3		0	-531.7	1618.9	0	812.7				
	-6	806.3	1184.8	0	-378.5	1665	0	858.8		Equivalent pass	sive force calculated	from pressures

 4th Degree Polynomial Trendline Coefficients

 CWALSHT PASSIVE FORCE=
 13234.007
 a
 b
 c
 d
 e

 CWALSHT FS=
 1.58
 12480
 -76494
 175701
 -191150
 92600

 GEOSTUDIO PASSIVE FORCE=
 5262.3
 Note: Coefficients used for calculating FS from graph

 PASSIVE FORCE DIFFERENCE=
 7971.7

10.5

759

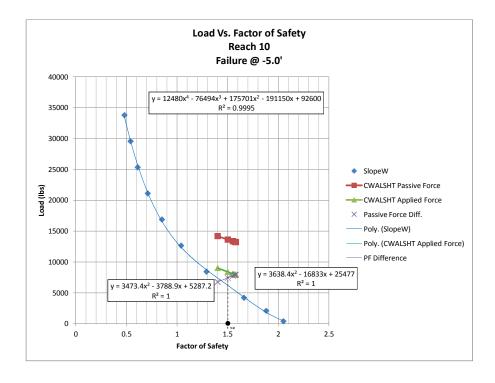
SHEET PILE LENGTH:

UNIFORM PRESSURE=

SOLUTION: FS = 1.58

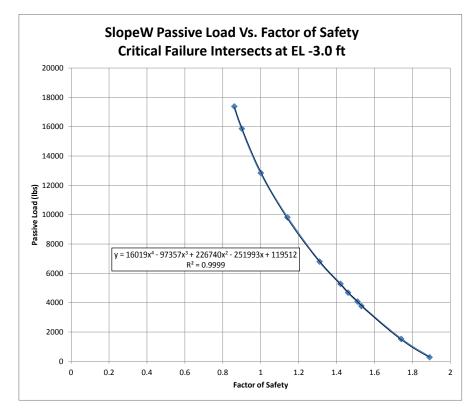
Note - see graph on sheet titled "Geostudio Vs. Cwalsht Graph".

Note: Table from CWALSHT design mode output file



Analyses by:	Reach	FLOOD SIDE CREST ELEVATION NAVD88	PROTECTED SIDE CREST ELEVATION NAVD89	SHEET PILE TIP ELEVATION NAVD88	SHEET PILE PENETRATION (D) (FT)	VATER LE ATION LE VD88 (Rig CWAISH	WATER LEVEL ELEVATION RIGHT SIDE NAVD88 (Left in CWAI SHT)	22 22	Net Pressure Zero @ EL (ft) ² [Crossover Point]	Slip Surface Elevation	ORIGINAL NOTES	FLAC FS RESULTS	slip surface distance above the sheet pile
CD	11	2.5	5.5	-6	8.5	8	-5.6	1.54	-4.7	-3	n/a	1.4	3

Slo	peW	
Surcharge load (pcf)	Passive Load (lbs)	FS
Water Canal=0 ft	281	1.89
Water Canal=4 ft	1528	1.74
Water Canal=8 ft	3775	1.53
5	4077	1.51
15	4682	1.46
25	5287	1.42
50	6799	1.31
100	9823	1.14
150	12848	1.00
200	15872	0.90
225	17384	0.86



teration = A	Applie	d Uniform F	Pressure =	769		Pile	Tip (EL) =	-5.99
						-	•	
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td></td><td>ET> WATER)</td><td colspan="2"><rightside></rightside></td></left<>	SIDE>		ET> WATER)	<rightside></rightside>	
	(FT)	(PSF)	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
	(1-1)		(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
	10	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0
	7	62.5	0	0	62.5	62.5	0	0
Protected Side	6	125	0	0	125	125	0	0
Ground Surface	5.5	156.3	0	0	156.3	156.3	0	0
Elevation	5.5	156.3	857.1	0	68.1	925.3	0	0
	5	187.5	871.5	0	85	956.5	0	0
	4	250	983.5	0	35.5	1019	0	0
	3	312.5	1095.5	0	-14	1081.5	0	0
	2.5	343.8	1151.5	0	-38.7	1112.8	0	0
	2.5	343.8	1151.5	0	-38.7	1969.9	0	857.1
	2	375	1207.5	0	-63.5	1980.5	0	836.5
	1.5	406.3	1263.5	0	-88.2	2037.9	0	862.6
	1	437.5	1319.5	0	-113	2095.3	0	888.8
	0	500	1303.7	0	-34.7	2082.3	0	813.3
	-1	562.5	1282.9	0	48.6	2064.4	0	732.9
Entry failure at this	-2	625	1384.9	0	9.1	2169.2	0	775.2
elevation per	-3	687.5	1486.9	0	-30.4	2274	0	817.5
SlopeW (see graph	-3	687.5	1486.9	0	-799.4	1505	0	817.5
title above).	-4	750	1588.5	0	-838.5	1609.9	0	859.9
	-5	812.5	1189	0	-376.5	1714.7	0	902.2
Water	-5.6	850	1253.8	0	-403.8	1777.6	0	927.6
Water	-6	850	1272	0	-422	1731.9	0	881.9
	Note: Table	from CWA	LSHT desi	gn mode ou	tput file	·		

Cohesion = Unchanged	Analysis Method = Sweep Search Metho

PAS	SIVE			Iterations		
PSF	LBS	FS	Uniform Load	Result	Tip (ft)	Message
857.1	432.15	1.4	790	Runs	-6.88	
871.5	927.5	1.4	780	Runs	-6.45	
983.5	1039.5	1.4	768	Runs	-5.94	
1095.5	561.75	1.4	770	Runs	-6.03	
1151.5	0	1.4	769	Runs	-5.99	
1151.5	589.75					
1207.5	617.75					
1263.5	645.75					
1319.5	1311.6					
1303.7	1293.3					
1282.9	1333.9					
1384.9	1435.9					
1486.9	0					

Equivalent passive force calculated from pressures

		4th I	Degree Polyn	omial Tren	dline Coeff	icients		
CWALSHT PASSIVE FORCE=	10188.85	а	b	С	d	е		
CWALSHT FS=	1.4	16019	-97357	226740	-251993	119512		
GEOSTUDIO PASSIVE FORCE=	5523.2	Note: Coefficients used for calculating FS from graph						
PASSIVE FORCE DIFFERENCE=	4665.7							
SHEET PILE LENGTH=	8.5							
UNIFORM PRESSURE=	549							

Iteration = B	Applie	d Uniform F	Pressure =	715		Pile	Tip (EL) =	-6.01
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><ne (SOIL+V</ne </td><td></td><td><righ< td=""><td>TSIDE></td></righ<></td></left<>	SIDE>	<ne (SOIL+V</ne 		<righ< td=""><td>TSIDE></td></righ<>	TSIDE>
	(FT)	(PSF)	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
	` '		(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
	10	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0
	7	62.5	0	0	62.5	62.5	0	0
Protected Side	6	125	0	0	125	125	0	0
Ground Surface	5.5	156.3	0	0	156.3	156.3	0	0
Elevation	5.5	156.3	800	0	71.3	871.3	0	0
	5	187.5	817.1	0	85.4	902.5	0	0
	4	250	929.1	0	35.9	965	0	0
	3	312.5	1041.1	0	-13.6	1027.5	0	0
	2.5	343.8	1097.1	0	-38.4	1058.8	0	0
	2.5	343.8	1097.1	0	-38.4	1858.8	0	800
	2	375	1153.1	0	-63.1	1872.4	0	782.4
	1.5	406.3	1209.1	0	-87.9	1929.9	0	808.6
	1	437.5	1265.1	0	-112.6	1987.3	0	834.8
	0	500	1257.7	0	-42.7	1982.7	0	767.7
	-1	562.5	1245.2	0	32.3	1973	0	695.5
Entry failure at this	-2	625	1347.2	0	-7.2	2077.9	0	737.9
elevation per	-3	687.5	1449.2	0	-46.7	2182.7	0	780.2
SlopeW (see graph	-3	687.5	1449.2	0	-761.7	1467.7	0	780.2
title above).	-4	750	1430	0	-680	1572.6	0	822.6
	-5	812.5	1189	0	-376.5	1677.4	0	864.9
Water	-5.6	850	1253.8	0	-403.8	1740.3	0	890.3
vvaior	-6	850	1272	0	-422	1698.6	0	848.6
	Note: Table	e from CWA	LSHT desi	gn mode ou	tput file			

Cohesion = Unchanged

Analysis Method = Sweep Search Method

ETL 1110-2-575

Analysis

PASSIVE Iterations PSF LBS FS Uniform Load Result Tip (ft) Message 800 404.275 Runs -5.33 1.5 817.1 873.1 1.5 720 -6.24 Runs 929.1 985.1 1.5 715 Runs -6.01 1041.1 534.55 1097.1 0 1097.1 562.55 1153.1 590.55 1209.1 618.55 1265.1 1261.4 1257.7 1251.45 1245.2 1296.2 1347.2 1398.2 1449.2 0

Equivalent passive force calculated from pressures

		4th Degree Polynomial Trendline Coefficients							
CWALSHT PASSIVE FORCE=	9775.925	а	b	С	d	е			
CWALSHT FS=	1.5	16019	-97357	226740	-251993	119512			
GEOSTUDIO PASSIVE FORCE=	4203.8	Note: Coefficients used for calculating FS from graph							
PASSIVE FORCE DIFFERENCE=	5572.1								
SHEET PILE LENGTH=	8.5								
UNIFORM PRESSURE=	656								

Notes: The next run is determined by finding the intersection of linear trendlines between the CWALSHT Applied Force Line and the Passive Force Difference Line. This is 1.537; therefore, 1.54 will be used for the next run.

Iteration = C	Applie	d Uniform F	Pressure =	692		Pile	Tip (EL) =	-6.00
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><ne (SOIL+V</ne </td><td></td><td colspan="2"><rightside></rightside></td></left<>	SIDE>	<ne (SOIL+V</ne 		<rightside></rightside>	
	(FT)	(PSF)	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
	(1 1)		(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
	10	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0
	7	62.5	0	0	62.5	62.5	0	0
Protected Side	6	125	0	0	125	125	0	0
Ground Surface	5.5	156.3	0	0	156.3	156.3	0	0
Elevation	5.5	156.3	779.2	0	69	848.3	0	0
	5	187.5	797.4	0	82.1	879.5	0	0
	4	250	909.4	0	32.6	942	0	0
	3	312.5	1021.4	0	-16.9	1004.5	0	0
	2.5	343.8	1077.4	0	-41.6	1035.8	0	0
	2.5	343.8	1077.4	0	-41.6	1815	0	779.2
	2	375	1133.4	0	-66.4	1829.8	0	762.8
	1.5	406.3	1189.4	0	-91.1	1887.2	0	789
	1	437.5	1245.3	0	-115.8	1944.6	0	815.1
	0	500	1240.9	0	-48.9	1943.1	0	751.1
	-1	562.5	1231.5	0	23	1936.5	0	682
Entry failure at this	-2	625	1333.5	0	-16.5	2041.3	0	724.3
elevation per	-3	687.5	1435.5	0	-56	2146.2	0	766.7
SlopeW (see graph	-3	687.5	1435.5	0	-748	1454.2	0	766.7
title above).	-4	750	1216.2	0	-466.2	1559	0	809
	-5	812.5	1189	0	-376.5	1663.8	0	851.3
Water	-5.6	850	1253.8	0	-403.8	1726.7	0	876.7
	-6	850	1272	0	-422	1686.5	0	836.5
	-6	850		0	-422			

Cohesion = Unchanged

Analysis Method = Sweep Search Method

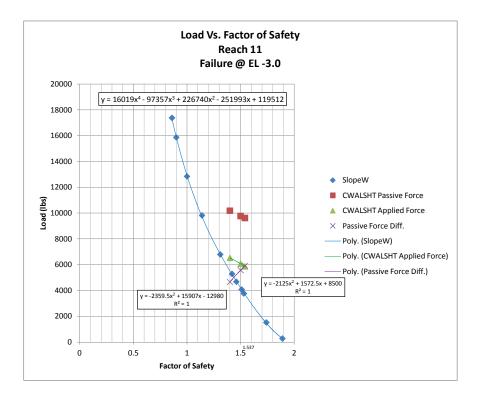
PAS	SIVE			Iterations		
PSF	LBS	FS	Uniform Load	Result	Tip (ft)	Message
779.2	394.15	1.54	700		-6.43	
797.4	853.4	1.54	690		-5.9	
909.4	965.4	1.54	692		-6	
1021.4	524.7					
1077.4	0					
1077.4	552.7					
1133.4	580.7					
1189.4	608.675					
1245.3	1243.1					
1240.9	1236.2					
1231.5	1282.5					
1333.5	1384.5					
1435.5	0					
		•				

Equivalent passive force calculated from pressures

		4th Degree Polynomial Trendline Coefficients								
CWALSHT PASSIVE FORCE=	9626.025	а	b	С	d	е				
CWALSHT FS=	1.54	16019	-97357	226740	-251993	119512				
GEOSTUDIO PASSIVE FORCE=	3704.5	Note: Coefficients used for calculating FS from graph								
PASSIVE FORCE DIFFERENCE=	5921.5									
SHEET PILE LENGTH=	8.5									
UNIFORM PRESSURE=	697									

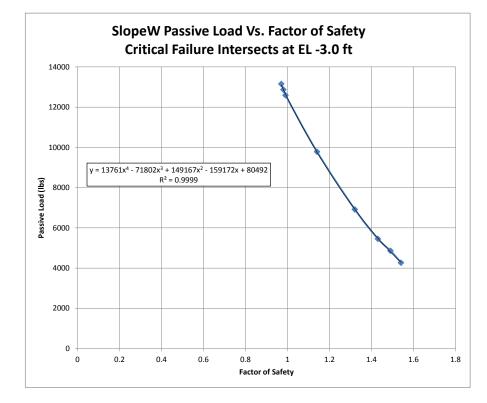
Notes: From the revised linear trendlines (including this iteration data point), the intersection between the CWALSHT Applied Force line and Passive Force Difference Line was found to be 1.537, the same as the previous iteration. Therefore, the resulting factor of safety is 1.54 per the ETL method (versus 1.40 FLAC).

SOLUTION: FS = 1.54 Note - see graph on next sheet.



Analyses by:	Reach	FLOOD SIDE CREST ELEVATION NAVD88	PROTECTED SIDE CREST ELEVATION NAVD89	SHEET PILE TIP ELEVATION NAVD88	SHEET PILE PENETRATION (D) (FT)	WATER LEVEL ELEVATION LEFT SIDE NAVD88 (Right in CWALSHT)	WATER LEVEL ELEVATION RIGHT SIDE NAVD88 (Left in CWALSHT)	Resulting Factor of Safety	Net Pressure Zero @ EL (ft) ² [Crossover Point]	Slip Surface Elevation	ORIGINAL NOTES	FLAC FS RESULTS	slip surface distance above the sheet pile
KA	11	2.5	5.5	-6	8.5	8.6	-5.6	1.54		-3	n/a	n/a	3

Slo	SlopeW									
Surcharge load (pcf)	Passive Load (lbs)	FS								
5	4266.1	1.54								
15	4862	1.49								
25	5453.8	1.43								
50	6918.1	1.32								
100	9784.7	1.14								
150	12592	0.99								
200	12872	0.98								
225	13154	0.97								



Iteration = 1	Applie	d Uniform F	Pressure =	679		Pile	e Tip (EL) =	-6.03
-								
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><nl (SOIL+V</nl </td><td>ET> VATER)</td><td><righ< td=""><td>TSIDE></td></righ<></td></left<>	SIDE>	<nl (SOIL+V</nl 	ET> VATER)	<righ< td=""><td>TSIDE></td></righ<>	TSIDE>
	(FT)	(PSF)	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
	(1 1)		(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
	10	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0
	8.6	0	0	0	0	0	0	0
	8	37.5	0	0	37.5	37.5	0	0
	7	100	0	0	100	100	0	0
Protected Side	6	162.5	0	0	162.5	162.5	0	0
Ground Surface	5.5	193.8	0	0	193.8	193.8	0	0
Elevation	5.5	193.8	827.6	0	45.2	872.8	0	0
	5	225	843.4	0	60.6	904	0	0
	4	287.5	955.4	0	11.1	966.5	0	0
	3	350	1067.4	0	-38.4	1029	0	0
	2.5	381.3	1123.4	0	-63.1	1060.3	0	0
	2.5	381.3	1123.4	0	-63.1	1887.8	0	827.6
	2	412.5	1179.4	0	-87.9	1900	0	808.5
	1.5	443.8	1235.4	0	-112.6	1957.4	0	834.7
	1	475	1291.4	0	-137.4	2014.8	0	860.8
	0	537.5	1279.9	0	-63.4	2006.2	0	789.7
	-1	600	1263.4	0	15.6	1992.6	0	713.6
Entry failure at this	-2	662.5	1365.4	0	-23.9	2097.4	0	755.9
elevation per	-3	725	1467.4	0	-63.4	2202.2	0	798.2
SlopeW (see graph	-3	725	1467.4	0	-742.4	1523.2	0	798.2
title above).	-4	787.5	1455.4	0	-667.9	1628.1	0	840.6
	-5	850	1189	0	-339	1732.9	0	882.9
Water	-5.6	887.5	1253.8	0	-366.3	1795.8	0	908.3
Fraio	-6	887.5	1272	0	-384.5	1752.2	0	864.7

Cohesion = Unchanged Analysis Method = Sweep Search Method

PASSIVE LBS 417.75 843.4 899.4 955.4 1011.4 1067.4 547.7 1123.4 0 1123.4 575.7 1179.4 603.7 1235.4 631.7 1291.4 1285.65 1279.9 1271.65 1263.4 1314.4 1365.4 1416.4 1467.4 0

Equivalent passive force calculated from pressures

Note: Table from CWALSHT design mode output file

		4th Degree Polynomial Trendline Coefficients						
CWALSHT PASSIVE FORCE=	9975.45	а	b	С	d	е		
CWALSHT FS=	1.45	13761 -71802 149167 -159172 80492						
GEOSTUDIO PASSIVE FORCE=	5249.4	Note: Coefficients used for calculating FS from graph						
PASSIVE FORCE DIFFERENCE=	4726.0							
SHEET PILE LENGTH=	8.5							
UNIFORM PRESSURE=	556							

Pile Tip (EL) = -6.0

	тррпс	a official i	1000010 =	002		1 110) TIP (EE) =	0.0	
	NET	WATER	<leftside></leftside>		<net></net>		<rightside></rightside>		
	ELEV.				(SOIL+WATER)				
	(FT)	(PSF)	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE	
	, ,		(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	
	10	0	0	0	0	0	0	0	
	9	0	0	0	0	0	0	0	
	8.6	0	0	0	0	0	0	0	
	8	37.5	0	0	37.5	37.5	0	0	
	7	100	0	0	100	100	0	0	
Protected Side	6	162.5	0	0	162.5	162.5	0	0	
Ground Surface	5.5	193.8	0	0	193.8	193.8	0	0	
Elevation	5.5	193.8	750	0	45.8	795.8	0	0	
	5	225	769.6	0	57.4	827	0	0	
	4	287.5	881.6	0	7.9	889.5	0	0	
	3	350	993.6	0	-41.6	952	0	0	
	2.5	381.3	1049.6	0	-66.3	983.3	0	0	
	2.5	381.3	1049.6	0	-66.3	1733.3	0	750	
	2	412.5	1105.6	0	-91.1	1749.7	0	735.2	
	1.5	443.8	1161.6	0	-115.8	1807.1	0	761.3	
	1	475	1217.5	0	-140.5	1864.5	0	787.5	
	0	537.5	1217.4	0	-77.9	1867.2	0	727.7	
	-1	600	1212.3	0	-10.3	1864.9	0	662.9	
Entry failure at this	-2	662.5	1314.2	0	-49.7	1969.7	0	705.2	
elevation per	-3	725	1416.1	0	-89.1	2074.6	0	747.6	
SlopeW (see graph	-3	725	1416.1	0	-691.1	1472.6	0	747.6	
title above).	-4	787.5	1158.4	0	-370.9	1577.4	0	789.9	
*	-5	850	1189	0	-339	1682.2	0	832.2	
Water	-5.6	887.5	1253.8	0	-366.3	1745.2	0	857.7	
vvaler	-6	887.5	1272	0	-384.5	1706.9	0	819.4	

Applied Uniform Pressure = 602

Iteration = 2

Cohesion = Unchanged Analysis Method = Sweep Search Method

PASSIVE LBS 379.9 769.6 825.6 881.6 937.6 993.6 510.8 1049.6 0 1049.6 538.8 1105.6 566.8 594.775 1161.6 1217.5 1217.45 1217.4 1214.85 1212.3 1263.25 1365.15 1314.2 1416.1 0

Equivalent passive force calculated from pressures

Note: Table from CWALSHT design mode output file

		4th Degree Polynomial Trendline Coefficients						
CWALSHT PASSIVE FORCE=	9414.975	а	b	С	d	е		
CWALSHT FS=	1.6	13761	-71802	149167	-159172	80492		
GEOSTUDIO PASSIVE FORCE=	3767.4	Note: Coefficients used for calculating FS from graph						
PASSIVE FORCE DIFFERENCE=	5647.6							
SHEET PILE LENGTH=	8.5							
UNIFORM PRESSURE=	664							

Iteration = 3	Applied Uniform Pressure =		625	Pile		e Tip (EL) =	-6	
	NET ELEV.	WATER	<leftside></leftside>		<net> (SOIL+WATER)</net>		<rightside></rightside>	
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
	10	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0
	8.6	0	0	0	0	0	0	0
	8	37.5	0	0	37.5	37.5	0	0
	7	100	0	0	100	100	0	0
Protected Side	6	162.5	0	0	162.5	162.5	0	0
Ground Surface	5.5	193.8	0	0	193.8	193.8	0	0
Elevation	5.5	193.8	774.2	0	44.6	818.8	0	0
	5	225	792.6	0	57.4	850	0	0
	4	287.5	904.6	0	7.9	912.5	0	0
	3	350	1016.6	0	-41.6	975	0	0
	2.5	381.3	1072.6	0	-66.3	1006.3	0	0
	2.5	381.3	1072.6	0	-66.3	1780.4	0	774.2
	2	412.5	1128.6	0	-91.1	1795.5	0	758
	1.5	443.8	1184.6	0	-115.8	1853	0	784.2
	1	475	1240.6	0	-140.6	1910.4	0	810.4
	0	537.5	1236.9	0	-74.4	1909.5	0	747
	-1	600	1228.2	0	-3.2	1903.7	0	678.7
Entry failure at this	-2	662.5	1330.2	0	-42.7	2008.5	0	721
elevation per	-3	725	1432.2	0	-82.2	2113.4	0	763.4
SlopeW (see graph	-3	725	1432.2	0	-707.2	1488.4	0	763.4
title above).	-4	787.5	1206.2	0	-418.7	1593.2	0	805.7
	-5	850	1189	0	-339	1698	0	848
Water	-5.6	887.5	1253.8	0	-366.3	1760.9	0	873.4
Water	-6	887.5	1272	0	-384.5	1721	0	833.5

Cohesion = Unchanged Analysis Method = Sweep Search Method

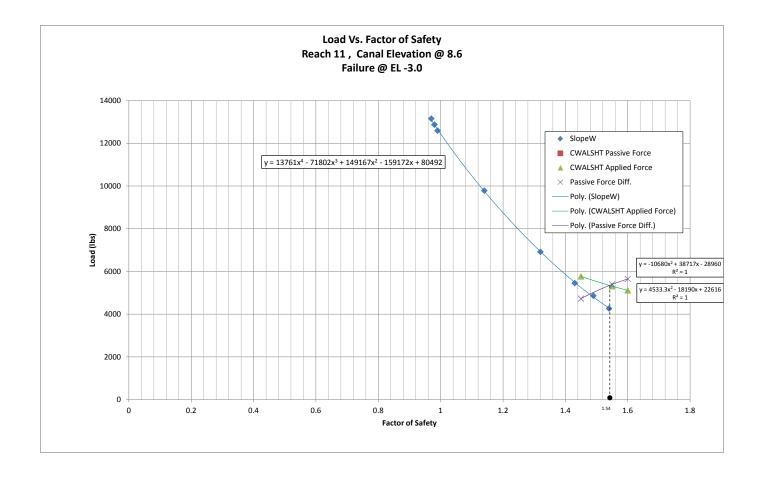
PASSIVE LBS 774.2 391.7 792.6 848.6 904.6 960.6 1016.6 522.3 1072.6 0 1072.6 550.3 1128.6 578.3 1184.6 606.3 1240.6 1238.75 1236.9 1232.55 1228.2 1279.2 1330.2 1381.2 1432.2 0

Equivalent passive force calculated from pressures

Note: Table from CWALSHT design mode output file

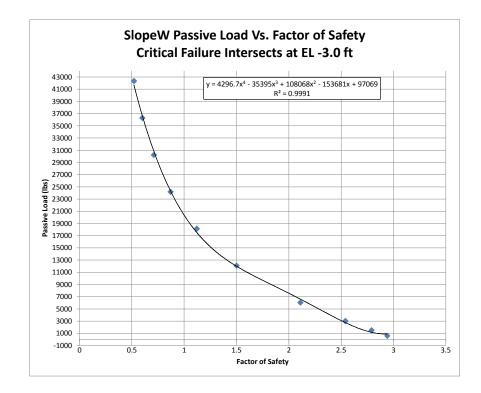
		4th Degree Polynomial Trendline Coefficients					
CWALSHT PASSIVE FORCE=	9589.8	а	b	С	d	е	
CWALSHT FS=	1.55	13761	-71802	149167	-159172	80492	
GEOSTUDIO PASSIVE FORCE=	4196.0	Note: Coefficients used for calculating FS from graph					
PASSIVE FORCE DIFFERENCE=	5393.8						
SHEET PILE LENGTH=	8.5						
LINIFORM PRESSURE=	635						

SOLUTION: FS = 1.54 Note - see graph on next sheet.



Analyses by:	Reach	FLOOD SIDE CREST ELEVATION NAVD88	PROTECTED SIDE CREST ELEVATION NAVD89	SHEET PILE TIP ELEVATION NAVD88	SHEET PILE PENETRATION (D) (FT)	WATER LEVEL ELEVATION LEFT SIDE NAVD88 (Right in CWALSHT)	WATER LEVEL ELEVATION RIGHT SIDE NAVD88 (Left in CWALSHT)	Factor of Safety REVISED PROCEDURE	Net Pressure Zero @ EL (ft) ² [Crossover Point]	Slip Surface Elevation	ORIGINAL NOTES	FLAC FS RESULTS	APPLIED HORIZONTAL LOAD (psf)	slip surface distance above the sheet pile
KA	12	2.4	5.5	-6	8.4	8	-3.8	2.39	-4.34	-3		n/a	347	3

S	SlopeW						
Surcharge	Passive	FS					
load (pcf)	Load (lbs)	гэ					
10	605	2.94					
25	1512	2.79					
50	3025	2.54					
100	6050	2.11					
200	12099	1.5					
300	18149	1.12					
400	24198	0.87					
500	30248	0.71					
600	36298	0.6					
700	42347	0.52					



Iteration = 1	Applie	ed Uniform I	Pressure =	330		Pile	Tip (EL) =	-6.08
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><ne (SOIL+V</ne </td><td>ET> WATER)</td><td><right< td=""><td>TSIDE></td></right<></td></left<>	SIDE>	<ne (SOIL+V</ne 	ET> WATER)	<right< td=""><td>TSIDE></td></right<>	TSIDE>
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
	10	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0
	7	62.5	0	0	62.5	62.5	0	0
	6	125	0	0	125	125	0	0
Protected Side	5.5	156.3	0	0	156.3	156.3	0	0
Ground Surface	5.5	156.3	400	0	86.3	486.3	0	0
Elevation	5	187.5	431	0	86.5	517.5	0	0
	4	250	529.9	0	50.1	580	0	0
	3	312.5	628.9	0	13.6	642.5	0	0
	2.4	350	688.2	0	-8.2	680	0	0
	2.4	350	688.2	0	-8.2	1080	0	400
	2	375	727.8	0	-22.8	1121.6	0	416.6
	1.4	412.5	787.2	0	-44.7	1184	0	441.5
	1	437.5	826.8	0	-59.3	1225.6	0	458.1
	0	500	925.7	0	-95.7	1329.6	0	499.6
	-1	562.5	1024.7	0	-132.2	1433.6	0	541.1
Entry failure at this	-2	625	1123.5	0	-168.5	1537.6	0	582.6
elevation per	-3	687.5	1192.9	0	-175.4	1641.6	0	624.1
SlopeW (see	-3	687.5	1192.9	0	-505.4	1311.6	0	624.1
graph title above).	-3.8	737.5	1190.4	0	-452.9	1394.8	0	657.3
	-4	737.5	1184.4	0	-446.9	1403.1	0	665.6
	Note: Table	from CWA	LSHT desig	n mode out	put file	·		

Cohesion = Unchanged

Analysis Method = Sweep Search Method

PASSIVE PSF LBS 400 207.75 431 480.45 529.9 579.4 628.9 395.13 688.2 0 688.2 283.2 454.5 727.8 787.2 322.8 826.8 876.25 925.7 975.2 1024.7 1074.1 1123.5 1158.2 1192.9 0

CWALSHT PASSIVE FORCE=	6806.98
CWALSHT FS=	-
GEOSTUDIO PASSIVE FORCE=	3084.5
PASSIVE FORCE DIFFERENCE=	3722.5
SHEET PILE LENGTH=	8.5
UNIFORM PRESSURE=	438

Iteration = 2	Applie	ed Uniform I	Pressure =	373		Pile	Tip (EL) =	-6.02
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td></td><td>ET> WATER)</td><td><righ< td=""><td>TSIDE></td></righ<></td></left<>	SIDE>		ET> WATER)	<righ< td=""><td>TSIDE></td></righ<>	TSIDE>
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
	10	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0
	7	62.5	0	0	62.5	62.5	0	0
	6	125	0	0	125	125	0	0
Protected Side	5.5	156.3	0	0	156.3	156.3	0	0
Ground Surface	5.5	156.3	444.4	0	84.8	529.3	0	0
Elevation	5	187.5	473.4	0	87.1	560.5	0	0
	4	250	572.3	0	50.7	623	0	0
	3	312.5	671.3	0	14.2	685.5	0	0
	2.4	350	730.6	0	-7.6	723	0	0
	2.4	350	730.6	0	-7.6	1167.4	0	444.4
	2	375	770.2	0	-22.2	1209	0	
	1.4	412.5	829.6	0	-44.1	1271.4	0	485.9
	1	437.5	869.1	0	-58.6	1313	0	502.5
	0	500	968.1	0	-95.1	1417	0	544
	-1	562.5	1067	0	-131.5	1521	0	585.5
Entry failure at this	-2	625	1166	0	-168	1625	0	627
elevation per	-3	687.5	1241.7	0	-181.2	1729	0	
SlopeW (see	-3	687.5	1241.7	0	-554.2	1356	0	
graph title above).	-3.8	737.5	1233.8	0	-496.3	1439.2	0	701.7
	-4	737.5	1226.7	0	-489.2	1447.5	0	710

Cohesion = Unchanged

Analysis Method = Sweep Search Method

4th Degree Polynomial Trendline Coefficients

-35395 108068 -153681

97069

b

Note: Coefficients used for calculating FS from graph

4296.7

PASSIVE PSF LBS 444.4 229.45 473.4 522.85 572.3 621.8 671.3 420.57 730.6 0 730.6 300.16 479.94 770.2 829.6 339.74 869.1 918.6 968.1 1017.55 1067 1116.5 1166 1203.85 1241.7 0

SHEET PILE LENGTH=

UNIFORM PRESSURE=

Equivalent passive force calculated from pressures

8.5

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Iteration = 3	Applie	ed Uniform I	Pressure =	345		Pile	Tip (EL) =	-6.00
	NET	WATER	<left< th=""><th>SIDE></th><th><ne (SOIL+V</ne </th><th>ET> WATER)</th><th><righ< th=""><th>TSIDE></th></righ<></th></left<>	SIDE>	<ne (SOIL+V</ne 	ET> WATER)	<righ< th=""><th>TSIDE></th></righ<>	TSIDE>
	ELEV. (FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
	10	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	-
	8	0	0	0	0	0	0	-
	7	62.5	0	0	62.5	62.5	0	0
	6	125	0	0	125	125	0	0
Protected Side	5.5	156.3	0	0	156.3	156.3	0	0
Ground Surface	5.5	156.3	416.7	0	84.6	501.3	0	0
Elevation	5	187.5	446.9	0	85.6	532.5	0	0
	4	250	545.8	0	49.2	595	0	0
	3	312.5	644.8	0	12.7	657.5	0	0
	2.4	350	704.1	0	-9.1	695	0	0
	2.4	350	704.1	0	-9.1	1111.7	0	416.7
	2	375	743.7	0	-23.7	1153.3	0	433.3
	1.4	412.5	803.1	0	-45.6	1215.7	0	458.2
	1	437.5	842.7	0	-60.2	1257.3	0	474.8
	0	500	941.6	0	-96.6	1361.3	0	516.3
	-1	562.5	1040.5	0	-133	1465.3	0	557.8
Entry failure at this	-2	625	1139.5	0	-169.5	1569.3	0	599.3
elevation per	-3	687.5	1211.2	0	-178.7	1673.3	0	640.8
SlopeW (see	-3	687.5	1211.2	0	-523.7	1328.3	0	640.8
graph title above).	-3.8	737.5	1209	0	-471.5	1411.5	0	674
	-4	737.5	1202.6	0	-465.1	1419.8	0	682.3

Note: Table from CWALSHT design mode output file

Cohesion = Unchanged

Analysis Method = Sweep Search Method

PASSIVE PSF LBS 416.7 215.9 446.9 496.35 545.8 595.3 644.8 404.67 704.1 0 704.1 289.56 743.7 464.04 803.1 329.16 842.7 892.15 941.6 991.05 1040.5 1090 1139.5 1175.35 1211.2 0

CWALSHT PASSIVE FORCE=	6943.53	
CWALSHT FS=	2.4	
GEOSTUDIO PASSIVE FORCE=	3960.0	Ν
PASSIVE FORCE DIFFERENCE=	2983.5	
SHEET PILE LENGTH=	8.5	
UNIFORM PRESSURE=	351	

Iteration = 4	Applie	d Uniform I	Pressure =	346		Pile	Tip (EL) =	-6.05
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td>(SOIL+N</td><td>ET> VATER)</td><td><righ< td=""><td>TSIDE></td></righ<></td></left<>	SIDE>	(SOIL+N	ET> VATER)	<righ< td=""><td>TSIDE></td></righ<>	TSIDE>
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
	10	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	-
	7	62.5	0	0	62.5	62.5	0	0
	6	125	0	0	125	125	0	0
Protected Side	5.5	156.3	0	0	156.3	156.3	0	0
Ground Surface	5.5	156.3	416.7	0	85.6	502.3	0	0
Elevation	5	187.5	446.9	0	86.6	533.5	0	0
	4	250	545.8	0	50.2	596	0	0
	3	312.5	644.8	0	13.7	658.5	0	0
	2.4	350	704.1	0	-8.1	696	0	0
	2.4	350	704.1	0	-8.1	1112.7	0	416.7
	2	375	743.7	0	-22.7	1154.3	0	433.3
	1.4	412.5	803.1	0	-44.6	1216.7	0	
	1	437.5	842.7	0	-59.2	1258.3	0	-
	0	500	941.6	0	-95.6	1362.3	0	
	-1	562.5	1040.5	0	-132	1466.3	0	
Entry failure at this	-2	625	1139.5	0	-168.5	1570.3	0	
elevation per	-3	687.5	1211.2	0	-177.7	1674.3	0	
SlopeW (see	-3	687.5	1211.2	0	-523.7	1328.3	0	
graph title above).	-3.8	737.5	1209	0	-471.5	1411.5	0	
	-4	737.5	1202.6	0	-465.1	1419.8	0	682.3

Cohesion = Unchanged

Analysis Method = Sweep Search Method

PASSIVE PSF LBS 416.7 215.9 446.9 496.35 545.8 595.3 644.8 404.67 704.1 0 704.1 289.56 743.7 464.04 803.1 329.16 842.7 892.15 941.6 991.05 1040.5 1090 1139.5 1175.35 1211.2 0

Equivalent passive force calculated from pressures

Note: Table from CWALSHT design mode output file

		4th De	egree Polyi	nomial Trer	ndline Coeff	icients
CWALSHT PASSIVE FORCE=	6943.53	а	b	С	d	е
CWALSHT FS=	2.4	4296.7	-35395	108068	-153681	97069
GEOSTUDIO PASSIVE FORCE=	3960.0	Note: Coefficie	ents used for c	alculating FS fr	om graph	
PASSIVE FORCE DIFFERENCE=	2983.5					
SHEET PILE LENGTH=	8.5					
UNIFORM PRESSURE=	351					

Iteration = 5	Applie	ed Uniform I	Pressure =	347		Pile	Tip (EL) =	-6.01
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><ne (SOIL+V</ne </td><td>ET> WATER)</td><td><right< td=""><td>TSIDE></td></right<></td></left<>	SIDE>	<ne (SOIL+V</ne 	ET> WATER)	<right< td=""><td>TSIDE></td></right<>	TSIDE>
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
	10	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0
	7	62.5	0	0	62.5	62.5	0	0
	6	125	0	0	125	125	0	0
Protected Side	5.5	156.3	0	0	156.3	156.3	0	0
Ground Surface	5.5	156.3	418.4	0	84.8	503.3	0	0
Elevation	5	187.5	448.5	0	86	534.5	0	0
	4	250	547.5	0	49.5	597	0	0
	3	312.5	646.4	0	13.1	659.5	0	0
	2.4	350	705.8	0	-8.8	697	0	0
	2.4	350	705.8	0	-8.8	1115.4	0	418.4
	2	375	745.4	0	-23.4	1157	0	435
	1.4	412.5	804.7	0	-45.2	1219.4	0	459.9
	1	437.5	844.3	0	-59.8	1261	0	476.5
	0	500	943.3	0	-96.3	1365	0	518
	-1	562.5	1042.2	0	-132.7	1469	0	559.5
Entry failure at this	-2	625	1141.2	0	-169.2	1573	0	601
elevation per	-3	687.5	1213.1	0	-178.6	1677	0	642.5
SlopeW (see	-3	687.5	1213.1	0	-525.6	1330	0	642.5
graph title above).	-3.8	737.5	1210.5	0	-473	1413.2	0	675.7
	-4	737.5	1204.1	0	-466.6	1421.5	0	684

0011001011 -	Chonangea

Analysis Method = Sweep Search Method

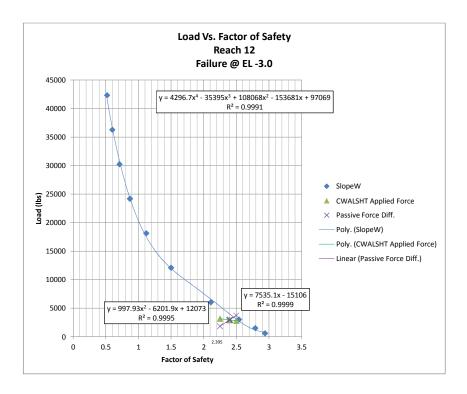
PASSIVE					
PSF	LBS				
0	0				
418.4	216.725				
448.5	498				
547.5	596.95				
646.4	405.66				
705.8	0				
705.8	290.24				
745.4	465.03				
804.7	329.8				
844.3	893.8				
943.3	992.75				
1042.2	1091.7				
1141.2	1177.15				
1213.1	0				

Equivalent passive force calculated from pressures

Note: Table from CWALSHT design mode output file

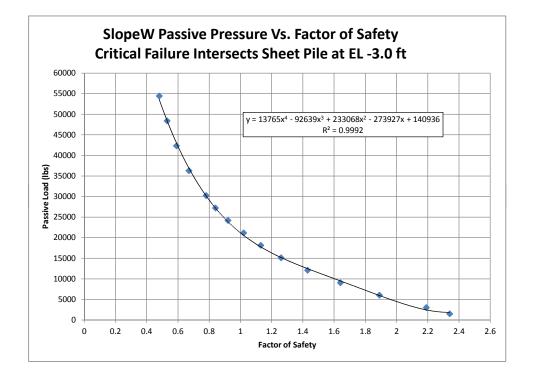
	4th De	egree Polyi	nomial Trei	ndline Coeff	icients		
CWALSHT PASSIVE FORCE=	6957.805	а	b	С	d	е	
CWALSHT FS=	2.39	4296.7	-35395	108068	-153681	97069	
GEOSTUDIO PASSIVE FORCE=	4050.1	Note: Coefficients used for calculating FS from graph					
PASSIVE FORCE DIFFERENCE=	2907.7						
SHEET PILE LENGTH=	8.5						
UNIFORM PRESSURE=	342						

SOLUTION: FS = 2.39 Note - see graph on next sheet.



Analyses by:	Reach	FLOOD SIDE CREST ELEVATION NAVD88	PROTECTED SIDE CREST ELEVATION NAVD89	SHEET PILE TIP ELEVATION NAVD88	SHEET PILE PENETRATION (D) (FT)	WATER LEVEL ELEVATION LEFT SIDE NAVD88 (Right in CWALSHT)	WATER LEVEL ELEVATION RIGHT SIDE NAVD88 (Left in CWALSHT)	Factor of Safety	Net Pressure Zero @ EL (ft) ² [Crossover Point]	Modified Slip Surface Elevation	ORIGINAL NOTES	FLAC FS RESULTS	APPLIED HORIZONTAL LOAD (psf)	Slip surface distance above the sheet pile
KA	13	3.3	6	-6	9.3	8	-3.9	2.06	-4.49	-3		n/a	672	3

	SlopeW						
Surcharge	Passive	FS					
load (pcf)	Load (lbs)						
25	1513	2.34					
50	3025	2.19					
100	6050	1.89					
150	9075	1.64					
200	12100	1.43					
250	15125	1.26					
300	18150	1.13					
350	21175	1.02					
400	24200	0.92					
450	27225	0.84					
500	30250	0.78					
600	36300	0.67					
700	42350	0.59					
800	48400	0.53					
900	54450	0.48					



Applied Uniform Pressure = 694 Pile Tip (EL) = -6.08

<---NET--->

Cohesion = Unchanged

Analysis Method = Sweep Search Method

Protected Side **Ground Surface** Elevation

<---LEFTSIDE---> <--RIGHTSIDE---> NET WATER (SOIL+WATER) ELEV. (PSF) PASSIVE ACTIVE ACTIVE PASSIVE ACTIVE PASSIVE (FT) (PSF) (PSF) (PSF) (PSF) (PSF) (PSF) 10 9 0 0 0 0 0 0 8 0 0 0 0 0 0 7 62.5 0 62.5 0 0 62.5 6 125 0 0 125 125 0 6 125 750 0 69 819 0 5 187.5 811.5 0 70 881.5 0 4 250 913.4 0 30.6 944 0 3.3 984.8 0 293.8 0 3 987.8 3.3 293.8 984.8 0 3 1737.8 0 750 3.2 298.5 992.5 0 0 1738.4 0 745.9 3 312.5 1015.3 0 -8.8 1740.3 0 733.8 2.3 356.3 1086.7 0 -36.4 1814.6 0 764.3 2 375 1117.3 0 -48.3 1846.4 0 777.4 1 437.5 1219.2 0 -87.7 1952.5 0 82 0 500 1321.1 0 -127.1 2058.6 0 864.6 -1 562.5 1423.1 0 908.3 0 -166.6 2164.8 -2 0 0 625 1245.1 73.9 2116.8 797.8 -3 687.5 1041.2 0 340.3 2061.3 0 679.8 -3 687.5 1041.2 0 -353.7 1367.3 0 679.8 -3.9 743.8 1073.8 0 -330 1449.3 0 705.5 743.8 1069 -325.3 1452.1 0 708.4 Note: Table from CWALSHT design mode output file

PASSIVE PSF LBS 0 0 780.75 750 811.5 862.45 913.4 664.37 984.8 0 984.8 98.865 992.5 200.78 1015.3 735.7 1086.7 330.6 1117.3 1168.25 1219.2 1270.15 1321.1 1372.1 1423.1 1334.1 1143.15 1245.1 1041.2 0

Entry failure at this elevation per SlopeW (see graph title above).

Equivalent passive force calculated from pressures

		4th Degree Polynomial Trendline Coeffic					
CWALSHT PASSIVE FORCE=	9961.265	а	b	С	d	е	
CWALSHT FS=	2	13765	-92639	233068	-273927	14093	
GEOSTUDIO PASSIVE FORCE=	4482.0	Note: Coefficients used for calculating FS from graph					
PASSIVE FORCE DIFFERENCE=	5479.3						
SHEET PILE LENGTH=	9						
UNIFORM PRESSURE=	609						

Applied Uniform Pressure = 609 Pile Tip (EL) = -6.05 Cohesion = Unchanged

Analysis Method = Sweep Search Method

Protected Side **Ground Surface** Elevation

Entry failure at this elevation per SlopeW (see graph title above).

NET ELEV.	WATER	<leftside></leftside>		<leftside></leftside>		<rightside></rightside>			
(FT)	(PSF)	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE		
(1-1)		(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)		
10	0	0	0	0	0	0	0		
9	0	0	0	0	0	0	0		
8	0	0	0	0	0	0	0		
7	62.5	0	0	62.5	62.5	0	0		
6	125	0	0	125	125	0	0		
6	125	704.2	0	70.8	775	0	0		
5	187.5	768.2	0	69.3	837.5	0	0		
4	250	870.1	0	29.9	900	0	0		
3.3	293.8	941.5	0	2.3	943.8	0	0		
3.3	293.8	941.5	0	2.3	1648	0	704.2		
3.2	297.4	947.4	0	0	1648.8	0	701.4		
3	312.5	972	0	-9.5	1652.3	0	689.8		
2.3	356.3	1043.4	0	-37.1	1726.6	0	720.3		
2	375	1074	0	-49	1758.4	0	733.4		
1	437.5	1175.9	0	-88.4	1864.5	0	777		
0	500	1277.8	0	-127.8	1970.7	0	820.7		
-1	562.5	1379.7	0	-167.2	2076.8	0	864.3		
-2	625	1211.3	0	63.7	2038	0	763		
-3	687.5	1017.1	0	320.4	1991.6	0	654.1		
-3	687.5	1017.1	0	-329.6	1341.6	0	654.1		
-3.9	743.8	1040.7	0	-297	1423.6	0	679.9		
-4	743.8	1043.8	0	-300	1426.5	0	682.7		
Note: Tab	Note: Table from CWALSHT design mode output file								

PASSIVE					
PSF	LBS				
0	0				
704.2	736.2				
768.2	819.15				
870.1	634.06				
941.5	0				
941.5	94.445				
947.4	191.94				
972	705.39				
1043.4	317.61				
1074	1124.95				
1175.9	1226.85				
1277.8	1328.75				
1379.7	1295.5				
1211.3	1114.2				
1017.1	0				

Equivalent passive force calculated from pressures

а

Note: Table from CWALSHT design mode output file

CWALSHT PASSIVE FORCE=	9589.045
CWALSHT FS=	2.13
GEOSTUDIO PASSIVE FORCE=	2983.1
PASSIVE FORCE DIFFERENCE=	6606.0
SHEET PILE LENGTH=	9
UNIFORM PRESSURE=	734

Note: Coefficients used for calculating FS from graph

b

-92639

4th Degree Polynomial Trendline Coefficients

d

-273927

e 140936

С

Applied Uniform Pressure = 675 Pile Tip (EL) = -5.97 Cohesion = Unchanged

Analysis Method = Sweep Search Method

Protected Side **Ground Surface** Elevation

Entry failure at this elevation per SlopeW (see graph title above).

NET ELEV.	WATER	<leftside></leftside>		ATER <leftside> (SOIL+WATER)</leftside>		<rightside></rightside>							
(FT)	(PSF)	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE						
(1 1)		(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)						
10	0	0	0	0	0	0	0						
9	0	0	0	0	0	0	0						
8	0	0	0	0	0	0	0						
7	62.5	0	0	62.5	62.5	0	0						
6	125	0	0	125	125	0	0						
6	125	731.7	0	68.3	800	0	0						
5	187.5	794.2	0	68.3	862.5	0	0						
4	250	896.1	0	28.9	925	0	0						
3.3	293.8	967.5	0	1.3	968.8	0	0						
3.3	293.8	967.5	0	1.3	1700.5	0	731.7						
3.3	295.8	970.8	0	0	1700.8	0	730						
3	312.5	998	0	-10.5	1703.7	0	716.2						
2.3	356.3	1069.4	0	-38.1	1778	0	746.7						
2	375	1100	0	-50	1809.8	0	759.8						
1	437.5	1201.9	0	-89.4	1915.9	0	803.4						
0	500	1303.8	0	-128.8	2022.1	0	847.1						
-1	562.5	1405.7	0	-168.2	2128.2	0	890.7						
-2	625	1231.6	0	68.4	2083.8	0	783.8						
-3	687.5	1032.3	0	330.2	2032	0	669.5						
-3	687.5	1032.3	0	-344.8	1357	0	669.5						
-3.9	743.8	1045.2	0	-301.5	1439	0	695.3						
-4	743.8	1043.8	0	-300	1441.9	0	698.1						
Note: Tab	le from CW	ALSHT des	ign mode o	utput file		Note: Table from CWALSHT design mode output file							

PASSIVE PSF LBS 0 731.7 762.95 794.2 845.15 652.26 896.1 967.5 0 967.5 0 970.8 295.32 723.59 998 1069.4 325.41 1100 1150.95 1201.9 1252.85 1354.75 1303.8 1405.7 1318.65 1231.6 1131.95 1032.3 0

Equivalent passive force calculated from pressures

CWALSHT PASSIVE FORCE=	9813.83
CWALSHT FS=	2.05
GEOSTUDIO PASSIVE FORCE=	3861.1
PASSIVE FORCE DIFFERENCE=	5952.7
SHEET PILE LENGTH=	9
UNIFORM PRESSURE=	661

-92639 233068 Note: Coefficients used for calculating FS from graph

h

4th Degree Polynomial Trendline Coefficients

d

-273927

e 140936

C

Applied Uniform Pressure = 669

Pile Tip (EL) = -6.03

Cohesion = Unchanged

Analysis Method = Sweep Search Method

Protected Side Ground Surface Elevation

Entry failure at this elevation per SlopeW (see graph title above).

ELEV. (PSF) PASSIVE ACTIVE (PSF) (PSF)		ACTIVE	PASSIVE	ACTIVE	5466045
	^	(PSF)	(PSF)	(PSF)	PASSIVE (PSF)
10 0 0	0	0	0	0	0
9 0 0	0	0	0	0	0
8 0 0	0	0	0	0	0
7 62.5 0	0	62.5	62.5	0	0
6 125 0	0	125	125	0	0
6 125 724.6	0	69.4	794	0	0
5 187.5 787.5	0	69	856.5	0	0
4 250 889.4	0	29.6	919	0	0
3.3 293.8 960.8	0	2	962.8	0	0
3.3 293.8 960.8	0	2	1687.4	0	724.6
3.2 296.9 965.9	0	0	1688	0	722.1
3 312.5 991.3	0	-9.8	1690.9	0	709.4
2.3 356.3 1062.7	0	-37.4	1765.2	0	740
2 375 1093.3	0	-49.3	1797	0	753
1 437.5 1195.2	0	-88.7	1903.2	0	796.7
0 500 1297.1	0	-128.1	2009.3	0	840.3
-1 562.5 1399.1	0	-167.6	2115.4	0	883.9
-2 625 1226.4	0	67.6	2072.5	0	778.5
-3 687.5 1028.6	0	327.9	2022.1	0	665.6
-3 687.5 1028.6	0	-341.1	1353.1	0	665.6
-3.9 743.8 1040.7	0	-297	1435.1	0	691.3
-4 743.8 1043.8	0	-300	1437.9	0	694.2

PASSIVE						
PSF	LBS					
0	0					
724.6	756.05					
787.5	838.45					
889.4	647.57					
960.8	0					
960.8	96.335					
965.9	195.72					
991.3	718.9					
1062.7	323.4					
1093.3	1144.25					
1195.2	1246.15					
1297.1	1348.1					
1399.1	1312.75					
1226.4	1127.5					
1028.6	0					

Equivalent passive force calculated from pressures

Note: Table from CWALSHT design mode output file

CWALSHT PASSIVE FORCE=	9755.175
CWALSHT FS=	2.07
GEOSTUDIO PASSIVE FORCE=	3626.5
PASSIVE FORCE DIFFERENCE=	6128.6
SHEET PILE LENGTH=	9
UNIFORM PRESSURE=	681

Note: Coefficients used for calculating FS from graph

b

-92639

4th Degree Polynomial Trendline Coefficients

d

-273927

e 140936

С

Applied Uniform Pressure = 673

WATER

NET

<---LEFTSIDE--->

Pile Tip (EL) = -6.09

<--RIGHTSIDE--->

<---NET--->

(SOIL+WATER)

Cohesion = Unchanged

Analysis Method = Sweep Search Method

Protected Side Ground Surface Elevation

Entry failure at this

above).

ELEV. (PSF) **PASSIVE** ACTIVE ACTIVE **PASSIVE** ACTIVE PASSIVE (FT) (PSF) (PSF) (PSF) (PSF) (PSF) (PSF) 10 0 0 0 0 0 0 9 0 0 0 0 0 0 8 0 0 0 0 0 0 7 0 0 62.5 0 62.5 62.5 6 125 0 0 125 125 0 6 125 728.2 0 69.8 798 0 5 187.5 790.8 0 69.7 860.5 0 4 250 892.7 0 30.3 923 0 3.3 293.8 964.1 0 2.7 966.8 0 3.3 964.1 1694.9 0 293.8 0 2.7 728.2 3.2 298 971 0 0 1695.7 0 724.7 3 312.5 994.7 0 -9.2 1698.3 0 712.8 2.3 356.3 1066 0 -36.8 1772.6 0 743.3 2 375 1096.6 0 -48.6 1804.4 0 756.4 1 437.5 1198.5 0 -88 1910.5 0 800 0 500 1300.5 0 -127.5 2016.7 0 843.7 -1 562.5 1402.4 0 -166.9 2122.8 0 887. -2 625 1229 0 0 781. 69 2079.1 -3 1030.6 elevation per SlopeW 687.5 0 329.9 2028 0 667.5 -3 687.5 1030.6 0 -343.1 1355 0 667.5 -3.9 743.8 1040.7 0 -297 1437 0 693.3 743.8 1043.8 0 -300 1439.9 0 696.1 Note: Table from CWALSHT design mode output file

PASSIVE PSF LBS 0 728.2 759.5 841.75 790.8 892.7 649.88 964.1 0 964.1 96.755 971 196.57 994.7 721.245 1066 324.39 1096.6 1147.55 1198.5 1249.5 1300.5 1351.45 1402.4 1315.7 1129.8 1229 1030.6 0

(see graph title

		4th Degree Polynomial Trendline Coefficients							
CWALSHT PASSIVE FORCE=	9784.09	а	b	С	d	е			
CWALSHT FS=	2.06	13765	-92639	233068	-273927	140936			
GEOSTUDIO PASSIVE FORCE=	3742.7	Note: Coefficients used for calculating FS from graph							
PASSIVE FORCE DIFFERENCE=	6041.4								
SHEET PILE LENGTH=	9								
UNIFORM PRESSURE=	671								

Applied Uniform Pressure = 672 Pile Tip (EL) = -6.01 Cohesion = Unchanged

Analysis Method = Sweep Search Method

Protected Side **Ground Surface** Elevation

Entry failure at this elevation per SlopeW (see graph title above).

ELEV. (FT)	(PSF)	WATER <leftside< th=""><th>(SOIL+V</th><th>VATER)</th><th colspan="4"><rightside></rightside></th></leftside<>		(SOIL+V	VATER)	<rightside></rightside>			
(1 1)	(1 01)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)		
10	0	0	0	0	0	0	0		
9	0	0	0	0	0	0	0		
8	0	0	0	0	0	0	0		
7	62.5	0	0	62.5	62.5	0	0		
6	125	0	0	125	125	0	0		
6	125	728.2	0	68.8	797	0	0		
5	187.5	790.8	0	68.7	859.5	0	0		
4	250	892.7	0	29.3	922	0	0		
3.3	293.8	964.1	0	1.7	965.8	0	0		
3.3	293.8	964.1	0	1.7	1693.9	0	728.2		
3.3	296.4	968.4	0	0	1694.4	0	726		
3	312.5	994.7	0	-10.2	1697.3	0	712.8		
2.3	356.3	1066	0	-37.8	1771.6	0	743.3		
2	375	1096.6	0	-49.6	1803.4	0	756.4		
1	437.5	1198.5	0	-89	1909.5	0	800		
0	500	1300.5	0	-128.5	2015.7	0	843.7		
-1	562.5	1402.4	0	-167.9	2121.8	0	887.3		
-2	625	1229	0	68	2078.1	0	781.1		
-3	687.5	1030.6	0	328.9	2027	0	667.5		
-3	687.5	1030.6	0	-343.1	1355	0	667.5		
-3.9	743.8	1040.7	0	-297	1437	0	693.3		
-4	743.8	1043.8	0	-300	1439.9	0	696.1		

PAS	SIVE
PSF	LBS
0	0
728.2	759.5
790.8	841.75
892.7	649.88
964.1	0
964.1	0
968.4	294.465
994.7	721.245
1066	324.39
1096.6	1147.55
1198.5	1249.5
1300.5	1351.45
1402.4	1315.7
1229	1129.8
1030.6	0

SHEET PILE LENGTH=

UNIFORM PRESSURE=

Note: Table from CWALSHT design mode output file

4th Degree Polynomial Trendline Coefficients CWALSHT PASSIVE FORCE= 9785.23 а b C d e 140936 CWALSHT FS= 2.06 13765 -92639 233068 -273927 GEOSTUDIO PASSIVE FORCE= 3742.7 Note: Coefficients used for calculating FS from graph PASSIVE FORCE DIFFERENCE= 6042.5

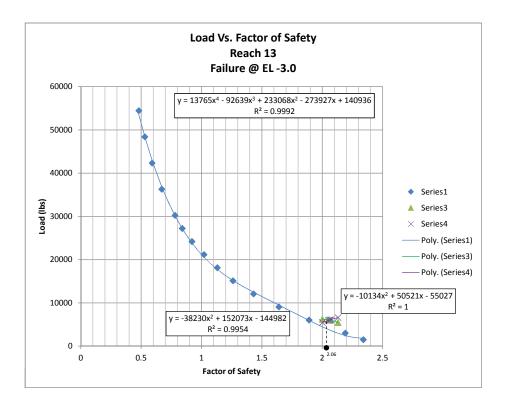
Equivalent passive force calculated from pressures

9

671

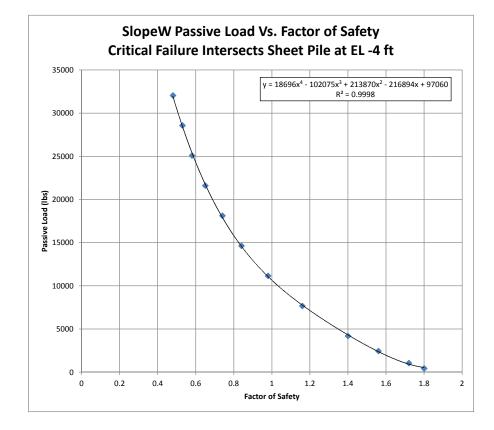
SOLUTION: FS = 2.06

Note - see graph on next sheet.



Analyses by:	Reach	FLOOD SIDE CREST ELEVATION NAVD88	PROTECTED SIDE CREST ELEVATION NAVD89	SHEET PILE TIP ELEVATION NAVD88	SHEET PILE PENETRATION (D) (FT)	WATER LEVEL ELEVATION LEFT SIDE NAVD88 (Right in CWALSHT)		Factor of Safety	Net Pressure Zero @ EL (ft) ² [Crossover Point]	Slip Surface Elevation	ORIGINAL NOTES	FLAC FS RESULTS	slip surface distance above the sheet pile
CD	14	4.2	6	-4.5	8.7	8	-5.7	1.37	-2.75	-4	n/a	1.69	0.5

	SlopeW	
Surcharge	Passive	FS
load (pcf)	Load (lbs)	
Hw=0	450	1.8
5	1067	1.72
25	2459	1.56
50	4200	1.4
100	7680	1.16
150	11161	0.98
200	14642	0.84
250	18123	0.74
300	21604	0.65
350	25085	0.58
400	28566	0.53
450	32047	0.48



	Iterations										
FS	Uniform Load	Result	Tip (ft)	Message							
				Sweep Search							
1.7	1000	Runs	-22.94								
1.7	700	Error	n/a	Conditions encountered where impending rotation							
1.7	900	Runs	-19.26								
1.7	800	Runs	n/a	Conditions encountered where impending rotation							
1.7	820	Runs		Design of Cantilever wall is above EL 4.00							
	830		-16.37								
	822			Design of Cantilever wall is above EL 4.00							
	824			Design of Cantilever wall is above EL 4.00							
	826			Design of Cantilever wall is above EL 4.00							
	828		-16.31								
				Fixed Surface Method							
1.7	828	Runs	-10.06								
1.7	826	Error		Design of Cantilever wall is above EL 4.00							
				Sweep Search							
1.4	1000	Error		Conditions encountered where impending rotation							
1.4	1100		-20.58	3							
1.4	1050		-18.59								
1.4	1025		-17.93	B Conditions encountered where impending rotation							
				Fixed Surface Method							
1.4	1025	Error		Design of Cantilever wall is above EL 4.00							
Notes:	Assymptotic be	havior arou	nd tip dept	h, where CWALSHT will not converge between -16' tip and 4.0 tip.							

Notes:

⁽¹⁾ Since waterline is below critical point, passive pressures do not need to be adjusted for water.

⁽²⁾ Various iterations were run in CWALSHT in order to find the right parameters for the software to run an analysis. As a result, the cohesion was lowered by 50% for the top 2ft of soil on the resisting side (860psf to 430psf)

Iteration = 1	Applied Unifo	orm Pressure =	591		Pile	Tip (EL) =	-4.38		Cohesion =	430/860 (50	%) For top 2ft		Analysi	s Method =	Sweep Se	earch Method
	NET ELEV.		<left< td=""><td>SIDE></td><td><ne (SOIL+V</ne </td><td></td><td><right< td=""><td>SIDE></td><td>1</td><td></td><td>1</td><td></td><td></td><td>Iterations</td><td><u> </u></td><td></td></right<></td></left<>	SIDE>	<ne (SOIL+V</ne 		<right< td=""><td>SIDE></td><td>1</td><td></td><td>1</td><td></td><td></td><td>Iterations</td><td><u> </u></td><td></td></right<>	SIDE>	1		1			Iterations	<u> </u>	
	(FT)	WATER (PSF)	PASSIVE	ACTIVE	1	PASSIVE	ACTIVE	PASSIVE	<u>-</u>				Ton 1ft re	duced cohe		6
	(1 1)		(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)					Uniform			
	10	0	0	0	0	0	0)			FS	Load	Result	Tip (ft)	Message
	9	0	0	0	0	0	0	()			1.7	830		16.39	
	8	0	0	0	0	0	0	()			1.7	700		0.65	
Protected Side	7	62.5	0	0	62.5	62.5	0	()	PAS	SSIVE	1.7	730		-10.04	
Ground Surface	6	125	0	0	125	125	0	()	PSF	LBS	1.7	715		-8.78	
Elevation	6	125	505.9	0	210.1	716	0	C)	505.9	545.1	1.7	705		0.35	
	5	187.5	584.3	0	194.2	778.5	0	()	584.3	501.28	1.7	710		-0.14	
	4.2	237.5	668.9	0	159.6	828.5	0	()	668.9	0	1.7	712		-0.52	
	4.2	237.5	668.9	0	159.6	1840.3	0	1011.8		668.9	146.03	1.7	713		-0.87	(1)
	4	250	791.4	0	49.6	1796.8	0	955.8		791.4	81.9	1.7	714		-8.68	
	3.9	255.6	846.6	0	0	1806.6	0	960)	846.6	744.905		Top 2ft re	duced cohe	sion by 50%	6
	3.2	300	1281.7	0	-390.7	1883.8	0	992.8	3	1281.7	258.45	1.7	714		-14.27	
	3	312.5	1302.8	0	-399.3	1905.5	0	1002	2	1302.8	1233.9	1.7	710		-14.04	
	2	375	1165	0	-199	1770.7	0	804.7		1165	1094.35	1.7	700		-13.49	
	1	437.5	1023.7	0	4.8	1632.4	0	603.9	9	1023.7	1073.05	1.7	650		-9.05	
	0	500	1122.4	0	-31.4	1733.4	0	642.4		1122.4	1171.75	1.7	600		-5.32	
	-1	562.5	1221.1	0	-67.6	1821.7	0	668.2		1221.1	1250.45	1.7	590		-4.23	
Entry failure at this	-2		1279.8	0	-63.8	1901.6	0	685.6		1279.8	1297.15	1.7	593	crash		
elevation per SlopeW	-3		1314.5	0	-36	1992.9	0	714.4		1314.5	1344.3	1.7	594	crash		
(see graph title	-4		1374.1	0	-33.1	2092.3	0	751.3		1374.1	0	1.7	595	crash		
above).	-4		1374.1	0	-624.1	1501.3	0			-		1.7	591		-4.38	
	-5		1183	0	-370.5	1600.6	0	788.1	IJ	Equivalent pass		1.7	592	crash		
	Note: Table f	from CWALSHT	design mod	le output fil	е				_	calculated from	pressures	1.7	596	crash		
												1.7	597		-5.05	

		4th Degree Polynomial Trendline Coefficients							
CWALSHT PASSIVE FORCE=	10742.615	а	b	С	d	е			
CWALSHT FS=	1.7	18696	-102075	213870	-216894	97060			

(1) Large variability with small loading change

966

UNIFORM PRESSURE=

Notes: Since CWALSHT would not converge on the tip elevation of -4.5, I ran the program to get as close to this as possible. This resulted in a tip depth of -4.38 ft. The first two trial runs I used an unmodified cohesion and then I lowered the top 1ft by 50%. Both of these would not converge at the tip, and there was a large fluctuation in design tip depth from 0ft to -8ft, and the program would not converge within this zone.

<--RIGHTSIDE--->

ACTIVE PASSIVE

Iteration = 2 Applied Uniform Pressure = 629.5

WATER (PSF)

NET ELEV

(FT)

-4.49 Pile Tip (EL) =

<---NET--->

(SOIL+WATER)

ACTIVE PASSIVE

Cohesion = 430/860 (50%) For top 2ft

1402.8

Analysis Method = Sweep Search Method

Protected Side **Ground Surface** Elevation

Entry failure at this

above).

(PSF) (PSF) (PSF) (PSF) (PSF) (PSF) 10 9 0 0 0 0 0 0 8 0 0 0 0 0 62.5 62.5 62.5 0 7 0 0 6 125 0 0 125 125 0 125 537.5 217 754.5 5 187.5 614.2 0 202.8 817 0 4.2 237.5 698.8 0 168.2 867 0 4.2 237.5 698.8 0 168.2 1942 0 1075 250 4 827.7 0 51.8 1894.5 0 1015 255.6 3.9 885.1 0 1904.1 0 1019. 0 3.2 300 1343.3 0 -413.8 1981.4 0 1051. 312.5 1364.4 -422.4 2003.2 1061.2 3 0 0 2 375 1211.5 0 -207 1853.2 0 848.7 437.5 1055.1 0 11.9 1699.8 0 632.8 0 500 1153.8 0 -24.3 1800.9 0 671.4 -1 562.5 1252.5 0 -60.5 1888.6 0 696.6 -2 625 1311.3 0 -56.8 1967.2 0 712.7 elevation per SlopeW -3 687.5 1345.4 -28.4 2057.9 0 740.9 0 -4 750 1402.8 0 -23.3 2157.3 777.8 -4 750 1402.8 -652.8 1527.8 777.8 -5 812.5 1183 -370.5 1627.2 0 814.7

<---LEFTSIDE--->

PASSIVE ACTIVE

PASSIVE Iterations PSF LBS Top 2ft reduced cohesion by 50% 537.5 575.85 Uniform FS Message Result Tip (ft) 614.2 525.2 Load 698.8 0 1.6 700 -9.75 698.8 152.65 1.6 650 -6.32 827.7 85.64 600 -1.53 1.6 -3.75 885.1 779.94 1.6 625 1343.3 270.77 1.6 635 -5.06 1364.4 1287.95 630 1.6 crash 1211.5 1133.3 1.6 633 crash 1055.1 1104.45 1.6 634 crash 1153.8 1203.15 1.6 629 -4.4 1252.5 1281.9 1.6 629.5 -4.49 1311.3 1328.35 1345.4 1374.1

(see graph title

Note: Table from CWALSHT design mode output file

		4th	Degree Poly	nomial Tre	ndline Coe	fficients		
CWALSHT PASSIVE FORCE=	11103.25	а	b	С	d	е		
CWALSHT FS=	1.6	18696	-102075	213870	-216894	97060		
GEOSTUDIO PASSIVE FORCE=	1963.7	Note: Coefficients used for calculating FS from graph						
PASSIVE FORCE DIFFERENCE=	9139.5							
SHEET PILE LENGTH=	10							
UNIFORM PRESSURE=	914							

<--RIGHTSIDE--->

Iteration = 3 Applied Uniform Pressure = 777.1 Pile Tip (EL) = -4.33

<---NET--->

Cohesion = 430/860 (50%) For top 2ft

Analysis Method = Sweep Search Method

Protected Side **Ground Surface** Elevation

Entry failure at this

(see graph title

above).

NET ELEV (SOIL+WATER) WATER (PSF) (FT) PASSIVE ACTIVE ACTIVE PASSIVE ACTIVE PASSIVE (PSF) (PSF) (PSF) (PSF) (PSF) (PSF) 10 9 0 0 0 0 0 0 8 0 0 0 0 0 62.5 62.5 62.5 7 0 0 0 6 125 0 0 125 125 0 125 6 661.5 0 240.6 902.1 0 5 187.5 731.6 233 964.6 0 4.2 237.5 816.1 0 198.5 1014.6 0 4.2 237.5 2337.7 1323. 816.1 0 198.5 0 250 969.9 57.2 2274.2 0 1247. 4 0 3.9 255.1 1032.2 0 2283 0 1250. 0 3.2 -507.9 300 1585 0 2361.1 0 1284 3 312.5 1606.1 0 -516.5 2382.9 0 1293.3 375 1393.9 0 -241.8 2173.6 0 1021. 2 437.5 1178.2 36.4 1960.9 0 746.3 0 0 500 1276.9 0.2 2062.2 0 785. 0 562.5 1375.6 2147.5 -1 0 -36 0 807. -2 625 1434.4 -32.3 2221 818.9 -3 687.5 1460.5 0 4.1 2309.4 0 844.8 elevation per SlopeW -4 750 1515.7 11.4 2408.8 0 881. -4 750 1515.7 -765.7 1631.7 0 881.7 812.5 1586 -773.5 1731.1 918.6

<---LEFTSIDE--->

PASSIVE Iterations PSF LBS Top 2ft reduced cohesion by 50% 696.55 FS Uniform Load 661.5 Result Message Tip (ft) 731.6 619.08 1.3 -1.4 816.1 0 1.3 800 -6.26178.6 770 -3.14 816.1 1.3 969.9 100.105 1.3 780 crash 1032.2 916.02 1.3 775 -3.88 1585 319.11 1.3 779 crash 1606.1 1500 1.3 778 crash 1393.9 1286.05 1.3 777 -4.31 1178.2 1227.55 1.3 777.5 crash 1276.9 1326.25 1.3 777.2 crash 1375.6 1405 777.1 -4.33 1.3 1434.4 1447.45 1.3 782 crash 1460.5 1488.1 1515.7

Note: Table from CWALSHT design mode output file

		4th	Degree Poly	nomial Tre	ndline Coe	fficients
CWALSHT PASSIVE FORCE=	12509.865	а	b	С	d	е
CWALSHT FS=	1.3	18696	-102075	213870	-216894	97060
GEOSTUDIO PASSIVE FORCE=	5677.0	Note: Coefficients used for calculating FS from graph				
PASSIVE FORCE DIFFERENCE=	6832.9					
SHEET PILE LENGTH=	10					
UNIFORM PRESSURE=	683					

720.9

Iteration = Applied Uniform Pressure = 4

Pile Tip (EL) = -4.40

<---NET--->

Cohesion = 430/860 (50%) For top 2ft

1387.7

1416.8

1472.5

Analysis Method = Sweep Search Method

Protected Side Ground Surface Elevation

<---LEFTSIDE---> <--RIGHTSIDE---> NET ELEV (SOIL+WATER) WATER (PSF, (FT) PASSIVE ACTIVE ACTIVE PASSIVE ACTIVE PASSIVE (PSF) (PSF) (PSF) (PSF) (PSF) (PSF) 10 9 0 0 0 0 0 0 8 0 0 0 0 0 62.5 62.5 62.5 0 7 0 0 6 125 0 0 125 125 0 125 6 614.3 0 231.6 845.9 0 5 187.5 686.9 0 221.5 908.4 0 771.4 4.2 237.5 0 187 958.4 0 4.2 237.5 771.4 1228.6 0 187 2187 0 250 915.7 0 55.2 2129.5 0 1158. 4 3.9 255.2 976.1 0 2138.6 0 1162. 0 3.2 1492.9 -472 1195.6 300 0 2216.5 0 3 312.5 1514.1 0 -480.7 2238.2 0 1204.8 2 375 1324.4 0 -228.5 2051.6 0 955. 437.5 1131.3 0 27.1 1861.5 0 703. 500 1962.7 0 741. 0 1230 0 -9.1 -1 562.5 1328.7 0 -45.3 2048.9 0 765. -2 -41.8 2124.4 0 778. 625 1387.7 0 -3 687.5 1416.8 0 -8.4 2213.6 0 805. -4 750 1472.5 0 -1.6 2313 0 842. -4 750 1472.5 0 -722.5 1592.1 0 842.1 -5 812.5 1543.4 -730.9 1691.5 879

PASSIVE Iterations PSF LBS Top 2ft reduced cohesion by 50% 614.3 650.6 FS Uniform Load Result Tip (ft) Message 686.9 583.32 720 -4.23 771.4 0 1.4 722 crash 771.4 168.71 721 1.4 crash 915.7 94.59 720.5 -4.32 1.4 976.1 864.15 720.8 -4.38 1.4 1492.9 300.7 720.9 1.4 -4.4 1514.1 1419.25 1.4 725 crash 1324.4 1227.85 1.4 728 -5.17 1131.3 1180.65 1230 1279.35 1358.2 1328.7

Entry failure at this elevation per SlopeW (see graph title above).

Note: Table from CWALSHT design mode output file

0 Equivalent passive force calculated from pressures

1402.25

1444.65

		4th Degree Polynomial Trendline Coefficients					
CWALSHT PASSIVE FORCE=	11974.27	а	b	С	d	е	
CWALSHT FS=	1.4	18696	-102075	213870	-216894	97060	
GEOSTUDIO PASSIVE FORCE=	4322.4	Note: Coefficients used for calculating FS from graph					
PASSIVE FORCE DIFFERENCE=	7651.9						
SHEET PILE LENGTH=	10						
UNIFORM PRESSURE=	765						

The actual pile tip (-4.50') could not be obtained without the software crashing. Thus, I used the analysis run where the tip was as close as to -4.5 as possible. Notes:

<--RIGHTSIDE--->

Iteration = 5 Applied Uniform Pressure = 742.4 Pile Tip (EL) = -4.38

<---NET--->

Cohesion = 430/860 (50%) For top 2ft

1405.7

1433.5

1488.9

Analysis Method = Sweep Search Method

Protected Side **Ground Surface** Elevation

NET ELEV (SOIL+WATER) WATER (PSF) (FT) PASSIVE ACTIVE ACTIVE PASSIVE ACTIVE PASSIVE (PSF) (PSF) (PSF) (PSF) (PSF) (PSF) 10 0 0 9 0 0 0 0 0 0 0 8 0 0 0 0 62.5 0 0 62.5 62.5 0 125 125 125 6 0 0 0 125 632.4 235 867.4 6 0 0 5 187.5 704 0 225.9 929.9 0 4.2 237.5 788.5 0 191.4 979.9 0 4.2 237.5 788.5 0 191.4 2244.6 0 1264.7 4 250 936.4 0 56 2184.8 0 1192. 3.9 255.2 997.6 0 0 0 2193.8 1196. 3.2 1528.1 -485.7 2271.8 1229. 300 0 0 312.5 -494.4 3 1549.3 0 2293.5 0 1238.6 2 375 1351 0 -233.6 2098.3 0 980.9 437.5 1149.3 1899.5 0 719.6 0 30.6 0 500 1248 0 -5.6 2000.7 0 758.3 562.5 -41.8 -1 1346.7 0 2086.6 0 781. -2 625 1405.7 0 -38.3 2161.3 0 793.9 -3 687.5 1433.5 0 -3.6 2250.3 0 820.4 -4 750 1488.9 0 3.5 2349.6 0 857. 750 1488.9 -738.9 1607.2 857.2 0 0 -5 812.5 1559.7 -747.2 1706.6 0 894.

<---LEFTSIDE--->

PASSIVE Iterations PSF LBS Top 2ft reduced cohesion by 50% FS Uniform Load 632.4 668.2 Result Message Tip (ft) 704 597 1.36 700 -0.65 788.5 0 1.36 750 -5.2 788.5 172.49 1.36 745 crash 936.4 96.7 740 1.36 -3.89743 997.6 883.995 1.36 crash 1528.1 307.74 1.36 742 -4.3 1549.3 1450.15 742.5 1.36 crash 1351 1250.15 1.36 742.2 -4.341149.3 1198.65 1.36 742.4 -4.38 1248 1297.35 1346.7 1376.2

Entry failure at this elevation per SlopeW (see graph title above).

Note: Table from CWALSHT design mode output file

0 Equivalent passive force calculated from pressures

1419.6

1461.2

		4th Degree Polynomial Trendline Coefficients					
CWALSHT PASSIVE FORCE=	12179.425	а	b	С	d	е	
CWALSHT FS=	1.36	18696	-102075	213870	-216894	97060	
GEOSTUDIO PASSIVE FORCE=	4852.3	Note: Coefficients used for calculating FS from graph					
PASSIVE FORCE DIFFERENCE=	7327.1						
SHEET PILE LENGTH=	10						
UNIFORM PRESSURE=	733						

Notes:

From the graph on the next sheet, intersection of curves is 1.366, which is an estimate of the solution. Therefore, try 1.37 for next run.

Applied Uniform Pressure = 736.9 Pile Tip (EL) = -4.38

<---NET--->

Cohesion = 430/860 (50%) For top 2ft

1429.2

1484.7

Analysis Method = Sweep Search Method

Protected Side **Ground Surface** Elevation

Entry failure at this

(see graph title

above).

<---LEFTSIDE---> <--RIGHTSIDE---> NET ELEV. (SOIL+WATER) WATER (PSF) (FT) PASSIVE ACTIVE ACTIVE PASSIVE ACTIVE PASSIVE (PSF) (PSF) (PSF) (PSF) (PSF) 10 0 0 9 0 0 0 0 0 0 8 0 0 0 62.5 0 0 62.5 62.5 0 125 Λ 125 125 6 0 0 125 627.7 234.2 861.9 6 0 0 5 187.5 699.6 0 224.8 924.4 0 4.2 237.5 784.2 0 190.2 974.4 0 4.2 237.5 784.2 0 190.2 2229.9 0 1255.5 4 250 931.1 0 55.8 2170.7 0 1183.8 3.9 255.2 992.1 2179.7 0 1187. 0 0 3.2 1519.1 0 -482.2 2257.7 1220.8 300 0 312.5 -490.9 3 1540.3 0 2279.4 0 1230 2 375 1344.2 0 -232.3 2086.4 0 974. 437.5 1144.7 29.7 1889.8 0 715. 0 0 500 1243.4 -6.5 0 754. 0 1991 562.5 -42.7 777. 1342.1 0 2076.9 0 -2 625 1401.1 0 -39.2 2151.9 0 790 -3 elevation per SlopeW 687.5 1429.2 0 -4.8 2240.9 0 816.5 -4 750 1484.7 0 2.2 2340.3 0 853.4 -4 750 1484.7 -734.7 1603.4 853.4 0 0 -5 812.5 1555.5 -743 1702.8 0 890. Note: Table from CWALSHT design mode output file

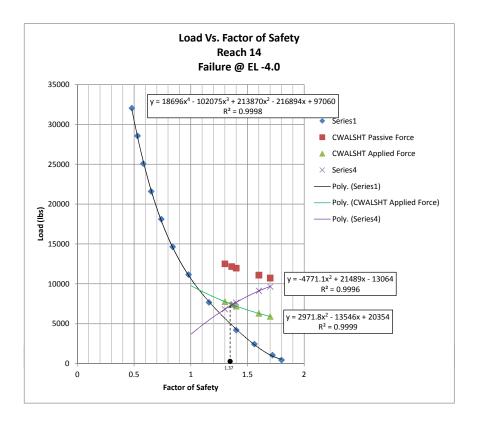
PASSIVE Top 2ft reduced cohesion by 50% PSF LBS Iterations 627.7 663.65 FS Uniform Load Result Tip (ft) Message 699.6 593.52 1.37 784.2 0 1.37 740 crash 784.2 171.53 1.37 745 -5.2596.16 738 931.1 1.37 crash 992.1 878.92 1.37 735 -3.98 1519.1 305.94 1.37 737 crash 1540.3 1442.25 736 -4.20 1.37 1344.2 1244.45 1.37 736.5 -4.301144.7 1194.05 1.37 736.8 -4.36 1243.4 1292.75 1.37 736.9 -4.38 1342.1 1371.6 1415.15 1401.1

0 Equivalent passive force calculated from pressures

1456.95

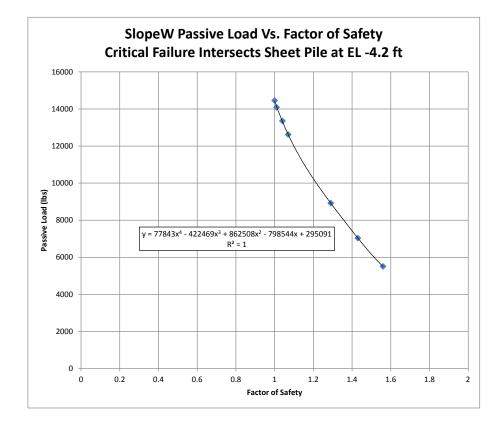
		4th Degree Polynomial Trendline Coefficients						
CWALSHT PASSIVE FORCE=	12126.92	а	b	С	d	е		
CWALSHT FS=	1.37	18696	-102075	213870	-216894	97060		
GEOSTUDIO PASSIVE FORCE=	4718.4	Note: Coefficients used for calculating FS from graph						
PASSIVE FORCE DIFFERENCE=	7408.6							
SHEET PILE LENGTH=	10							
UNIFORM PRESSURE=	741							

SOLUTION: FS = 1.37 Note - see graph on next sheet.



Analyses by:	Reach	FLOOD SIDE CREST ELEVATION NAVD88	PROTECTED SIDE CREST ELEVATION NAVD89	SHEET PILE TIP ELEVATION NAVD88	SHEET PILE PENETRATION (D) (FT)	WATER LEVEL ELEVATION LEFT SIDE NAVD88 (Right in CWALSHT)	WATER LEVEL ELEVATION RIGHT SIDE NAVD88 (Left in CWALSHT)	Factor of Safety	Slip Surface Elevation	ORIGINAL NOTES	slip surface distance above the sheet pile
KA	14	4.2	6	-4.5	8.7	8.9	-5.7	1.51	-4.2	n/a	0.3

	SlopeW	
Surcharge	Passive	FS
load (pcf)	Load (lbs)	
5	5507.6	1.56
25	7035.9	1.43
50	8921.4	1.29
100	12624	1.07
150	13357	1.04
200	14091	1.01
250	14460	1



17th St. Outfall Canal

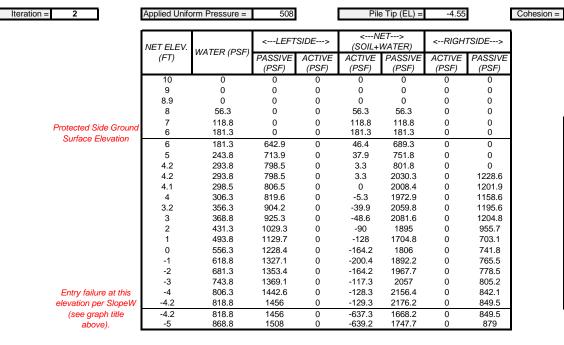
Notes:

Reach 14

Iteration = 1	Applied Unifo	orm Pressure =	555		Pile	Tip (EL) =	-4.55		Cohesion =	450/860 (A	oprox. 50%) For top 2 lay	vers Analysis	Method =	Sweep Search Method
	NET ELEV.	WATER (PSF)	<left< td=""><td></td><td><ne (SOIL+V</ne </td><td>VATER)</td><td><right< td=""><td></td><td>]</td><td></td><td></td><td></td><td></td><td></td></right<></td></left<>		<ne (SOIL+V</ne 	VATER)	<right< td=""><td></td><td>]</td><td></td><td></td><td></td><td></td><td></td></right<>]					
	(FT)	, ,	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	(PSF)	(PSF)	PASSIVE (PSF)						
	10	0	0	0	0	0	0	0						
	9	0	0	0	0	0	0	0						
	8.9	0	0	0	0	0	0	0						
	8	56.3	0	0	56.3	56.3	0	0						
D. (1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1	7	118.8	0	0	118.8	118.8	0	0	l [PA	SSIVE			
Protected Side Ground Surface Elevation	6	181.3	0	0	181.3	181.3	0	0		PSF	LBS			
Surface Elevation	6	181.3	692.3	0	43.9	736.3	0	0		692.3	726.5			
	5	243.8	760.7	0	38.1	798.8	0	0	l [760.7	642.36			
	4.2	293.8	845.2	0	3.5	848.8	0	0	I [845.2	0			
	4.2	293.8	845.2	0	3.5	2171.8	0	1323.1		845.2	84.95			
	4.1	298.8	853.8	0	0	2146	0	1292.2		853.8	86.01			
	4	306.3	866.4	0	-5.1	2108.3	0	1247.1		866.4	726.92			
	3.2	356.3	950.9	0	-39.7	2195.3	0	1284		950.9	192.3			
	3	368.8	972.1	0	-48.3	2217	0	1293.3		972.1	1024.05			
	2	431.3	1076	0	-89.8	2007.8	0	1021.5	l [1076	1126.25			
	1	493.8	1176.5	0	-127.7	1795.1	0	746.3	l [1176.5	1225.85			
	0	556.3	1275.2	0	-163.9	1896.3	0	785.1	l [1275.2	1324.55			
	-1	618.8	1373.9	0	-200.1	1981.6	0	807.9	l [1373.9	1386.65			
	-2	681.3	1399.4	0	-163.2	2055.2	0	818.9	l [1399.4	1406.6			
	-3	743.8	1413.8	0	-115.1	2143.6	0	844.8	l [1413.8	1448.7			
Entry failure at this	-4	806.3	1483.6	0	-122.3	2242.9	0	881.7	l [1483.6	298.11			
elevation per SlopeW	-4.2	818.8	1497.5	0	-123.8	2262.8	0	889.1	j [1497.5	0			
(see graph title	-4.2	818.8	1497.5	0	-678.8	1707.8	0	889.1	<u> </u>	-				
above).	-5	868.8	1553.1	0	-684.3	1787.3	0	918.6		Equivalent pas	sive force			
	-								_	calculated from	pressures			

		4th Degree Polynomial Trendline Coefficients					
CWALSHT PASSIVE FORCE=	11699.8	а	b	С	d	е	
CWALSHT FS=	1.3	77843	-422469	862508	-798544	295091	
GEOSTUDIO PASSIVE FORCE=	8785.3	Note: Coefficients used for calculating FS from graph					
PASSIVE FORCE DIFFERENCE=	2914.5						
SHEET PILE LENGTH=	10.2						
UNIFORM PRESSURE=	286						

Based upon past runs for this reach, the only way to get this particular reach to run and for the iterations to converge on the pile tip was to reduce the cohesion of the top two layers by approximately 50%.



	SSIVE
PSF	LBS
642.9	678.4
713.9	604.96
798.5	0
798.5	80.25
806.5	81.305
819.6	689.52
904.2	182.95
925.3	977.3
1029.3	1079.5
1129.7	1179.05
1228.4	1277.75
1327.1	1340.25
1353.4	1361.25
1369.1	1405.85
1442.6	289.86
1456	0

450/860 (Approx. 50%) For top 2 layers

Analysis Method = Sweep Search Method

		4th Degree Polynomial Trendline Coefficients					
CWALSHT PASSIVE FORCE=	11228.195	а	b	С	d	е	
CWALSHT FS=	1.4	77843	-422469	862508	-798544	295091	
GEOSTUDIO PASSIVE FORCE=	7431.8	Note: Coefficients used for calculating FS from graph					
PASSIVE FORCE DIFFERENCE=	3796.4						
SHEET PILE LENGTH=	10.2						
UNIFORM PRESSURE=	372						

teration = 3	Applied Uniform Pressure =		467		Pile Tip (EL) =		-4.53		Cohesion =	430/860 (50	0%) For top 2ft
	NET ELEV.	WATER (PSF)	<left< td=""><td>SIDE></td><td><ni (SOIL+V</ni </td><td></td><td colspan="2"><rightside></rightside></td><td></td><td></td><td></td></left<>	SIDE>	<ni (SOIL+V</ni 		<rightside></rightside>				
	(FT)	WATER (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)			
	10	0	0	0	0	0	0	0			
	9	0	0	0	0	0	0	0			
	8.9	0	0	0	0	0	0	0			
	8	56.3	0	0	56.3	56.3	0	0			
Protected Side Ground	7	118.8	0	0	118.8	118.8	0	0		PA:	SSIVE
Surface Elevation	6	181.3	0	0	181.3	181.3	0	0		PSF	LBS
Surface Elevation	6	181.3	600	0	48.3	648.3	0	0		600	636.65
	5	243.8	673.3	0	37.4	710.8	0	0		673.3	572.48
	4.2	293.8	757.9	0	2.8	760.8	0	0		757.9	0
	4.2	293.8	757.9	0	2.8	1907.4	0	1146.7		757.9	76.14
	4.1	297.9	764.9	0	0	1890.3	0	1125.4		764.9	77.2
	4	306.3	779.1	0	-5.8	1855.3	0	1082		779.1	657.08
	3.2	356.3	863.6	0	-40.4	1942.2	0	1119		863.6	174.84
	3	368.8	884.8	0	-49	1964	0	1128.2		884.8	936.75
	2	431.3	988.7	0	-90.5	1796.9	0	898.7		988.7	1038.95
	1	493.8	1089.2	0	-128.4	1626.4	0	665.6		1089.2	1138.55
	0	556.3	1187.9	0	-164.6	1727.5	0	704.2		1187.9	1237.25
	-1	618.8	1286.6	0	-200.8	1814.5	0	728.7		1286.6	1300.1
	-2	681.3	1313.6	0	-165.4	1891.6	0	743.4		1313.6	1321.95
	-3	743.8	1330.3	0	-119.5	1981.7	0	770.9		1330.3	1368.7
Entry failure at this	-4	806.3	1407.1	0	-133.8	2081.1	0	807.8		1407.1	282.67
elevation per SlopeW	-4.2	818.8	1419.6	0	-133.8	2100.9	0	815.2		1419.6	0
(see graph title	-4.2	818.8	1419.6	0	-600.8	1633.9	0	815.2	'		-
above).	-5	868.8	1465.9	0	-597.1	1713.4	0	844.7		Equivalent pass	sive force

PA	SSIVE					
PSF	LBS					
600	636.65					
673.3	572.48					
757.9	0					
757.9	76.14					
764.9	77.2					
779.1	657.08					
863.6	174.84					
884.8	936.75					
988.7	1038.95					
1089.2	1138.55					
1187.9	1237.25					
1286.6	1300.1					
1313.6	1321.95					
1330.3	1368.7					
1407.1	282.67					
1419.6	0					

Equivalent passive force calculated from pressures

			Γ
CWALSH ⁻	Γ PASSIVE FORCE=	10819.31	Ī
	CWALSHT FS=	1.5	
GEOSTUDIO	PASSIVE FORCE=	6165.3	Ν
PASSIVE FO	RCE DIFFERENCE=	4654.0	1
	EET PILE LENGTH=		
UNI	FORM PRESSURE=	456]

77843 -422469 862508 -798544 Note: Coefficients used for calculating FS from graph

4th Degree Polynomial Trendline Coefficients

295091

Analysis Method = Sweep Search Method

1458

-589.3

0

1707.1

Cohesion = 430/860 (50%) For top 2ft Applied Uniform Pressure = 459 Pile Tip (EL) = -4.48 Analysis Method = Sweep Search Method Iteration = 4 <---NET---> <---LEFTSIDE---> <--RIGHTSIDE---> NET ELEV (SOIL+WATER) WATER (PSF) (FT) PASSIVE ACTIVE ACTIVE PASSIVE ACTIVE PASSIVE (PSF) (PSF) (PSF) (PSF) (PSF) (PSF) 10 0 9 0 0 0 0 0 0 0 8.9 0 0 0 0 0 0 0 8 56.3 0 0 56.3 56.3 0 0 0 0 118.8 118.8 0 PASSIVE 118.8 0 Protected Side Ground 6 181.3 0 181.3 181.3 0 0 PSF LBS Surface Elevation 6 181.3 592.1 0 48.1 640.3 0 0 592.1 629 5 243.8 665.9 0 36.9 702.8 0 0 665.9 566.52 4.2 293.8 750.4 0 2.3 752.8 0 0 750.4 0 4.2 293.8 750.4 0 2.3 1884.3 0 1131.6 750.4 75.325 4.1 297.1 756.1 0 0 1870.7 0 1114.6 756.1 76.385 4 306.3 771.6 0 -6.3 1833.1 0 1067.9 771.6 651.08 3.2 856.1 173.34 356.3 856.1 0 -40.9 1920.1 0 1104.9 3 368.8 877.3 0 -49.5 1941.8 0 1114.1 877.3 929.25 2 431.3 -91 1778.4 888.1 981.2 1031.45 981.2 0 0 493.8 1081.7 0 -128.9 1611.4 0 658.7 1081.7 1131.05 0 556.3 1180.4 0 -165.1 1712.5 0 697.3 1180.4 1229.75 -1 618.8 1279.1 0 -201.3 1799.7 0 722 1279.1 1292.65 -2 681.3 1306.2 0 -166 1877.2 0 736.9 1306.2 1314.65 -3 743.8 1323.1 0 -120.4 1967.4 0 764.6 1323.1 1360.2 Entry failure at this 1397.3 2066.7 1397.3 280.73 -4 806.3 0 -132.1 0 801.5 -4.2 1410 818.8 1410 0 -132.3 2086.6 0 808.9 0 elevation per SlopeW -4.2 1410 (see graph title 818.8 0 -591.3 1627.6 0 808.9

0

838.4

SOLUTION: FS = 1.51 Note - see graph on next sheet.

868.8

-5

above).

 4th Degree Polynomial Trendline Coefficients

 CWALSHT PASSIVE FORCE=
 10741.38
 a
 b
 c
 d
 e

 CWALSHT FS=
 1.52
 77843
 -422469
 862508
 -798544
 295091

 GEOSTUDIO PASSIVE FORCE=
 5934.5
 Note: Coefficients used for calculating FS from graph

 PASSIVE FORCE DIFFERENCE=
 4806.9

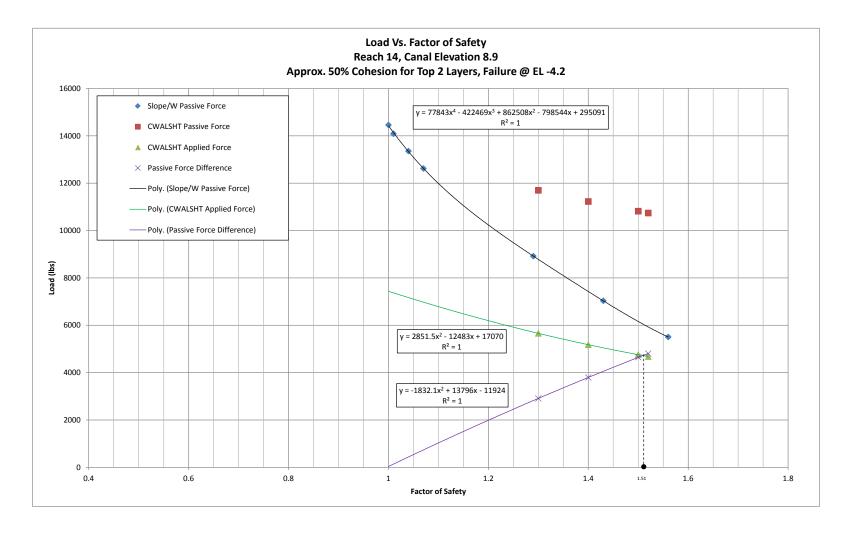
10.2

471

Equivalent passive force calculated from pressures

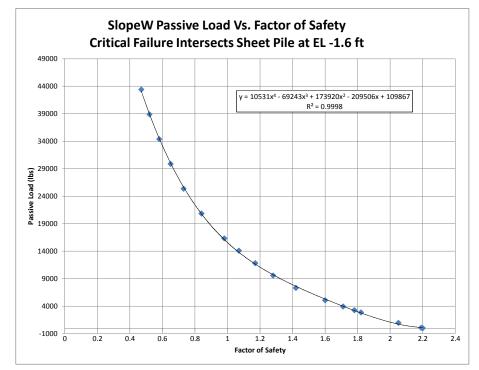
SHEET PILE LENGTH=

UNIFORM PRESSURE=



Analyses by:	Reach	FLOOD SIDE CREST ELEVATION NAVD88	PROTECTED SIDE CREST ELEVATION NAVD89	SHEET PILE TIP ELEVATION NAVD88	HEET PI	WATER LEVEL ELEVATION LEFT SIDE NAVD88 (Right in	WATER LEVEL ELEVATION RIGHT SIDE NAVD88 (Left in CWALSHT)	Factor of Safety	Net Pressure Zero @ EL (ft) ² [Crossover Point]	Modified Slip Surface Elevation	ORIGINAL NOTES	FLAC FS RESULTS	slip surface distance above the sheet pile
KA	15B	7.5	7.3	-4.5	11.8	8.1	-5.1	1.84	-3.22	-1.6	n/a	n/a	2.9

SlopeW									
Surcharge load (pcf)	Passive Load (lbs)	FS							
Water Canal= -1ft	11	2.2							
Water Canal= 0ft	79	2.19							
Water Canal= 4ft	978	2.05							
Water Canal= 8ft	2875	1.82							
10	3267	1.78							
25	3944	1.71							
50	5072	1.60							
100	7328	1.42							
150	9584	1.28							
200	11840	1.17							
250	14096	1.07							
300	16352	0.98							
400	20865	0.84							
500	25377	0.73							
600	29889	0.65							
700	34401	0.58							
800	38914	0.52							
900	43426	0.47							



17th St. Outfall Canal

Reach 15B

Iteration	= 1	Applied Uniform	n Pressure =	792	[Pile	Tip (EL) =	-4.51		Cohesion =	600/800 psf f	or top 3ft (75%)] [Analys	is Method =	Sweep Sea	rch Method
		NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><ne< td=""><td></td><td><right< td=""><td>SIDE></td><td>Ī</td><td></td><td></td><td>Cohesion 800</td><td>Load</td><td></td><td>omments</td><td></td></right<></td></ne<></td></left<>	SIDE>	<ne< td=""><td></td><td><right< td=""><td>SIDE></td><td>Ī</td><td></td><td></td><td>Cohesion 800</td><td>Load</td><td></td><td>omments</td><td></td></right<></td></ne<>		<right< td=""><td>SIDE></td><td>Ī</td><td></td><td></td><td>Cohesion 800</td><td>Load</td><td></td><td>omments</td><td></td></right<>	SIDE>	Ī			Cohesion 800	Load		omments	
				D4.0011/E	A OTIVE	(SOIL+WATER) TIVE ACTIVE PASSIVE		ACTIVE PASSIVE		l					Dsgn tip ab		
		(FT)	(PSF)	PASSIVE (PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)				800 800	1000 850		2.4 93	
		10	0	(PSF) 0	(PSF) 0	(PSF) 0	(PSF)	` /	(PSF)	ŀ			800	900		93 57	
		9	0	0	0	0	0	0	0				800	950		1.2	
		8.1	0	0	0	0	0	0	0				800	925		.2 75	
		8.1	6.2	0	0	6.2	6.2	0	0				800	915	-7	1	
		7.5	37.5	0	0	37.5	37.5	0	0	l i	DAG	SSIVE	800	920	7	48	
	Protected Side	7.5	37.5	0	0	37.5	916.6	0	879.1		PSF	LBS	800	917		32	
	Ground Surface	7.3	50	0	0	57.5 50	869.1	0	819.1		0	0	800	916		26	
	Ground Surface	7.3	50	659.3	0	182.7	1661.1	0	819.1		659.3	202.92	800	915.5		23	
		7.3		693.5	0	167.2	1694.1		833.3		693.5	513.38			sion in Top 3	_	
		,	68.8					0			773.3	237.12					
		6.3	112.5	773.3	0	131.2	1770.9	0	866.4				700 700	915.5		.6 47	
		6	131.3	807.5	0	115.7	1803.9	0	880.6		807.5 921.5	864.5 192.2	700	900 850			
		5 4.8	193.8 208.5	921.5 1000.5	0	64.2	1913.7 1939.7	0	927.9		921.5 1000.5	313.335	700	850	2.	ash 04	
		-	208.5	1000.5		0 -71.4	1939.7	0	939.1 951.6		1000.5	585.925	700	840		5	
		4.5	256.3	1255.3	0	-71.4 -207.1	2023.5	0	975.3		1255.3	1312.3	700	838.5		o 02	
		3	318.8	1369.3	0	-258.6	2133.3	0	1022.6		1369.3	1309.55	600	838.5		34	
		2	381.3	1249.8	0	-236.6 -76.6	2008.2	0	835		1249.8	1190.05	600	825		64	
		4	443.8	1130.3	0	105.5	1881.8	0	646.1		1130.3	1124.25	600	800		11	
		0	506.3	1118.2	0	180	1990.2	0	692		1130.3	1111.6	600	780		.11	
	Entry failure at this	-1	568.8	1110.2	0	255.7	1798.5	0	437.8		1110.2	677.37	600	790		35	
	elevation per SlopeW	-1.6	606.3	1152.9	0	245.4	1866.9	0	468.7		1152.9	011.31	600	790		43	
	(see graph title above)	-1.6	606.3	1152.9	0	-546.6	1074.9	0	468.7		1132.9	0	600	791		51	
		-1.0	631.3	1170.8	0	-539.5	1158.9	0	527.6		Envisoring to a section of	force calculated from		192	-4.	.51	
							1130.9	U	327.0	L	Equivalent passive	force calculated from		aroo Boly	nomial Tron	dline Coeffi	cionte
	Note: Table from CWALSHT design mode output file										SIVE FORCE=	9634.5		h h			
Comments:	Could achieve actual pi	le tin elevation of	f -4 5ft while m	naintainina a	an 800nef o	ohasion in t	n		CV		CWALSHT FS=	1.82	a 10531	-69243	c 173920	-209506	e 109867
Comments.	layer. Tip depth had larg	•							GEOSTUDIO PASSIVE FORCE= 2768.6						alculating FS f		109807
	of top few feet.	ge gap nom i to	-1.23 WHEN IE	illieu. Illei	eiore, redu	ceu conesio	""		PASSIVE FORCE DIFFERENCE= 6865.9					ents used for c	aiculating FS I	ioni graph	
	or tob lew leet.						ŀ		PASS		PILE LENGTH=	8.9					
										Office I F	TILE LENGTHE	0.9	I				

UNIFORM PRESSURE=

Iteration = 2	Applied Uniform	Pressure =	799		Pile	Tip (EL) =	-4.48		Cohesion = 600/800 psf for top 3ft (75%) Analysis Method = Sweep Search
			<lefts< td=""><td>SIDE></td><td><ne< td=""><td></td><td>∠RIGH</td><td>SIDE></td><td>Cohesion. Load Tip EL/Comments</td></ne<></td></lefts<>	SIDE>	<ne< td=""><td></td><td>∠RIGH</td><td>SIDE></td><td>Cohesion. Load Tip EL/Comments</td></ne<>		∠RIGH	SIDE>	Cohesion. Load Tip EL/Comments
	NET ELEV.	WATER	_		(SOIL+WATER)				600 780 0.22
	(FT)	(PSF)	PASSIVE	ACTIVE		PASSIVE		PASSIVE	
			(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	600 799 -4.48
`	10	0	0	0	0	0	0	0	
	9	0	0	0	0	0	0	0)
	8.1	0	0	0	0	0	0	0	D Company of the Comp
	8	6.2	0	0	6.2	6.2	0	0)
	7.5	37.5		0	37.5	37.5	0	0	D PASSIVE
Protected Side	7.5	37.5	0	0	37.5	926.4	0		
Ground Surface	7.3	50		0		878.1	0		
	7.3	50		0		1677.1	0		
	7	68.8		0	166.9	1710.1	0	842.3	
	6.3	112.5	780.7	0	130.8	1786.9	0		
	6	131.3		0	115.4	1819.9	0	889.6	
	5	193.8	928.9	0	63.9	1929.7	0	936.9	928.9 193.62
	4.8	208.3		0	0	1955.3	0	948	
	4.5	225	1097	0	-73	1984.6	0		
	4	256.3	1265.1	0	-209.8	2039.5	0	984.3	3 1265.1 1322.1
	3	318.8	1379.1	0	-261.3	2149.3	0	1031.6	6 1379.1 1318.05
	2	381.3	1257	0	-76.7	2021.6	0	841.4	4 1257 1195.95
	1	443.8	1134.9	0	107.9	1892.6	0	649.9	1134.9 1128.45
Entry failure at this	0	506.3	1122	0	183.2	2001	0	695.8	B 1122 1115.25
elevation per SlopeW	-1	568.8		0	259.3	1805.5	0	437.8	
(see graph title above)	-1.6	606.3		0	248.1	1873.9	0		
(see graph title above)	-1.6	606.3		0	-550.9	1074.9	0		
	-2	631.3		0	-544.2	1158.5	0	527.2	Equivalent passive force calculated from pressures
•	Note: Table fron	n CWALSHT	design mode	e output file	9				4th Degree Polynomial Trendline Coefficie

_	C CZ7.2 Equivalent passive	, force calculated from p	// Coourco							
	<u> </u>		4th D	egree Polyı	nomial Tren	dline Coeff	icients			
	CWALSHT PASSIVE FORCE=	9694.21	а	b	С	d	е			
	CWALSHT FS=	1.8	10531	-69243	173920	-209506	109867			
	GEOSTUDIO PASSIVE FORCE=	2982.0	Note: Coefficients used for calculating FS from graph							
	PASSIVE FORCE DIFFERENCE=	6712.2								
	SHEET PILE LENGTH=	8.9								
	UNIFORM PRESSURE=	754								

Iteration = 3	Applied Uniform	m Pressure =	788		Pile	Tip (EL) =	-4.48		Cohesion = 600/800 psf for top 3ft (75%) Analysis Method = Sweep Search Method
	NET ELEV.	WATER	<leftside></leftside>		<ne (SOIL+V</ne 	VATER)		SIDE>	
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	
`	10	0	0	0	0	0	0	0	
	9	0	0	0	0	0	0	0	
	8.1	0	0	0	0	0	0	0	
	8	6.2		0		6.2	0	0	
	7.5			0		37.5	0		0 PASSIVE
Protected Side	7.5		0	0		911.8	0		
Ground Surface	7.3		0	0		864.7	0	814.7	
	7.3		655.7	0		1652.7	0	814.7	
	7	68.8	689.9	0		1685.6	0	828.9	
	6.3		769.7	0		1762.5	0	862	
	6			0		1795.5	0	876.2	
	5	193.8	917.9	0		1905.3	0	923.5	
	4.8	208.5		0		1931.2	0		
	4.5		1084.2	0		1960.2	0	947.2	
	4	256.3	1250.5	0		2015.1	0	970.8	
	3	318.8	1364.5	0		2124.9	0	1018.2	
	2	381.3	1246.3	0		2001.1	0	831.8	
	1	443.8	1128	0		1876	0	644.2	
Entry failure at this	0	506.3	1116.4	0		1984.4	0	690.1	
elevation per SlopeW	-1	568.8	1103.3	0	253.4	1794.5	0	437.8	
(see graph title above	-1.0		1150.8	0		1862.9	0		
	-1.6		1150.8	0		1074.9	0	468.7	
	-2	631.3	1168.4	0	-537.2	1159.1	0	527.8	7.8 Equivalent passive force calculated from pressures

Note: Table from CWALSHT design mode output file

CWALSHT PASSIVE FORCE=	9605.19
CWALSHT FS=	1.83
GEOSTUDIO PASSIVE FORCE=	2663.4
PASSIVE FORCE DIFFERENCE=	6941.8
SHEET PILE LENGTH=	8.9
UNIFORM PRESSURE=	780

4th Degree Polynomial Trendline Coefficients

Iteration =	4		Applied Uniform	Pressure =	784.5		Pile	Tip (EL) =	-4.49		Cohesion =	600/800 psf	for top 3ft (75%)	Analysis Method = Sweep Search Method
											-			· · · · · · · · · · · · · · · · · · ·
			NET ELEV.	WATER	<leftside></leftside>		<net> (SOIL+WATER)</net>		<rightside></rightside>					
			(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)				
		`	10	0	0	0	0	0	0	0	Î			
			9	0	0	0	0	0	0	0				
			8.1	0	0	0	0	0	0	0				
			8	6.2	0	0	6.2	6.2	0	0				_
			7.5	37.5		0	37.5	37.5	0	0			SSIVE	
	Protecte		7.5	37.5	0	0	37.5	907.1	0	869.6		PSF	LBS	
	Ground S	Surface	7.3	50	0	0		860.3	0	810.3		0	0	
			7.3	50	652.2	0	182.3	1644.8	0	810.3		652.2	200.79	
			7	68.8	686.4	0	166.9	1677.8	0	824.5		686.4	508.41	
			6.3	112.5	766.2	0	130.8	1754.6	0	857.6		766.2	234.99	
			6	131.3		0	115.4	1787.6	0	871.8	l —	800.4	857.4	
			5	193.8		0	63.9	1897.4	0	919.1		914.4	190.75	
			4.8	208.6		0	0	1923.5	0	930.4		993.1	310.98	
			4.5	225	1080.1	0	-70.6	1952.3	0	942.8		1080.1	581.475	
			4	256.3		0	-205	2007.2	0	966.5		1245.8	1302.8	
			3	318.8	1359.8	0	-256.5	2117	0	1013.8	l L	1359.8	1301.3	
			2	381.3		0	-77	1994.4	0	828.7	l L	1242.8	1184.3	
			1	443.8	1125.8	0	102.4	1870.6	0	642.4		1125.8	1120.15	
	Entry failui	re at this	0	506.3	1114.5	0	176.3	1979.1	0	688.3		1114.5	1108.15	
	elevation pe		-1	568.8	1101.8	0	251.5	1791	0	437.8		1101.8	675.18	
	see graph t		-1.6	606.3		0		1859.4	0	468.7		1148.8	0	
,	ooo grapii t	(2000)	-1.6	606.3	1148.8	0	-542.6	1074.9	0	468.7				
			-2	631.3		0	-534.9	1159.2	0	528	<u> </u>	Equivalent passive	force calculated from p	pressures

		4th Degree Polynomial Trendline Coefficients							
CWALSHT PASSIVE FORCE=	9576.675	а	b	С	d	е			
CWALSHT FS=	1.84	10531	-69243	173920	-209506	109867			
GEOSTUDIO PASSIVE FORCE=	2559.3	Note: Coefficients used for calculating FS from graph							
PASSIVE FORCE DIFFERENCE=	7017.4								
SHEET PILE LENGTH=	8.9								
UNIFORM PRESSURE=	788								

Analysis

Analysis Method = Sweep Search Method

4th Degree Polynomial Trendline Coefficients

10531 -69243 173920 -209506 109867

Note: Coefficients used for calculating FS from graph

5	Applied Uniform	n Pressure =	786	ĺ	Pile	Tip (EL) =	-4.5		Cohesion = 600/800 p	sf for top 3ft (75%)]
	NET ELEV.	WATER	<left< td=""><td></td><td><ni (SOIL+\</ni </td><td>VATER)</td><td><right< td=""><td></td><td></td><td></td><td></td></right<></td></left<>		<ni (SOIL+\</ni 	VATER)	<right< td=""><td></td><td></td><td></td><td></td></right<>				
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)			
•	10	0	0	0	0	0	0	0	Ī		
	9	0	0	0	0	0	0	0			
	8.1	0	0	0	0	0	0	0			
	8	6.2	0	0	6.2	6.2	0	0			_
	7.5	37.5	0	0	37.5	37.5	0	0		PASSIVE]
Protected Side	7.5	37.5	0	0	37.5	909	0	871.5	PSF	LBS	
Ground Surface	7.3	50	0	0	50	862.1	0	812.1		0]
	7.3	50	653.6	0	182.4	1648.1	0			201.21	
	7	68.8	687.8	0	167	1681	0	826.3	687.8	509.39	
	6.3	112.5	767.6	0	130.9	1757.9	0	859.4	767.6	235.41]
	6	131.3	801.8	0	115.5	1790.8	0	873.6	801.8	858.8]
	5	193.8	915.8	0	64	1900.6	0	920.9	915.8	191.04	
	4.8	208.6	994.6	0	0	1926.7	0	932.1	994.6	311.445	
	4.5	225	1081.7	0	-70.7	1955.5	0	944.5	1081.7	582.35]
	4	256.3	1247.7	0	-205.4	2010.5	0	968.2	1247.7	1304.7	1
	3	318.8	1361.7	0	-256.9	2120.3	0	1015.5	1361.7	1302.95	
	2	381.3	1244.2	0	-76.9	1997.2	0	829.9	1244.2	1185.45]
	1	443.8	1126.7	0	103.1	1872.8	0	643.1	1126.7	1121	
Entry failure at this	0	506.3	1115.3	0	177	1981.3	0	689	1115.3	1108.85	_
elevation per SlopeW	-1	568.8	1102.4	0	252.4	1792.5	0	437.8		675.6	_
(see graph title above)	-1.6	606.3	1149.6	0	242.7	1860.9	0	468.7	1149.6	0	_
(see graph title above)	-1.6	606.3	1149.6	0	-543.3	1074.9	0	468.7	<u> </u>		_
	-2	631.3	1167.1	0	-535.8	1159.2	0	527.9	Equivalent pass	sive force calculated from	press
	Note: Table from	n CWALSHT	design mod	e output file	9			•	=		

Solution: FS=1.84 Note - see graph on next sheet.

Iteration =

CWALSHT PASSIVE FORCE=

GEOSTUDIO PASSIVE FORCE=

PASSIVE FORCE DIFFERENCE=

CWALSHT FS=

SHEET PILE LENGTH=

UNIFORM PRESSURE=

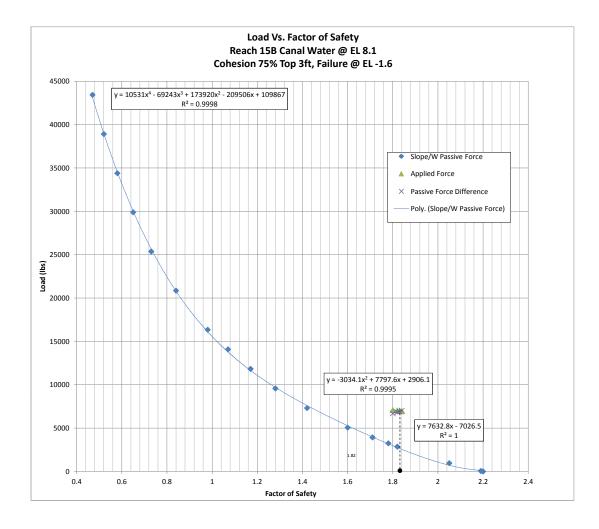
9588.195

1.84

2600.8

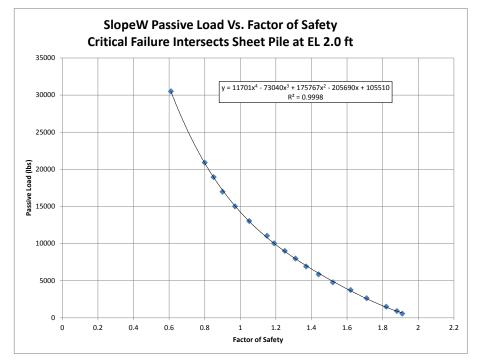
6987.4

8.9



Analyses by:	Reach	FLOOD SIDE CREST ELEVATION NAVD88	PROTECTED SIDE CREST ELEVATION NAVD89	SHEET PILE TIP ELEVATION NAVD88	SHEET PILE PENETRATION (D) (FT)	WATER LEVEL ELEVATION LEFT SIDE NAVD88 (Right in CWALSHT)	WATER LEVEL ELEVATION RIGHT SIDE NAVD88 (Left in CWALSHT)	Factor of Safety	Modified Slip Surface Elevation	ORIGINAL NOTES	slip surface distance above the sheet pile
KA	15B	7.5	7.3	-4.5	11.8	9.2	-5	1.9	2	n/a	6.5

SlopeW											
Surcharge load (pcf)	Passive Load (lbs)	FS									
10	557.46	1.91									
25	912.72	1.88									
50	1495.9	1.82									
100	2635.5	1.71									
150	3742.8	1.62									
200	4776.6	1.52									
250	5852.2	1.44									
300	6912.1	1.37									
350	7976.8	1.31									
400	9006.8	1.25									
450	10030	1.19									
500	11049	1.15									
600	13031	1.05									
700	15009	0.97									
800	16980	0.9									
900	18943	0.85									
1000	20901	0.8									
1500	30498	0.61									



Iteration = 1	Applied Uniform	m Pressure =	988		Pile	Tip (EL) =	-4.5]	Cohesion =	600/800 psf for	top 2 layers (75%)	Analysis Method = Sweep Search Method
	NET ELEV.	WATER		SIDE>		ET> WATER)	<righ< td=""><td>TSIDE></td><td></td><td></td><td></td><td></td></righ<>	TSIDE>				
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)				
*	10	0	0	0	0	0	0	0	1			
	9.2	0	0	0	0	0	0	0				
	9	12.5	0	0	12.5	12.5	0	0				
	8	75	0	0	75	75	0	0				
	7.5	106.3	0	0	106.3	106.3	0	0				
	7.5	106.3	0	0	106.3	1172.9	0	1066.7	l l	PA	SSIVE	
Protected Side	7.3	118.8	0	0	118.8	1110.6	0	991.8	l l	PSF	LBS	
Ground Surface	7.3	118.8	800	0	416.8	2208.6	0	991.8	l [800	245.13	
	7	137.5	834.2	0	401.3	2241.5	0	1006	l [834.2	611.87	
	6.3	181.3	914	0	365.3	2318.4	0	1039.2	l l	914	279.33	
	6	200	948.2	0	349.8	2351.4	0	1053.4		948.2	1005.2	
	5	262.5	1062.2	0	298.3	2461.2	0	1100.7		1062.2	578.675	
	4.5	293.8	1252.5	0	139.2	2516.1	0	1124.3		1252.5	534.32	
	4.1	321.1	1419.1	0	0	2564.1	0	1145		1419.1	143.1	
Entry failure at this	4	325	1442.9	0	-19.9	2571	0	1148		1442.9	1499.9	
elevation per SlopeW	3	387.5	1556.9	0	-71.4	2680.8	0	1195.3		1556.9	1472.2	
(see graph title above)	2	450	1387.5	0	160.5	2506.2	0	958.2		1387.5	0	
(occ graph and above)	2	450	1387.5	0	-937.5	1408.2	0	958.2				
	1	512.5	1218.2	0	-705.7	1231.6	0	719.1				
	0	575	1190.8	0	-615.8	1339.4	0	764.4		Equivalent passive	force calculated from p	pressures
	-1	637.5	1163.2	0	-525.7	1075.3	0	437.8				
	-2	700	1248.4	0	-548.4	1189.3	0	489.3	Į .			

Comments:

Based on previous runs of this reach in CWALSHT, the cohesion of the top 3 feet needed to be reduced in order for the pile tip to converge to EL -4.5.

		4th Degree Polynomial Trendline Coefficients								
CWALSHT PASSIVE FORCE=	6369.725	а	b	С	d	е				
CWALSHT FS=	1.5	11701 -73040 175767 -205690 10								
GEOSTUDIO PASSIVE FORCE=	5177.1	Note: Coefficients used for calculating FS from graph								
PASSIVE FORCE DIFFERENCE=	1192.7									
SHEET PILE LENGTH=	5.3									
UNIFORM PRESSURE=	225									

Iteration = 2	Applied Unifor	m Pressure =	929	1	Pile	e Tip (EL) =	-4.48]	Cohesion = 600/800 psf for top 2 layers (75%) Analysis Method = Sweep Search Method
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td></td><td>ET> WATER)</td><td><righ< td=""><td>TSIDE></td><td></td></righ<></td></left<>	SIDE>		ET> WATER)	<righ< td=""><td>TSIDE></td><td></td></righ<>	TSIDE>	
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	
`	10	0	0	0	0	0	0	0	
	9.2	0	0	0	0	0	0	0	
	9	12.5	0	0	12.5	12.5	0	0	
	8	75	0	0	75	75	0	0	
	7.5	106.3	0	0	106.3	106.3	0	0	
	7.5	106.3	0	0	106.3	1106.3	0	1000	PASSIVE
Ground Surface	7.3	118.8	0	0	118.8	1049.2	0	930.5	PSF LBS
Elevation	7.3	118.8	750	0	297.8	1978.2	0	930.5	750 230.13
	7	137.5	784.2	0	282.3	2011.1	0	944.6	784.2 576.87
	6.3	181.3	864	0	246.3	2088	0	977.8	864 264.33
	6	200	898.2	0	230.8	2121	0	992	898.2 955.2
	5	262.5	1012.2	0	179.3	2230.8	0	1039.3	
	4.5	293.8	1069.2	0	153.6	2285.7	0	1062.9	
	4	325	1126.2	0	127.8	2340.6	0	1086.6	
Entry failure at this	3	387.5	1240.2	0	76.3	2450.4	0	1133.9	
elevation per Slope	V 2	450	1213.6	0	165.4	2293.4	0	914.4	1213.6 0
(see graph title above		450	1213.6	0	-763.6	1364.4	0	914.4	
(111 3 1)	1 1	512.5	1187	0	-674.5	1205.7	0	693.2	
	0	575	1138	0	-563	1313.6	0	738.6	Equivalent passive force calculated from pressures
	-1	637.5	1094.2	0	-456.7	1075.3	0	437.8	

0

489.3

Note: Table from CWALSHT design mode output file

1060.2

-360.2

1189.3

		4th Degree Polynomial Trendline Coefficients							
CWALSHT PASSIVE FORCE=	5505.83	а	b	С	d	е			
CWALSHT FS=	1.6	11701	-73040	175767	-205690	105510			
GEOSTUDIO PASSIVE FORCE=	3881.4	Note: Coefficients used for calculating FS from graph							
PASSIVE FORCE DIFFERENCE=	1624.5]							
SHEET PILE LENGTH=	5.3]							
UNIFORM PRESSURE=	307	1							

Iteration = 3	Applied Uniform	n Pressure =	877		Pile	e Tip (EL) =	-4.48]	Cohesion =	600/800 psf for	top 2 layers (75%
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td></td><td>ET> WATER)</td><td><righ< td=""><td>TSIDE></td><td></td><td></td><td></td></righ<></td></left<>	SIDE>		ET> WATER)	<righ< td=""><td>TSIDE></td><td></td><td></td><td></td></righ<>	TSIDE>			
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)			
*	10	0	0	0	0	0	0	0	1		
	9.2	0	0	0	0	0	0	0			
	9	12.5	0	0	12.5	12.5	0	0			
	8	75	0	0	75	75	0	0			
	7.5	106.3	0	0	106.3	106.3	0	0			
	7.5	106.3	0	0	106.3	1047.4	0	941.2		PA	SSIVE
Protected Side	7.3	118.8	0	0	118.8	995	0	876.3		PSF	LBS
Ground Surface	7.3	118.8	705.9	0	289.9	1872	0	876.3	1	705.9	216.9
	7	137.5	740.1	0	274.4	1905	0	890.5		740.1	546
	6.3	181.3	819.9	0	238.4	1981.8	0	923.6		819.9	251.1
	6	200	854.1	0	222.9	2014.8	0	937.8		854.1	911.1
	5	262.5	968.1	0	171.4	2124.6	0	985.1		968.1	498.3
	4.5	293.8	1025.1	0	145.7	2179.5	0	1008.8		1025.1	526.8
	4	325	1082.1	0	119.9	2234.4	0	1032.4		1082.1	1139.1
Entry failure at this	3	387.5	1196.1	0	68.4	2344.2	0	1079.7		1196.1	1186.9
elevation per SlopeW	2	450	1177.7	0	149.3	2202.7	0	875.7		1177.7	0
(see graph title above)	2	450	1177.7	0	-727.7	1325.7	0	875.7	1		
(356 graph title above)	1	512 5	1159 4	0	-646 9	11827	0	670.2			

1159.4

1114.1

1070.9

1060.2

-646.9

-539.1

-433.4

-360.2

0

0

1182.7

1290.9

1075.3

1189.3

670.2

715.9

437.8

489.3

0

0

0

0

Equivalent passive force calculated from pressures

Note: Table from CWALSHT design mode output file

512.5

575

637.5

700

0

		4th Degree Polynomial Trendline Coefficients							
CWALSHT PASSIVE FORCE=	5276.2	а	b	d	е				
CWALSHT FS=	1.7	11701 -73040 175767 -205690 105							
GEOSTUDIO PASSIVE FORCE=	2686.0	Note: Coefficients used for calculating FS from graph							
PASSIVE FORCE DIFFERENCE=	2590.2								
SHEET PILE LENGTH=	5.3								
UNIFORM PRESSURE=	489	1							

Analysis Method = Sweep Search Method

Iteration = 4	Applied Uniform	m Pressure =	832		Pile	e Tip (EL) =	-4.51		Cohesion = 600/800 psf for top 2 layers (75%) Analysis Method = Sweep Search Method
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td></td><td>ET> NATER)</td><td><righ< td=""><td>TSIDE></td><td>></td></righ<></td></left<>	SIDE>		ET> NATER)	<righ< td=""><td>TSIDE></td><td>></td></righ<>	TSIDE>	>
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	
•	10	0	0	0	0	0	0	0	
	9.2	0	0	0	0	0	0	0	
	9	12.5	0	0	12.5	12.5	0	0	
	8	75	0	0	75	75	0	0	
	7.5	106.3	0	0	106.3	106.3	0	0	
	7.5	106.3	0	0	106.3	995.1	0	888.9	PASSIVE
Protected Side	7.3	118.8	0	0	118.8	946.9	0	828.1	1 PSF LBS
Ground Surface	7.3	118.8	666.7	0	284.1	1778.9	0	828.1	
	7	137.5	700.9	0	268.6	1811.8	0	842.3	
	6.3	181.3	780.7	0	232.6	1888.7	0	875.4	
	6	200	814.9	0	217.1	1921.6	0	889.6	814.9 871.9
	5	262.5	928.9	0	165.6	2031.4	0	936.9	
	4.5	293.8	985.9	0	139.9	2086.4	0	960.6	
	4	325	1042.9	0	114.1	2141.3	0	984.3	
Entry failure at this	3	387.5	1156.9	0	62.6	2251.1	0	1031.6	
elevation per SlopeW	2	450	1145.9	0	136.1	2123.4	0	841.4	4 1145.9 0
(see graph title above)	2	450	1145.9	0	-695.9	1291.4	0	841.4	
(oce graph and above)	1	512.5	1134.9	0	-622.4	1162.4	0	649.9	
	0	575	1092.9	0	-517.9	1270.8	0	695.8	B Equivalent passive force calculated from pressures

0

0

437.8

489.3

Note: Table from CWALSHT design mode output file

1048.3

1060.2

0

0

-410.8

-360.2

1075.3

1189.3

637.5

		4th Degree Polynomial Trendline Coefficients							
CWALSHT PASSIVE FORCE=	5072.14	а	b	С	d	е			
CWALSHT FS=	1.8	11701	-73040	175767	-205690	105510			
GEOSTUDIO PASSIVE FORCE=	1616.2	Note: Coefficients used for calculating FS from graph							
PASSIVE FORCE DIFFERENCE=	3455.9								
SHEET PILE LENGTH=	5.3								
UNIFORM PRESSURE=	652]							

Iteration = 5	Applied Uniform	m Pressure =	810	ļ	Pile	e Tip (EL) =	-4.49		Cohesion	= 600/800 psf fo	r top 2 layers (75%)		Anal	ysis Method =	Sweep Sear	ch Method
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td></td><td>ET> WATER)</td><td><righ< td=""><td>ΓSIDE></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></righ<></td></left<>	SIDE>		ET> WATER)	<righ< td=""><td>ΓSIDE></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></righ<>	ΓSIDE>								
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)								
•	10	0	0	0	0	0	0	0								
	9.2	0	0	0	0	0	0	0								
	9	12.5	0	0	12.5	12.5	0	0								
	8	75	0	0	75	75	0	0								
	7.5	106.3	0	0	106.3	106.3	0	0								
	7.5	106.3	0	0	106.3	971.1	0	864.9		PA	SSIVE					
Protected Side	7.3	118.8	0	0	118.8	924.7	0	806		PSF	LBS					
Ground Surface	7.3	118.8	648.6	0	280.1	1734.7	0	806		648.6	199.71					
	7	137.5	682.8	0	264.7	1767.7	0	820.2		682.8	505.89					
	6.3	181.3	762.6	0	228.6	1844.6	0	853.3		762.6	233.91					
	6	200	796.8	0	213.2	1877.5	0	867.5		796.8	853.8					
	5	262.5	910.8	0	161.7	1987.3	0	914.8		910.8	469.65					
	4.5	293.8	967.8	0	135.9	2042.2	0	938.5		967.8	498.15					
	4	325	1024.8	0	110.2	2097.1	0	962.1		1024.8	1081.8					
Entry failure at this	3	387.5	1138.8	0	58.7	2206.9	0	1009.4		1138.8	1135					
elevation per SlopeW	2	450	1131.2	0	128.8	2085.6	0	825.6		1131.2	0					
(see graph title above)	2	450	1131.2	0	-681.2	1275.6	0	825.6								
(oce graph the above)	1	512.5	1123.6	0	-611.1	1153	0	640.5								
	0	575	1083.2	0	-508.2	1261.5	0	686.5		Equivalent passive	e force calculated from p	ressures				
	-1	637.5	1037.1	0	-399.6	1075.3	0	437.8								
	-2	700	1060.2	0	-360.2	1189.3	0	489.3	J							

		4th D	egree Poly	nomial Trer	dline Coeff	cients
CWALSHT PASSIVE FORCE=	4977.91	а	b	С	d	е
CWALSHT FS=	1.85	11701	-73040	175767	-205690	105510
GEOSTUDIO PASSIVE FORCE=	1143.9	Note: Coeffic	ients used for o	calculating FS	from graph	<u>.</u>
PASSIVE FORCE DIFFERENCE=	3834.0					
SHEET PILE LENGTH=	5.3					
UNIFORM PRESSURE=	723]				

PASSIVE

(PSF)

0

0

0

Ω

842.1

785

785

799.2

832.3

846.5

893.9

917.5

941.2

988.5

810.6

810.6

631.7

677.7

437.8

489.3

Applied Uniform Pressure = 790 Pile Tip (EL) = -4.49 Iteration = 6 <---NET---> <---LEFTSIDE---> <--RIGHTSIDE---> NET ELEV. WATER (SOIL+WATER) (PSF) PASSIVE ACTIVE ACTIVE PASSIVE ACTIVE (PSF) (PSF) (PSF) (PSF) (PSF) 10 0 0 0 0 9.2 0 0 0 0 0 12.5 12.5 12.5 9 0 n 0 75 0 75 75 7.5 0 106.3 106.3 106.3 0 7.5 0 948.4 0 106.3 0 106.3 Protected Side 7.3 118.8 118.8 903.8 7.3 **Ground Surface** 118.8 631.6 277.2 1693.8 0 0 137.5 665.8 261.7 1726.7 6.3 745.6 225.7 0 181.3 0 1803.6 6 200 779.8 0 210.2 1836.5 0 5 262.5 893.8 0 158.7 1946.4 0 4.5 293.8 950.8 0 133 2001.3 0 325 1007.8 0 107.2 2056.2 0

387.5

450

450

512.5

575

637.5

700

2

Ω

-2

1121.8

1117.4

1117.4

1112.9

1073.9

1025.3

1060.2

55.7

122.6

-667.4

-600.4

-498.9

-387.8

-360.2

0

0

0

0

2166

2050.6

1260.6

1144.2

1252.7

1075.3

1189.3

0

0

0

0

0

0

Entry failure at this elevation per SlopeW (see graph title above)

PASSIVE 631.6 194.61 665.8 493.99 745.6 228.81 779.8 836.8 893.8 461.15 950.8 489.65 1007.8 1064.8 1121.8 1119.6 1117.4 0

Cohesion = 600/800 psf for top 2 layers (75%)

Analysis Method = Sweep Search Method

4th Degree Polynomial Trendline Coefficients

105510

-73040

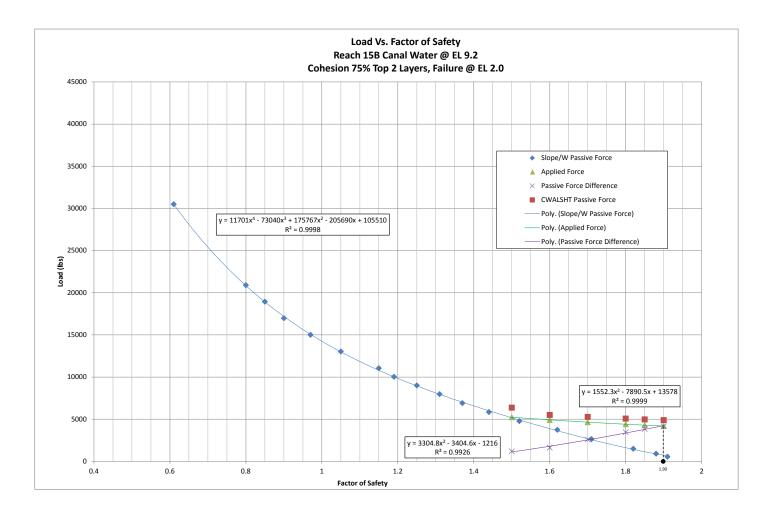
Equivalent passive force calculated from pressures

Note: Table from CWALSHT design mode output file

Solution: FS=1.90

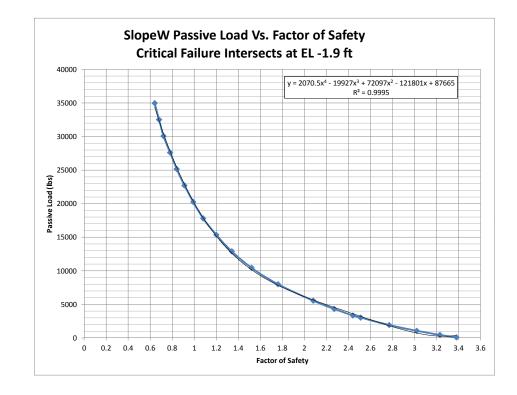
Note - see graph on next sheet.

CWALSHT PASSIVE FORCE= 4889.41 CWALSHT FS= GEOSTUDIO PASSIVE FORCE= 725.1 lote: Coefficients used for calculating FS from graph PASSIVE FORCE DIFFERENCE= 4164.3 SHEET PILE LENGTH= 5.3 UNIFORM PRESSURE= 786



Analyses by:	Reach	FLOOD SIDE CREST ELEVATION NAVD88	PROTECTED SIDE CREST ELEVATION NAVD89	SHEET PILE TIP ELEVATION NAVD88	SHEET PILE PENETRATION (D) (FT)	WATER LEVEL ELEVATION LEFT SIDE NAVD88 (Right in CWALSHT)	WATER LEVEL ELEVATION RIGHT SIDE NAVD88 (Left in CWALSHT)	Factor of Safety	Net Pressure Zero @ EL (ft) ² [Crossover Point]	Slip Surface Elevation	ORIGINAL NOTES	FLAC FS RESULTS	slip surface distance above the sheet pile
KA	15A	3.6	6.5	-4.5	8.1	8	-5.2	2.58	-3.25	-1.9	n/a	2.07	2.6

	SlopeW									
Surcharge load (pcf)	Passive Load (lbs)	FS								
Hw= 0.0	112	3.38								
Hw= 2.0	475	3.23								
Hw= 4.0	1086	3.02								
Hw= 6.0	1947	2.77								
Hw= 8.0	3058	2.51								
5	3365	2.44								
25	4345	2.27								
50	5570	2.08								
100	8020	1.76								
150	10470	1.52								
200	12920	1.34								
250	15370	1.2								
300	17820	1.08								
350	20270	0.99								
400	22721	0.91								
450	25171	0.84								
500	27621	0.78								
550	30071	0.72								
600	32521	0.68								
650	34971	0.64								



17th St. Outfall Canal

Reach 15A

Iteration = 1	Applied Unifor	m Pressure =	641		Pile	Tip (EL) =	-4.52		Cohesion = 5	500/800 psf for to	op 1.5 ft (62.5%)] [Ar	nalysis Method =	Sweep Se	earch Method
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><ne (SOIL+W</ne </td><td></td><td><rights< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></rights<></td></left<>	SIDE>	<ne (SOIL+W</ne 		<rights< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></rights<>									
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)								
`	8	0	0	0	0	0	0	0	l _							
	7	62.5	0	0	62.5	62.5	0	0	l L		SIVE			Iterations		
Protected Side Ground	6.5	93.8	0	0	93.8	93.8	0	0	l L	PSF	LBS	Method	FS	Uniform Load	Tip (ft)	Message
Surface Elevation	6.5	93.8	500	0	234.8	734.8	0	0	l L	500	262.5	SS	2	800	-12.43	
Canaco Elevation	6	125	550	0	216	766	0	0	l L	550	681.3	SS	2	600		(1)
	5	187.5	812.6	0	15.9	828.5	0	0	l L	812.6	943.9	SS	2	700		(1)
	4	250	1075.2	0	-184.2	891	0	0		1075.2	439.08	SS	2	750		(2)
	3.6	275	1120.2	0	-204.2	916	0	0	l L	1120.2	0	SS	2	770	-11.29	
	3.6	275	1120.2	0	-204.2	1716	0	800		1120.2	692.4	SS	2	760		(2)
	3	312.5	1187.8	0	-234.3	1759.5	0	806	l L	1187.8	484.12	SS	2	765	-10.99	
	2.6	337.5	1232.8	0	-254.3	1804.5	0	826		1232.8	712.14	FS	2	765		(2)
	2	375	1141	0	-125	1712.2	0	696.2		1141	1064.45	(1) Impen				
	1	437.5	987.9	0	90.6	1558.4	0	479.9	l L	987.9	1044.2	(2) Cantil	ever wa	all above elevation	3	
Entry failure at this	0	500	1100.5	0	40.5	1670.6	0	529.6		1100.5	977.75					
elevation per SlopeW	-1	562.5	855	0	348.5	1783	0	579.5	l L	855	815.67	_				
(see graph title above).	-1.9	618.8	957.6	0	302.2	1884.1	0	624.3	l L	957.6	0	J				
(Geo graph the above).	-1.9	618.8	957.6	0	-338.9	1243.1	0	624.3								
	-2	625	969	0	-344	1254.3	0	629.3	E	Equivalent passive for	rce calculated from pr	ressures				
	-3	687.5	1084.2	0	-396.7	1429.3	0	741.8								
	-4	750	1322.1	0	-572.1	1604.3	0	854.3								
	-5	812.5	1311	0	-498.5	1589.7	0	777.2								
	-5.2	825	1329.8	0	-504.8	1464.2	0	639.2								
	-6	825	1355	0	-530	1299.4	0	474.4	l							
	Note: Table fro	om CWALSHT	design mode	e output file								4th	Degree	Polynomial Tren	dline Coe	efficients

		4th	Degree P	olynomial Tre	ndline Coe	fficients
CWALSHT PASSIVE FORCE=	8117.51	а	b	С	d	е
CWALSHT FS=	2	2070.5	-19927	72097	-121801	87665
GEOSTUDIO PASSIVE FORCE=	6163.0	Note: Coef	ficients used	for calculating FS f	rom graph	
PASSIVE FORCE DIFFERENCE=	1954.5					
SHEET PILE LENGTH=	8.4					
UNIFORM PRESSURE=	233					

Iteration = 2	Applied Unifo	rm Pressure =	499		Pile	Tip (EL) =	-4.47		Cohesion = 500/800 psf for top 1.5 ft (62.5%) Analysis Method = Sweep Search Metho
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><ne (SOIL+V</ne </td><td></td><td><rights< td=""><td>SIDE></td><td></td></rights<></td></left<>	SIDE>	<ne (SOIL+V</ne 		<rights< td=""><td>SIDE></td><td></td></rights<>	SIDE>	
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE I	PASSIVE (PSF)	
`	8	0	0	0	0	0	0	0	
	7	62.5	0	0	62.5	62.5	0	0	PASSIVE
Protected Side Ground	6.5	93.8	0	0	93.8	93.8	0	0	PSF LBS
Surface Elevation	6.5	93.8	380.2	0	212.5	592.8	0	0	380.2 203
Surface Lievation	6	125	431.8	0	192.2	624	0	0	431.8 545.1
	5	187.5	658.4	0	28.1	686.5	0	0	658.4 771.7
	4	250	885	0	-136	749	0	0	885 363.02
	3.6		930.1	0		774	0	0	930.1 0
	3.6	275	930.1	0	-156.1	1382.4	0	608.4	930.1 578.31
	3	312.5	997.6	0	-186.1	1431.6	0	620.1	997.6 408.06
	2.6	337.5	1042.7	0	-206.2	1476.6	0	640.1	1042.7 609.51
	2	375	989	0	-115	1422.6	0	548.6	
	1	437.5	899.6	0		1332.5	0	396	
Entry failure at this	0	500	942.2	0		1444.7	0	445.7	942.2 898.6
elevation per SlopeW	-1	562.5	855	0	206.5	1557.1	0	495.6	
(see graph title above).	-1.9	618.8	957.6	0	160.2	1658.2	0	540.4	957.6 0
(GGC graph line above).	-1.9		957.6	0		1159.2	0	540.4	
	-2		969	0	-344	1170.4	0	545.4	
	-3	687.5	1083	0	-395.5	1330.4	0	642.9	
	-4	750	1226.9	0	-476.9	1490.4	0	740.4	
	-5	812.5	1311	0	-498.5	1505.8	0	693.3	
	-5.2		1329.8	0		1390.8	0	565.8	
	-6		1355		-530	1299.4	0	474.4	
	Note: Table fr	om CWALSHT	design mod	e output file			•		4th Degree Polynomial Trendline Coefficients

0						
		4th	Degree F	olynomial Tre	endline Coe	fficients
CWALSHT PASSIVE FORCE	= 7058.17	а	b	С	d	е
CWALSHT FS	= 2.63	2070.5	-19927	72097	-121801	87665
GEOSTUDIO PASSIVE FORCE	= 2575.1	Note: Coef	ficients used	for calculating FS t	rom graph	
PASSIVE FORCE DIFFERENCE	= 4483.0					
SHEET PILE LENGTH	= 8.4					
UNIFORM PRESSURE	= 534					

Iteration = 3	Applied Unifor	rm Pressure =	522		Pile	Tip (EL) =	-4.50		Cohesion = \$500/800 psf for top 1.5 ft (62.5%) Analysis Method = Sweep Search Method
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><ne (SOIL+V</ne </td><td></td><td><right< td=""><td>SIDE></td><td></td></right<></td></left<>	SIDE>	<ne (SOIL+V</ne 		<right< td=""><td>SIDE></td><td></td></right<>	SIDE>	
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	
`	8	0	0	0	-	0	0	0	<u></u>
	7	62.5	0	0	62.5	62.5	0	0	0 PASSIVE
Protected Side Ground	6.5	93.8	0	0	93.8	93.8	0	0	0 PSF LBS
Surface Elevation	6.5	93.8	400	0	215.8	615.8	0	0	0 400 212.825
Surface Lievation	6	125	451.3	0	195.7	647	0	0	0 451.3 567.6
	5	187.5	683.9	0	25.6	709.5	0	0	0 683.9 800.15
	4	250	916.4	0	-144.4	772	0	0	916.4 375.58
	3.6	275	961.5	0	-164.5	797	0	0	0 961.5 0
	3.6	275	961.5	0	-164.5	1437	0	640	0 961.5 597.15
	3	312.5	1029	0	-194.5	1485.3	0	650.8	8 1029 420.6
	2.6	337.5	1074	0	-214.5	1530.3	0	670.8	8 1074 626.43
	2	375	1014.1	0	-117.1	1469.9	0	572.9	9 1014.1 964.15
	1	437.5	914.2	0	45.3	1369.3	0	409.8	8 914.2 936.4
Entry failure at this	0	500	958.6	0	63.4	1481.6	0	459.6	
elevation per SlopeW	-1	562.5	855	0		1593.9	0	509.4	
(see graph title above).	-1.9	618.8	957.6	0	183.2	1695	0	554.3	
(see graph title above).	-1.9	618.8	957.6	0	-338.9	1173	0	554.3	3
	-2	625	969	0		1184.3	0	559.3	
	-3	687.5	1083	0	-395.5	1346.7	0	659.2	
	-4	750	1243	0		1509.2	0	759.2	
	-5	812.5	1311	0	-498.5	1519.7	0	707.2	2
	-5.2	825	1329.8	0		1403.2	0	578.2	
	-6		1355	0		1299.4	0	474.4	
	Note: Table fr	om CWALSHT	design mod	e output file					4th Degree Polynomial Trendline Coefficients

0 474.4						
		4th	Degree P	olynomial Tre	endline Coe	fficients
CWALSHT PASSIVE FORCE=	7223.355	а	b	С	d	е
CWALSHT FS=	2.5	2070.5	-19927	72097	-121801	87665
GEOSTUDIO PASSIVE FORCE=	3288.3	Note: Coef	ficients used	for calculating FS t	rom graph	
PASSIVE FORCE DIFFERENCE=	3935.1					
SHEET PILE LENGTH=	8.4					
UNIFORM PRESSURE=	468					

Iteration = 4	Applied Unifor	rm Pressure =	513	I	Pile	Tip (EL) =	-4.50		Cohesion =	500/800 psf for	top 1.5 ft (62.5%)	Analysis Method = Sweep Search Method
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><ne (SOIL+W</ne </td><td></td><td><righ< td=""><td>TSIDE></td><td></td><td></td><td></td><td></td></righ<></td></left<>	SIDE>	<ne (SOIL+W</ne 		<righ< td=""><td>TSIDE></td><td></td><td></td><td></td><td></td></righ<>	TSIDE>				
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)				
•	8	0	0	0	0	0	0	0				
	7	62.5	0	0	62.5	62.5	0	0			SSIVE	
Protected Side Ground	6.5	93.8	0	0	93.8	93.8	0	0		PSF	LBS	
Surface Elevation	6.5	93.8		0		606.8	0	0		392.2	208.925	
Curiado Elevation	6	125		0		638	0	0		443.5	558.65	
	5	187.5		0		700.5	0	0		673.8	788.9	
	4	250	904	0	-141	763	0	0		904	370.6	
	3.6	275		0	-161	788	0	0		949	0	
	3.6	275		0		1415.5	0	627.5		949	589.68	
	3	312.5		0	-191.1	1464.1	0	638.6		1016.6	415.64	
	2.6	337.5		0	-211.1	1509.1	0	658.6		1061.6	619.71	
	2	375		0	-116.1	1451.3	0	563.3		1004.1	956.25	
	1	437.5		0	42.1	1354.8	0	404.3		908.4	930.25	
Entry failure at this	0	500	952.1	0	60.9	1467.1	0	454.1		952.1	903.55	
elevation per SlopeW	-1	562.5		0	220.5	1579.4	0	503.9		855	815.67	
(see graph title above).	-1.9	618.8		0		1680.6	0		4	957.6	0	
(dee graph title abeve).	-1.9			0		1167.6	0					
	-2	625		0		1178.8	0	553.8		Equivalent passive for	orce calculated from pres	ssures
	-3	687.5	1083	0	-395.5	1340.3	0	652.8				
	-4	750	1235.9	0	-485.9	1501.8	0	751.8				
	-5	812.5	1311	0		1514.2	0	701.7				
	-5.2	825	1329.8	0	-504.8	1398.3	0	573.3				
	-6	825		0	-530	1299.4	0	474.4			_	
	Note: Table fro	om CWALSHT	design mode	output file								4th Degree Polynomial Trendline Coefficients

		4th	Degree P	olynomial Tre	ndline Coe	fficients
CWALSHT PASSIVE FORCE=	7157.825	а	b	С	d	е
CWALSHT FS=	2.55	2070.5	-19927	72097	-121801	87665
GEOSTUDIO PASSIVE FORCE=	3012.1	Note: Coefficients used for calculating FS from graph				
PASSIVE FORCE DIFFERENCE=	4145.8					
SHEET PILE LENGTH=	8.4					
UNIFORM PRESSURE=	494					

Reach 15A

Iteration = 5	Applied Unifor	rm Pressure =	506		Pile	Tip (EL) =	-4.50		Cohesion = 500/800 psf for top 1.5 ft (62.5%) Analysis Method = Sweep Search Method
	NET ELEV.	WATER	<left< td=""><td></td><td><ne (SOIL+W</ne </td><td>/ATER)</td><td><rights< td=""><td></td><td></td></rights<></td></left<>		<ne (SOIL+W</ne 	/ATER)	<rights< td=""><td></td><td></td></rights<>		
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE I (PSF)	PASSIVE (PSF)	
`	8	0	0	0	0	0	0	0	
	7	62.5	0	0	62.5	62.5	0	0	PASSIVE
Protected Side Ground	6.5	93.8	0	0	93.8	93.8	0	0	PSF LBS
Surface Elevation	6.5	93.8	386.1	0	213.6	599.8	0	0	386.1 205.925
Surface Lievation	6	125	437.6	0	193.4	631	0	0	437.6 551.8
	5	187.5	666	0	27.5	693.5	0	0	666 780.2
	4	250	894.4	0	-138.4	756	0	0	894.4 366.76
	3.6	275	939.4	0	-158.4	781	0	0	939.4 0
	3.6	275	939.4	0	-158.4	1398.8	0	617.8	
	3	312.5	1006.9	0	-188.4	1447.7	0	629.2	
	2.6	337.5	1052	0	-208.5	1492.7	0	649.2	
	2	375	996.5	0	-115.5	1436.8	0	555.8	
	1	437.5	903.9	0	39.6	1343.6	0	400.1	
Entry failure at this	0	500	947	0		1455.9	0	449.9	
elevation per SlopeW	-1	562.5	855	0	213.5	1568.2	0	499.7	
(see graph title above).	-1.9		957.6	0	167.2	1669.3	0	544.6	
(See graph title above).	-1.9		957.6	0		1163.3	0	544.6	
	-2	625	969	0		1174.5	0	549.5	
	-3	687.5	1083	0		1335.3	0	647.8	
	-4	750	1231.3	0	-481.3	1496	0	746	
	-5	812.5	1311	0	-498.5	1509.9	0	697.4	
	-5.2	825	1329.8	0		1394.4	0	569.4	
	-6	825	1355	0	-530	1299.4	0	474.4	
	Note: Table fr	om CWALSHT	design mode	e output file					4th Degree Polynomial Trendline Coefficients

		4th Degree Polynomial Trendline Coefficient							
CWALSHT PASSIVE FORCE=	7107.225	а	b	С	d	е			
CWALSHT FS=	2.59	2070.5	-19927	72097	-121801	87665			
GEOSTUDIO PASSIVE FORCE=	2792.6	Note: Coef	ficients used	for calculating FS f	rom graph				
PASSIVE FORCE DIFFERENCE=	4314.6								
SHEET PILE LENGTH=	8.4								
UNIFORM PRESSURE=	514								

Iteration = 6	Applied Unifo	rm Pressure =	510	I	Pile	Tip (EL) =	-4.47		Cohesion = 500/800 psf for top 1.5 ft (62.5%) Analysis Method = Sweep Search Method
	NET ELEV.	WATER	<left< td=""><td></td><td><ne (SOIL+W</ne </td><td>ATER)</td><td><rights< td=""><td></td><td></td></rights<></td></left<>		<ne (SOIL+W</ne 	ATER)	<rights< td=""><td></td><td></td></rights<>		
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	
•	8	0	0	0	0	0	0	0	<u></u>
	7	62.5	0	0	62.5	62.5	0	0	PASSIVE
Protected Side Ground	6.5	93.8	0	0	93.8	93.8	0	0	PSF LBS
Surface Elevation	6.5	93.8	389.9	0	213.9	603.8	0	0	389.9 207.8
Surface Lievation	6	125	441.3	0	193.7	635	0	0	441.3 556.05
	5	187.5	670.8	0	26.7	697.5	0	0	670.8 785.55
	4	250	900.3	0	-140.3	760	0	0	900.3 369.14
	3.6	275	945.4	0	-160.4	785	0	0	945.4 0
	3.6	275	945.4	0	-160.4	1408.8	0	623.8	945.4 587.49
	3	312.5	1012.9	0	-190.4	1457.5	0	635	1012.9 414.18
	2.6	337.5	1058	0	-210.5	1502.5	0	655	1058 617.76
	2	375	1001.2	0	-116.2	1445.4	0	560.4	1001.2 953.95
	1	437.5	906.7	0	40.8	1350.2	0	402.7	906.7 928.45
Entry failure at this	0	500	950.2	0		1462.5	0	452.5	950.2 902.6
elevation per SlopeW	-1	562.5	855	0	217.5	1574.8	0	502.3	855 815.67
(see graph title above).	-1.9		957.6	0	171.2	1675.9	0	547.2	957.6 0
(ood graph and above).	-1.9		957.6	0		1165.9	0	547.2	
	-2	625	969	0	-344	1177.2	0	552.2	Equivalent passive force calculated from pressures
	-3		1083	0		1338.4	0	650.9	
	-4	750	1234.2	0	-484.2	1499.6	0	749.6	
	-5	812.5	1311	0	-498.5	1512.6	0	700.1	
	-5.2		1329.8	0		1396.8	0	571.8	
	-6		1355	0	-530	1299.4	0	474.4	
	Note: Table fr	om CWALSHT	design mode	e output file		_			4th Degree Polynomial Trendline Coefficients

-									
		4th Degree Polynomial Trendline Coefficients							
CWALSHT PASSIVE FORCE=	7138.64	а	b	С	d	е			
CWALSHT FS=	2.57	2070.5	-19927	72097	-121801	87665			
GEOSTUDIO PASSIVE FORCE=	2929.6	Note: Coef	ficients used	for calculating FS f	rom graph				
PASSIVE FORCE DIFFERENCE=	4209.1								
SHEET PILE LENGTH=	8.4								
UNIFORM PRESSURE=	501								

87665

Cohesion = 500/800 psf for top 1.5 ft (62.5%)

Analysis Method = Sweep Search Method

Protected Side Ground Surface Elevation

Entry failure at this elevation per SlopeW (see graph title above).

NET ELEV.	WATER	<left< th=""><th>SIDE></th><th></th><th>ET> WATER)</th><th><right< th=""><th>TSIDE></th></right<></th></left<>	SIDE>		ET> WATER)	<right< th=""><th>TSIDE></th></right<>	TSIDE>
(FT)	(PSF)	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
		(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
8	0	0	0	0	0	0	0
7	62.5	0	0	62.5	62.5	0	0
6.5	93.8	0	0	93.8	93.8	0	0
6.5	93.8	387.6	0	214.2	601.8	0	0
6	125	439	0	194	633	0	0
5	187.5	667.9	0	27.6	695.5	0	0
4	250	896.7	0	-138.7	758	0	0
3.6	275	941.8	0	-158.8		0	0
3.6	275	941.8	0	-158.8	1403.2	0	620.2
3	312.5	1009.3	0	-188.8	1452	0	631.5
2.6	337.5	1054.4	0	-208.9	1497	0	651.5
2	375	998.4	0	-115.4	1440.7	0	557.7
1	437.5	905	0	40.5	1346.6	0	401.1
0	500	948.3	0	59.7	1458.9	0	450.9
-1	562.5	855	0	215.5	1571.2	0	500.7
-1.9	618.8	957.6	0	169.2	1672.4	0	545.6
-1.9	618.8	957.6	0	-338.9	1164.4	0	545.6
-2	625	969	0	-344	1175.6	0	550.6
-3	687.5	1083	0	-395.5	1336.5	0	649
-4	750	1232.5	0	-482.5	1497.4	0	747.4
-5	812.5	1311	0	-498.5	1511	0	698.5
-5.2	825	1329.8	0	-504.8		0	570.4
-6	825	1355	0	-530	1299.4	0	474.4
Note: Table fr	om CWALSHT	design mode	e output file				

PAS	SSIVE
PSF	LBS
387.6	206.65
439	553.45
667.9	782.3
896.7	367.7
941.8	0
941.8	585.33
1009.3	412.74
1054.4	615.84
998.4	951.7
905	926.65
948.3	901.65
855	815.67
957.6	0

Equivalent passive force calculated from pressures

CWALSHT PASSIVE FORCE=	7119.68
CWALSHT FS=	2.58
GEOSTUDIO PASSIVE FORCE=	2847.3
PASSIVE FORCE DIFFERENCE=	4272.4
SHEET PILE LENGTH=	8.4
UNIFORM PRESSURE=	509

2070.5 -19927 72097 -121801

Note: Coefficients used for calculating FS from graph

4th Degree Polynomial Trendline Coefficients

on = 8	Applied Unifor	m Pressure =	509	l	Pile	Tip (EL) =	-4.53		Cohesion = 500/800 psf for top 1.5 ft (62.5%) Analysis Method = Sweep Search Method
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><ne (SOIL+V</ne </td><td></td><td><right< td=""><td>SIDE></td><td></td></right<></td></left<>	SIDE>	<ne (SOIL+V</ne 		<right< td=""><td>SIDE></td><td></td></right<>	SIDE>	
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	
`	8	0	0	0	0	0	0	(<u>o</u>
	7	62.5	0	0	62.5	62.5	0	(0 PASSIVE
B + + + 101+ 0 - +	6.5	93.8	0	0	93.8	93.8	0	(0 PSF LBS
Protected Side Ground	6.5	93.8	388.3	0	214.4	602.8	0	(0 388.3 207.025
Surface Elevation	6	125	439.8	0	194.2	634	0	(0 439.8 554.35
	5	187.5	668.9	0	27.6	696.5	0	(0 668.9 783.4
	4	250	897.9	0	-138.9	759	0	(0 897.9 368.18
	3.6	275	943	0	-159	784	0	(0 943 0
	3.6	275	943	0	-159	1405.4	0	621.4	4 943 586.05
	3	312.5	1010.5	0	-189	1454.2	0	632.7	7 1010.5 413.2
	2.6	337.5	1055.5	0	-209	1499.2	0	652.7	7 1055.5 616.44
	2	375	999.3	0	-115.3	1442.6	0	558.6	6 999.3 952.45
	1	437.5	905.6	0	40.9	1348.1	0	401.6	6 905.6 927.25
Entry failure at this	0	500	948.9	0	60.1	1460.4	0	451.4	948.9 901.95
elevation per SlopeW	-1	562.5	855	0	216.5	1572.8	0	501.3	855 815.67
(see graph title above).	-1.9	618.8	957.6	0	170.2	1673.9	0	546.	1 957.6 0
(300 graph lille above).	-1.9	618.8	957.6	0	-338.9	1164.9	0	546.1	1
	-2	625		0	-344	1176.1	0	551.1	
	-3	687.5	1083	0	-395.5	1337.1	0	649.6	6
	-4	750	1233	0	-483	1498.1	0	748.	
	-5	812.5		0	-498.5	1511.5	0	699	
	-5.2	825	1329.8	0	-504.8	1395.9	0	570.9	
	-6	825		0	-530	1299.4	0	474.4	
	Note: Table fro	om CWALSHT	design mod	e output file			-		4th Degree Polynomial Trendline Coefficients
							-		CWALSHT PASSIVE FORCE= 7125.965 a b c d e

CWALSHT FS=

SHEET PILE LENGTH=

UNIFORM PRESSURE:

GEOSTUDIO PASSIVE FORCE=

PASSIVE FORCE DIFFERENCE=

2.58

2874.7

4251.2

8.4

506

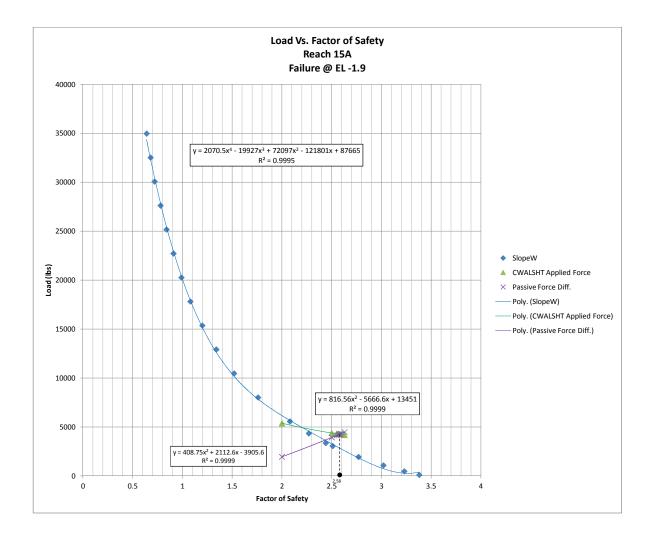
-19927

72097

Note: Coefficients used for calculating FS from graph

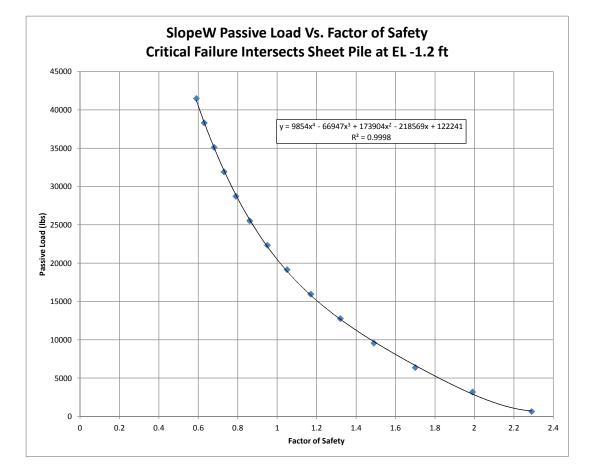
87665

SOLUTION: FS = 2.58 Note - see graph on next sheet.



Analyses by:	Reach	FLOOD SIDE CREST ELEVATION NAVD88	PROTECTED SIDE CREST ELEVATION NAVD89	SHEET PILE TIP ELEVATION NAVD88	SHEET PILE PENETRATION (D) (FT)	WATER LEVEL ELEVATION LEFT SIDE NAVD88 (Right in CWALSHT)	WATER LEVEL ELEVATION RIGHT SIDE NAVD88 (Left in CWALSHT)	Factor of Safety	Net Pressure Zero @ EL (ft) ² [Crossover Point]	Slip Surface Elevation	ORIGINAL NOTES	FLAC FS RESULTS	slip surface distance above the sheet pile
KA	17	9.9	10	-2.5	12.4	10	-3.4	1.89	-2.19	-1.2	Reduce C	1.92	1.3

SlopeW										
Surcharge load (pcf)	Passive Load (lbs)	FS								
10	638	2.29								
50	3192	1.99								
100	6384	1.7								
150	9577	1.49								
200	12769	1.32								
250	15961	1.17								
300	19153	1.05								
350	22345	0.95								
400	25537	0.86								
450	28730	0.79								
500	31922	0.73								
550	35114	0.68								
600	38306	0.63								
650	41498	0.59								



Iteration = 1	Applied Uniform	Pressure =	699		Pile	Tip (EL) =	-2.87		Cohesion =	500/800 psf fo	r top 3ft (62.5%)	Analysis Method = Sweep Search Method
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><ne (SOIL+V</ne </td><td></td><td><right< td=""><td>SIDE></td><td></td><td></td><td></td><td></td></right<></td></left<>	SIDE>	<ne (SOIL+V</ne 		<right< td=""><td>SIDE></td><td></td><td></td><td></td><td></td></right<>	SIDE>				
	(FT)	(PSF)	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE		PAS	SIVE	
Protected Side			(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)		PSF	LBS	
Ground Surface	10	0	454.5	0	244.5	699	0	0		454.5	46.03	
	9.9	6.2	466.1	0	239.1	705.3	0	0		466.1	0	
	9.9	6.2	466.1	0	239.1	1432.5	0	727.3		466.1	466.47	
	9	62.5	570.5	0	191	1536.9	0	775.4		570.5	57.63	
	8.9	68.8	582.1	0	185.6	1548.5	0	780.8		582.1	570.87	
	8	125	686.5	0	137.5	1568.5	0	744.5		686.5	544.495	
	7.3	170.2		0	0	1566.1	0	696.9		869.2	271.215	
	7	187.5		0	-52.4	1565.2	0	678.7		938.9	1065.1	
	6	250		0	-242.3	1646.6	0	697.6		1191.3	1249.3	
	5	312.5		0	-295.8	1743.5	0	732		1307.3	651	
	4.5	343.8		0	-254	1716.9	0	674.1		1296.7	629.7	
	4	375		0	-148.1	1689.1	0	615.1		1222.1	1196.85	
	3	437.5		0	-35.1	1779.2	0	642.7		1171.6	1193.8	
	2	500		0	-17	1866.4	0	667.4		1216	1124.75	
	1	562.5		0	228	1952.1	0	690.6		1033.5	1090	
	0	625		0	177.5	2039.1	0	715.1		1146.5	1203	
Entry failure at this	-1	687.5		0	127	2141.5	0	755		1259.5	512.84	
elevation per	-1.4	712.5		0	106.8	2181.6	0	770.1		1304.7	0	
SlopeW (see	-1.4	712.5		0	-592.2	1482.6	0	-				
graph title above)	-2	750		0	-622.5	1532.6	0	782.6		Equivalent passive	force calculated from	pressures
	-3	812.5		0	-673	1480.2	0	667.7				
	-3.4	837.5		0	-691.2	1523.4	0	685.9				
	-4	837.5	1556	0	-718.5	1550.7	0	713.2				

		4th	Degree Pol	endline Coe	efficients	
CWALSHT PASSIVE FORCE=	11873.05	а	b	С	d	е
CWALSHT FS=	2.2	9854	-66947	173904	-218569	122241
GEOSTUDIO PASSIVE FORCE=	1068.8	Note: Coe	efficients used	for calculating	FS from graph	
PASSIVE FORCE DIFFERENCE=	10804.3					
SHEET PILE LENGTH=	11.2					
UNIFORM PRESSURE=	965					

Iteration = 2	Applied Uniform	Pressure =	755		Pile	Tip (EL) =	-2.58		Cohesion = 50	00/800 psf for	top 3ft (62.5%)	Analysis Method = Sweep Search Method
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><ne (SOIL+V</ne </td><td></td><td><right< td=""><td>TSIDE></td><td></td><td></td><td></td><td></td></right<></td></left<>	SIDE>	<ne (SOIL+V</ne 		<right< td=""><td>TSIDE></td><td></td><td></td><td></td><td></td></right<>	TSIDE>				
	(FT)	(PSF)	PASSIVE			PASSIVE		PASSIVE			SIVE	
Protected Side			(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	_	PSF	LBS	
Ground Surface	10	0		0	260	755	0	_		495	50.08	
	9.9	6.2	506.6	0	254.6		0	_		506.6	0	
	9.9	6.2	506.6	0	254.6	1553.3	0	-		506.6	502.92	
	9	62.5	611	0	206.5	1657.7	0			611	61.68	
	8.9	68.8	622.6	0	201.1	1669.3	0		<u> </u>	622.6	607.32	
	8	125	727	0	153	1682.4	0			727	661.72	
	7.2	172.3	927.3	0	0	1672.8	0	745.5		927.3	191.89	
	/	187.5	991.6	0	-49.1	1669.7	0			991.6	1123.85	
	6	250	1256.1	0	-251.1	1750	0	745		1256.1	1314.1	
	5	312.5	1372.1	0	-304.6	1846.9	0	-		1372.1	681.875	
	4.5	343.8	1355.4	0	-256.7	1813.4	0			1355.4	657.075	
	4	375	1272.9	0	-142.9	1779.7	0			1272.9	1245.6	
	3	437.5	1218.3	0	-25.8	1870	0			1218.3	1241.3	
	2	500	1264.3	0	-9.3	1957.8	0			1264.3	1290.85	
	1	562.5	1317.4	0	0.1	2045.7	0	_	<u> </u>	1317.4	1231.95	
Fortuna for illumo and Albrica	0 -1	625 687.5	1146.5 1259.5	0	233.5 183	2131.2 2232.3	0	751.2 789.8	<u> </u>	1146.5 1259.5	1203	
Entry failure at this	-1 -1.4	712.5	1259.5	0	162.8	2232.3	0			1304.7	512.84 0	
elevation per SlopeW (see	-1.4	712.5	1304.7	0	-592.2	1520.4	0		<u> </u>	1304.7	U	
graph title above)		7 12.5 750	1372.5	0	-622.5	1574.4					former and and all all former	
graph title above)	-2 -3	750 812.5	1372.5	0	-622.5 -673	1480.2	0	824.4 667.7	Equ	uivaient passive	force calculated from	pressures
	-3 -3.4	812.5	1528.7	0	-691.2	1523.4	0					
	-3.4 -4	837.5 837.5	1528.7	0	-718.5	1523.4	0					
	Note: Table from			O OUTDUIT FILO		1000.7	U	/ 13.2				
	inote. Table from	ICWALSHI	uesign mod	e output file							_	

		4th l	Degree Pol	ynomial Tr	endline Coe	efficients	
CWALSHT PASSIVE FORCE=	12578.05	а	b	С	d	е	
CWALSHT FS=	2.02	9854	-66947	173904	-218569	122241	
GEOSTUDIO PASSIVE FORCE=	2590.8	Note: Coefficients used for calculating FS from graph					
PASSIVE FORCE DIFFERENCE=	9987.2						
SHEET PILE LENGTH=	11.2						

892

UNIFORM PRESSURE=

Iteration = 3	Applied Uniform	Pressure =	808	j	Pile	Tip (EL) =	-2.54		Cohesion =	500/800 psf fo	r top 3ft (62.5%)	Analysis Method = Sweep Search Method
	NET ELEV.	WATER	<left< th=""><th>SIDE></th><th><ne (SOIL+V</ne </th><th></th><th><right< th=""><th>SIDE></th><th></th><th></th><th></th><th></th></right<></th></left<>	SIDE>	<ne (SOIL+V</ne 		<right< th=""><th>SIDE></th><th></th><th></th><th></th><th></th></right<>	SIDE>				
	(FT)	(PSF)	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE		PAS	SIVE	
Protected Side			(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)		PSF	LBS	
Ground Surface	10	0	540.5	0	267.5	808	0	0		540.5	54.63	
	9.9	6.2	552.1	0	262.1	814.3	0	0		552.1	0	
	9.9	6.2	552.1	0	262.1	1679.1	0	864.9		552.1	543.87	
	9	62.5	656.5	0	214	1783.5	0	913		656.5	66.23	
	8.9	68.8	668.1	0	208.6	1795.1	0	918.4		668.1	648.27	
	8	125	772.5	0	160.5	1800.3	0	867.3		772.5	613.2	
	7.3	171.5	979.5	0	0	1783.1	0	803.6		979.5	304.53	
	7	187.5	1050.7	0	-55.2	1777.2	0	781.7		1050.7	1189.8	
	6	250	1328.9	0	-270.9	1855.8	0	797.8		1328.9	1386.9	
	5	312.5	1444.9	0	-324.4	1954.2	0	833.7		1444.9	716.575	
	4.5	343.8	1421.4	0	-269.7	1913	0	761.2		1421.4	687.85	
	4	375		0	-147	1871	0			1330	1300.4	
	3	437.5		0	-25.3	1962.1	0			1270.8	1294.3	
	2	500		0	-9.8	2051	0			1317.8	1345.2	
	1	562.5		0	-2.1	2139.2	0			1372.6	1259.55	
	0	625		0	286.5	2224.7	0			1146.5	1203	
Entry failure at this		687.5		0	236	2325.4	0			1259.5	512.84	
elevation per	-1.4	712.5		0	215.8	2368.1	0			1304.7	0	
SlopeW (see	-1.4	712.5		0		1560.1	0					
graph title above)	-2	750		0	-622.5	1617.1	0			Equivalent passive	force calculated fron	n pressures
	-3	812.5		0	-673	1500.8	0	688.3				
	-3.4	837.5		0	-691.2	1523.4	0					
	-4	837.5	1556	0	-718.5	1550.7	0	713.2				

	4th Degree Polynomial Trendline Coefficients						
CWALSHT PASSIVE FORCE=	13127.145	а	b	С	d	е	
CWALSHT FS=	1.85	9854	-66947	173904	-218569	122241	
GEOSTUDIO PASSIVE FORCE=	4616.4	Note: Coefficients used for calculating FS from graph					
PASSIVE FORCE DIFFERENCE=	8510.8						
SHEET PILE LENGTH=	11.2						
UNIFORM PRESSURE=	760						

Iteration = 4	Applied Uniform	Pressure =	780		Pile	Tip (EL) =	-2.78		Cohesion = 500/800 psf for top 3ft (62.5%) Analysis Method = Sweep Search Method
	NET ELEV.	WATER	<left< td=""><td></td><td><ne (SOIL+V</ne </td><td>VATER)</td><td><right< td=""><td></td><td><u> </u></td></right<></td></left<>		<ne (SOIL+V</ne 	VATER)	<right< td=""><td></td><td><u> </u></td></right<>		<u> </u>
Protected Side	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	F PASSIVE PSF LBS
Ground Surface	10	0		(131)	264.5	780	(131)		0 515.5 52.13
Croaria Cariaco	9.9	6.2		0	259.2	786.3	0	0	0 527.1 0
	9.9	6.2		0	259.2	1611	0	824.7	
	9	62.5		0	211	1715.4	0	872.9	
	8.9	68.8		0	205.7	1727	0	878.2	
	8	125	747.5	0	157.5	1736.5	0	831.5	
	7.2	172.3	952.3	0	0	1723.4	0	771.1	.1 952.3 197.04
	7	187.5	1018.1	0	-50.6	1719.2	0	751.7	.7 1018.1 1153.4
	6	250	1288.7	0	-258.7	1798.7	0	768.7	.7 1288.7 1346.7
	5	312.5	1404.7	0	-312.2	1896.2	0	803.7	.7 1404.7 697.425
	4.5	343.8	1385	0	-261.3	1859.3	0	735.5	
	4	375		0	-143.5	1822.1	0	667.1	
	3	437.5		0	-24.3	1912.5	0	695	
	2	500	1288.4	0	-8.4	2000.6	0	720.6	
	1	562.5		0	-0.9	2089.4	0	746.9	
	0	625		0	258.5	2174.4	0	769.4	
Entry failure at this	-1	687.5		0	208	2275.1	0	807.6	
elevation per	-1.4	712.5		0	187.8	2318.2	0		
SlopeW (see	-1.4	712.5		0	-592.2	1538.2	0	825.7	
graph title above)	-2	750		0	-622.5	1593.7	0	843.7	
	-3	812.5		0	-673	1484.9	0	672.4	
	-3.4	837.5		0	-691.2	1523.4	0	685.9	
	-4	837.5	1556	0	-718.5	1550.7	0	713.2	.4

CWALSHT PASSIVE FORCE=	12820.3	а	b	С	d	е				
CWALSHT FS=	1.94	9854	-66947	173904	-218569	122241				
GEOSTUDIO PASSIVE FORCE=	3495.3	Note: Coefficients used for calculating FS from graph								
PASSIVE FORCE DIFFERENCE=	9325.0									
SHEET PILE LENGTH=	11.2									
UNIFORM PRESSURE=	833									

Iteration = 5	Applied Uniform	Pressure =	795		Pile	Tip (EL) =	-2.61		Cohesion =	500/800 psf fo	r top 3ft (62.5%)	Analysis Method = Sweep Search Method
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><ne (SOIL+V</ne </td><td></td><td><right< td=""><td>SIDE></td><td></td><td></td><td></td><td></td></right<></td></left<>	SIDE>	<ne (SOIL+V</ne 		<right< td=""><td>SIDE></td><td></td><td></td><td></td><td></td></right<>	SIDE>				
	(FT)	(PSF)	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE		PAS	SIVE	
Protected Side			(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)		PSF	LBS	
Ground Surface	10	0	529.1	0	265.9	795	0	0		529.1	53.49	
	9.9	6.2	540.7	0	260.5	801.3	0	0		540.7	0	
	9.9	6.2	540.7	0	260.5	1647.8	0	846.6		540.7	533.61	
	9	62.5	645.1	0	212.4	1752.2	0	894.7		645.1	65.09	
	8.9	68.8		0	207	1763.8	0			656.7	638.01	
	8	125		0	158.9	1771	0			761.1	604.765	
	7.3	171.8		0	0	1755.6	0			966.8	300.39	
	7	187.5		0	-53.3	1750.5	0			1035.8	1173.2	
	6	250		0	-265.6	1829.6	0			1310.6	1368.6	
	5	312.5		0	-319.1	1927.5	0			1426.6	707.85	
	4.5	343.8		0	-266.1	1888.2	0	749.5		1404.8	680.1	
	4	375		0	-145.6	1848.5	0			1315.6	1286.6	
	3	437.5	1257.6	0	-25.1	1939.2	0	706.7		1257.6	1281.1	
	2	500	1304.6	0	-9.6	2027.7	0			1304.6	1332.1	
	1	562.5	1359.6	0	-2.1	2116.3	0			1359.6	1253.05	
	0	625	1146.5	0	273.5	2201.5	0			1146.5	1203	
Entry failure at this		687.5		0	223	2302.2	0	819.7		1259.5	512.84	
elevation per	-1.4	712.5		0	202.8	2345.1	0			1304.7	0	
SlopeW (see	-1.4	712.5		0	-592.2	1550.1	0					
graph title above)	-2	750		0	-622.5	1606.6	0	856.6		Equivalent passive	force calculated from	pressures
	-3	812.5		0	-673	1493.1	0	680.6				
	-3.4	837.5		0	-691.2	1523.4	0	685.9				
	-4	837.5		0	-718.5	1550.7	0	713.2				

		4th I	Degree Pol	ynomial Tr	endline Coe	efficients	
CWALSHT PASSIVE FORCE=	12993.795	а	b	С	d	е	
CWALSHT FS=	1.89	9854	-66947	173904	-218569	122241	
GEOSTUDIO PASSIVE FORCE=	4106.9	Note: Coefficients used for calculating FS from graph					
PASSIVE FORCE DIFFERENCE=	8886.9						
SHEET PILE LENGTH=	11.2						
UNIFORM PRESSURE=	793						

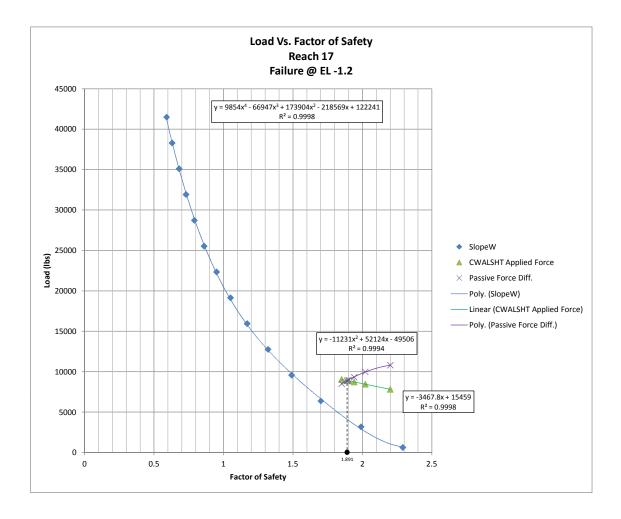
Iteration = 6	Applied Uniform	Pressure =	792	ĺ	Pile	Tip (EL) =	-2.66		Cohesion =	500/800 psf fo	r top 3ft (62.5%)	Analysis Method = Sweep Search Method
	NET ELEV.	WATER	<left< th=""><th>SIDE></th><th><ne (SOIL+V</ne </th><th></th><th><right< th=""><th>TSIDE></th><th></th><th></th><th></th><th></th></right<></th></left<>	SIDE>	<ne (SOIL+V</ne 		<right< th=""><th>TSIDE></th><th></th><th></th><th></th><th></th></right<>	TSIDE>				
	(FT)	(PSF)	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE		PAS	SSIVE	
Protected Side			(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)		PSF	LBS	
Ground Surface	10	0	526.3	0	265.7	792	0	0	1	526.3	53.21	
	9.9	6.2	537.9	0	260.3	798.3	0	0		537.9	0	
	9.9	6.2	537.9	0	260.3	1640.4	0	842.1		537.9	531.09	
	9	62.5	642.3	0	212.2	1744.8	0	890.3		642.3	64.81	
	8.9	68.8	653.9	0	206.8	1756.4	0	895.6		653.9	635.49	
	8	125	758.3	0	158.7	1764	0	847		758.3	688.88	
	7.2	171.9	963.9	0	0	1749.1	0	785.2		963.9	199.61	
	7	187.5		0	-52.7	1744.2	0			1032.2	1169.15	
	6	250		0	-264.1	1823.3	0			1306.1	1364.1	
	5	312.5		0	-317.6	1921.2	0			1422.1	705.725	
	4.5	343.8		0	-265	1882.4	0			1400.8	678.25	
	4	375		0	-145.2	1843.2	0			1312.2	1283.3	
	3	437.5		0	-24.9	1933.9	0			1254.4	1277.85	
	2	500		0	-9.3	2022.2	0			1301.3	1328.85	
	1	562.5		0	-1.9	2110.8	0			1356.4	1251.45	
	0	625		0	270.5	2196	0			1146.5	1203	
Entry failure at this		687.5		0	220	2296.7	0			1259.5	512.84	
elevation per	-1.4	712.5		0	199.8	2339.7	0			1304.7	0	
SlopeW (see	-1.4	712.5		0	-592.2	1547.7	0					
graph title above)	-2	750		0	-622.5	1604	0			Equivalent passive	force calculated from	pressures
	-3	812.5		0	-673	1491.5	0					
	-3.4	837.5		0	-691.2	1523.4	0					
	-4	837.5	1556	0	-718.5	1550.7	0	713.2				

		4th Degree Polynomial Trendline Coefficients					
CWALSHT PASSIVE FORCE=	12947.605	а	b	С	d	е	
CWALSHT FS=	1.9	9854	-66947	173904	-218569	122241	
GEOSTUDIO PASSIVE FORCE=	3982.2	Note: Coefficients used for calculating FS from graph					
PASSIVE FORCE DIFFERENCE=	8965.4						
SHEET PILE LENGTH=	11.2						
UNIFORM PRESSURE=	800						

Iteration = 7	Applied Uniform	Pressure =	794		Pile	Tip (EL) =	-2.39		Cohesion =	500/800 psf fo	r top 3ft (62.5%)	Analysis Method = Sweep Search Method
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><ne (SOIL+V</ne </td><td></td><td><righ< td=""><td>TSIDE></td><td></td><td></td><td></td><td></td></righ<></td></left<>	SIDE>	<ne (SOIL+V</ne 		<righ< td=""><td>TSIDE></td><td></td><td></td><td></td><td></td></righ<>	TSIDE>				
	(FT)	(PSF)	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE		PAS	SSIVE	
Protected Side			(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)		PSF	LBS	
Ground Surface	10	0	529.1	0	264.9	794	0	0		529.1	53.49	
	9.9	6.2	540.7	0	259.5	800.3	0	0		540.7	0	
	9.9	6.2	540.7	0	259.5	1646.8	0	846.6		540.7	533.61	
	9	62.5	645.1	0	211.4	1751.2	0	894.7		645.1	65.09	
	8.9	68.8	656.7	0	206	1762.8	0	900.1		656.7	638.01	
	8	125	761.1	0	157.9	1770	0	851		761.1	604.31	
	7.3	171.5	965.5	0	0	1754.7	0	789.2		965.5	300.195	
	7	187.5		0	-54.3	1749.5	0			1035.8	1173.2	
	6	250	1310.6	0	-266.6	1828.6	0	784.6		1310.6	1368.6	
	5	312.5	1426.6	0	-320.1	1926.5	0	820		1426.6	707.85	
	4.5	343.8	1404.8	0	-267.1	1887.2	0	749.5		1404.8	680.1	
	4	375	1315.6	0	-146.6	1847.5	0	678.5		1315.6	1286.6	
	3	437.5	1257.6	0	-26.1	1938.2	0			1257.6	1281.1	
	2	500	1304.6	0	-10.6	2026.7	0	732.7		1304.6	1332.1	
	1	562.5	1359.6	0	-3.1	2115.3	0	758.8		1359.6	1253.05	
	0	625	1146.5	0	272.5	2200.5	0	781.5		1146.5	1203	
Entry failure at this	-1	687.5	1259.5	0	222	2301.2	0	819.7		1259.5	512.84	
elevation per	-1.4	712.5	1304.7	0	201.8	2344.1	0	837.6		1304.7	0	
SlopeW (see	-1.4	712.5	1304.7	0	-592.2	1550.1	0	837.6				
graph title above)	-2	750	1372.5	0	-622.5	1606.6	0	856.6		Equivalent passive	force calculated from	n pressures
	-3	812.5	1485.5	0	-673	1493.1	0	680.6				
	-3.4	837.5	1528.7	0	-691.2	1523.4	0	685.9				
	-4	837.5	1556	0	-718.5	1550.7	0	713.2				
	Note: Table from	CWALCHT	docian mod	o output filo					_			

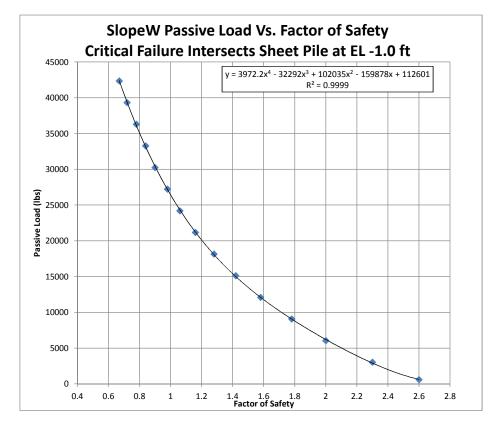
CWALSHT PASSIVE FORCE=	12993.145	а	b	С	d	е				
CWALSHT FS=	1.89	9854	-66947	173904	-218569	122241				
GEOSTUDIO PASSIVE FORCE=	4106.9	Note: Coefficients used for calculating FS from graph								
PASSIVE FORCE DIFFERENCE=	8886.2									
SHEET PILE LENGTH=	11.2									
UNIFORM PRESSURE=	793									

Solution: FS=1.89
Note - see graph on next sheet.



Analyses by:	Reach	FLOOD SIDE CREST ELEVATION NAVD88	PROTECTED SIDE CREST ELEVATION NAVD89	SHEET PILE TIP ELEVATION NAVD88	SHEET PILE PENETRATION (D) (FT)	WATER LEVEL ELEVATION LEFT SIDE NAVD88 (Right in CWALSHT)	WATER LEVEL ELEVATION RIGHT SIDE NAVD88 (Left in CWALSHT)	Factor of Safety	Net Pressure Zero @ EL (ft)² [Crossover Point]	Slip Surface Elevation	ORIGINAL NOTES	FLAC FS RESULTS	slip surface distance above the sheet pile
JV	18	8.6	8.5	-2.5	11	10	-3.4	2.19	-1.3	-1.0	n/a	n/a	1.5

SlopeW										
Surcharge	Passive	FS								
load (pcf)	Load (lbs)	го								
10	605	2.6								
50	3025	2.3								
100	6049	2								
150	9074	1.78								
200	12098	1.58								
250	15123	1.42								
300	18147	1.28								
350	21172	1.16								
400	24196	1.06								
450	27221	0.98								
500	30246	0.9								
550	33270	0.84								
600	36295	0.78								
650	39319	0.72								
700	42344	0.67								



Iteration = 1	Applied Uniform	Pressure =	1106	İ	Pile	Tip (EL) =	-2.53		Cohesion = Unchanged Analysis Method = Sweep Search Method
	NET ELEV.	WATER	<lefts< td=""><td></td><td>(SOIL+N</td><td colspan="2"><net> (SOIL+WATER)</net></td><td>SIDE></td><td></td></lefts<>		(SOIL+N	<net> (SOIL+WATER)</net>		SIDE>	
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	
	10	0	0	0	0	0	0	0	
	9	62.5	0	0	62.5	62.5	0	0	
	8.6	87.5	0	0	87.5	87.5	0	0	
	8.6	87.5	0	0	87.5	1154.2	0	1066.7	PASSIVE
Ground Surface	8.5	93.8	0	0	93.8	1165.7	0	1071.9	PSF LBS
Elevation	8.5	93.8	1066.7	0	133.1	2271.7	0	1071.9	1066.7 542.7
	8	125	1104.1	0	126.9	2329.2	0	1098.2	1104.1 566.175
	7.5	156.3	1160.6	0	101.7	2386.7	0	1124.4	1160.6 594.4
	7	187.5	1217	0	76.5	2385.4	0	1091.9	1217 1273.5
	6	250	1330	0	26	2344.4	0	988.4	1330 679.55
	5.5	282.2	1388.2	0	0	2380.5	0	992.2	1388.2 707.775
	5	312.5	1442.9	0	-24.4	2414.3	0	995.8	1442.9 1499.4
	4	375	1555.9	0	-74.9	2516.3	0	1035.3	1555.9 1612.35
	3	437.5	1668.8	0	-125.3	2618.2	0	1074.7	1668.8 1725.3
	2	500	1781.8	0	-175.8	2720.1	0	1114.1	1781.8 1838.25
	1	562.5	1894.7	0	-226.2	2822	0	1153.5	1894.7 1850.8
Entry failure at this	0	625	1806.9	0	-75.9	2708.8	0	977.8	1806.9 1583.4
elevation per	-1	687.5	1359.9	0	433.6	2593.3	0	799.8	1359.9 0
SlopeW (see	-1	687.5	1359.9	0	-672.4	1487.3	0	799.8	
graph title above)	-2	750	1201.5	0	-451.5	1578.9	0	828.9	Equivalent passive force calculated from pressures
	-3	812.5	1760.7	0	-948.2	1824.6	0	1012.1	
	-3.4	837.5	2341.6	0	-1504.1	1924.2	0	1086.7	
	-4	837.5	1383	0	-545.5	1942.1	0	1104.6	
	-5	837.5	1735.6	0	-898.1	1967.1	0	1129.6	
	Note: Table from	n CWALSHT	design mode	e output file	е				4th Degree Polynomial Trendline Coefficients
								CWALS	SHT PASSIVE FORCE= 14473.6 a b c d e
									CWALSHT FS= 1.5 3972.2 -32292 102035 -159878 112601
								GEOSTU	DIO PASSIVE FORCE= 13486.5 Note: Coefficients used for calculating FS from graph
							F	ASSIVE F	FORCE DIFFERENCE= 987.1

SHEET PILE LENGTH=

UNIFORM PRESSURE=

9.5

	NET ELEV.	WATER	<leftside></leftside>		<net> (SOIL+WATER)</net>		<rightside></rightside>		7
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	
	10	0	0	0	0	0	0	(0
	9	62.5	0	0	62.5	62.5	0	(0
	8.6	87.5	0	0	87.5	87.5	0	(0
	8.6	87.5	0	0	87.5	887.5	0	800	0 PASSIVE
Ground Surface	8.5	93.8	0	0	93.8	899	0	805.3	PSF LBS
Elevation	8.5	93.8	800	0	136.8	1742	0	805.3	800 410.55
	8	125	842.2	0	125.8	1799.5	0	831.5	5 842.2 435.225
	7.5	156.3	898.7	0	100.6	1857	0	857.8	8 898.7 463.45
	7	187.5	955.1	0	75.4	1869.9	0	839.4	
	6	250	1068.1	0	24.9	1865.1	0	772.1	
	5.5	280.9	1123.9	0	0	1903.6	0	779.7	
	5	312.5	1181	0	-25.5	1943	0	787.5	
	4	375	1294	0	-76	2045	0	827	
	3	437.5	1406.9	0	-126.4	2146.9	0	866.4	
	2	500	1519.9	0	-176.9	2247.3	0	904.3	
	1	562.5	1632.8	0	-227.3	2347.3	0	941.8	
Entry failure at this	0	625	1595	0	-127	2288	0	820	
elevation per	-1	687.5	1089.5	0	441	2222.3	0	691.8	
SlopeW (see	-1	687.5	1089.5	0	-402	1379.3	0	691.8	
graph title above)	-2	750	1201.5	0	-451.5	1469.6	0	719.6	
	-3	812.5	2041.6	0	-1229.1	1676.9	0	864.4	
	-3.4	837.5	1973.4	0	-1135.9	1759.6	0	922.1	
	-4 -5	837.5	1383	0	-545.5 -767.4	1777.1	0	939.6	
		837.5	1604.9	0		1802.1	0	964.6	
	Note: Table from	n CWALSHI	aesign moa	e output file	9	Ī		CIMAL	4th Degree Polynomial Trendline Coefficients SHT PASSIVE FORCE= 12028.9 a b c d e
								CWAL	
								CEOCTU	
								GEUSIU	JDIO PASSIVE FORCE= 6204.2 Note: Coefficients used for calculating FS from graph

PASSIVE FORCE DIFFERENCE=

SHEET PILE LENGTH= UNIFORM PRESSURE= 5824.7 9.5

Iteration = 3	Applied Uniform	n Pressure =	743		Pile	Tip (EL) =	-2.53		Cohesion = Unchanged Analysis Method = Sweep Search Method
	NET ELEV. WATER		<leftside></leftside>		<net> (SOIL+WATER)</net>		<rightside></rightside>		
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	
	10	0	0	0	0	0	0	0	0
	9	62.5	0	0	62.5	62.5	0	0	0
	8.6	87.5	0	0	87.5	87.5	0	0	0
	8.6	87.5	0	0	87.5	783.2	0	695.7	7 PASSIVE
Ground Surface	8.5	93.8	0	0	93.8	794.7	0	700.9	9 PSF LBS
Elevation	8.5	93.8	695.7	0	141.1	1537.7	0	700.9	9 695.7 358.85
	8	125	739.7	0	128.3	1595.2	0	727.2	739.7 383.975
	7.5	156.3	796.2	0	103.1	1652.7	0	753.4	4 796.2 412.2
	7	187.5	852.6	0	77.9	1671	0	740.5	852.6 909.1
	6	250	965.6	0	27.4	1680.4	0	687.4	4 965.6 498.15
	5.5	284	1027	0	0	1724.5	0	697.5	5 1027 526.375
	5	312.5	1078.5	0	-23	1761.5	0	706	6 1078.5 1135
	4	375	1191.5	0	-73.5	1863.4	0	745.4	4 1191.5 1247.95
	3	437.5	1304.4	0	-123.9	1964.4	0	783.9	9 1304.4 1360.9
	2	500	1417.4	0	-174.4	2064.5	0	821.5	5 1417.4 1473.85
	1	562.5	1530.3	0	-224.8	2165.4	0	859.9	9 1530.3 1521.2
Entry failure at this	0	625	1512.1	0	-144.1	2125.5	0	757.5	5 1512.1 1300.8
elevation per	-1	687.5	1089.5	0	341	2079.7	0	649.2	2 1089.5 0
SlopeW (see	-1	687.5	1089.5	0	-402	1336.7	0	649.2	2
graph title above)	-2	750	1201.5	0	-451.5	1425	0	675	Equivalent passive force calculated from pressures
	-3	812.5	1845.4	0	-1032.9	1619.6	0	807.1	1
	-3.4	837.5	1829.3	0	-991.8	1697.9	0	860.4	4
	-4	837.5	1383	0	-545.5	1711.6	0	874.1	1
	-5	837.5	1547.3	0	-709.8	1734.4	0	896.9	9
	Note: Table from	n CWALSHT	design mod	e output file	Э				4th Degree Polynomial Trendline Coefficients
								CWALS	SHT PASSIVE FORCE= 11128.4 a b c d e
									CWALSHT FS= 2.3 3972.2 -32292 102035 -159878 112601
							(GEOSTU	DIO PASSIVE FORCE= 2908.4 Note: Coefficients used for calculating FS from graph
							P	ASSIVE F	FORCE DIFFERENCE= 8219.9
									CHEET DUE LENGTH 0.5

SHEET PILE LENGTH= 9.5 UNIFORM PRESSURE= 865

Iteration = 4	Applied Uniform	Pressure =	776	l	Pile	Tip (EL) =	-2.47]	Cohesion = Unchanged		An	alysis Method	= Sweep Se	arch Method
	NET ELEV.	WATER	<lefts< td=""><td></td><td><ne (SOIL+W</ne </td><td>/ATER)</td><td></td><td>TSIDE></td><td></td><td></td><td></td><td></td><td></td><td></td></lefts<>		<ne (SOIL+W</ne 	/ATER)		TSIDE>						
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)						
	10	0	0	0	0	0	0	(0					
	9	62.5	0	0	62.5	62.5	0	(0					
	8.6	87.5	0	0	87.5	87.5	0	(0					
	8.6	87.5	0	0	87.5	818.1	0	730.6	6 PASSIVE					
Ground Surface	8.5	93.8	0	0	93.8	829.6	0	735.8	8 PSF LBS	S				
Elevation	8.5	93.8	730.6	0	139.2	1605.6	0	735.8	730.6 376.	15				
	8	125	774	0	127	1663.1	0	762.	1 774 401.1	25				
	7.5	156.3	830.5	0	101.8	1720.6	0	788.3	830.5 429.3	375				
	7	187.5	887	0	76.5	1737.1	0	773.6	6 887 943. ⁻	45				
	6	250	999.9	0	26.1	1741.8	0	715.8	999.9 514.	55				
	5.5	282.3	1058.3	0	0	1783.2	0	724.8	8 1058.3 542	.8				
	5	312.5	1112.9	0	-24.4	1821.8	0							
	4	375	1225.8	0	-74.8	1923.7	0	772.7						
	3	437.5	1338.8	0	-125.3	2025	0	811.5						
	2	500	1451.7	0	-175.7	2125.3	0							
	1	562.5	1564.6	0	-226.1	2225.8	0							
Entry failure at this	0	625	1539.9	0	-138.9	2179.8	0			1.7				
elevation per	-1	687.5	1089.5	0	374	2126.9	0							
SlopeW (see	-1	687.5	1089.5	0	-402	1350.9	0							
graph title above)	-2	750	1201.5	0	-451.5	1439.5	0			orce calc	ulated from pro	essures		
	-3	812.5	1911.1	0	-1098.6	1638.8	0							
	-3.4	837.5	1877.5	0	-1040	1718.8	0							
	-4	837.5	1383	0	-545.5	1734	0							
	-5	837.5	1570.9	0	-733.4	1757.3	0	919.8	8	_				
	Note: Table from	n CWALSHT	design mode	e output file	9						4th Degree	Polynomial	Trendline Co	efficients
								CWAL	SHT PASSIVE FORCE= 11429	_	a b		d	е
									CWALSHT FS= 2.1		72.2 -322	292 10203	5 -159878	112601

0 0.0.0	_									
		4th Degree Polynomial Trendline Coefficients								
CWALSHT PASSIVE FORCE=	11429.5	а	b	С	d	е				
CWALSHT FS=	2.19	3972.2	-32292	102035	-159878	112601				
GEOSTUDIO PASSIVE FORCE=	4031.4	Note: Coefficients used for calculating FS from graph								
PASSIVE FORCE DIFFERENCE=	7398.1									
SHEET PILE LENGTH=	9.5									
UNIFORM PRESSURE=	779									

teration = 5	Applied Uniform	Pressure =	777	Į	Pile	Tip (EL) =	-2.50]	Cohesion = Unchanged]	Analysis	Method =	Sweep Sea	arch Method
	NET ELEV.	WATER	<lefts< td=""><td></td><td><ne (SOIL+V</ne </td><td>VATER)</td><td>_</td><td>TSIDE></td><td></td><td></td><td></td><td></td><td></td><td></td></lefts<>		<ne (SOIL+V</ne 	VATER)	_	TSIDE>						
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)						
	10	0	0	0	0	0	0		0					
	9	62.5	0	0	62.5	62.5	0							
	8.6	87.5	0	0	87.5	87.5	0							
	8.6	87.5	0	0	87.5	818.8	0	731.	PASSIVE	1				
Ground Surface	8.5	93.8	0	0	93.8	830.3	0	736.	PSF LBS					
Elevation	8.5	93.8	731.3	0	139.5	1607.3	0	736.	731.3 376.5	1				
	8	125	774.7	0	127.3	1664.8	0	762.	774.7 401.45					
	7.5	156.3	831.1	0	102.1	1722.3	0	78	831.1 429.675					
	7	187.5	887.6	0	76.9	1738.8	0	774.	887.6 944.1					
	6	250	1000.6	0	26.4	1743.3	0	716.	1000.6 515.075					
	5.5	282.7	1059.7	0	0	1785.2	0	725.	1059.7 543.3					
	5	312.5	1113.5	0	-24	1823.3	0	733.	1113.5 1170					
	4	375	1226.5	0	-74.5	1925.3	0	773.	1226.5 1282.95					
	3	437.5	1339.4	0	-124.9	2026.6	0	812.	1339.4 1395.9					
	2	500	1452.4	0	-175.4	2126.8	0	849.	1452.4 1508.85					
	1	562.5	1565.3	0	-225.8	2227.3	0	887.	1565.3 1552.85					
Entry failure at this	0	625	1540.4	0	-138.4	2181.2	0	779.	1540.4 1314.95					
elevation per	-1	687.5	1089.5	0	375	2128.2	0	663.	1089.5 0					
SlopeW (see	-1	687.5	1089.5	0	-402	1351.2	0	663.	7	_				
graph title above)	-2	750	1201.5	0	-451.5	1439.8	0		· · ·	calculated t	from pressure	es		
	-3	812.5	1912.3	0	-1099.8	1639.2	0	826.						
	-3.4	837.5	1878.5	0	-1041	1719.2	0							
	-4	837.5		0	-545.5	1734.4	0							
	-5	837.5	1571.2	0	-733.7	1757.7	0	920.	2					
	Note: Table fron	n CWALSHT	design mod	e output file	е					4th D	egree Poly	nomial Tr	endline Coe	efficients
								CWAL	SHT PASSIVE FORCE= 11435.6	а	b	С	d	е

CWALSHT FS=

GEOSTUDIO PASSIVE FORCE= 4052.8

PASSIVE FORCE DIFFERENCE= 7382.8

SHEET PILE LENGTH= 9.5

UNIFORM PRESSURE= 777

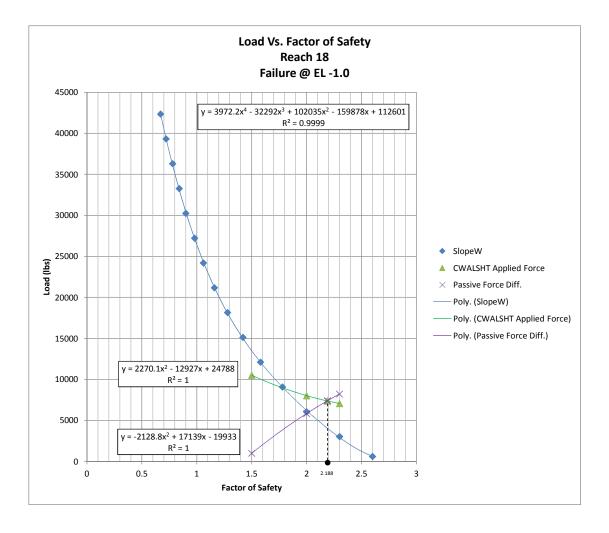
2.19

3972.2 -32292 102035 -159878

Note: Coefficients used for calculating FS from graph

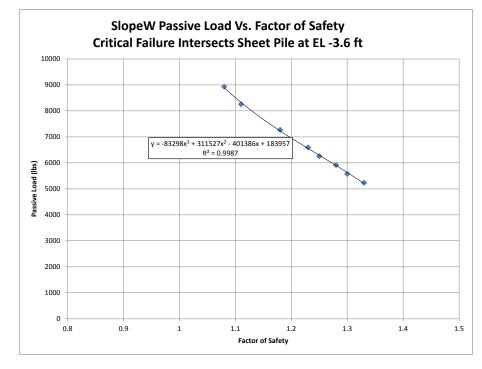
112601

Solution: FS=2.19
Note - see graph on next sheet.



Analyses by:	Reach	FLOOD SIDE CREST ELEVATION NAVD88	PROTECTED SIDE CREST ELEVATION NAVD89	SHEET PILE TIP ELEVATION NAVD88	SHEET PILE PENETRATION (D) (FT)	WATER LEVEL ELEVATION LEFT SIDE NAVD88 (Right in CWALSHT)	WATER LEVEL ELEVATION RIGHT SIDE NAVD88 (Left in CWALSHT)	Factor of Safety	Modified Slip Surface Elevation	ORIGINAL NOTES	slip surface distance above the sheet pile
KA	30	8.2	8.2	-12.4	20.6	9.1	-5.8	1.4	-3.6	n/a	11.8

S	SlopeW									
Surcharge load	Passive	FS								
(pcf)	Load (lbs)	_								
5	5232.8	1.33								
10	5575	1.3								
15	5915.7	1.28								
20	6256.2	1.25								
25	6593.4	1.23								
35	7269.2	1.18								
50	8257.9	1.11								
60	8932.2	1.08								



Iteration = 1	Applied Uniform	m Pressure =	528		Pile	e Tip (EL) =	-12.39]	Cohesion =	= 325/850 psf f	or top layer (38%)	Analysis Method = Sweep Search	n Method
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td></td><td>ET> WATER)</td><td><righ< td=""><td>ITSIDE></td><td>]</td><td></td><td></td><td></td><td></td></righ<></td></left<>	SIDE>		ET> WATER)	<righ< td=""><td>ITSIDE></td><td>]</td><td></td><td></td><td></td><td></td></righ<>	ITSIDE>]				
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)					
*	10	0	0	0	0	0	0	0					
	9.1	0	0	0	0	0	0	0					
	9	6.2	0	0	6.2	6.2	0	0		P.A	SSIVE		
Protected Side	8.2	56.3	0	0	56.3	56.3	0	0		PSF	LBS		
Ground Surface	8.2	56.3	565.2	0	19	2062.5	0	1478.3	1	565.2	105.75		
	8	68.8	492.3	0	104.5	1725.6	0	1128.9		492.3	424		
	7.2	118.8	567.7	0	79.1	1806.2	0	1159.5		567.7	115.42		
	7	131.3	586.5	0	72.7	1826.4	0	1167.2		586.5	621.8		
	6	193.8	657.1	0	64.7	1927.2	0	1205.4		657.1	681.6		
	5	256.3	706.1	0	78.2	2028	0	1243.7		706.1	736.75		
	4	318.8	767.4	0	79.4	2128.7	0	1282		767.4	802.3		
	3	381.3	837.2	0	72	2229.5	0	1320.3		837.2	870.45		
	2	443.8	903.7	0	68	2307.8	0	1336.1		903.7	906.4		
	1	506.3	909.1	0	125.2	1679.8	0	645.6		909.1	921.05		
	0	568.8	933	0	163.8	1517.3	0	420.5		933	985.5		
	-1	631.3	1038	0	121.3	1622.3	0	463		1038	1090.5		
	-2	693.8	1143	178.6	78.8	1548.7	0	505.5		1143	1195.5		
Entry failure at this	-3	756.3	1248	504.1	36.3	1328.2	0	548	l	1248	767.7		
elevation per SlopeW	-3.6	793.8	1311	615.5	10.8	1279.8	0	573.5	J	1311	0		
(see graph title above)	-3.6	793.8	1311	615.5	-517.3	751.8	0	573.5	1				
(see graph title above)	-4	818.8	1353	647.2	-534.3	762.1	0	590.5]				
									='	Equivalent passiv	e force calculated from pr	ressures	

Note: Table from CWALSHT design mode output file

Comments: In order to get this Reach to run, the cohesion needed to be reduced for the top layer to 325 psf.

		3rd Degree Polynomial Trendline Coeffi					
CWALSHT PASSIVE FORCE=	10224.72	а	b	С	d		
CWALSHT FS=	1.15	-83298	311527	-401386	183957		
GEOSTUDIO PASSIVE FORCE=	7671.7	Note: Coeffic	ients used for	calculating FS t	from graph		
PASSIVE FORCE DIFFERENCE=	2553.0]					
SHEET PILE LENGTH=	11.8]					
UNIFORM PRESSURE=	216						

Iteration = 2	Applied Uniform	n Pressure =	513		Pile	Tip (EL) =	-12.39]	Cohesion =	325/850 psf fo	or top layer (38%)	ļ	Analys	is Method = S	Sweep Search	Method
	NET ELEV.	WATER		SIDE>	(SOIL+\	ET> VATER)		TSIDE>								
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)								
`	10	0	0	0	0	0	0	0								
	9.1	0	0	0	0	0	0	0								
	9	6.2	0	0	6.2	6.2	0	0		PA	SSIVE					
Protected Side	8.2	56.3	0	0	56.3	56.3	0	0		PSF	LBS					
Ground Surface	8.2	56.3	541.7	0	27.6	1985.9	0	1416.7		541.7	101.43					
	8	68.8	472.6	0	109.2	1663.9	0	1082.2		472.6	408.2					
	7.2	118.8	547.9	0	83.8	1744.5	0	1112.8		547.9	111.47					
	7	131.3	566.8	0	77.5	1764.7	0	1120.4		566.8	602.3					
	6	193.8	637.8	0	69	1865.5	0	1158.7		637.8	662.7					
	5	256.3	687.6	0	81.6	1966.2	0	1197		687.6	718.3					
	4	318.8	749	0	82.8	2067	0	1235.3		749	783.55					
	3	381.3	818.1	0	76.2	2167.8	0	1273.5		818.1	850.8					
	2	443.8	883.5	0	73.2	2245.7	0	1288.9		883.5	886					
	1	506.3	888.5	0	130.8	1644	0	624.8		888.5	910.75					
	0	568.8	933	0	148.8	1502.3	0	420.5		933	985.5					
	-1	631.3	1038	0	106.3	1607.3	0	463		1038	1090.5					
	-2	693.8	1143	178.6	63.8	1533.7	0	505.5		1143	1195.5					
Entry failure at this	-3	756.3	1248	504.1	21.3	1313.2	0	548		1248	637.125					
elevation per SlopeW	-3.5	787.5	1300.5	596.9	0	1272.9	0	569.3		1300.5	130.575					
(see graph title above)	-3.6	793.8	1311	615.5	-4.3	1264.8	0	573.5		1311	0					
(coo graph and above)	-3.6	793.8	1311	615.5	-517.3	751.8	0	573.5								

Note: Table from CWALSHT design mode output file

		3rd D	egree Poly	nomial Tren	dline Coeff	icients
CWALSHT PASSIVE FORCE=	10074.7	а	b	С	d	
CWALSHT FS=	1.2	-83298	311527	-401386	183957	
GEOSTUDIO PASSIVE FORCE=	6953.7	Note: Coeffic	ients used for o	calculating FS f	rom graph	
PASSIVE FORCE DIFFERENCE=	3121.0					
SHEET PILE LENGTH=	11.8					
UNIFORM PRESSURE=	264					

Equivalent passive force calculated from pressures

ETL 1110-2-575

Analysis

Analysis Method = Sweep Search Method

Iteration = 3	Applied Uniform	n Pressure =	486	1	Pil	e Tip (EL) =	-12.4]	Cohesion =	325/850 psf fo	or top layer (38%)
	NET ELEV.	WATER	<left< th=""><th>SIDE></th><th></th><th>ET> WATER)</th><th><righ< th=""><th>TSIDE></th><th></th><th></th><th></th></righ<></th></left<>	SIDE>		ET> WATER)	<righ< th=""><th>TSIDE></th><th></th><th></th><th></th></righ<>	TSIDE>			
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)			
	10	0	0	0	0	0	0	0			
	9.1	0	0	0	0	0	0	0			
	9	6.2	0	0	6.2	6.2	0	0		PA	SSIVE
Protected Side	8.2	56.3	0	0	56.3	56.3	0	0		PSF	LBS
Ground Surface	8.2	56.3	500	0	42.3	1849.9	0	1307.7		500	93.77
	8	68.8	437.7	0	117.1	1554.3	0	999.5		437.7	380.28
	7.2	118.8	513	0	91.7	1634.9	0	1030.1		513	104.49
	7	131.3	531.9	0	85.4	1655	0	1037.8		531.9	567.8
	6	193.8	603.7	0	76.1	1755.8	0	1076.1		603.7	629.35
	5	256.3	655	0	87.2	1856.6	0	1114.3		655	685.7
	4	318.8	716.4	0	88.3	1957.4	0	1152.6		716.4	750.3
	3	381.3	784.2	0	83.1	2057.7	0	1190.4		784.2	815.85
	2	443.8	847.5	0	82.2	2134.3	0	1204.6		847.5	848.45
	1	506.3	849.4	0	142.8	1580.6	0	588.4		849.4	891.2
	0	568.8	933	0	121.8	1475.3	0	420.5		933	985.5
	-1	631.3	1038	0	79.3	1580.3	0	463		1038	1090.5
	-2	693.8	1143	178.6	36.8	1506.7	0	505.5		1143	1069.56
Entry failure at this	-2.9	747.8	1233.8	460	0	1316	0	542.3		1233.8	124.09
Entry lallure at trils	1										

PASSIVE PSF LBS 500 93.77 437.7 380.28 104.49 513 531.9 567.8 603.7 629.35 655 685.7 716.4 750.3 784.2 815.85 847.5 848.45 849.4 891.2 933 985.5 1038 1090.5 1143 1069.56 1233.8 124.09 1248 767.7 1311 0

Equivalent passive force calculated from pressures

Note: Table from CWALSHT design mode output file

1248

1311

1311

1353

504.1

615.5

615.5

647.2

-5.8

-31.3

-517.3

-534.3

1286.2

1237.8

751.8

762.1

756.3

793.8

793.8

818.8

-3

-3.6

-3.6

-4

Entry failure at this

elevation per SlopeW

(see graph title above

3rd Degree Polynomial Trendline Coefficients CWALSHT PASSIVE FORCE= 9804.54 -83298 311527 -401386 183957 CWALSHT FS= 1.3 Note: Coefficients used for calculating FS from graph GEOSTUDIO PASSIVE FORCE= 5630.1 PASSIVE FORCE DIFFERENCE= 4174.4 SHEET PILE LENGTH= 11.8 UNIFORM PRESSURE= 354

0

Ō

0

0

548

573.5

573.5

590.5

Iteration = 4 Applied Uniform Pressure = 464 Pile Tip (EL) = -12.41

Cohesion = 325/850 psf for top layer (38%)

Analysis Method = Sweep Search Method

(FT)	(PSF) 0 0 0 0 1214.3
10 0 0 0 0 0 0 0 9.1 0 0 0 0 0 0 9 6.2 0 0 6.2 6.2 0 Protected Side 8.2 56.3 0 0 56.3 56.3 0	0 0 0 0 0 1214.3
9.1 0 0 0 0 0 0 0 9 6.2 0 0 6.2 6.2 0 Protected Side 8.2 56.3 0 0 56.3 56.3 0	0 0 0 1214.3
9 6.2 0 0 6.2 6.2 0 Protected Side 8.2 56.3 0 0 56.3 56.3 0	0 0 1214.3
Protected Side 8.2 56.3 0 0 56.3 56.3 0	0 1214.3
	1214.3
Ground Surface 8.2 56.3 464.3 0 56 1734.5 0	
8 68.8 407.7 0 125 1461.4 0	928.7
7.2 118.8 483.1 0 99.6 1542 0	959.3
7 131.3 502 0 93.3 1562.2 0	966.9
6 193.8 574.5 0 83.3 1663 0	1005.2
5 256.3 626.9 0 93.3 1763.7 0	1043.5
4 318.8 688 0 94.8 1864.5 0	1081.8
3 381.3 753.8 0 91.4 1964.3 0	1119.1
2 443.8 814.9 0 92.9 2040 0	1132.2
1 506.3 828 0 142.3 1527 0	556.8
0 568.8 933 0 99.8 1453.3 0	420.5
-1 631.3 1038 0 57.3 1558.3 0	463
-2 693.8 1143 178.6 14.8 1484.7 0	505.5
Entry failure at this -2.3 715.4 1179.4 291.6 0 1408.1 0	520.3
elevation per SlopeW -3 756.3 1248 504.1 -27.8 1264.2 0	548
(see graph title above) -3.6 793.8 1311 615.5 -53.3 1215.8 0	573.5
-3.6 793.8 1311 615.5 -517.3 751.8 0	573.5
-4 818.8 1353 647.2 -534.3 762.1 0	590.5

PASSIVE PSF LBS 464.3 87.2 407.7 356.32 483.1 98.51 538.25 502 574.5 600.7 626.9 657.45 688 720.9 753.8 784.35 814.9 821.45 828 880.5 933 985.5 1038 1090.5 1143 348.36 1179.4 849.59 1248 767.7 1311

Equivalent passive force calculated from pressures

UNIFORM PRESSURE=

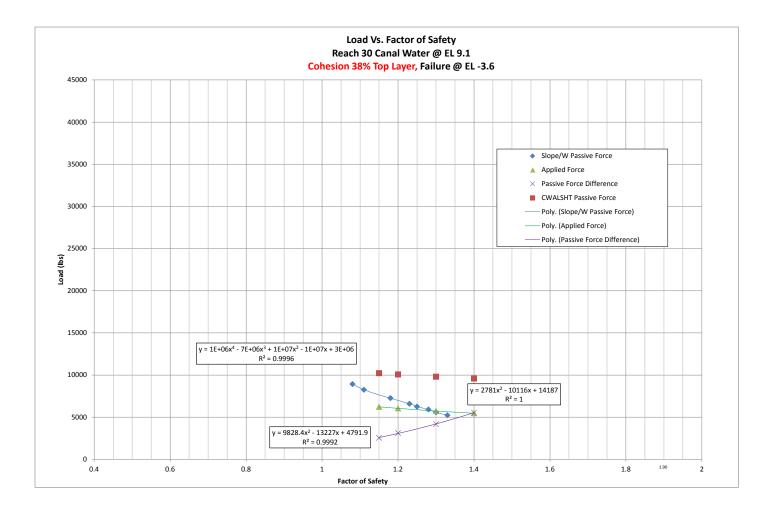
Note: Table from CWALSHT design mode output file

Solution: FS=1.40

Note - see graph on next sheet.

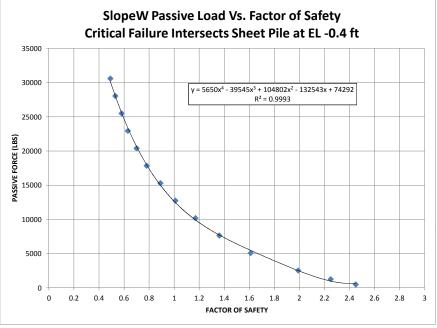
		3rd E	egree Poly	nomial Trer	ndline Coeff	icients
CWALSHT PASSIVE FORCE=	9587.28	а	b	С	d	
CWALSHT FS=	1.4	-83298	311527	-401386	183957	
GEOSTUDIO PASSIVE FORCE=	4039.8	Note: Coeffic	ients used for o	calculating FS t	from graph	
PASSIVE FORCE DIFFERENCE=	5547.5					
SHEET PILE LENGTH=	11.8					

470



Analyis by:	Reach	FLOOD SIDE CREST ELEVATION NAVD88	PROTECTED SIDE CREST ELEVATION NAVD89	SHEET PILE TIP ELEVATION NAVD88	SHEET PILE PENETRATION (D) (FT)	WATER LEVEL ELEVATION LEFT SIDE NAVD88 (Right in CWALSHT)	WATER LEVEL ELEVATION RIGHT SIDE NAVD88 (Left in CWALSHT)	Factor of Safety	Net Pressure Zero @ EL (ft) ² [Crossover Point]	Slip Surface Elevation	ORIGINAL NOTES	FLAC FS RESULTS	slip surface distance above the sheet pile
CD	33	9.8	9.7	-3.4	13.1	10	-5.3	1.9	-1.48	-0.4	C=500	n/a	3

	SlopeW	
Surcharge	Passive	FS
load (pcf)	Load (lbs)	2
water level =	= 2.5	
10	510	2.45
25	1275	2.25
50	2550	1.99
100	5100	1.61
150	7650	1.36
200	10200	1.17
250	12750	1.01
300	15300	0.89
350	17850	0.78
400	20399	0.70
450	22949	0.63
500	25499	0.58
550	28049	0.53
600	30599	0.49



		Itera	tions	
FS	Load	С	Tip	Notes
1.5	700	750	Error	Tip above EL 9.00
1.5	900	750	Error	Tip above EL 9.01
2	900	750	-15.71	
2	800	750	-12.05	
2	700	750	Error	Tip above EL 9.00
2	750	750	-9.81	
2	725	750	+7.39	
2	735	750	-9.36	
2	730	750	-9.22	
1.8	800	750	7.93	

Note: Unable to converge on tip depth without modifying cohesion.

METHOD 1

Reduced cohesion of entire top layer in order to successfully run the program. Without reducing the cohesion, the software would not result in pile tip elevations close to required values. Thus, the top left side layer (3.7ft) of soil was modified from a cohesion of 750psf to 500psf. The final factor of safety using the Sweep Search Method was approximately 1.89 (Iteration 4).

Iteration = 1-1	Applied Uniform	Pressure =	573.8		Pile	Tip (EL) =	-3.40]	Cohesion =	500/750 psf top	layer (3.7ft) (67%)
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><ni (SOIL+V</ni </td><td>ET> WATER)</td><td><righ< td=""><td>TSIDE></td><td></td><td></td><td></td><td></td></righ<></td></left<>	SIDE>	<ni (SOIL+V</ni 	ET> WATER)	<righ< td=""><td>TSIDE></td><td></td><td></td><td></td><td></td></righ<>	TSIDE>				
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)				
	10	0	0	0	0	0	0	0				
	9.8	12.5	0	0	12.5	12.5	0	0				
	9.8	12.5	0	0	12.5	845.8	0	833.3			SSIVE	I
Protected Side	9.7	18.8	0	0	18.8	856.8	0	838.1		PSF	LBS	1
Ground Surface	9.7	18.8	555.6	0	37	1430.6	0	838.1		555.6	401.87	
Elevation	9	62.5	592.6	0	43.7	1507.6	0	871.3		592.6	182.4	1
	8.7	81.3	623.4	0	31.6	1540.6	0	885.6		623.4	461.58	
	8	125	695.4	0	3.4	1617.6	0			695.4	69.975	
	7.9	130.3	704.1	0	0	1624.1	0	920.1		704.1	676.035	
	7	187.5	798.2	0	-36.9	1694.7	0	933.4		798.2	800.2	
	6	250	802.2	0	21.6	1439.3	0	615.5		802.2	802.35	
	5	312.5	802.5	0	83.8	1194.6	0	308.3		802.5	850.75	1
	4	375	899	0	49.8	1214.3	0	265.5		899	947.65	(
	3	437.5	996.3	0	15	1319.3	0			996.3	1044.95	6
	2	500	1093.6	0	-19.8	1431.9	0	358.1		1093.6	1134.6	е
	1	562.5	1175.6	0	-39.3	1542.2	0	405.9		1175.6	1216.05	Т
Entry failure at this	0	625	1256.5	0	-57.7	1652.3	0	453.5		1256.5	467.1	а
elevation per	-0.4	650	1079	0	144.8	1705.9	0	482.1		1079	0	(2
SlopeW (see graph	-0.4	650	1079	0	-429	1132.1	0	482.1				
title above).	-1	687.5	1142	0	-454.5	1177.2	0	489.7		Equivalent passive for	orce calculated from p	ress
	-2	750	1247	0	-497	1270.5	0	520.5				
	Note: Table from	n CWALSHT	desian mode	output file	1				_			

Votes LBS Load Tip 555.6 401.87 1.8 800 592.6 182.4 1.8 700 -10.02 461.58 623.4 1.8 600 -6.32 695.4 69.975 1.8 500 (1) 550 676.035 1.8 6.43 704.1 (2) 798.2 800.2 1.8 570 -2.91 574 802.2 802.35 1.8 -3.43 802.5 850.75 1.8 573.8 -3.4 947.65 Large variation in tip EL between 899 996.3 1044.95 6.43 and -2.91. However, this does not 1093.6 1134.6 encompass the tip EL of -3.4. 1175.6 1216.05 Therefore, the run will converge 467.1 adequately on the actual tip EL of -3.4. 1079 0 (2) Tip above EL 9.00

Analysis Method = Sweep Search Method

Note: Table from CWALSHT design mode output file

Notes: File Name 'R33_C500_3.7ft_1.dat'

		4th Degree Poly. Trendline Coefficients							
CWALSHT PASSIVE FORCE=	9055.51	а	b	С	d	е			
CWALSHT FS=	1.8	5650	-39545	104802	-132543	74292			
GEOSTUDIO PASSIVE FORCE=	3958.1	Note: Coefficients used for calculating FS from graph							
PASSIVE FORCE DIFFERENCE=	5097.4								
SHEET PILE LENGTH=	10.1								
UNIFORM PRESSURE=	505								

Equivalent passive force calculated from pressures

Iteration = 1-2	Applied Uniform	Pressure =	549	1 '	Pile	e Tip (EL) =	-3.40] '
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td></td><td>ET> WATER)</td><td><righ< td=""><td>TSIDE></td></righ<></td></left<>	SIDE>		ET> WATER)	<righ< td=""><td>TSIDE></td></righ<>	TSIDE>
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)
	10	0		0	-	-	-	
	9.8	12.5		-				-
Protected Side	9.8	12.5		0				
Ground Surface	9.7	18.8	0	0	18.8	8.808	0	790.1
Elevation	9.7	18.8	523.6	0	44.2	1357.8	0	790.1
	9	62.5	562.6	0	48.9	1434.8	0	823.3
	8.7	81.3	593.4	0	36.8	1467.8	0	837.6
	8	125	665.4	0	8.6	1544.8	0	870.8
	7.8	138.3	687.3	0	0	1561.6	0	874.3
	7	187.5	768.3	0	-31.8	1623.7	0	887.2
	6	250	777.6	0	21.4	1388.3	0	589.3
	5	312.5	783.6	0	77.9	1162	0	300.5
	4	375	880.2	0	43.8	1189.5	0	265.5

Cohesion = 500/750 psf top layer (3.7ft) (67%)

	, ,	(- /	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
	10	0	0	0	0	0	0	0
	9.8	12.5	0	0	12.5	12.5	0	0
Protected Side	9.8	12.5	0	0	12.5	797.8	0	785.3
Ground Surface	9.7	18.8	0	0	18.8	8.808	0	790.1
Elevation	9.7	18.8	523.6	0	44.2	1357.8	0	790.1
	9	62.5	562.6	0	48.9	1434.8	0	823.3
	8.7	81.3	593.4	0	36.8	1467.8	0	837.6
	8	125	665.4	0	8.6	1544.8	0	870.8
	7.8	138.3	687.3	0	0	1561.6	0	874.3
	7	187.5	768.3	0	-31.8	1623.7	0	887.2
	6	250	777.6	0	21.4	1388.3	0	589.3
	5	312.5	783.6	0	77.9	1162	0	300.5
	4	375	880.2	0	43.8	1189.5	0	265.5
	3	437.5	977.5	0	9	1294.5	0	308
	2	500	1074.8	0	-25.8	1402.3	0	353.3
Entry failure at this	1	562.5	1157	0	-45.5	1512.5	0	401
elevation per	0	625	1239	0	-65	1618.2	0	444.2
SlopeW (see graph	-0.4	650	1079	0	120	1668.4	0	469.4
title above).	-0.4	650	1079	0	-429	1119.4	0	469.4
	-1	687.5	1142	0	-454.5	1165.5	0	478
	-2	750	1247	0	-497	1270.5	0	520.5
•	Note: Table fro	m CWALSHT o	lesign mode	output file				

PASSIVE Runs PSF LBS FS Load Tip 523.6 380.17 1.85 550 -2.02 562.6 173.4 1.9 550 -3.24 593.4 440.58 1.93 550 -4.32 665.4 135.27 1.91 550 -3.55 687.3 582.24 1.91 548 -3.26 768.3 772.95 1.91 549 777.6 780.6 783.6 831.9 880.2 928.85 977.5 1026.15 1074.8 1115.9 1157 1198 1239 463.6 1079 0

Equivalent passive force calculated from pressures

		4th Degree Poly. Trendline Coefficients						
CWALSHT PASSIVE FORCE=	8829.61	а	b	С	d	е		
CWALSHT FS=	1.91	5650	-39545	104802	-132543	74292		
GEOSTUDIO PASSIVE FORCE=	3112.4	Note: Co	efficients use	d for calculating	ng FS from gra	ph		
PASSIVE FORCE DIFFERENCE=	5717.2							
SHEET PILE LENGTH=	10.1							
UNIFORM PRESSURE=	566							

Analysis Method = Sweep Search Method

Notes

-3.4

Iteration = 1-3	Applied Uniform	Pressure =	560	ļ	Pile	Tip (EL) =	-3.41		Cohesion =	500/750 psf top	layer (3.7ft) (67%)
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><ne (SOIL+W</ne </td><td></td><td><right< td=""><td>SIDE></td><td></td><td></td><td></td></right<></td></left<>	SIDE>	<ne (SOIL+W</ne 		<right< td=""><td>SIDE></td><td></td><td></td><td></td></right<>	SIDE>			
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)			
	10 9.8	0 12.5	0	0	0 12.5	0 12.5	0	0			
	9.8	12.5	0	0	12.5	819	0	806.5		PAS	SSIVE
Protected Side	9.7	18.8	0	0	18.8	830	0	811.2		PSF	LBS
Ground Surface	9.7	18.8	537.6	0	41.1	1390	0	811.2	1	537.6	389.69
Elevation	9	62.5	575.8	0	46.7	1467	0	844.5		575.8	177.36
	8.7	81.3	606.6	0	34.6	1500	0	858.7		606.6	449.82
	8	125	678.6	0	6.4	1577	0	892		678.6	137.35
	7.8	134.9	694.9	0	0	1589.3	0	894.4		694.9	590.52
	7	187.5	781.4	0	-33.9	1655	0	907.5		781.4	784.9
	6	250	788.4	0	21.6	1410.8	0	600.8		788.4	790.15
	5	312.5	791.9	0	80.6	1176.4	0	303.9		791.9	840.2
	4	375	888.5	0	46.5	1200.5	0	265.5		888.5	937.15
	3	437.5	985.8	0	11.7	1305.5	0	308		985.8	1034.45
	2	500	1083.1	0	-23.1	1415.4	0	355.4		1083.1	1124.15
	1	562.5	1165.2	0	-42.7	1525.6	0	403.1		1165.2	1205.95
Entry failure at this	0	625	1246.7	0	-61.7	1633.3	0	448.3		1246.7	465.14
elevation per	-0.4	650	1079	0	131	1685	0	475		1079	0
SlopeW (see graph	-0.4	650	1079	0	-429	1125	0	475			
title above).	-1	687.5	1142	0	-454.5	1165.5	0	478		Equivalent passive for	orce calculated from press
	-2	750	1247	0	-497	1270.5	0	520.5	ĺ		
	Note: Table from	CWALSHT	lesian mode	output file							

PASSIVE Runs PSF LBS FS Load Tip Notes 537.6 389.69 1.9 560 -4.8 575.8 177.36 1.89 560 -4.51 560 606.6 449.82 1.85 -3.11 137.35 1.86 560 -3.41 678.6 694.9 590.52 781.4 784.9 788.4 790.15 791.9 840.2 888.5 937.15 1034.45 985.8 1083.1 1124.15 1165.2 1205.95 1246.7 465.14 1079

Analysis Method = Sweep Search Method

Note: Table from CWALSHT design mode output file

		4th Degree Poly. Trendline Coefficients						
CWALSHT PASSIVE FORCE=	8926.83	а	b	С	d	е		
CWALSHT FS=	1.86	5650	-39545	104802	-132543	74292		
GEOSTUDIO PASSIVE FORCE=	3492.5	Note: Co	efficients use	d for calculating	ng FS from gra	ph		
PASSIVE FORCE DIFFERENCE=	5434.3							
SHEET PILE LENGTH=	10.1							
UNIFORM PRESSURE=	538							

Equivalent passive force calculated from pressures

Iteration = 1-4 Applied Uniform Pressure = 553.4 Pile Tip (EL) = -3.41 Cohesion = 500/750 psf top layer (3.7ft) (67%) <---> <---LEFTSIDE---> <--RIGHTSIDE---> NET ELEV. WATER (SOIL+WATER) **PASSIVE** ACTIVE PASSIVE (FT) (PSF) ACTIVE ACTIVE PASSIVE (PSF) (PSF) (PSF) (PSF) (PSF) 10 9.8 12.5 0 0 12.5 12.5 0 9.8 12.5 0 0 12.5 806.2 0 793.7 9.7 18.8 18.8 817.2 0 798. Protected Side **Ground Surface** 9.7 18.8 529.1 0 43 1370.6 0 798.4 Elevation 9 62.5 567.8 0 48.1 1447.6 0 831.7 8.7 598.6 1480.6 845.9 81.3 0 36 0 8 125 670.6 0 7.8 1557.6 0 879.2 137.1 690.5 0 7.8 0 0 1572.7 882.3 187.5 773.4 0 -32.5 1636.1 0 895.2 250 781.9 0 21.5 1397.2 0 593.8 312.5 786.8 0 79 1 1167.8 0 301.9 5 375 883.5 44.9 1193.9 0 265.5 0 437.5 0 3 980.8 0 10.1 1298.9 308 2 500 1078.1 1407.5 0 0 -24.7 354.1 562.5 1160.2 0 -44.3 1517.7 0 401.8 Entry failure at this 1624.2 0 625 1242 0 -63.6 0 445.8 471.6 -0.4 650 1079 0 124.4 1675 0 elevation per SlopeW (see graph -0.4 650 1079 -429 1121.6 0 471.6 0 title above). 687.5 1142 0 -454.5 1165.5 0 478 -497 1270.5 520.5 750 1247 0 Note: Table from CWALSHT design mode output file

	SSIVE			Runs		
PSF	LBS	FS	Load	Tip	Notes	
529.1	383.915	1.89	550	-2.97		
567.8	174.96	1.89	553	-3.35		
598.6	444.22	1.89	554	-3.5		
670.6	136.11	1.89	553.4	-3.41		
690.5	585.56					
773.4	777.65					
781.9	784.35					
786.8	835.15					
883.5	932.15					
980.8	1029.45					
1078.1	1119.15					
1160.2	1201.1					

Equivalent passive force calculated from pressures

464.2

1242

1079

CWALSHT PASSIVE FORCE= 8867.965 CWALSHT FS= 1.89 GEOSTUDIO PASSIVE FORCE= 3263.4 PASSIVE FORCE DIFFERENCE= 5604.5 SHEET PILE LENGTH= 10.1 UNIFORM PRESSURE: 555

5650 -39545 104802 -132543 74292 Note: Coefficients used for calculating FS from graph

4th Degree Poly. Trendline Coefficients

Analysis Method = Sweep Search Method

SOLUTION: FS = 1.89

A second method will be used to compare with method 1 in order to determine the best overall factor of safety. When comparing lowered cohesion values, the higher factor of safety between the two methods will provide the more accurate solution.

METHOD 2

Reduced Cohesion of left side top 1ft, instead of entire top layer, in order to minimize error in FS, while allowing the program to run successfully. This allowed the design method to achieve the required -3.4ft tip elevation and run multiple iterations with differeing FS and Applied Uniform Lateral Pressures on the sheet pile wall. The final factor of safety using the Sweep Search Method was approximately 1.9 (Iteration 3).

ion = 2-1	Applied Uniform	Pressure =	630.6		Pile	Tip (EL) =	-3.4		Cohesion =	375/750 ps	f top 1ft (50%)		Analysis I	Method = \$	Sweep Search M
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><ne (SOIL+W</ne </td><td></td><td><right< td=""><td>SIDE></td><td></td><td></td><td></td><td></td><td>Itera</td><td>ations</td><td></td></right<></td></left<>	SIDE>	<ne (SOIL+W</ne 		<right< td=""><td>SIDE></td><td></td><td></td><td></td><td></td><td>Itera</td><td>ations</td><td></td></right<>	SIDE>					Itera	ations	
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)				FS	Load on: Reduce		Notes o FOOper
	- 10				, ,	. /	` /	(FSF)	-						o Soupsi
	10	0 12.5	-	0	0	0 12.5	0	(?[1.89 1.89	550 580	7.77	
Protected Side	9.8 9.8	12.5		0	12.5 12.5	806.2	0	793.7	<i>;</i>	DA	SSIVE	1.89	600	7.32 6.98	
Ground Surface	9.7			-			-			PSF	LBS		650		
Elevation		18.8		0	18.8	817.2	0	798.4				1.89		5.85	
Elevation	9.7	18.8			252.5	1447.8	0	798.4		396.8	294.21	1.89	750	-9.56	
	9 8.7	62.5 81.3		0	249.3 117.8	1524.8 1557.8	0	831.7		443.8 594	155.67	1.89	775 675	-10.46 -6.97	
	-			-			0	845.9			198.405	1.89		_	
	8.4	98.1	728.7	0	0	1587.3	0	858.7		728.7	334.64	1.89	665	-6.14	(1)
	8	125		0	-188.9	1634.8	0	879.2		944.5	995.9	1.89	655	5.66	
	/	187.5		0	-229.2	1713.3	0	895.2		1047.3	985.35	Cohesi		ed top 1ft to	o 375pst
	6	250	923.4	0	-42.8	1474.4	0	593.8		923.4	860.25	1.89	665	-7.39	
	5	312.5		0	146	1245	0	301.9		797.1	846	1.89	600	5.45	
	4	375		0	110.7	1271.1	0	265.5		894.9	943.7	1.89	630	-3.34	
	3	437.5		0	75.6	1376.1	0	308		992.5	1040.55	1.89	631	-3.44	
	2	500	1088.6	0	42	1484.7	0	354.1		1088.6	1130	1.89	630.7	-3.41	
	1	562.5		0	21.7	1594.9	0	401.8		1171.4	1213.4	1.89	630.6	-3.4	
Entry failure at this	0	625		0	0.2	1701.4	0	445.8		1255.4	509.94		o large vari		
elevation per	-0.4	650			-13.7	1752.2	0	471.6		1294.3	0		small chan		
SlopeW (see graph	-0.4	650	1294.3	0	-644.3	1121.6	0	471.6					I load, the		
title above).	-1	687.5		0	-454.5	1165.5	0	478		1	orce calculated from		able, and c		
	-2	750	1247	0	-497	1270.5	0	520.5	5	pressures		actual tip	depth of -3	3.4 is not p	ossible.

		4th Degree Poly. Trendline Coefficients							
CWALSHT PASSIVE FORCE=	9508.015	а	b	С	d	е			
CWALSHT FS=	1.89	5650	-39545	104802	-132543	74292			
GEOSTUDIO PASSIVE FORCE=	3263.4	Note: Co	e: Coefficients used for calculating FS from graph						
PASSIVE FORCE DIFFERENCE=	6244.6								
SHEET PILE LENGTH=	10.1								
UNIFORM PRESSURE=	618								

Iteration = 2-2	Applied Uniforn	Pressure =	625		Pile	Tip (EL) =	-3.4		Cohesion =	375/750 ps	f top 1ft (50%)]
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td></td><td>ET> WATER)</td><td><righ< td=""><td>TSIDE></td><td>]</td><td></td><td></td><td></td></righ<></td></left<>	SIDE>		ET> WATER)	<righ< td=""><td>TSIDE></td><td>]</td><td></td><td></td><td></td></righ<>	TSIDE>]			
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)				
	10	0	-	0	0	-	0	0				
	9.8	12.5	0	0	12.5	12.5	0	0				
Protected Side	9.8	12.5	0	0	12.5	797	0	784.5		PA	SSIVE	
Ground Surface	9.7	18.8	0	0	18.8	808	0	789.3		PSF	LBS	FS
Elevation	9.7	18.8	392.3	0	251.5	1433	0	789.3		392.3	291.165	1.8
	9	62.5	439.6	0	247.9	1510	0	822.5	i	439.6	154.2	1.8
	8.7	81.3	588.4	0	117.9	1543	0	836.8		588.4	196.74	1.8
	8.4	98.2	723.2	0	0	1572.9	0	849.7	1	723.2	331.76	
	8	125	935.6	0	-185.6	1620	0	870		935.6	987	
	7	187.5	1038.4	0	-225.9	1698.9	0	886.4		1038.4	977.8	
	6	250	917.2	0	-42.2	1463.9	0	588.9		917.2	855.3	
	5	312.5	793.4	0	144.1	1237.9	0	300.4		793.4	842.35	
	4	375	891.3	0	108.7	1265.5	0	265.5	i	891.3	940	
	3	437.5	988.7	0	73.8	1370.5	0	308		988.7	1036.8	
	2	500	1084.9	0	40.1	1478.2	0	353.2		1084.9	1126.4	
	1	562.5	1167.9	0	19.6	1588.4	0	400.9		1167.9	1209.95	
Entry failure at this	0	625	1252	0	-2	1694	0	444		1252	508.6	
elevation per	-0.4	650	1291	0	-16	1744.1	0	469.1		1291	0	
SlopeW (see graph	-0.4	650	1291	0	-641	1119.1	0	469.1				
title above).	-1	687.5	1142	0	-454.5	1165.5	0	478		Equivalent passive f	orce calculated from p	ressures
	-2	750	1247	0	-497	1270.5	0	520.5				
		OLIVAL OLIT			_	_		_	-			

SSIVE Runs LBS FS Load Notes 291.165 650 -2.91 154.2 1.8 1.8 660 655 -3.91 196.74 -3.42 331.76 987 977.8 855.3 842.35 940 1036.8 1126.4 1209.95 508.6 0

Analysis Method = Sweep Search Method

Note: Table from CWALSHT design mode output file

		4th Degree Poly. Trendline Coefficients							
		4th Degree Foly. Trendine Coemclents							
CWALSHT PASSIVE FORCE=	9458.065	а	b	С	d	е			
CWALSHT FS=	1.913	5650	-39545	104802	-132543	74292			
GEOSTUDIO PASSIVE FORCE=	3089.8	Note: Coefficients used for calculating FS from graph							
PASSIVE FORCE DIFFERENCE=	6368.2								
SHEET PILE LENGTH=	10.1								
UNIFORM PRESSURE=	631								

eration = 2-3	Applied Uniforn	n Pressure =	627		Pile	Tip (EL) =	-3.40	(
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td></td><td>VATER)</td><td><righ1< td=""><td>SIDE></td></righ1<></td></left<>	SIDE>		VATER)	<righ1< td=""><td>SIDE></td></righ1<>	SIDE>
	(FT)	(PSF)	PASSIVE	ACTIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
			(PSF)	(PSF)	(PSF)	(PSF)	(PSF)	(PSF)
	10	0	0	0	0	0	0	0
	9.8	12.5	0	0	12.5	12.5	0	0
Protected Side	9.8	12.5	0	0	12.5	800.3	0	787.8
Ground Surface	9.7	18.8	0	0	18.8	811.3	0	792.6
Elevation	9.7	18.8	393.9	0	251.8	1438.3	0	792.6
	9	62.5	441.1	0	248.4	1515.3	0	825.8
	8.7	81.3	590.4	0	117.8	1548.3	0	840.1
	8.4	98.2	725.2	0	0	1578.1	0	852.9
	8	125	938.8	0	-186.8	1625.3	0	873.3
	7	187.5	1041.6	0	-227.1	1704.1	0	889.6
	6	250	919.4	0	-42.4	1467.7	0	590.7
	5	312.5	794.8	0	144.7	1240.4	0	300.9
	4	375	892.6	0	109.4	1267.5	0	265.5
	3	437.5	990.1	0	74.4	1372.5	0	308
	2	500	1086.2	0	40.8	1480.5	0	353.5
	1	562.5	1169.2	0	20.3	1590.7	0	401.2
Entry failure at this	0	625	1253.3	0	-1.3	1696.6	0	444.6
elevation per	-0.4	650	1292.2	0	-15.2	1747	0	470
SlopeW (see graph	-0.4	650	1292.2	0	-642.2	1120	0	470
title above).	-1	687.5	1142	0	-454.5	1165.5	0	478
	-2	750	1247	0	-497	1270.5	0	520.5
	Note: Table from	·· OMMALOUT	teritoria accept	a acceptance Cla				

PAS	SSIVE			Runs	
PSF	LBS	FS	Load	Tip	Notes
393.9	292.25	1.7	700		crash
441.1	154.725	1.7	680	-2.91	
590.4	197.34	1.7	690	-3.94	
725.2	332.8	1.7	685	-3.43	
938.8	990.2	1.7	684.7	-3.4	
1041.6	980.5				
919.4	857.1				
794.8	843.7				
892.6	941.35				
990.1	1038.15				
1086.2	1127.7				
1169.2	1211.25				
1253.3	509.1				
1292.2	0				

Analysis Method = Sweep Search Method

Note: Table from CWALSHT design mode output file

		4th Degree Poly. Trendline Coefficients								
CWALSHT PASSIVE FORCE=	9476.165	а	b	С	d	е				
CWALSHT FS=	1.904	5650	-39545	104802	-132543	74292				
GEOSTUDIO PASSIVE FORCE=	3157.5	Note: Co	efficients use	d for calculati	ng FS from gra	ph				
PASSIVE FORCE DIFFERENCE=	6318.6									
SHEET PILE LENGTH=	10.1									
LINIFORM PRESSURE-	626									

Equivalent passive force calculated from pressures

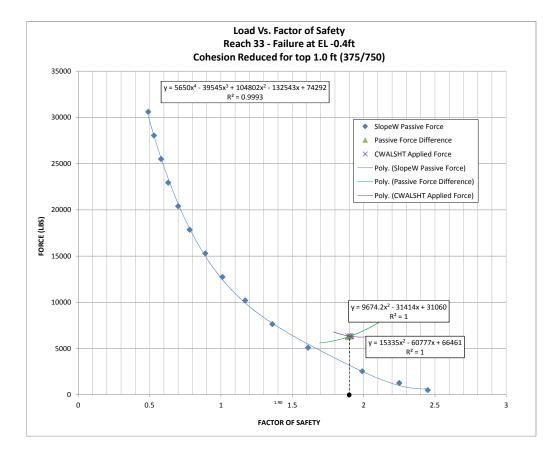
375/750 psf top 1ft (50%)

SOLUTION: FS = 1.90

Notes: Use the higher FS, since this will be closer to the results if no adjustments to the cohesion had been performed. By lowering the cohesion on the protected side, the FS will decrease, thus the run with the higher FS when lowering the cohesion is closest to the unmodified version.

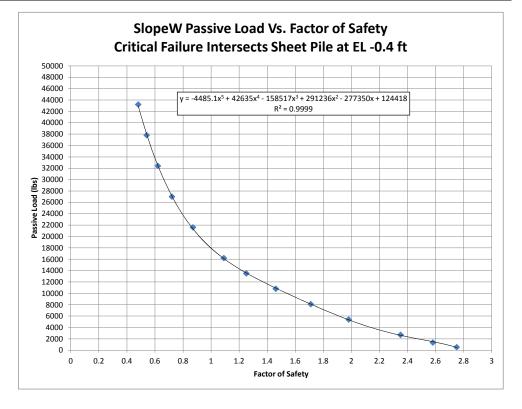
FINAL SOLUTION: FS = 1.90

Note - see graph below



Ansalysis by:	Reach	FLOOD SIDE CREST ELEVATION NAVD88	PROTECTED SIDE CREST ELEVATION NAVD89	SHEET PILE TIP ELEVATION NAVD88	⊒ N	VATER ATION VD88 (WATER LEVEL ELEVATION RIGHT SIDE NAVD88 (Left in CWAISHT)	Factor of Safety	Net Pressure Zero @ EL (ft) ² [Crossover Point]	Slip Surface Elevation	ORIGINAL NOTES	FLAC FS RESULTS	slip surface distance above the sheet pile
CD	34	9.9	9.7	-3.4	13.1	10	-4.3	2.23	-0.7	-0.4	Reduce C	n/a	3

SlopeW										
Surcharge	Passive	FS								
load (pcf)	Load	13								
10	540	2.75								
25	1351	2.58								
50	2702	2.35								
100	5404	1.98								
150	8105	1.71								
200	10807	1.46								
250	13509	1.25								
300	16210	1.09								
400	21614	0.87								
500	27017	0.72								
600	32421	0.62								
700	37824	0.54								
800	43228	0.48								



Iteration = 1	Applied Uniform	n Pressure =	526.4		Pile	Tip (EL) =	-2.97]	Cohesion =	500/700 psf fo	r top layer, 3	.7ft (71%))
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td></td><td>ET> WATER)</td><td><right< td=""><td>SIDE></td><td></td><td></td><td></td><td></td><td></td></right<></td></left<>	SIDE>		ET> WATER)	<right< td=""><td>SIDE></td><td></td><td></td><td></td><td></td><td></td></right<>	SIDE>					
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)					
	10 9.9	0 6.2	0	0	0 6.2	0 6.2	0						
	9.9	6.2	0	0	6.2	706.3	0	-	-	PASS	IVE		_
Protected Side	9.7	18.8	0	0	18.8	727.7	0			PSF	LBS	го.	T
Ground Surface	9.7	18.8	500	0	45.2	1254.1	0	708.9	1	500	366.555	FS	ı
	9	62.5	547.3	0	41.6	1329	0	740.1		547.3	168.765	2	
	8.7	81.3	577.8	0	29.9	1361.1	0	753.4		577.8	429.345	2	
	8	125	648.9	0	2.5	1436	0	784.6		648.9	65.215	2	
	7.9	129	655.4	0	0	1439.6	0	784.2		655.4	632.655	2	
	7	187.5	750.5	0	-36.6	1493.2	0	779.3		750.5	751.2	2	
	6	250	751.9	0	24.5	1294.6	0	518.2		751.9	752.6	2	
	5	312.5	753.3	0	85.6	1128.5	0	289.6		753.3	803.9	2	
	4	375	854.5	0	46.9	1164	0	262.6		854.5	904.75	2	
	3	437.5	955	0	8.9	1271	0			955	1005.35	2	
	2	500	1055.7	0	-29.3	1378	0	351.6		1055.7	1106.35	2	
	1	562.5	1157	0	-68.1	1495.5	0	406.6		1157	1207.6		
Entry failure at this		625	1258.2	0	-106.8	1593.8	0			1258.2	467.78		
elevation per	-0.4	650	1080.7	0	95.7	1639.8	0			1080.7	0	<u> </u>	
SlopeW (see	-0.4	650	1080.7	0	-430.7	1113.4	0						
graph title above)	-1	687.5	1144.9	0	-457.4	1212.6	0	525.1		Equivalent passive			
	Note: Table from	m CWALSHT	design mod	le output file	е	·	·			calculated from pre	essures		

PASSIVE Iterations PSF LBS Uniform FS Tip (ft) Notes 500 366.555 Load 547.3 168.765 550 2 -6.2 577.8 429.345 2 500 6.62 648.9 65.215 2 520 -2.31 655.4 632.655 2 530 -4.48 750.5 751.2 2 525 -2.8 751.9 752.6 2 527 -4.08 2 753.3 803.9 526 -2.92 2 854.5 904.75 526.5 -4 2 -2.96 955 1005.35 526.3 1055.7 1106.35 2 526.4 -2.97 Closest possible w/ out

Analysis Method = Sweep Search Method

reducing cohesion

124418

5th Degree Polynomial Trendline Coefficients

Notes: Adjusted cohesion until pile tip was close to -3.4, which was approximately -3.0ft. This same tip elevation was used for remaining iterations. Final answer will be slightly conservative since tip is actually 0.4ft deeper. .than analysis assumption

CWALSHT PASSIVE FORCE=	8662.065	
CWALSHT FS=	2	-44
GEOSTUDIO PASSIVE FORCE=	5162.8	Note
PASSIVE FORCE DIFFERENCE=	3499.3	
SHEET PILE LENGTH=	10.1	
UNIFORM PRESSURE=	346	

485.1 42635 -158517 291236 -277350 te: Coefficients used for calculating FS from graph

С

-2.91

Pile Tip (EL) =

<---NET---> <---LEFTSIDE---> <--RIGHTSIDE---> (SOIL+WATER) NET ELEV. WATER (FT) (PSF) PASSIVE ACTIVE ACTIVE PASSIVE ACTIVE PASSIVE (PSF) (PSF) (PSF) (PSF) (PSF) (PSF) 10 0 0 9.9 6.2 0 0 6.2 6.2 0 9.9 6.2 0 0 6.2 642.6 0 636.4 Protected Side 9.7 18.8 0 18.8 664 0 645.3 **Ground Surface** 9.7 18.8 454.5 0 55.2 1155 0 645.3 9 62.5 504 0 49.5 1229.9 0 676.4 534.5 8.7 81.3 0 37.8 1262 0 689.8 8 125 605.6 0 10.4 1336.9 0 720.9 7.7 141.6 632.6 0 0 1353.2 0 720.6 7 187.5 707.3 0 -28.8 1398.4 0 719.9 6 250 717.8 0 23.2 1226.1 0 485.1 5 312.5 728.3 0 75.2 1082.7 0 279.2 4 375 829.1 0 36.9 1128.6 0 262.6 3 0 437.5 929.6 0 -1.1 1235.6 307.1 2 0 500 1030.6 0 -39.6 351.6 1342.6 562.5 1131.9 0 -78.4 1452.7 0 399.2 0 0 Entry failure at this 0 625 1233.2 -117.2 1556.6 440.6 -0.4 650 1080.7 0 60.3 1599.4 0 458.4 elevation per -0.4 650 458.4 -430.7 0 SlopeW (see 1080.7 0 1108.4 -1 687.5 0 -457.4 1202.8 0 515.3 1144.9 graph title above) Note: Table from CWALSHT design mode output file

491

Applied Uniform Pressure =

Iteration =

2

PASS	SIVE	Iterations							
PSF	LBS	FS	Uniform	Tip (ft)	Notes				
454.5	335.475	۲3	Load	TIP (II)	Notes				
504	155.775	2.2	490	-2.79					
534.5	399.035	2.2	500	-5					
605.6	185.73	2.2	495	-4.48					
632.6	468.965	2.2	492	none	crash				
707.3	712.55	2.2	493	-4.25					
717.8	723.05	2.2	492.5	-4.18					
728.3	778.7	2.2	492.2	-4.13					
829.1	879.35	2.2	492.05	none	crash				
929.6	980.1	2.2	491	-2.91	used				
1030.6	1081.25	2.2	491.5	none	crash				
1131.9	1182.55								
1233.2	462.78								

Equivalent passive force calculated from pressures

0

1080.7

Cohesion = 500/700 psf for top layer, 3.7ft (71%)

CWALSHT PASSIVE FORCE= 8345.31

CWALSHT FS= 2.2

GEOSTUDIO PASSIVE FORCE= 3546.1

PASSIVE FORCE DIFFERENCE= 4799.2

SHEET PILE LENGTH= 10.1

UNIFORM PRESSURE= 475

Analysis Method = Sweep Search Method

Iteration = 3	Applied Uniform	n Pressure =	487		Pile	Tip (EL) =	-3.00		Cohesion = 500	/700 psf fo	r top layer, 3.	.7ft (71%)]
	NET ELEV.	WATER	<left< td=""><td>SIDE></td><td><ni (SOIL+\</ni </td><td>ET> VATER)</td><td><right< td=""><td>SIDE></td><td></td><td></td><td></td><td></td><td></td></right<></td></left<>	SIDE>	<ni (SOIL+\</ni 	ET> VATER)	<right< td=""><td>SIDE></td><td></td><td></td><td></td><td></td><td></td></right<>	SIDE>					
	(FT)	(PSF)	PASSIVE (PSF)	ACTIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)	ACTIVE (PSF)	PASSIVE (PSF)					
	10	0	0	0	0	0	0						
	9.9 9.9	6.2 6.2	0	0	6.2 6.2	6.2 634.1	0			PASS	SIVE		_
Protected Side	9.7	18.8	0	0	18.8	655.5	0			PSF	LBS		Γ
Ground Surface	9.7	18.8	448.4	0	57.3	1142.5	0	636.7		448.4	331.31	FS	
	9	62.5	498.2	0	51.3	1217.4	0			498.2	154.02	2.23	
	8.7	81.3	528.6	0	39.6	1249.5	0			528.6	394.94	2.23	
	8	125	599.8	0	12.2	1324.4	0			599.8	184.695	2.23	
	7.7	144.5	631.5	0	0	1343.7	0			631.5	466.515	2.23	
	7	187.5	701.4	0	-26.9	1386.4	0			701.4	707.3	2.23	
	6	250	713.2	0	23.8	1217.6	0			713.2	719.05	2.23	
	5	312.5	724.9	0	74.6	1077.2	0			724.9	775.3	i	
	4	375	825.7	0	36.3	1124.6	0			825.7	875.95		
	3	437.5	926.2	0	-1.7	1231.6	0			926.2	976.7		
	2	500	1027.2	0	-40.2	1338.6	0	351.6		1027.2	1077.85	İ	
	1	562.5	1128.5	0	-79	1447.3	0	397.8		1128.5	1179.15	j	
Entry failure at this		625	1229.8	0	-117.8	1552.6	0			1229.8	462.1	İ	
elevation per	-0.4	650	1080.7	0	56.3	1595.4	0			1080.7	0		
SlopeW (see	-0.4	650	1080.7	0	-430.7	1108.4	0			·			
graph title above)	-1	687.5	1144.9	0	-457.4	1201.5	0	514		alent passive	e force		

PASS	IVE		Itera	ations	
PSF	LBS	FS	Uniform	Tip (ft)	Notes
448.4	331.31	1	Load	TIP (II)	140163
498.2	154.02	2.23	485	-2.77	
528.6	394.94	2.23	487	-3	used
599.8	184.695	2.23	489	-4.34	
631.5	466.515	2.23	488	-4.21	
701.4	707.3	2.23	487.2	none	crash
713.2	719.05	2.23	487.1	none	crash
724.9	775.3				
825.7	875.95				
926.2	976.7				
1027.2	1077.85				
1128.5	1179.15				
1229.8	462.1				
1080.7	0				

Note: Table from CWALSHT design mode output file

Equivalent passive force calculated from pressures

CWALSHT PASSIVE FORCE=	8304.88
CWALSHT FS=	2.23
GEOSTUDIO PASSIVE FORCE=	3341.1
PASSIVE FORCE DIFFERENCE=	4963.7
SHEET PILE LENGTH=	10.1
UNIFORM PRESSURE=	491

-4485.1 42635 -158517 291236 Note: Coefficients used for calculating FS from graph

С

b

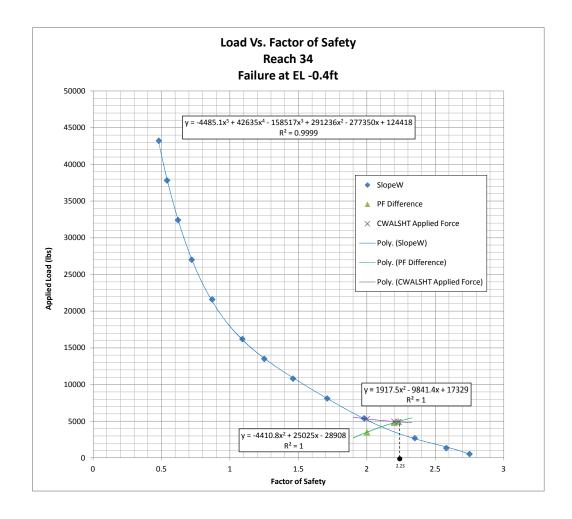
5th Degree Polynomial Trendline Coefficients

d

-277350 124418

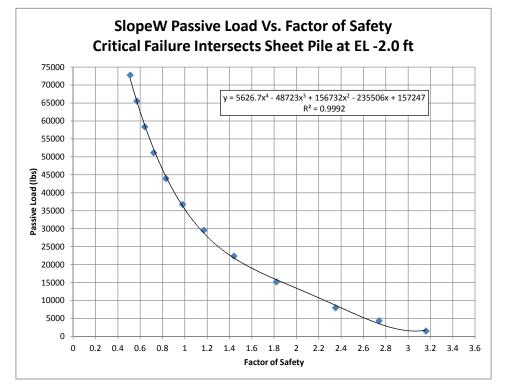
Analysis Method = Sweep Search Method

Solution: FS=2.23 Note - see graph on next sheet.



Analyses by:	Reach	FLOOD SIDE CREST ELEVATION NAVD88	PROTECTED SIDE CREST ELEVATION NAVD89	SHEET PILE TIP ELEVATION NAVD88	SHEET PILE PENETRATION (D) (FT)	WATER LEVEL ELEVATION LEFT SIDE NAVD88 (Right in CWALSHT)	WATER LEVEL ELEVATION RIGHT SIDE NAVD88 (Left in CWALSHT)	Factor of Safety	Net Pressure Zero @ EL (ft) ² [Crossover Point]	Slip Surface Elevation	ORIGINAL NOTES	FLAC FS RESULTS	slip surface distance above the sheet pile
KA	35	8.5	8.1	-4.5	12.6	10	-4.1	2.65	-3.5	-2.0	n/a	n/a	2.5

SlopeW						
Surcharge	Passive	FS				
load (pcf)	Load (lbs)	13				
10	1500	3.16				
50	4379.6	2.74				
100	7979.4	2.35				
200	15179	1.82				
300	22379	1.44				
400	29579	1.17				
500	36779	0.98				
600	43978	0.83				
700	51178	0.72				
800	58378	0.64				
900	65578	0.57				
1000	72777	0.51				



-235506

157247

Iteration = 1 Applied Uniform Pressure = 486 Pile Tip (EL) = -4.53 Cohesion = Unchanged Analysis Method = Sweep Search Method <---> <---LEFTSIDE---> <--RIGHTSIDE---> NET WATER (SOIL+WATER) ELEV. (PSF) **PASSIVE** ACTIVE ACTIVE PASSIVE ACTIVE PASSIVE (FT) (PSF) (PSF) (PSF) (PSF) (PSF) (PSF) 10 0 0 0 0 0 9 62.5 0 0 62.5 62.5 0 8.5 93.8 0 0 93.8 93.8 0 **PASSIVE** Protected Side 8.5 93.8 0 0 93.8 730.1 0 636.4 **Ground Surface** 8.1 118.8 0 0 118.8 774.9 0 656.2 PSF LBS Elevation 62.99 8.1 118.8 636.4 0 -31.6 1260.9 0 656.2 636.4 623.4 0 0 661.1 623.4 604.62 8 125 -12.4 1272.1 7.1 181.3 720.2 0 -53 1372.9 0 705.7 720.2 72.56 7 187.5 731 0 1384.1 0 710.6 731 784.75 -57.5 838.5 398.35 6 838.5 0 -102.5 1496.1 0 760. 250 5.5 281.3 754.9 0 12.4 1415 0 647.8 754.9 356.15 1299.4 500.9 669.7 720.5 5 312.5 669.7 0 128.8 0 4 375 771.3 0 89.7 1320.1 0 459.1 771.3 822.05 3 437.5 0 50.7 0 475.5 872.8 923.6 872.8 1399 2 974.4 0 1489.7 0 503.7 974.4 1025.2 500 11.6 562.5 1076 0 -27.5 1579.7 0 531.2 1076 1126.5 1 0 625 1177 0 -66 1671.4 0 560.4 1177 1227.1 Entry failure at this -1 687.5 1277.2 0 -103.7 1763.6 0 590. 1277.2 1327.25 elevation per -2 750 1377.3 0 -141.3 1848.6 0 612.6 1377.3 0 SlopeW (see graph -2 750 1377.3 0 -627.3 1362.6 0 612.6 title above). -3 812.5 1190.2 0 -377.7 1443.4 0 630.9 Equivalent passive force calculated from pressures -4 875 1368.5 0 -493.5 1673.1 0 798. 881.3 1425.9 0 -544.6 1689.5 0 808.3 -4.1 1666.2 881.3 1433.5 0 -552.2 0 785

Note: Table from CWALSHT design mode output file

4th Degree Polynomial Trendline Coefficients CWALSHT PASSIVE FORCE= 9451.62 CWALSHT FS= 2.2 5626.7 -48723 156732 GEOSTUDIO PASSIVE FORCE= 10723.0 Note: Coefficients used for calculating FS from graph PASSIVE FORCE DIFFERENCE= -1271.4 SHEET PILE LENGTH= 10.1 UNIFORM PRESSURE= -126

Iteration = 2 Applied Uniform Pressure = 439 Pile Tip (EL) = -4.47 Cohesion = Unchanged Analysis Method = Sweep Search Method <---NET---> <---LEFTSIDE---> <--RIGHTSIDE---> NET WATER (SOIL+WATER) ELEV. (PSF) PASSIVE ACTIVE ACTIVE PASSIVE ACTIVE PASSIVE (FT) (PSF) (PSF) (PSF) (PSF) (PSF) (PSF) 10 0 9 62.5 0 0 62.5 62.5 0 0 0 8.5 93.8 93.8 93.8 0 Protected Side 8.5 93.8 0 0 93.8 665.2 0 571.4 PASSIVE **Ground Surface** 8.1 118.8 0 0 118.8 710 0 591.2 PSF LBS Elevation 8.1 118.8 571.4 0 -13.7 1149 0 591.2 571.4 56.615 548.37 8 125 560.9 0 3.1 1160.2 0 596.2 560.9 7.1 657.7 0 -37.4 0 640.7 657.7 66.31 181.3 1261 7 187.5 668.5 0 -42 1272.2 0 645.7 668.5 722.25 6 250 776 0 -87 1384.2 0 695.2 776 370.575 335.35 5.5 281.3 0 1317 0 596.7 706.3 706.3 13.9 5 312.5 635.1 0 116.4 1218.3 0 466.8 635.1 685.85 4 1246.6 0 432.6 736.6 787.4 375 736.6 0 77.4 3 437.5 838.2 0 38.3 1326.7 0 450.2 838.2 889 2 500 939.8 0 1416.8 0 477.8 939.8 990.55 -0.8 1 562.5 1041.3 0 -39.8 1506.1 0 504.6 1041.3 1091.55 0 625 1141.8 0 -77.8 1597.9 0 533.9 1141.8 1191.95 Entry failure at this -1 687.5 1242.1 0 -115.6 1688.2 0 561.7 1242.1 1292.35 elevation per -2 750 1342.6 0 -153.6 1766.6 0 577.6 1342.6 0 SlopeW (see graph -2 750 1342.6 0 -592.6 1327.6 0 577.6 title above). -3 812.5 1190.2 0 -377.7 1414.4 0 601.9 Equivalent passive force calculated from pressures -4 875 1307.8 0 -432.81634.1 0 759.1 -4.1 881.3 1363.3 0 -482.1 1650.2 0 768.9

1641.3

-466.7

Note: Table from CWALSHT design mode output file

1348

881.3

0	760							
		•		4th Degree Polynomial Trendline Coefficients				
	CWALS	SHT PASSIVE FORCE=	9028.12	а	b	С	d	е
		CWALSHT FS=	2.45	5626.7	-48723	156732	-235506	157247
	GEOSTU	DIO PASSIVE FORCE=	7244.6	Note: Coeffici	ents used for o	calculating FS	from graph	
F	PASSIVE	FORCE DIFFERENCE=	1783.5					
		SHEET PILE LENGTH=	10.1					
	Ų	JNIFORM PRESSURE=	177					

157247

Iteration = Applied Uniform Pressure = 408 Pile Tip (EL) = -4.46 Cohesion = Unchanged Analysis Method = Sweep Search Method 3 <---NET---> <---LEFTSIDE---> <--RIGHTSIDE---> NET WATER (SOIL+WATER) ELEV. (PSF) PASSIVE ACTIVE ACTIVE PASSIVE ACTIVE PASSIVE (FT) (PSF) (PSF) (PSF) (PSF) (PSF) (PSF) 10 0 9 62.5 0 0 62.5 62.5 0 8.5 93.8 0 0 93.8 93.8 0 8.5 93.8 0 0 93.8 622.1 0 528.3 PASSIVE Protected Side **Ground Surface** 118.8 0 0 118.8 666.9 0 548. PSF LBS 8.1 Elevation 8.1 118.8 528.3 0 -1.6 1074.9 0 548. 528.3 52.385 8 125 519.4 0 13.6 1086.1 0 553. 519.4 511.02 7.1 0 -26.9 0 597.6 616.2 62.155 181.3 616.2 1186.9 7 187.5 626.9 0 -31.4 1198.1 0 602.6 626.9 680.7 6 250 734.5 0 -76.5 1310.1 0 652. 734.5 352.125 321.525 5.5 281.3 674 0 1252.1 0 562.8 674 15.2 5 312.5 612.1 0 108.4 1164.7 0 444.2 612.1 662.9 1197.8 0 713.7 764.45 4 375 713.7 0 69.3 414.8 3 437.5 815.2 0 30.3 1278.9 0 433.4 815.2 866 2 0 0 460.8 916.8 967.35 500 916.8 -8.8 1368.8 562.5 1017.9 0 -47.4 1457.5 0 487 1017.9 1068.15 1 0 625 1118.4 0 -85.4 1548.4 0 515.4 1118.4 1168.7 Entry failure at this -1 687.5 1219 0 -123.5 1636.8 0 1219 1269.25 541.3 elevation per -2 750 1319.5 0 -161.5 1713 0 555 1319.5 0 SlopeW (see graph -2 750 0 -569.5 0 555 1319.5 1305 title above). -3 812.5 1190.2 0 -377.7 1396.6 0 584.1 Equivalent passive force calculated from pressures -4 875 1295.2 0 -420.2 1608.2 0 733.2 -4.1 881.3 1306.1 0 -424.9 1624.1 0 742.8

1624.7

-466.7

Note: Table from CWALSHT design mode output file

1348

881.3

4th Degree Polynomial Trendline Coefficients CWALSHT PASSIVE FORCE= 8746.71 CWALSHT FS= 2.65 5626.7 GEOSTUDIO PASSIVE FORCE= 4573.4 PASSIVE FORCE DIFFERENCE= 4173.3 SHEET PILE LENGTH= 10.1 UNIFORM PRESSURE= 413

743.4

0

-48723 156732 -235506 Note: Coefficients used for calculating FS from graph

<---NET--->

(SOIL+WATER)

ACTIVE PASSIVE

(PSF)

62.5

93.8

624.1

668.9

1078.9

1090.1

1190.9

1202.1

1314.1

1255.7

1167.8

1200.6

1281.7

1371.6

1460.3

1551.3

1639.8

1716.1

1306.1

1397.4

1609.4

1625.3

1625.4

(PSF)

62.5

93.8

93.8

-1.6

13.7

-26.9

-31.4

-76.4

15.7

70.3

31.2

-7.9

-46.5

-84.5

-424.9

-466.7

118.8

Iteration = 4 Applied Uniform Pressure = 410

WATER

(PSF)

62.5

93.8

93.8

118.8

118.8

181.3

125

NET

ELEV.

(FT)

10

8.5

8.5

8.1

8.1

8

7.1

-4.1

9

<---LEFTSIDE--->

0

0

0

0

530.3

521.3

618.1

ACTIVE

(PSF)

0

0

0

0

0

0

0

0

0

PASSIVE

(PSF)

Pile Tip (EL) = -4.5

(PSF)

<--RIGHTSIDE--->

ACTIVE PASSIVE

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

0

(PSF)

530.3

550.

550.

555.

599.6

604.6

654.

564.4

445.3

415.6

434.2

461.6

487.8

516.3

542.3

556.

556.

584.9

734.4

744.2

744

Cohesion = Unchanged

Analysis Method = Sweep Search Method

Protected Side **Ground Surface** Elevation

7 187.5 628.9 0 6 250 736.4 0 5.5 281.3 675.5 0 5 312.5 613.2 0 109.3 4 375 714.7 0 3 437.5 816.3 0 2 0 500 917.9 562.5 0 1 1019 0 625 1119.5 0 Entry failure at this -1 687.5 1220.1 0 -122.6 elevation per -2 750 1320.6 0 -160.6 SlopeW (see graph -2 750 0 -570.6 1320.6 title above). -3 812.5 1190.2 0 -377.7 -4 875 1295.2 0 -420.2

881.3

881.3

PASSIVE PSF LBS 530.3 52.58 521.3 512.73 618.1 62.35 628.9 682.65 736.4 352.975 322.175 675.5 613.2 663.95 714.7 765.5 816.3 867.1 917.9 968.45 1019 1069.25 1119.5 1169.8 1220.1 1270.35 1320.6 0

Equivalent passive force calculated from pressures

5626.7

Note: Table from CWALSHT design mode output file

1306.1

1348

CWALSHT PASSIVE FORCE= 8759.86 CWALSHT FS= 2.64 GEOSTUDIO PASSIVE FORCE= 4698.6 PASSIVE FORCE DIFFERENCE= 4061.3 SHEET PILE LENGTH= 10.1 UNIFORM PRESSURE= 402

Note: Coefficients used for calculating FS from graph

-48723

4th Degree Polynomial Trendline Coefficients

156732

-235506

157247

Iteration = 5

Applied Uniform Pressure = 409

Pile Tip (EL) = -4.42

Cohesion = Unchanged

Analysis Method = Sweep Search Method

Protected Side Ground Surface Elevation

Entry failure at this elevation per SlopeW (see graph

title above).

<---NET---> <---LEFTSIDE---> <--RIGHTSIDE---> NET WATER (SOIL+WATER) ELEV. (PSF) PASSIVE ACTIVE ACTIVE PASSIVE ACTIVE PASSIVE (FT) (PSF) (PSF) (PSF) (PSF) (PSF) (PSF) 10 9 62.5 0 0 62.5 62.5 0 0 0 8.5 93.8 93.8 93.8 0 8.5 93.8 0 0 93.8 624.1 0 530.3 8.1 118.8 0 0 118.8 668.9 0 550. 8.1 118.8 530.3 0 -2.6 1077.9 0 550. 1089.1 8 125 521.3 0 12.7 0 555. 7.1 0 -27.9 1189.9 0 599.6 181.3 618.1 7 187.5 628.9 0 -32.41201.1 0 604.6 6 250 736.4 0 -77.4 1313.1 0 654. 675.5 5.5 281.3 0 1254.7 0 564.4 14.7 5 312.5 613.2 0 108.3 1166.8 0 445.3 4 1199.6 0 415.6 375 714.7 0 69.3 3 437.5 816.3 0 30.2 1280.7 0 434.2 2 500 0 -8.9 1370.6 0 461.6 917.9 562.5 1019 0 -47.5 1459.3 0 487.8 1 0 625 1119.5 0 -85.5 1550.3 0 516.3 -1 687.5 1220.1 0 -123.6 1638.8 0 542.3 -2 750 1320.6 0 -161.6 1715.1 0 556. -2 750 0 -570.6 1306.1 0 556. 1320.6 -3 812.5 1190.2 0 -377.7 1397.4 0 584.9 -4 875 1295.2 0 -420.2 1609.4 0 734.4 -4.1 881.3 1306.1 0 -424.9 1625.3 0 744 1625.4 0 881.3 1348 -466.7 744.2 Note: Table from CWALSHT design mode output file

PASSIVE				
PSF	LBS			
530.3	52.58			
521.3	512.73			
618.1	62.35			
628.9	682.65			
736.4	352.975			
675.5	322.175			
613.2	663.95			
714.7	765.5			
816.3	867.1			
917.9	968.45			
1019	1069.25			
1119.5	1169.8			
1220.1	1270.35			
1320.6	0			

Equivalent passive force calculated from pressures

5626.7

CWALSHT PASSIVE FORCE= 8759.86

CWALSHT FS= 2.64

GEOSTUDIO PASSIVE FORCE= 4698.6

PASSIVE FORCE DIFFERENCE= 4061.3

SHEET PILE LENGTH= 10.1

UNIFORM PRESSURE= 402

Note: Coefficients used for calculating FS from graph

-48723

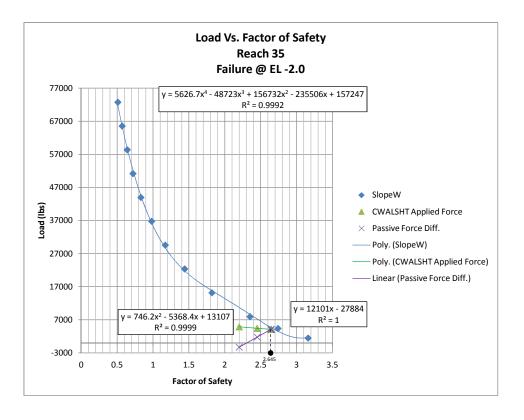
4th Degree Polynomial Trendline Coefficients

156732

-235506

157247

SOLUTION: FS = 2.65Note - see graph on next sheet.



Appendix F- Numerical Analyses (FLAC)					

APPENDIX F – FLAC Results 17th Street Outfall Canal Summary Soil Structure Interaction Analysis

General

Soil structure interaction (SSI) analyses were completed for the 17th Street Outfall Canal and are summarized in this appendix. Evaluations were competed using the FLAC (Fast Lagrangian Analysis of Continua) v 7.0 finite difference code (Itasca 2011). The analyses presented were performed to estimate the gap propagation behavior, wall displacements and factors of safety at specific locations along the outfall canal for varying canal water levels. FLAC models were prepared using an I-wall template created for the USACE by the Itasca Consulting Group, developers of the FLAC software. The use of the template allows the relatively quick creation of models by making several simplifying assumptions. These assumptions include:

Horizontal soil layers

- Pore-water pressures in granular layers based on a piezometric surface
- MC constitutive model (i.e. strength is stress dependent but modulus values are assigned as input parameters and are not recalculated based on changes in mean effective stress)
- Interface properties are uniform with the maximum shear strength based on a percentage of the maximum soil cohesion that the beam passes through in the model (i.e. 0.9 x levee cohesion)

To support these analyses an evaluation of the full scale London Avenue Canal Site Specific Load Test (LLT) was completed by New Orleans USACE and others to estimate the most likely values (MLV) for stress strain properties. The analyses and methodology of this test can be found and further explained within Appendix D FLAC Results London Avenue Outfall Canal Summary Soil Structure Interaction Analysis. The shear modulus to undrained shear strength ratios (G/Su) from the London Load Test analysis were then used to estimate stress strain properties for the 17th Street Outfall Canal's specific reaches. All elevations are presented in NAVD88 unless otherwise stated.

This appendix presents results from soil structure interaction (SSI) analyses performed for Reaches 10, 11, 14, 15A and 17. The locations, geometrics and foundation conditions for those reaches are described in the 17TH Street Outfall Canal Reevaluation Report part 1 of 2 September 2012 and URS JEG JV, Appendix C Final Geotechnical Engineering Report, Remediation to Raise the Maximum Operating Level for the 17th Street Canal OFC-05,October 2010.

All analyses presented in this appendix are based on the non-linear Mohr-Coulomb (MC) constitutive model. All analyses are considered complete SSI analyses in that intrinsic material

properties (soil and structure) are used to model the soil-structural response to applied load conditions without using predetermined forces.

Factor of safety (FoS) calculations were performed using the 'c- φ ' reduction technique built into FLAC. In these analyses the cohesion and friction strength properties are factored by a strength reduction-factor (SRF) until the model is essentially unstable. The SRF associated with the point of instability is called the FoS. The interface shear strength properties were correspondingly reduced by the same SRF applied to the strength properties in the FoS calculations.