# FINAL TRANSPORTATION REPORT FOR THE CONSTRUCTION OF THE 100-YEAR HURRICANE AND STORM DAMAGE RISK REDUCTION SYSTEM

US Army Corps of Engineers®

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# Summary

The "Final Transportation Report for the Construction of the 100-year Hurricane and Storm Damage Risk Reduction System" updates, describes and characterizes the environmental impacts of transporting the materials necessary to construct the 100-year Hurricane and Storm Damage Risk Reduction System (HSDRRS) for New Orleans metropolitan area in Louisiana. The analyses address the effects of using the public highways and waterways to supply earthen borrow, structural steel (e.g., sheet pile, pipe pile, H-pile), ready-mix concrete, concrete pile, aggregate, and rock to over 150 different construction projects for the Lake Pontchartrain and Vicinity and West Bank and Vicinity Projects. HSDRRS construction projects are scheduled for completion by 2017 at a total cost of over $14 billion. The database of projects used to analyze effects contains 150 projects that include material quantities shown below in table S-1.

**Table S-1. Major Materials Quantities**

| Material | Quantity | Units |
|---|---|---|
| Earthen Fill | 17,319,700 | cubic yards |
| Concrete | 1,559,500 | cubic yards |
| Aggregate | 2,979,300 | Tons |
| Sheet Pile | 11,479,800 | square feet |
| H-Pile | 10,368,800 | linear feet |
| Pipe Pile | 845,500 | linear feet |
| Concrete Pile | 1,592,200 | linear feet |
| Rock | 3,043,500 | Tons |

The United States Army Corps of Engineers (USACE) New Orleans District (CEMVN) has also prepared a Comprehensive Environmental Document (CED) to address the overall cumulative impacts of construction and future operations and maintenance for the HSDRRS. The transportation impacts analysis is more limited in scope, but supports the CED.

## Constructed Action

The majority of all truck trips necessary to construct the HSDRRS are for the transportation of borrow (earthen fill). There are two reasons why the majority of trips to deliver materials to build the system are from delivering earthen fill via truck: 1) earthen fill is the material type used most often in constructing levee systems and 2) this material cannot be economically transported by rail or barge. Borrow can only be transported by truck because the source sites lack the infrastructure to accommodate the use of rail or barge and significant costs accrue when borrow is handled multiple times (the loading and unloading of material). For this reason, multiple

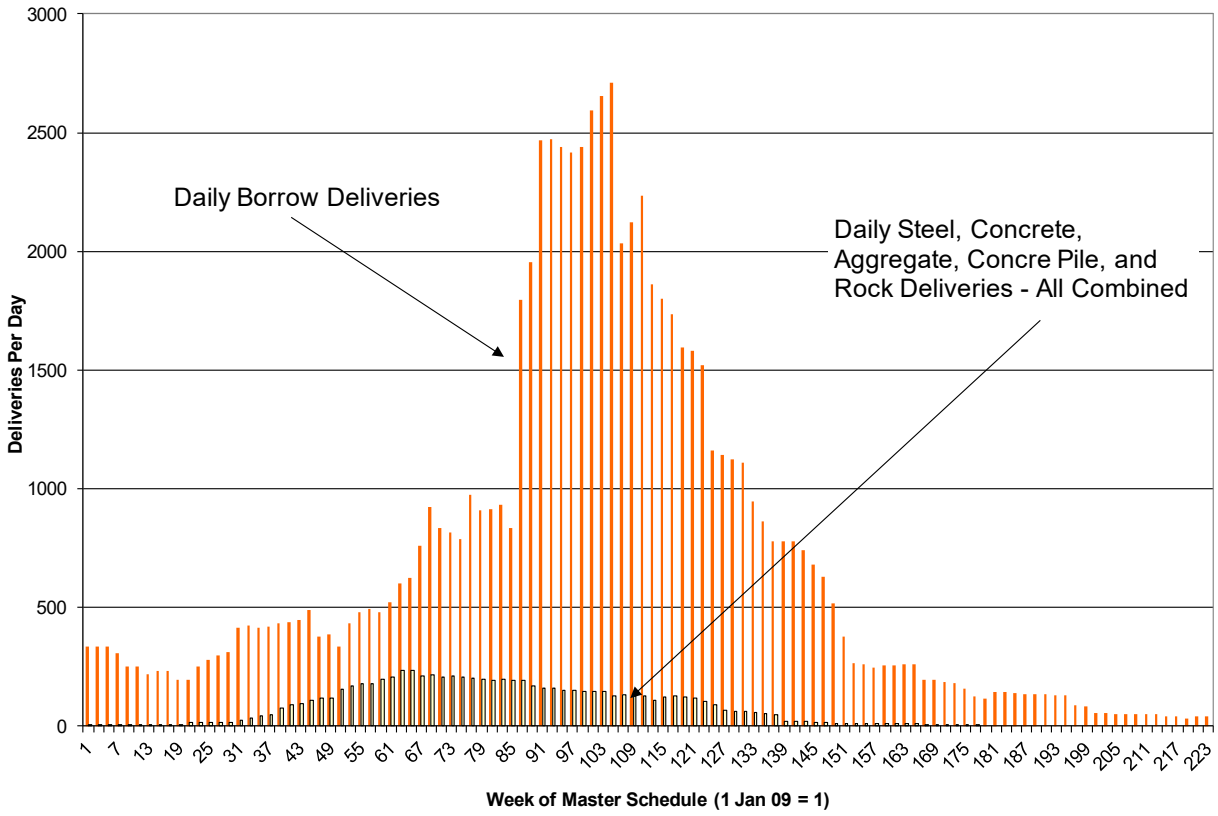
modes of transportation (e.g., truck to rail to truck and truck to barge to truck) of borrow were not used nor evaluated.

Figures S-1 shows truck deliveries per day for all project materials distributed across a master schedule,[1] beginning on 1 January 2007.[2] The figures consistently show daily borrow deliveries of:

- over 1,000 for 45 weeks;
- over 2,000 for 22 weeks;
- over 3,000 for 0 weeks; and
- over 4,000 for 0 weeks.

Most importantly, the vast majority of trips are made for the delivery of borrow, which is transported exclusively by truck.

**Figure S-1 Truck Trips Distributed Across Schedule Constructed Action**




[1]The master schedule was established based on database as of April 2015.
[2]The period of analysis includes roughly 450 weeks. Construction at a select few sites began as early as July 2007 and goes through May 2017. Figure S-1 represents deliveries per day beginning in February 2009 through April 2013, the most active construction period.

## Assessment

Transportation impacts were evaluated by attaching the number of truck trips per day, over the course of each project construction, to each road segment traversed, by the route carrying materials, from the material origin to the roadway exit point, and returning to the origin. For each road segment used in the constructed action, the number of trucks traversing each road segment during each week of the construction project was summed. This quantification provided the total number of trucks traversing any part of the transportation network at any time in the project schedule. This allows the estimation of the effects to traffic congestion, infrastructure degradation, accident risks, and diesel emissions.

## Findings

The environmental consequences for transportation were modeled using actual material quantities and calculated truck or barge trips based on standardized truck and barge loading factors, and transported along routes to construction projects. This analysis depicts the effects of all construction projects completed by year 2017 which are based in part on assumptions described in this report (particularly sections 1.4 and 1.5). Predicting traffic or road surface conditions on a particular segment of route, on a given day in the project schedule is not a realistic expectation from this analysis.

However, these limitations should not diminish the value of the analysis or the validity of the potential transportation impacts. The constructed action is evaluated to estimate the effects to traffic congestion, infrastructure degradation, accidents, and emissions. There are slight differences in some of the metrics (e.g., truckloads) because of different rounding assumptions as the data were manipulated; this does not diminish the value of the assessment.

### Mitigating Effects of Congestion

In response to the original 2009 Transportation Report findings the USACE contracted a Traffic Engineer and staff to manage the potential traffic impacts from construction of the HSDRRS project. The activities of the USACE Traffic Team centered on developing strategies of traffic management, law enforcement, and information coordination and exchange. The following paragraphs explain the tasks that were undertaken to address these activities.

The USACE Traffic Engineer held a Traffic Coordination meeting every three to four weeks with the Department of Transportation and Development (DOTD) traffic staff, local State Police commanders, and the Regional Planning Commission (RPC) staff to exchange project and traffic information. The meeting frequency allowed current traffic issues to be discussed, effectively providing 'live' management of traffic impacts. Typical meeting agendas included reports by the USACE about project schedules, truck delivery counts, route locations, type of materials being delivered, and general work progress. The DOTD traffic staff added information about their DOTD projects and associated traffic restrictions. State Police informed everyone of enforcement and safety related observations made while on patrol. RPC added coordination efforts with parishes, other planned projects, and information about air quality. Discussions at these meetings

provided a basis for traffic management and enforcement by the responsible parties. Timely information was exchanged by each of the attending parties.

To address *Congestion* the Traffic Engineer collected truck delivery information from a representative number of projects that was used to calculate the number of additional trucks being added to existing traffic volumes on area roadways. Information about volumes and locations was reported at the Traffic Coordination meetings, from which the responsible parties could perform traffic management and enforcement. Daily truck trips based on actual project information is shown in Figure S-1.

Success of mitigation strategies used to manage the traffic impacts was measured in a different manner. Based on information exchanged at traffic coordination meetings held between the USACE, DOTD, State Police, and RPC, frequent positive comments were made by all parties. State Police stated several times that the information made available to them about project progress and the associated trucking resulted in mostly uneventful operations. The police used the information to efficiently use their staff to provide proper enforcement. The DOTD also made frequent positive comments stating that the information helped them to better understand how HSDRRS projects affected the roadway system. There were many instances where project work touched public roadways in addition to the many trucks that used the roads to deliver materials. The DOTD was able to approach the interaction of projects with informed knowledge, helping them to make fast and correct decisions. RPC also was highly satisfied with the information being exchanged and was able to keep local parish officials briefed about the project. The USACE Traffic Team also received information that was relayed to USACE project managers. Based on the past experiences of all of the participating parties in dealing with traffic conditions, this project was judged successful because anticipated impacts were only marginally realized. Credit was given to the traffic management strategies that came from exchanging, discussing, and understanding project and truck traffic information.

## Congestion

The specific transportation routes developed were parsed into approximately 8,000 route segments. These route segments, along with schedules for delivery and the demand-driven truck trips, formed the basis for the calculation of incremental changes to the Regional Planning Commission's Congestion Management Index (CMI). These changes provide a relative assessment of the predicted changes in traffic. Over 3 million separate changes in the CMI were calculated for the transportation route segments, for DOTD classes of roads in greater New Orleans, for each of the 520 weeks of the project analysis period moving more than 1.3 million truckloads of borrow and concrete ready-mix.

Table S-2 presents the calculated change in the CMI for any of the 8,000 segments within four DOTD road classifications. These data indicate a discernable change in CMI for Class 1 roads (Interstate Highways) and a much smaller change in CMI for Class 3 (Principal Arterial) and Class 4 (Minor Arterial) roads. CMIs for Class 5 (Minor Urban Collector) through Class 7 (Local) roads was not available from the RPC as only larger capacity roads were studied in developing the indices.

The median with-project condition CMI is 2.75 for Interstate Highways and 2.77 for Class 2 roads (Expressways), both well under the score of 3.25 which is considered "congested". The

median CMI of 2.75 can be explained as half of the days during construction had CMIs above 2.75 for Interstate Highways and half of the days had lower CMIs. The maximum CMI for any class of road is 3.12, approaching the level that the RPC considers "congested". The maximum score reflects the worst case scenario of road congestion brought about by the HSDRRS construction or the day having the highest level of congestion.

**Table S-2. Constructed Action – Changes in CMI**

| | Minimum (4/7/2007) | | | Median (10/29/2014) | | | Maximum (3/8/2011) | | |
|---|---|---|---|---|---|---|---|---|---|
| DOTD Class | Existing | With Project | Change | Existing | With Project | Change | Existing | With Project | Change |
| 1 | 2.47 | 2.47 | 0.00 | 2.47 | 2.75 | 0.28 | 2.47 | 3.12 | 0.65 |
| 2 | 2.77 | 2.77 | 0.00 | 2.77 | 2.77 | 0.00 | 2.77 | 2.95 | 0.17 |
| 3 | 2.22 | 2.22 | 0.00 | 2.22 | 2.22 | 0.00 | 2.22 | 2.26 | 0.04 |
| 4 | 2.06 | 2.06 | 0.00 | 2.06 | 2.06 | 0.00 | 2.06 | 2.07 | 0.01 |

An additional method was used to increase the understanding and improve the communication of truck congestion resulting from materials delivery. This method was based on the need to identify individual, highly utilized roads for community-level planning and public awareness. A key component of the analysis was the establishment of truck traffic thresholds. The thresholds, shown in table S-3, were used as a proxy to suggest the level of truck traffic at which the roadway users and adjacent property owners would likely perceive an increase.

**Table S-3. Truck Frequency Thresholds by Functional Road Class**

| Functional Road Class | Materials Transportation Trucks Per 12-Hour Workday | Truck Frequency |
|---|---|---|
| 1 | 1,500 | 30 seconds |
| 2 | 1,500 | 30 seconds |
| 3 | 360 | 2 minutes |
| 4 | 240 | 3 minutes |
| 5 | 150 | 5 minutes |
| 6 | 50 | 15 minutes |
| 7 | 50 | 15 minutes |

Source: The Highway Capacity Manual[3] (HCM) is published by the National Science Foundation's Transportation Research Board (TRB).

[3] The Highway Capacity Manual is a publication of the Transportation Research Board and contains concepts, guidelines, and computational procedures for evaluating the capacity and quality of service of various highway facilities, including freeways, highways, arterial roads, roundabouts, signalized and unsignalized intersections, rural highways, and the effects of transit, pedestrians, and bicycles on the performance of these systems.

To better understand the overall effect on single roadways, multiple segments (of the 8,000 route segments) were dissolved into single road segments where both name and functional classification were shared. Segments from the modeled road network were examined to determine how many miles of road exceeded the functional-class specific thresholds that are presented in Table S-3. Table S-4 below summarizes the miles of road, by functional classification, that exceed the thresholds based on this model. For example, none of the functional class 1 or 2 roads exceed the truck frequency threshold of 1,500 trucks per 12-hour workday during the project schedule. However, 35.9 miles of class 3 roads and 69.4 miles of class 4 roads used in materials transportation exceed the threshold of 360 trucks/day and 240 trucks/day, respectively. Table S-4 summarizes the number of roads, by functional classification, that exceeded the thresholds.

**Table S-4. Miles of Roads Exceeding Truck Frequency Thresholds by Functional Class**

| DOTD Class | Street Network Miles | Street Network Miles Exceeded |
|---|---|---|
| 1 | 175.2 | 0 |
| 2 | 27.7 | 0 |
| 3 | 204.8 | 35.9 |
| 4 | 258.5 | 69.4 |
| 5 | 44.1 | 7.8 |
| 6 | 7.4 | 4.2 |
| 7 | 45.0 | 19.8 |

Figure S-5 shows the roads included in the routing of project materials. Figure S-6 shows the locations of roads that exceeded frequency thresholds. The results indicate the truck frequency exceedance was concentrated in a few specific locations such as roads in New Orleans East, the local roads near the Bonnet Carré Spillway, and U.S. 90 Highway on the Westbank of the Mississippi River.

**Figure S-5. Road Network Used for Project Materials Delivery**

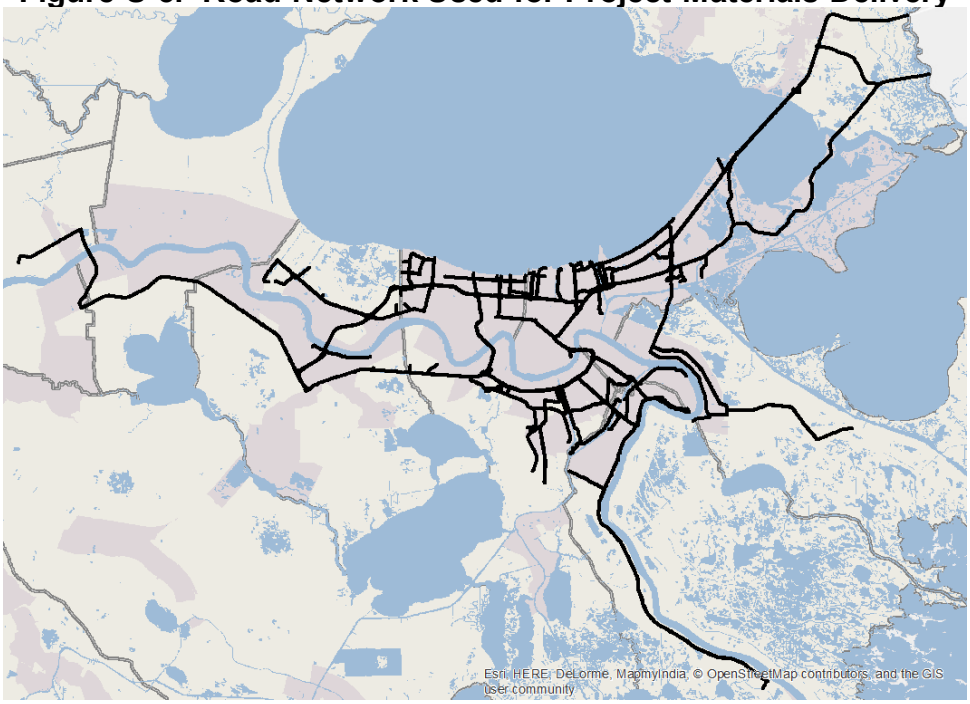
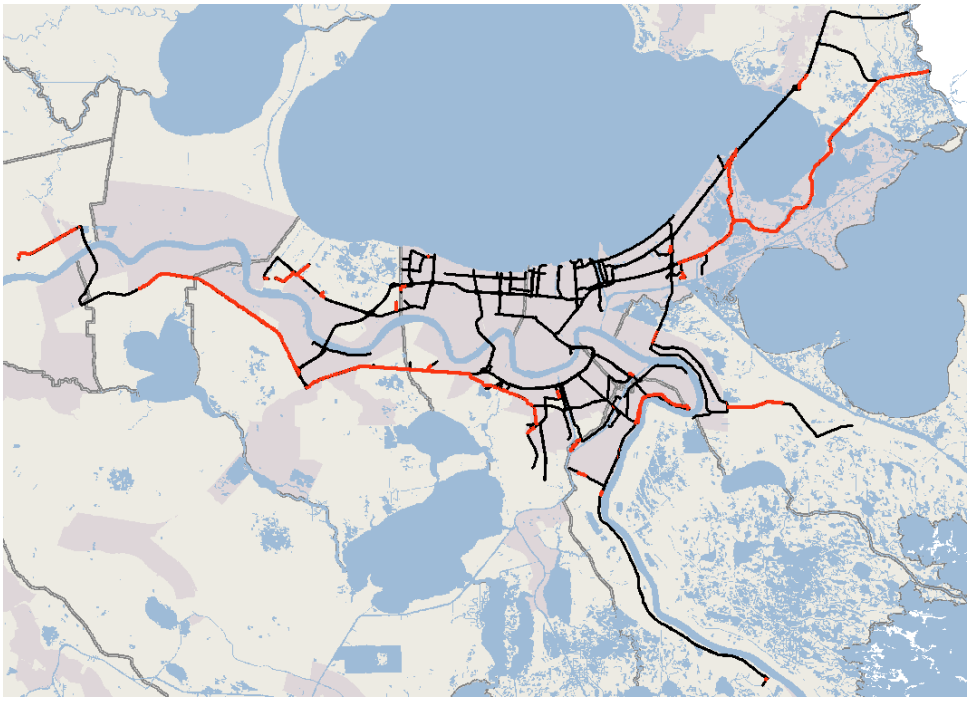


**Figure S-6. Roads (in Red) Exceeding Thresholds**



The following four tables (S-5 through S-9) identify the functional class-specific roads that exceed the truck frequency thresholds shown in table S-3. For the identified roads, the tables provide the number of days the threshold would be exceeded, the minimum number of trucks per day that triggered the first exceedance, the maximum number of trucks per day, and the average number of trucks per day. The roadways are sorted in descending order by the number of months the truck thresholds are exceeded. Roads listed in these tables are those predicted to be most affected by increases in truck traffic and the durations for which these effects are expected.

## Table S-5. DOTD Road Class 3
## Number of Days Threshold of 360 Material Delivery Trucks Per Day Exceeded

| Roadway | Number of Days Threshold Exceeded | Statistics for Days on Which Materials Delivery Truck Count Threshold is Exceeded | | |
|---|---|---|---|---|
| | | Minimum Trucks per Day | Average Trucks per Day | Maximum Trucks per Day |
| Highway 90 (St. Charles) | 368 | 361 | 552 | 1,257 |
| Highway 90 (Jefferson) | 285 | 361 | 495 | 765 |
| Paris Rd | 173 | 498 | 537 | 568 |
| Airline Hwy | 169 | 363 | 505 | 640 |
| Lapalco Blvd | 90 | 365 | 419 | 604 |

## Table S-6. DOTD Road Class 4
## Number of Days Threshold of 240 Material Delivery Trucks Per Day Exceeded

| Roadway | Number of Days Threshold Exceeded | Statistics for Days on Which Materials Delivery Truck Count Threshold is Exceeded | | |
|---|---|---|---|---|
| | | Minimum Trucks per Day | Average Trucks per Day | Maximum Trucks per Day |
| Highway 3127 | 613 | 241 | 404 | 938 |
| Chef Menteur Hwy | 422 | 247 | 417 | 982 |
| US Hwy 11 | 345 | 247 | 499 | 988 |
| Highway 90 (St. Tammany) | 265 | 562 | 568 | 743 |
| E LA 46 | 173 | 247 | 283 | 351 |
| Lake Forest Blvd | 173 | 494 | 495 | 495 |
| Highway 23 | 166 | 242 | 289 | 379 |

## Table S-7. DOTD Road Class 5
## Number of Days Threshold of 150 Material Delivery Trucks Per Day Exceeded

| | | Statistics for Days on Which Materials Delivery Truck Count Threshold is Exceeded | | |
|---|---|---|---|---|
| Roadway | Days Threshold is Exceeded | Minimum Trucks per Day | Average Trucks per Day | Maximum Trucks per Day |
| E Point Ct | 411 | 221 | 583 | 990 |
| Howze Rd | 297 | 162 | 208 | 276 |
| Barataria Blvd | 135 | 152 | 179 | 196 |
| Highway 3125 | 68 | 168 | 168 | 168 |

## Table S-8. DOTD Road Class 6
## Number of Days Threshold of 50 Material Delivery Trucks Per Day Exceeded

| | | Statistics for Days on Which Materials Delivery Truck Count Threshold is Exceeded | | |
|---|---|---|---|---|
| Roadway | Days Threshold is Exceeded | Minimum Trucks per Day | Average Trucks per Day | Maximum Trucks per Day |
| Veterans Memorial Blvd | 149 | 75 | 75 | 75 |
| Main St (Belle Chasse) | 125 | 54 | 67 | 101 |
| Ames Blvd | 88 | 94 | 94 | 94 |
| Avenue G | 69 | 66 | 76 | 79 |

**Table S-9. DOTD Road Class 7**
**Number of Days Threshold of 50 Material Delivery Trucks Per Day Exceeded**

| Roadway | Days Threshold is Exceeded | Statistics for Days on Which Materials Delivery Truck Count Threshold is Exceeded: Minimum Trucks per Day | Average Trucks per Day | Maximum Trucks per Day |
|---|---|---|---|---|
| Walker Rd | 839 | 52 | 107 | 162 |
| Belle Chasse Launch Rd | 630 | 72 | 72 | 72 |
| MacAuthur Ave | 630 | 72 | 78 | 78 |
| Concord Rd | 539 | 60 | 131 | 245 |
| Bayou Rd | 508 | 58 | 112 | 208 |
| Williams Blvd | 458 | 62 | 66 | 74 |
| West X St | 372 | 53 | 108 | 149 |
| James Dr West | 346 | 60 | 137 | 215 |
| Lacrosse Ln | 320 | 82 | 82 | 82 |
| Van Ness Dr | 254 | 66 | 220 | 584 |
| Jourdan Rd | 194 | 68 | 79 | 80 |
| Veterans Memorial Blvd | 149 | 75 | 75 | 75 |
| Belleview Blvd | 149 | 72 | 72 | 72 |
| Michoud Facility Rd | 137 | 69 | 86 | 140 |
| Saturn Blvd | 137 | 69 | 69 | 70 |
| Lower Guide Levee Rd | 133 | 142 | 148 | 148 |
| Duncan St | 129 | 92 | 92 | 94 |
| Frontage Rd | 90 | 142 | 142 | 142 |
| Woodland Dr | 90 | 142 | 142 | 142 |
| South Concord Rd | 80 | 80 | 114 | 146 |
| Main St | 69 | 66 | 66 | 67 |
| Patterson Rd | 69 | 66 | 66 | 66 |
| Hester | 68 | 168 | 168 | 168 |

## Infrastructure Degradation

The 2009 Transportation Report listed infrastructure degradation as a potential impact. The large number of heavy trucks added to the typical traffic volumes was thought to potentially cause noticeable damage to travelled streets. This concern was echoed by many of the parish officials.

The Traffic Team assembled visual records of roads being used by trucks delivering materials to project sites. Digital videos were recorded for truck route roads in both directions of travel. Single direction roads were noted when routes were only in one direction, when trucks were making a circuit route. More than 500 total miles of directional truck routes were recorded. To determine the actual routes used the Traffic Team began with roads identified in the 2009 Transportation Report. The report linked probable supply locations and project access points by estimating truck delivery trips using major traffic routes and local streets. Many of the predicted routes were used, but some were modified when the projects began. Actual truck routes were identified by the USACE Traffic Team from reports gathered from project engineers and by observations of the team. Additionally some routes were identified by using aerial photos that showed truck access points to project sites. By gathering information about location of borrow sites and the origin of other materials the Traffic Team was able to construct the actual routes from material origin points to projects.

The completed video records can be used for future reference to verify prior conditions of a road if damage is claimed by the owner. These records will not substantiate blame for damage but will show the prior condition, which could be of interest when establishing the level of damage that has occurred.

While recording the video files, the Traffic Team observed that conditions of roads being traveled by delivery trucks generally only show a small amount of degradation, limited to some isolated areas of damage to shoulders and minor rutting. More severe damage was found at White's Road in Mississippi. This is a local road that was used for access to a clay borrow source. The trucking contractor temporarily accepted maintenance responsibilities for this road. There are a few other local roads used for project access which contractors maintained. Because the large majority of roads used are major routes or previously approved truck routes that have adequate strength, degradation appeared to be isolated and minimal. As noted earlier, fewer roads were involved with the project than were predicted in the 2009 Transportation Report so fewer roads were impacted or damaged.

The relatively small number of barge trips would not be expected to have any discernable effects to the marine terminal infrastructure in greater New Orleans. Therefore, the discussion of the effects to infrastructure focused exclusively on the effects of truck transportation.

As show in table S-9, approximately 1,300 lane miles of roadway within greater New Orleans would be traversed with about 1.5 million truck trips; the cost to repair all of the infrastructure used is estimated at $650 million dollars. Principal and minor arterial roads, expressways and Interstate Highways make up over 90% of lane miles used to deliver the materials needed to construct the HSDDRS. These road classifications are also the most robust because they were designed to handle large numbers of trucks on a daily basis.

**Table S-9. Potential Infrastructure Degradation**

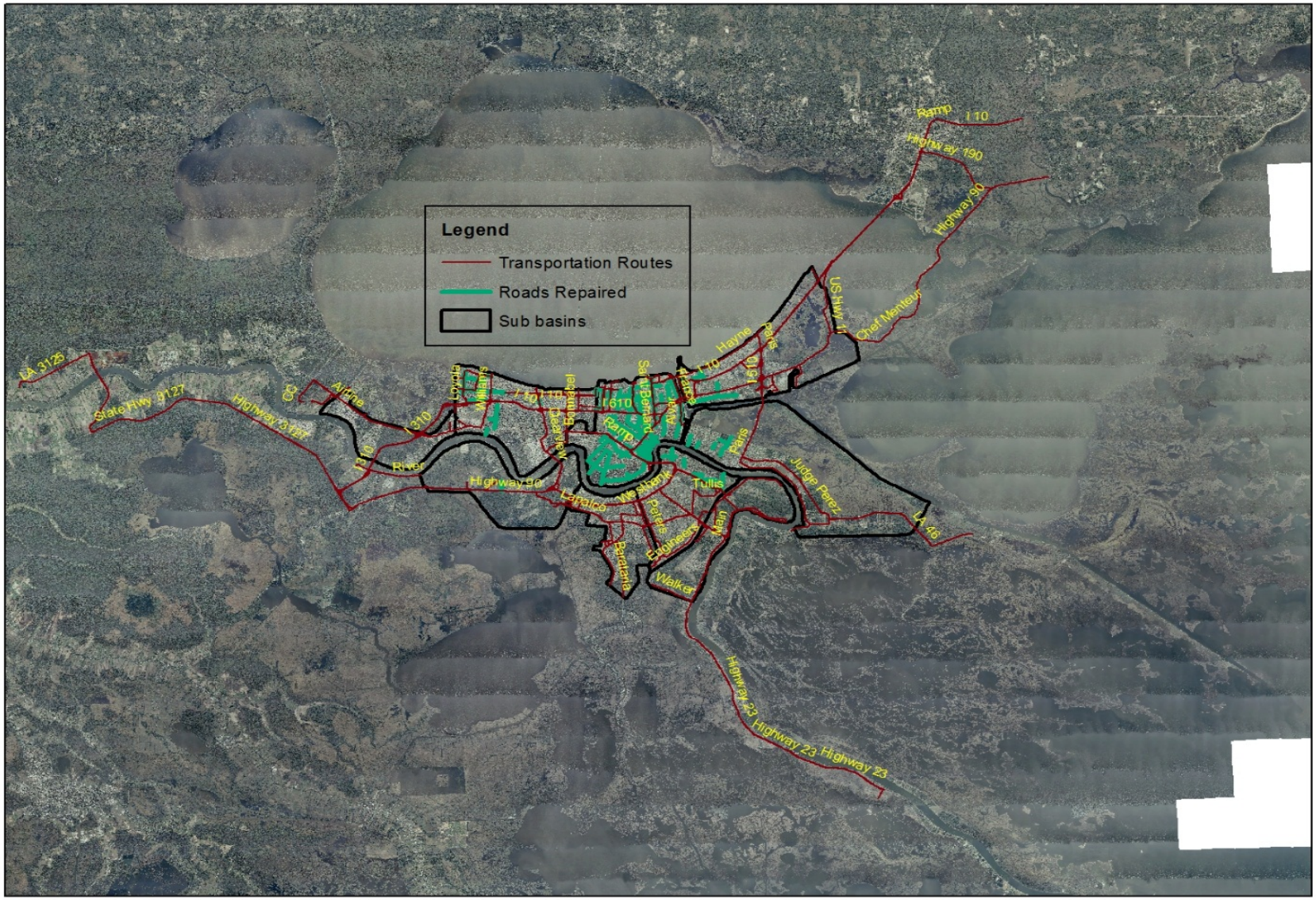
| LADOTD Road Classification | Class Description | Lane Miles |
|---|---|---|
| 1 | Interstate | 394.4 |
| 2 | Expressway | 82.2 |
| 3 | Principal Arterial | 412.1 |
| 4 | Minor Arterial | 313.8 |
| 5 | Major Urban Collector | 44.1 |
| 6 | Minor Urban Collector | 7.4 |
| 7 | Local Road | 45.3 |
| Estimated Total Lane Miles | | 1,299.3 |
| Estimated Total Truckloads (millions) | | 1.5 |
| Estimated Infrastructure Cost ($ millions)[4] | | 649.7 |

Figure S-10 shows HSDRRS network roads that were repaired under the Paths to Progress/Submerged Road Program (in red) and include roads connecting the I-10 to Lake Pontchartrain such as Elysian Fields, Canal Blvd., West End Blvd., and Downman Road.

Paths to Progress (P2P) is a multi-award winning transportation improvement program to rehabilitate, restore and enhance over 60 roadway segments in Orleans and Jefferson parishes. Many of the roadways repaired were damaged during hurricanes Katrina and Rita and were used as major haul routes for post-storm recovery operations. Paths to Progress is a coordinated effort between the Federal Highway Administration, Louisiana Department of Transportation and Development, New Orleans Regional Planning Commission, City of New Orleans, Parish of Jefferson and City of Kenner.

[4] Cost of approximately $500,000 per lane mile based on cost per lane mile from the Submerged Road Program (RPC, 2009a).

## Figure S-10. Network Roads Repaired through Submerged Road Program



## Transportation Risks

To address a potential increase of incidents the USACE Traffic Team worked with DOTD, State Police, and Parish officials to apply strategies that address safety. Using some of the same information collected to identify congestion, the Team presented information to the DOTD and State Police identifying roads where large truck volumes were present. The DOTD responded with implementation of roadway improvements that reduced the risk of traffic incidents. State Police responded by focusing efforts of truck inspections and traffic regulation enforcement in those areas. Information discussed at meetings was forwarded to Parish officials to make them aware of truck routes and schedules. Public Affairs personnel informed the public of truck operations and construction activities. Information was made available on the USACE's public website. These strategies are described in more detail in the following paragraphs.

To address potential safety risks, the USACE was requested by the DOTD to make minor roadway improvements to areas where trucks were making turns into project access points. These improvements were discussed and decided at review meetings between the USACE, the designer, and the road owner. Approval of project construction plans included agreement about specific roads that would be used to deliver materials to the project site. Project plans included the modifications that were agreed to in design development discussions. The USACE Traffic Engineer assisted the USACE Construction Division with review and suggested improvements that could help improve traffic safety. Improvements were minor lane and intersection revisions. When right-of-way was readily available, turn lanes, deceleration lanes and acceleration lanes were added where truck movements would be improved. Revisions to pavement markings and signs were also made at some locations. In most instances the USACE Construction Contractor performed the needed construction. Approval of the design and construction was given by the roadway owner, being either the DOTD or Parish. During construction, the Traffic Engineer monitored progress for work and discussed the improvements with the DOTD and State Police at USACE Traffic Coordination Meetings.

Enforcement of traffic laws and ordinances on public roads is the responsibility of state and local police. State Police commanders were included in discussions at the USACE Traffic Coordination meetings. At the meetings they gathered and discussed traffic operation information, and planned enforcement strategies. They commented several times with appreciation for being included in the discussions and gave much credit to the meeting discussions for the small number of traffic problems on area roads resulting from the HDSRRS project. The Coordination Meeting discussions helped police successfully enforce traffic ordinances and carry out vehicle inspections. These measures helped reduce the risk of incidents as evidenced by state police observations and verbal reports of only a small number of events.

In addition to initiatives by the USACE Traffic Team, USACE Public Affairs personnel promoted safety and awareness at over 180 public meeting presentations by explaining work schedules, truck routes, traffic restrictions, and project phasing. Attendees were made aware of HSDRRS project impacts. The USACE maintained a telephone hotline throughout the project where citizens could call to get information about construction questions. A public affairs specialist answered the calls and in most cases immediately gave information to the caller. When more information was needed

the questions were referred to the appropriate USACE representative to provide a more detailed explanation. An incident report was used to track completed follow-ups. Over the course of the HSDRRS project, over 100 calls were referred for a detailed explanation.

While the 2009 Transportation Report could only estimate the number of truck accidents, this Final Transportation Report has been updated with actual accident data to evaluate the potential impacts of HSDRRS material transportation. Table S-11 shows the LADTOD accident data for all five parishes included in the transportation network used for the analysis for the years 2005-2014 along with the total number of miles travelled to transport materials in each of those years. Notably, during 2010 and 2011, when transportation activity was at its peak, there were a similar number of accidents compared to prior and subsequent years.

**Table S-11. Industrial Truck Accidents**

| Year | Estimated Miles Traveled | Accidents | | |
|---|---|---|---|---|
| | | Property Damage Only | Injury Only | Fatality |
| 2005 | 0 | 435 | 114 | 4 |
| 2006 | 0 | 512 | 163 | 3 |
| 2007 | 401,625 | 480 | 133 | 7 |
| 2008 | 1,761,788 | 465 | 153 | 2 |
| 2009 | 3,601,864 | 387 | 101 | 1 |
| 2010 | 15,376,273 | 425 | 128 | 6 |
| 2011 | 18,617,374 | 532 | 137 | 5 |
| 2012 | 2,619,121 | 413 | 124 | 1 |
| 2013 | 926,114 | 376 | 111 | 4 |
| 2014 | 1,184,828 | 420 | 123 | 3 |

Source: LADOTD.
Note: Data is for Jefferson, St. Charles, St. James, St. Tammany, St. John the Baptist, St. Bernard, and Plaquemines Parishes.

## Emissions

Orleans, Jefferson, Plaquemines, and St. Charles parishes are in attainment for all NAAQS; St. Bernard Parish, is in attainment for all NAAQS except for sulfur dioxide (SO2). The New Orleans Ozone Maintenance Area, which includes all or part of Orleans, Jefferson, Plaquemines, St. Charles, and St. Bernard parishes, is a transportation maintenance area for O3, as previously mentioned (USEPA 2010b). Although transportation conformity regulations do apply for non-

attainment and maintenance areas, the nature of the HSDRRS project does not fall under a transportation conformity (USEPA 2010b). The HSDRRS project is a flood risk reduction project not a transportation project such as widening a two lane highway to four lanes with the intention of increasing the overall transportation capacity for the area. The HSDRRS project does not result in short-term or long-term transportation planning for the area. Vehicle emissions consist of construction/hauling vehicles traveling on established roadways and emissions from construction equipment. Therefore, the air emissions generated by the HSDRRS actions did not trigger a transportation conformity determination even if they exceed de minimis levels (100 tons per year).

Table S-12 does not segregate emissions by Parish nor does the table separate by the calendar year in which the emissions would occur. However, it does estimate what emissions would have been over 8 years of project construction, given factors developed in the MOBILE 6.2 model. MOBILE is an EPA emissions factor model for predicting grams per mile emissions of the priority pollutants and other toxics from on-road vehicles under various conditions. The emissions, shown in tons, represent truck and barge emissions resulting from delivery of materials needed to build the HSDDRS, over the last 8 years. They are not annual averages but are total emissions since construction beginning in July 2007.

**Table S-12. Diesel Emissions (tons)**

| Mode | Miles | Gallons of Diesel | VOCs | NOx | $CO_2$ | CO | $PM_{2.5}$ | $PM_{10}$ | $SO_2$ | $NH_3$ |
|---|---|---|---|---|---|---|---|---|---|---|
| Local Truck | 51,671,100.0 | 8,156,565.4 | 26.7 | 485.1 | 91,926.6 | 129.6 | 9.7 | 10.5 | 0.9 | 1.5 |
| Non-Local Truck | 19,349,900.0 | 3,050,537.3 | 10.0 | 180.7 | 34,378.8 | 48.2 | 3.6 | 3.9 | 0.3 | 0.6 |
| Tug / Barge | 947,700.0 | 8,429,062.5 | 196.8 | 5,194.2 | 263,646.6 | 432.9 | 94.9 | 103.2 | 512.3* | N/A |
| TOTALS | 71,968,700.0 | 22,315,460.0 | 233.4 | 5,860.1 | 389,952.0 | 610.7 | 108.3 | 117.7 | 513.5* | 2.0 |

*No separate emission factor used for SO2 for tug emissions. Reported as SOx.

Note: Table S-12 is updated from the 2009 report, which uses MOBILE 6.2 emission factors applied to miles traveled.

To evaluate emissions from increased truck traffic the Traffic Engineer obtained ambient air quality monitoring station records from the Louisiana Department of Environmental Quality's public website for the period June 2009 to January 2011. Data from two monitoring stations in the HSDRRS project area, one in Kenner, LA and one in City Park in Orleans Parish were observed. The stations record hourly levels of ozone, 10 micron particulates, and 2.5 micron particulates. Based on a review by the Traffic Engineer of the recorded data, there was no evident correlation between increased truck traffic and degraded air quality at the air quality monitoring locations. See the comparison of air quality measurements with corresponding truck volumes occurring at the same points in time in Figure S-13 and Figure S-14. If a correlation did result the air quality measurements would increase during the same time period as the truck volume increase. This is not the case. Many factors affect air quality, including air temperature, wind speed, wind

direction, and other weather conditions and they likely aided in keeping the air quality readings below levels of concern.

**FIGURE S-13:**
ACTUAL DAILY TRUCK VOLUMES TO EMISSIONS DATA: KENNER

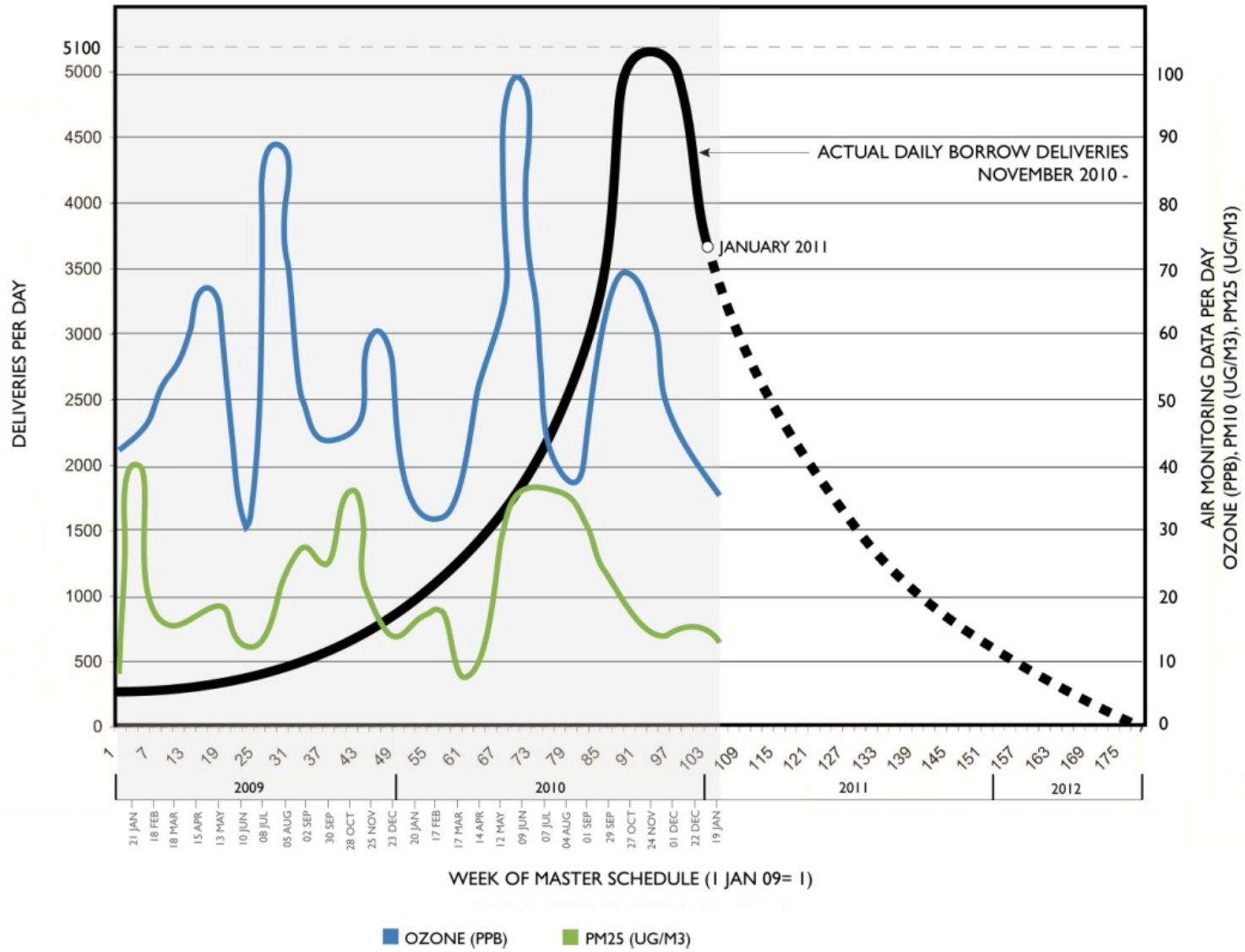
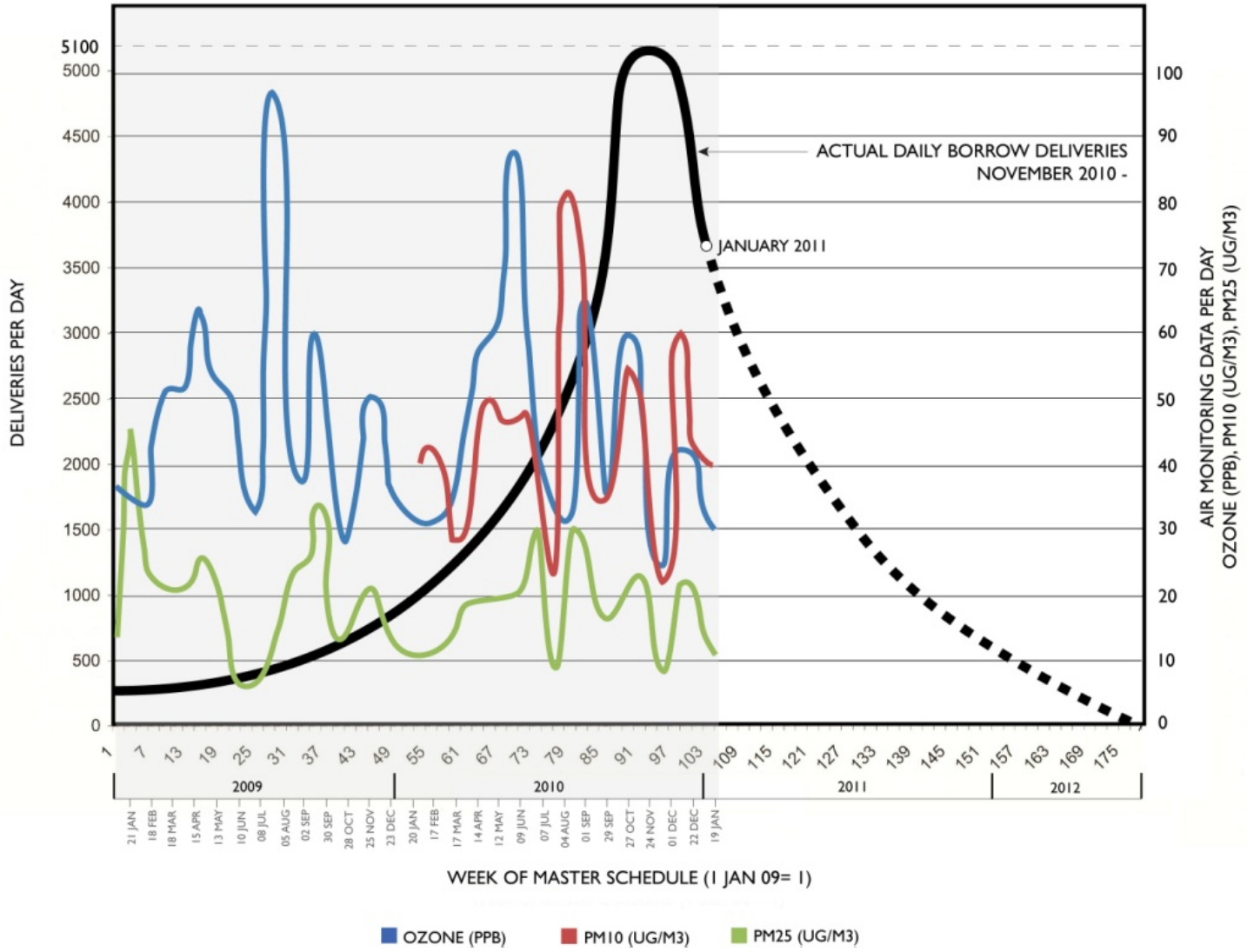


**FIGURE S-14:**
ACTUAL DAILY TRUCK VOLUMES TO EMISSIONS DATA: CITY PARK



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# 1 Introduction

This document describes and characterizes the environmental impacts of transporting the materials necessary to construct the 100-year Hurricane and Storm Damage Risk Reduction System (HSDRRS) for New Orleans, Louisiana and the surrounding area. The analyses address the effects of using the public highways and waterways to supply earthen borrow, structural steel (e.g., sheet pile, pipe pile, H-pile), ready-mix concrete, concrete pile, aggregate, and rock to 150 construction projects for the Lake Pontchartrain and Vicinity (LPV) and West Bank and Vicinity (WBV) Projects. The magnitude of the construction effort, in conjunction with the schedule for completion, necessitates the examination of the cumulative environmental consequences of transportation.

The construction-related negative effects resulting from providing the 100-year level of hurricane damage risk reduction for the remaining HSDRRS projects currently under construction will add to the cumulative environmental consequences in the New Orleans region through approximately 2017. In order to construct the HSDRRS, substantial quantities of building materials were brought to and transported within greater New Orleans. Quantifying the cumulative environmental effects from the transportation of these materials to, and within, the New Orleans area is the focus of this study.

An analysis of HSDRRS transportation effects was originally performed in 2009 prior to the completion of final design and construction, and was based on estimates of material quantities needed to construct the HSDRRS. The 2009 Transportation Report developed the estimates from design calculations, best professional judgment, and design reports completed for similar levee and floodwall alignments nearby. These estimates are provided in appendix F of the CED Phase I. The 2009 Transportation Report and analysis is incorporated herein by reference.

The HDRRS CED Phase II transportation analysis has been prepared using Narrative Completion Reports (NCR) for a majority of the levee contracts. The NCRs provide a detailed description of the actual quantities contractors used to construct the various segments of the system. In addition, the data gathering phase relied on pay estimate sheets and best professional judgment from construction engineers and project managers and used the engineering design reports for projects not yet finalized. The transportation analysis provides an approximation of how the materials were transported to the necessary construction projects. The transportation analysis presents impacts from 150 construction contract reaches. The main construction projects not included in this analysis are several of the Mississippi River Levee (MRL) engineered measures, Orleans Stormproofing, (OSP), Jefferson Parish Stormproofing (JSP) and armoring of project levees. These projects are not analyzed due to insufficient data available as these contracts were ongoing during the writing of the transportation analysis or the projects themselves had minor transportation impacts related to stormproofing and replacing pump station generators, levee armoring, windows and roofs, and raising structures.

## *1.1 Purpose and Need for Corps Action*

On 29 August 2005, Hurricane Katrina caused major damage to the Federal and non-Federal flood control and HSDRRS in southeast Louisiana. Hurricane Rita followed this storm on 24

September 2005, and made landfall on the Louisiana-Texas state border, causing damage to the HSDRRS in southern Louisiana. Since the storms, the USACE has been working with state and local officials to restore the Federal and non-Federal flood control structures and build the 100-yr HSDRRS in the affected area. To date, a vast majority of the HSDRR system is in place and operating as designed.

Approximately 85 percent of the New Orleans population has returned to the area. Many residences and businesses have seen positive improvements in the level of protection since returning to the area. The USACE goal of June 2011 was set and met for completion of much of the work that raised the level of protection in the New Orleans area to the new 100-yr standard and provide a level of security to residents and businesses that allowed and encouraged them to return to the area.

The purpose of the action is to construct and maintain 100-year risk reduction for greater New Orleans within the LPV and WBV Projects. The constructed action results from a defined need to reduce flood risk and storm damage to residences, businesses, and other infrastructure from hurricanes (100-year storm events) and other high water events. The completed HSDRRS lowers the risk of harm to citizens, and damage to infrastructure during a storm event. The safety of people in the region is the highest priority of the CEMVN.

The LPV Project (Individual Environmental Reports ((IER)s #1-11) extends approximately 125 miles in length from the La Branch Wetlands Levee in St. Charles Parish to the Mississippi River Levee Tie-in near Caernarvon at LPV 149in Orleans, St. Bernard and Plaquemines Parishes. The LPV Project provides risk reduction to the Mississippi River East Bank of New Orleans. The WBV project, (IERs #12-17) extends approximately 66 miles in length from the Western Tie-in (IER #16) in St. Charles and Jefferson Parishes to the Hero Canal Levee and Eastern Terminus in Plaquemines Parish (IER #13). IER #27 provides 100-year level of risk reduction for the 17th Street, Orleans Avenue, and London Avenue Canals by remediation of the floodwalls along these canals. Finally, IER #33 provides 100-year level of risk reduction along the West Bank and Vicinity - Mississippi River Levee, from the Eastern Tie-in of the WBV project with the MRL at Oakville in Plaquemines Parish to a point approximately 15.5 miles upriver southeast of the Algiers Lock in Orleans Parish.

## 1.2 Authority for the Projects

The authority for the constructed actions was provided as part of a number of hurricane protection projects spanning southeastern Louisiana, including the LPV Hurricane Protection Project and the WBV Hurricane Protection Project. Congress and the Administration granted a series of supplemental appropriations acts following Hurricanes Katrina and Rita to repair and upgrade the project systems damaged by the storms that gave additional authority to the USACE to construct 100-year HSDRRS projects.

The LPV project was authorized under the Flood Control Act of 1965 (P.L. [Public Law] 89-298, Title II, Sec. 204) which amended, authorized a "project for hurricane protection on Lake Pontchartrain, Louisiana...substantially in accordance with the recommendations of the Chief of Engineers in House Document 231, Eighty-ninth Congress." The original statutory authorization for the LPV Project was amended by the Water Resources Development Acts (WRDA) of 1974 (P.L. 93-251, Title I, Sec. 92) 1986 (P.L. 99-662, Title VIII, Sec. 805 1990 (P.L. 101-640, Sec. 116); 1992 (P.L. 102-580, Sec. 102), 1996 (P.L. 104-303, Sec. 325); 1999 (P.L. 106-53, Sec.

324); and 2000 (P.L. 106-541, Sec. 432); and Energy and Water Development Appropriations Acts of 1992 (PL 102-104, Title I, Construction, General); 1993 (PL 102-377, Title I, Construction, General); and 1994 (PL 103-126, Title I, Construction, General).

The WBV project was authorized under the WRDA, as cited previously. The Westwego to Harvey Canal Hurricane Protection Project was authorized by the WRDA of 1986. The WRDA of 1996 modified the project and added the Lake Cataouatche Project and the East of Harvey Canal Project. The WRDA 1999 (P.L. 106-53, Section 328) combined the three projects into one project under the current name.

The Department of Defense, Emergency Supplemental Appropriations to Address Hurricanes in the Gulf of Mexico, and Pandemic Influenza Act of 2006 (3rd Supplemental - P.L. 109-148, Chapter 3, Construction, and Flood Control and Coastal Emergencies) authorized accelerated completion of the project and restoration of project features to design elevations at 100 percent Federal cost. The Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery of 2006 (4th Supplemental - P.L. 109-234, Title II, Chapter 3, Construction, and Flood Control and Coastal Emergencies) authorizes construction of authorized a 100-year level of protection; the replacement or reinforcement of floodwalls; and the construction of levee armoring at critical locations. Additional Supplemental Appropriations include the U.S. Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Appropriations Act, 2007 H.R. 2206 (pg. 41-44) Title IV, Chapter 3, Flood Control and Coastal Emergencies, (5th Supplemental), General Provisions, Sec. 4302.

## 1.3 Requirement for Evaluation

The National Environmental Policy Act (NEPA) requires CEMVN to consider the environmental consequences of major Federal actions and to make informed decisions. One component of examining the consequences of decision-making is a consideration of the effects to the human environment from transportation of construction materials. When transportation is such a major component of an action, the environmental impacts of transporting materials should be analyzed.

The CEQ regulations require that in preparing an EIS, an agency consider three types of impacts on the environment: direct, indirect, and cumulative. Indirect impacts are defined as those "which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable" (40 CFR §1508.8). A cumulative impact is defined as an "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR §1508.7).

This study quantifies the effects from transporting large quantities of materials, over the same transportation routes, to and within greater New Orleans. These successive trips, through the same geographic areas, may result in cumulative effects on infrastructure, traffic congestion, air quality, and accident risks to the public.

Both NEPA and the CEQ regulations require that CEMVN consider and evaluate appropriate alternatives to proposed actions that will affect the environment. Section 102(2)(E) of NEPA provides that all agencies of the Federal shall "study, develop, and describe appropriate

alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." For an evaluation of other transportation alternatives such as transporting all the material via truck or by barge or rail if possible, see the CED Phase 1.

## *1.4 Cargo Capacity Assumptions*

The dimensions of units used to transport freight vary widely within each of the modes of transportation (truck and barge) evaluated in this report. In order to facilitate a meaningful cross-modal comparison, standard dimensions of the units used by each mode were defined. In comparing the modes, the capacity of the unit of transport were analyzed, not the average load. In this manner, all modes could be evaluated on the same scale.

### 1.4.1 Truck Transport

The typical bulk commodity truck's body type, axle configuration, fuel, gross, tare, and cargo weight used in this study were developed based on interviews with various trucking entities and comparison to similar studies (e.g., MARAD, 2007). The typical truck for this study is a Heavy Duty Diesel Vehicle with a GVWR of 80,000 lbs providing 40,000 lbs (20 tons) of cargo weight for the transport of steel and concrete pile, 22.5 tons for the transport of rock and aggregate, and 14.5 cubic yards of borrow. The typical axle configuration is that of a typical tractor-trailer truck (i.e., an 18-wheeler) with a steering axle and two tandem axles, or five total axles.

### 1.4.2 Barge Transport

The most common dimension of shallow draft barges carrying dry bulk are approximately 200 feet long by 35 feet wide. The average cargo capacity for barges of approximately this size is approximately 1,757 short tons (MARAD, 2007), rounded down to 1,200 tons for use in this study in most cases. For direct delivery of rock and concrete pile to Lake Pontchartrain project sites, barges were assumed to be light loaded at 500 tons. The analysis also assumes that barges would not be transported singly by a tug, but would be part of a barge fleet where 10 barges (2 x 5) were moved per tug.

### 1.4.3 Comparison of Mode Capacity

The standard capacities for the various freight units, across the two modes of transportation are summarized in table 1-1. Table 1-2 provides a comparison of the carrying capacity of each mode of transportation. Table 1-3 provides the standard cargo capacity comparison when considering a shipping unit of a barge tow that includes multiple barges within the shipping event.

**Table 1-1. Assumed Freight Unit Capacities**

| Freight Unit | Standard Cargo Capacity (Tons) |
|---|---|
| Highway – Truck Trailer | 20, 22.5, 14.5 CY |
| Riverine – Single Barge | 1,200 |

**Table 1-2. Number of Units Needed to Move 1,500 Tons of Material**

| Mode of Transport | Units Needed to Move 1,200 Tons of Material |
|---|---|
| Truck Trailer | 60 |
| Single Barge | 1 |

**Table 1-3. Standard Cargo Capacity Comparison**

| Mode of Transport | Configuration | Cargo Capacity (tons) |
|---|---|---|
| Truck Trailer | Single Tractor With Trailer | 20, 22.5 |
| Barge Tow | 10 Barge Tow (5 x 2) | 12,000 |

## *1.5 Materials Delivery Assumptions*

The primary objectives in the transportation and traffic impact analysis were to determine the logical path for delivering construction materials from the respective origins to the project sites (destinations) and assess the impact of this transportation. To assist in this analysis and assessment effort, the LaDOTD highway classification scheme and the Congestion Management Index data from the New Orleans Regional Planning Commission were mapped to the existing street data.

The determination of the logical path of travel required the identification of construction materials source locations (borrow pits, concrete plants, etc.) and locations where project vehicles would leave the roadway to gain access to the construction sites. GIS roadway routing software was used to determine the optimal route based on the assumption that truck drivers would maximize their use of highways over local streets. Borrow source locations and roadway exit point locations were explicitly paired to link origins and destinations. Round-trip route paths were modeled such that routes using divided highways and one-way streets used separate street segments for return paths. Multiple material source locations were modeled for all material types, thereby providing opportunities for truck or barge methods of bringing these materials into the greater New Orleans area.

These alternative source locations include New Orleans marine terminals and I-10, if transported by barge or truck, respectively. From the list of all possible routes, the optimal route is based on the assumption that truck drivers would maximize their use of highways over local streets then take the shortest route for material delivery. These most likely routes were matched to the materials used at each project to determine which routes would be presumed to transport

materials to each project. This process of matching routes to project materials requirements was performed for all projects and all major materials.

The transportation and traffic impact assessment was conducted by attaching the number of truck trips per day over the course of each project's construction timeframe, to each road segment traversed by the route carrying each type of material from the origin to the destination and returning to the origin. For each road segment used, the number of trucks traversing each road segment during each week of the construction project was aggregated. This quantification provided the total number of trucks traversing any part of the transportation network at any time in the project schedule.[5] These values represent the added traffic load anticipated as a result of project construction.

[5] Construction start date and duration were established based on CEMVN's milestone database as of April 1, 2015.

# 2 Projects and Quantities

Sections 2.1 through 2.19 provide quantity estimates for material needed to construct the projects evaluated in constructed actions of 19 IERs.

The database of projects used to analyze quantities, trips, and timing of trips contains 150 projects, which were analyzed in 19 IERs. In total, 150 projects used the following material quantities:

| Material | Quantity | Units |
|---|---|---|
| Earthen Fill | 17,319,700 | cubic yards |
| Concrete | 1,559,500 | cubic yards |
| Aggregate | 2,979,300 | tons |
| Sheet Pile | 11,479,800 | square feet |
| H-Pile | 10,368,800 | linear feet |
| Pipe Pile | 845,500 | linear feet |
| Concrete Pile | 1,592,200 | linear feet |
| Rock | 3,043,500 | tons |

For each IER, seven separate tables provide details about the materials used to construct the HSDRRS. The tables reflect quantities data collected from pay estimates, narrative completion reports, design documents, project management reports, borrow tracking reports, milestone reports, project management scheduling output, construction engineers and project managers, and best professional judgment.

The first table shown for each IER, Table 2.1a for example, shows the quantities of earthen fill, concrete, aggregate, sheet pile, H-pile, pipe pile, concrete pile, and rock for the entire IER. The tables that follow, Table 2.1b through Table 2.1g for example, provide the scheduled demand for each project's earthen fill, steel, concrete, aggregate, concrete pile, and rock. Information on duration (in calendar days) and Notice to Proceed (NTP) for each project is also included.

Tables "b" through "g" show demand separated into three equal time periods:

- first third;
- second third;
- and final third.

Separating a project demand schedule into thirds allows a more realistic depiction of the uneven demand for materials during construction. For example, during the first third of any earthen levee project, 10 percent of the earthen material required for construction is assumed to be delivered to the site. This assumption allows time for site preparation and earthwork prior to full-scale production of the earthen levee. Similar assumptions have been made for all other types of materials and projects.

The assumed proportions of materials required for construction during each project third is shown below.

| Material | First Third | Second Third | Final Third |
|---|---|---|---|
| Borrow | 10% | 70% | 20% |
| Steel | 100% | 0% | 0% |
| Concrete | 20% | 40% | 40% |
| Aggregate | 20% | 40% | 40% |
| Concrete Pile | 100% | 0% | 0% |
| Rock | 0% | 0% | 100% |

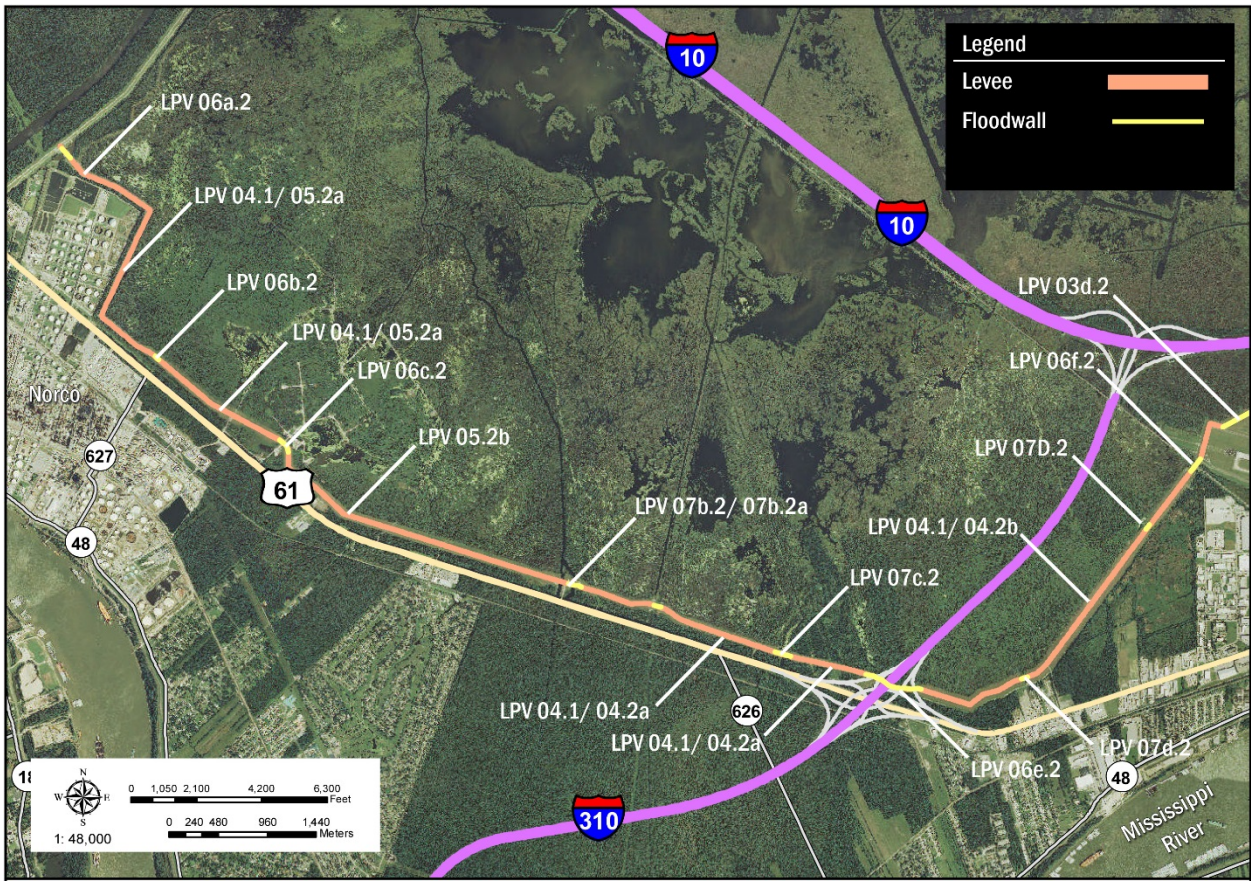
Note that the data shown for steel in the "c" tables, and concrete pile in the "f" tables do not match the data for quantities shown in the "a" tables. Steel is shown in the "a" tables in square feet for sheet pile, and linear feet for H-pile and pipe pile. Similarly, concrete pile is shown in the "a" tables in linear feet. This is because the quantities shown in the "a" tables are taken from pay estimates and narrative completion reports and provide a traceable link to the data sources. Tables "b" through "f" show materials after any necessary conversion to tons for truckloads.

## 2.1 IER #1 - La Branche Wetlands Levee, St. Charles Parish, Louisiana

The construction actions for IER #1, IERS #1, and IERS #1b include raising approximately nine miles of earthen levees, replacing over 3,000 feet of floodwalls, rebuilding or modifying four drainage structures, closing one drainage structure, and modifying one railroad gate in St. Charles Parish, Louisiana. Details of these actions are available in the Final IER and supplements at www.nolaenvironmental.gov. Individual contracts included in IER #1, IERS #1, and IERS #1b are listed below, and figure 2-1 provides an overview of the projects.

| | |
|---|---|
| LPV03d.2 | Airport Runway 10 Levee - Phase 2 |
| LPV04.1 | St. Charles Levee - Reach 1A, 1B & 2A - Phase 1 |
| LPV04.2A | Levee - Reach 1A - Phase 2 |
| LPV04.2B | Levee - Reach 1B - Phase 2 |
| LPV05.2A | Levee - Reach 2A - Phase 2 |
| LPV05.2B | Levee - Reach 2B - Phase 2 |
| LPV06a.2 | Bayou Trepagnier Complex Floodwall |
| LPV06b.2 | Shell Pipeline Floodwall - Phase 2 |
| LPV06c.2 | Good Hope Floodwall - Phase 2 |
| LPV06e.2 | Floodwall Under I-310 – Phase 2 |
| LPV06f.2 | Canadian National Railroad Gate |
| LPV07b.2 | Cross Bayou Drainage Structure Tie-ins – Phase 2 |
| LPV07b.2a | LPV07b.2a Cross Bayou Pile Load Test |
| LPV07c.2 | St. Rose Drainage Structure - Phase 2 |
| LPV07d.2 | Almedia / Walker Drainage Structure - Phase 2 |

**Figure 2-1. IER #1, IERS #1, and IERS #1.b Project Area**



## Table 2-1a. Materials Quantities for Construction Reaches in IER #1

| Reach | Earthen Fill CY | Concrete CY | Aggregate Tons | Sheet Pile SF | H-Pile VLF | Pipe Pile VLF | Concrete Pile VLF | Rock Tons |
|---|---|---|---|---|---|---|---|---|
| LPV03d.2 | 68,400 | 100 | 100 | 300 | - | - | - | - |
| LPV04.1 | 740,000 | - | - | - | - | - | - | - |
| LPV04.2A | 198,400 | 200 | 200 | 5,900 | 17,600 | - | - | 1,200 |
| LPV04.2B | 500,600 | 100 | 100 | - | - | - | - | 1,000 |
| LPV05.2A | 195,300 | - | - | - | - | - | 2,000 | - |
| LPV05.2B | 541,700 | 100 | 200 | - | - | - | - | - |
| LPV06a.2 | 7,700 | - | - | 12,100 | 21,100 | - | 200 | 1,200 |
| LPV06b.2 | 4,400 | 100 | 200 | 7,100 | 6,100 | - | - | - |
| LPV06c.2 | 7,000 | 100 | 200 | 10,000 | 11,700 | - | - | - |
| LPV06e.2 | 24,600 | 600 | 1,000 | 81,200 | 53,400 | - | - | 200 |
| LPV06f.2 | 7,100 | 100 | 100 | 1,500 | 11,100 | - | - | - |
| LPV07b.2 | 4,900 | 300 | 400 | 27,900 | 55,400 | - | - | 900 |
| LPV07b.2a | - | - | - | - | - | - | 1,900 | - |
| LPV07c.2 | 78,800 | 200 | 400 | 29,000 | 37,700 | - | - | LT50 |
| LPV07d.2 | 11,500 | 200 | 300 | 30,600 | 8,600 | - | - | - |

LT: "Less Than"

## Table 2-1b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #1

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV03d.2 | 440 | Oct-10 | 6,800 | 50 | 47,900 | 330 | 13,700 | 90 |
| LPV04.1 | 1,080 | Jul-07 | 74,000 | 210 | 518,000 | 1,440 | 148,000 | 410 |
| LPV04.2A | 760 | Oct-09 | 19,800 | 80 | 138,900 | 550 | 39,700 | 160 |
| LPV04.2B | 510 | Jan-10 | 50,100 | 290 | 350,400 | 2,060 | 100,100 | 590 |
| LPV05.2A | 340 | Jan-10 | 19,500 | 170 | 136,700 | 1,210 | 39,100 | 350 |
| LPV05.2B | 1,250 | Dec-09 | 54,200 | 130 | 379,200 | 910 | 108,300 | 260 |
| LPV06a.2 | 360 | Dec-09 | 800 | LT10 | 5,400 | 50 | 1,500 | 10 |
| LPV06b.2 | 150 | Dec-10 | 400 | LT10 | 3,000 | 60 | 900 | 20 |
| LPV06c.2 | 250 | Jan-10 | 700 | LT10 | 4,900 | 60 | 1,400 | 20 |
| LPV06e.2 | 330 | Apr-10 | 2,500 | 20 | 17,200 | 160 | 4,900 | 40 |
| LPV06f.2 | 400 | Jul-10 | 708 | LT10 | 5,000 | 40 | 1,400 | 10 |
| LPV07b.2 | 430 | Mar-10 | 485 | LT10 | 3,400 | 20 | 1,000 | LT10 |
| LPV07b.2a | 150 | Oct-09 | - | - | - | - | - | - |
| LPV07c.2 | 480 | Jan-10 | 7,876 | 49 | 55,100 | 340 | 15,800 | 100 |
| LPV07d.2 | 400 | Aug-09 | 1,150 | LT10 | 8,100 | 60 | 2,300 | 20 |

## Table 2-1c. Steel Demand (Tons) by Project Period in IER #1

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV03d.2 | 440 | Oct-10 | 10 | LT10 | - | - | - | - |
| LPV04.1 | 1,080 | Jul-07 | - | - | - | - | - | - |
| LPV04.2A | 760 | Oct-09 | 900 | LT10 | - | - | - | - |
| LPV04.2B | 510 | Jan-10 | - | - | - | - | - | - |
| LPV05.2A | 340 | Jan-10 | - | - | - | - | - | - |
| LPV05.2B | 1,250 | Dec-09 | - | - | - | - | - | - |
| LPV06a.2 | 360 | Dec-09 | 1,180 | LT10 | - | - | - | - |
| LPV06b.2 | 150 | Dec-10 | 410 | LT10 | - | - | - | - |
| LPV06c.2 | 250 | Jan-10 | 720 | LT10 | - | - | - | - |
| LPV06e.2 | 330 | Apr-10 | 4,000 | 40 | - | - | - | - |
| LPV06f.2 | 400 | Jul-10 | 520 | LT10 | - | - | - | - |
| LPV07b.2 | 430 | Mar-10 | 3,020 | 20 | - | - | - | - |
| LPV07b.2a | 150 | Oct-09 | - | - | - | - | - | - |
| LPV07c.2 | 480 | Jan-10 | 2,260 | 10 | - | - | - | - |
| LPV07d.2 | 400 | Aug-09 | 990 | LT10 | - | - | - | - |

## Table 2-1d. Concrete Demand (Cubic Yards) by Project Period in IER #1

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV03d.2 | 440 | Oct-10 | 20 | LT10 | 40 | LT10 | 40 | LT10 |
| LPV04.1 | 1,080 | Jul-07 | - | - | - | - | - | - |
| LPV04.2A | 760 | Oct-09 | 30 | LT10 | 70 | LT10 | 70 | LT10 |
| LPV04.2B | 510 | Jan-10 | 10 | LT10 | 20 | LT10 | 20 | LT10 |
| LPV05.2A | 340 | Jan-10 | - | - | - | - | - | - |
| LPV05.2B | 1,250 | Dec-09 | 30 | LT10 | 60 | LT10 | 60 | LT10 |
| LPV06a.2 | 360 | Dec-09 | - | - | - | - | - | - |
| LPV06b.2 | 150 | Dec-10 | 30 | LT10 | 60 | LT10 | 60 | LT10 |
| LPV06c.2 | 250 | Jan-10 | 20 | LT10 | 50 | LT10 | 50 | LT10 |
| LPV06e.2 | 330 | Apr-10 | 130 | LT10 | 260 | LT10 | 260 | LT10 |
| LPV06f.2 | 400 | Jul-10 | 10 | LT10 | 20 | LT10 | 20 | LT10 |
| LPV07b.2 | 430 | Mar-10 | 50 | LT10 | 100 | LT10 | 100 | LT10 |
| LPV07b.2a | 150 | Oct-09 | - | - | - | - | - | - |
| LPV07c.2 | 480 | Jan-10 | 50 | LT10 | 90 | LT10 | 90 | LT10 |
| LPV07d.2 | 400 | Aug-09 | 40 | LT10 | 90 | LT10 | 90 | LT10 |

## Table 2-1e. Aggregate Demand (Tons) by Project Period in IER #1

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV03d.2 | 440 | Oct-10 | 30 | LT10 | 60 | LT10 | 60 | LT10 |
| LPV04.1 | 1,080 | Jul-07 | - | - | - | - | - | - |
| LPV04.2A | 760 | Oct-09 | 50 | LT10 | 100 | LT10 | 100 | LT10 |
| LPV04.2B | 510 | Jan-10 | 20 | LT10 | 40 | LT10 | 40 | LT10 |
| LPV05.2A | 340 | Jan-10 | - | - | - | - | - | - |
| LPV05.2B | 1,250 | Dec-09 | 50 | LT10 | 90 | LT10 | 90 | LT10 |
| LPV06a.2 | 360 | Dec-09 | - | - | - | - | - | - |
| LPV06b.2 | 150 | Dec-10 | 40 | LT10 | 90 | LT10 | 90 | LT10 |
| LPV06c.2 | 250 | Jan-10 | 30 | LT10 | 70 | LT10 | 70 | LT10 |
| LPV06e.2 | 330 | Apr-10 | 190 | LT10 | 390 | LT10 | 390 | LT10 |
| LPV06f.2 | 400 | Jul-10 | 20 | LT10 | 30 | LT10 | 30 | LT10 |
| LPV07b.2 | 430 | Mar-10 | 80 | LT10 | 160 | LT10 | 160 | LT10 |
| LPV07b.2a | 150 | Oct-09 | - | - | - | - | - | - |
| LPV07c.2 | 480 | Jan-10 | 70 | LT10 | 140 | LT10 | 140 | LT10 |
| LPV07d.2 | 400 | Aug-09 | 60 | LT10 | 130 | LT10 | 130 | LT10 |

## Table 2-1f. Concrete Pile Demand (Tons) by Project Period in IER #1

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV03d.2 | 440 | Oct-10 | - | - | - | - | - | - |
| LPV04.1 | 1,080 | Jul-07 | - | - | - | - | - | - |
| LPV04.2A | 760 | Oct-09 | - | - | - | - | - | - |
| LPV04.2B | 510 | Jan-10 | - | - | - | - | - | - |
| LPV05.2A | 340 | Jan-10 | 530 | LT10 | - | - | - | - |
| LPV05.2B | 1,250 | Dec-09 | - | - | - | - | - | - |
| LPV06a.2 | 360 | Dec-09 | 40 | LT10 | - | - | - | - |
| LPV06b.2 | 150 | Dec-10 | - | - | - | - | - | - |
| LPV06c.2 | 250 | Jan-10 | - | - | - | - | - | - |
| LPV06e.2 | 330 | Apr-10 | - | - | - | - | - | - |
| LPV06f.2 | 400 | Jul-10 | - | - | - | - | - | - |
| LPV07b.2 | 430 | Mar-10 | - | - | - | - | - | - |
| LPV07b.2a | 150 | Oct-09 | 510 | 10 | - | - | - | - |
| LPV07c.2 | 480 | Jan-10 | - | - | - | - | - | - |
| LPV07d.2 | 400 | Aug-09 | - | - | - | - | - | - |

## Table 2-1g. Rock Demand (Tons) by Project Period in IER #1

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV03d.2 | 440 | Oct-10 | - | - | - | - | - | - |
| LPV04.1 | 1,080 | Jul-07 | - | - | - | - | - | - |
| LPV04.2A | 760 | Oct-09 | - | - | - | - | 1,240 | LT10 |
| LPV04.2B | 510 | Jan-10 | - | - | - | - | 970 | LT10 |
| LPV05.2A | 340 | Jan-10 | - | - | - | - | - | - |
| LPV05.2B | 1,250 | Dec-09 | - | - | - | - | - | - |
| LPV06a.2 | 360 | Dec-09 | - | - | - | - | 1,250 | 10 |
| LPV06b.2 | 150 | Dec-10 | - | - | - | - | - | - |
| LPV06c.2 | 250 | Jan-10 | - | - | - | - | - | - |
| LPV06e.2 | 330 | Apr-10 | - | - | - | - | 220 | LT10 |
| LPV06f.2 | 400 | Jul-10 | - | - | - | - | - | - |
| LPV07b.2 | 430 | Mar-10 | - | - | - | - | 930 | LT10 |
| LPV07b.2a | 150 | Oct-09 | - | - | - | - | - | - |
| LPV07c.2 | 480 | Jan-10 | - | - | - | - | 40 | LT10 |
| LPV07d.2 | 400 | Aug-09 | - | - | - | - | - | - |

## 2.2 IER #2 – West Return Floodwall, Jefferson-St. Charles Parish, Louisiana

The construction actions for IER #2, IERS #2, and IERS #2a is the replacement of approximately 3.4 miles of floodwalls: West Return Floodwall, Floodwall under I-10, and Recurve I-Wall in Northwest Kenner. Details of these actions are available in the Final IER and supplements at www.nolaenvironmental.gov.

Individual contracts included in IER #2, IERS #2, and IERS #2a are listed below, and figure 2-2 provides an overview of the projects.

| | |
|---|---|
| LPV03.2A | West Return Floodwall - Phase 2 |
| LPV03.2B | West Return Floodwall - Phase 2 |

**Figure 2-2. IER #2, IERS #2, and IERS #2.a Project Area**

## Table 2-2a. Materials Quantities for Construction Reaches in IER #2

| Reach | Earthen Fill CY | Concrete CY | Aggregate Tons | Sheet Pile SF | H-Pile VLF | Pipe Pile VLF | Concrete Pile VLF | Rock Tons |
|---|---|---|---|---|---|---|---|---|
| LPV03.2A | 67,100 | 12,100 | 18,300 | 102,500 | 93,800 | 6,800 | 1,100 | 8,700 |
| LPV03.2B | 41,000 | 49,600 | 75,000 | 445,500 | 572,100 | - | 5,600 | 43,200 |

## Table 2-2b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #2

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV03.2A | 610 | Sep-10 | 6,700 | 30 | 47,000 | 230 | 13,400 | 70 |
| LPV03.2B | 650 | Aug-10 | 4,100 | 20 | 28,700 | 130 | 8,200 | 40 |

## Table 2-2c. Steel Demand (Tons) by Project Period in IER #2

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV03.2A | 610 | Sep-10 | 6,650 | 30 | - | - | - | - |
| LPV03.2B | 650 | Aug-10 | 34,370 | 160 | - | - | - | - |

## Table 2-2d. Concrete Demand (Cubic Yards) by Project Period in IER #2

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV03.2A | 610 | Sep-10 | 2,420 | 10 | 4,830 | 20 | 4,830 | 20 |
| LPV03.2B | 650 | Aug-10 | 9,920 | 50 | 19,840 | 90 | 19,840 | 90 |

## Table 2-2e. Aggregate Demand (Tons) by Project Period in IER #2

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV03.2A | 610 | Sep-10 | 3,650 | 20 | 7,310 | 40 | 7,310 | 40 |
| LPV03.2B | 650 | Aug-10 | 15,000 | 70 | 30,000 | 140 | 30,000 | 140 |

## Table 2-2f. Concrete Pile Demand (Tons) by Project Period in IER #2

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV03.2A | 610 | Sep-10 | 300 | LT10 | - | - | - | - |
| LPV03.2B | 650 | Aug-10 | 1,500 | LT10 | - | - | - | - |

## Table 2-2g. Rock Demand (Tons) by Project Period in IER #2

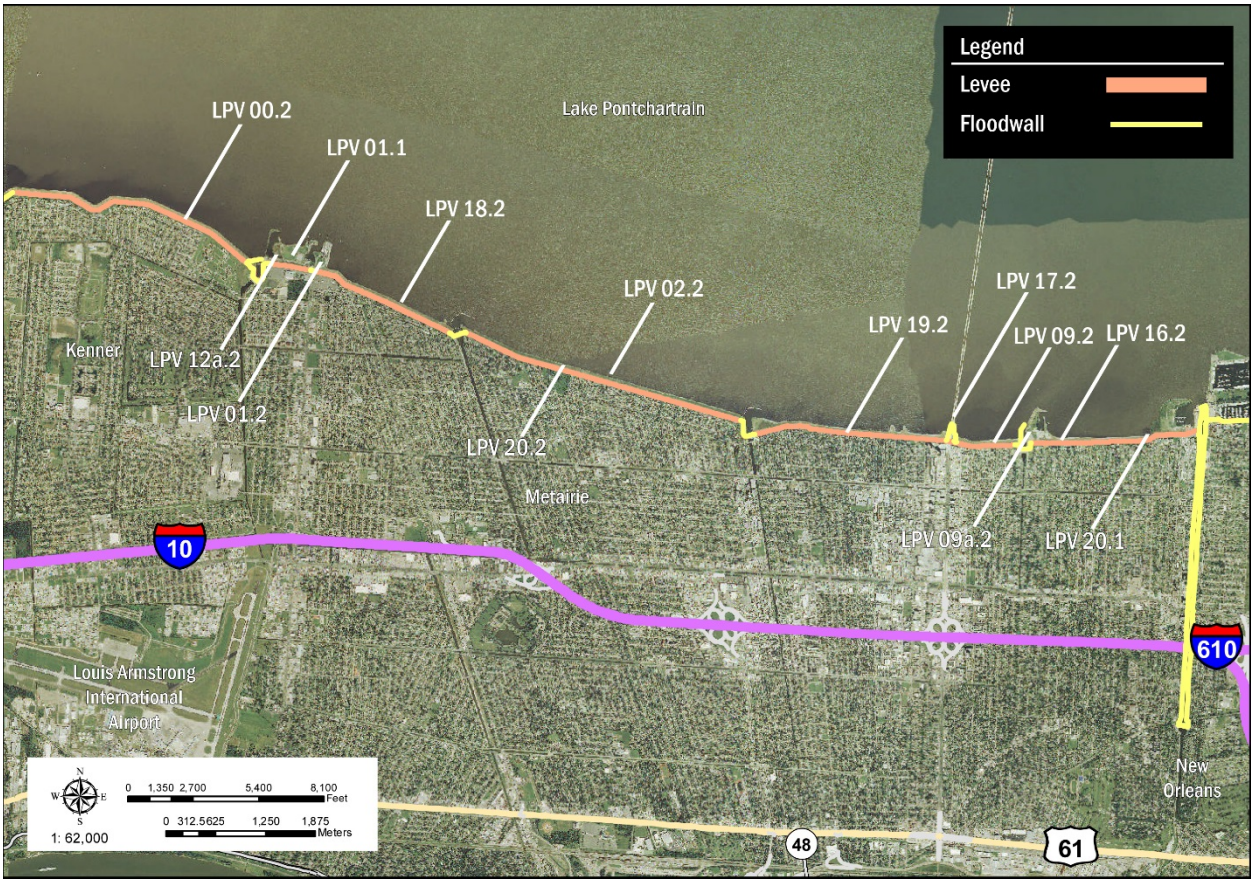
| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV03.2A | 610 | Sep-10 | - | - | - | - | 8,690 | 40 |
| LPV03.2B | 650 | Aug-10 | - | - | - | - | 43,200 | 200 |

## 2.3 IER #3 – Jefferson East Bank, Jefferson Parish Louisiana

The construction actions for IER #3 and IERS #3.a are 13 separate construction projects that collectively rebuild 9.5 miles of earthen levees along the Lake Pontchartrain waterfront, upgrade the foreshore protection, replace two floodgates, and construct fronting protection and breakwaters at four pumping stations. Details of these actions are available in the Final IER and supplement at www.nolaenvironmental.gov. Individual contracts included in IER #3 and IERS #3.a are listed below, and figure 2-3 provides an overview of the projects.

| | |
|---|---|
| LPV00.2 | Reach 1 Lakefront Levee - Phase 2 |
| LPV01.1 | Reach 1 3rd Lift Phase I |
| LPV01.2 | Foreshore Protection A - Phase 2 |
| LPV02.2 | Reach 3 - Lakefront Levee - Phase 2 |
| LPV09.2 | Pump Station #1 (Bonnabel) Modification, Fronting Protection - Phase 2 |
| LPV09a.2 | Pump Station #1 Breakwater - Phase 2 |
| LPV12a.2 | Pump Station #4 Breakwater - Phase 2 |
| LPV16.2 | Floodwall and Gate at Bonnabel Boat Launch - Phase 2 |
| LPV17.2 | Bridge Abutment and Floodwall Tie-ins at Causeway Bridge - Phase 2 |
| LPV18.2 | Floodwall and Gate at Williams Boat Launch - Phase 2 |
| LPV19.2 | Reach 4 Lakefront Levee - Phase 2 |
| LPV20.1 | Jefferson Parish Lakefront Levee Reach 5 |
| LPV20.2 | Foreshore Protection B |

## Figure 2-3. IER #3 and IERS #3.a Project Area




## Table 2-3a. Materials Quantities for Construction Reaches in IER #3

| Reach | Earthen Fill CY | Concrete CY | Aggregate Tons | Sheet Pile SF | H-Pile VLF | Pipe Pile VLF | Concrete Pile VLF | Rock Tons |
|---|---|---|---|---|---|---|---|---|
| LPV00.2 | 122,200 | - | - | - | - | - | - | 200 |
| LPV01.1 | 129,300 | - | - | - | - | - | - | 300 |
| LPV01.2 | 183,400 | - | - | - | - | - | - | 330,000 |
| LPV02.2 | 91,500 | - | - | - | - | - | - | 200 |
| LPV09.2 | 47,800 | 45,700 | 69,100 | 86,000 | 226,000 | 26,200 | 97,000 | 54,200 |
| LPV09a.2 | - | - | - | 17,000 | - | - | 19,700 | 13,200 |
| LPV12a.2 | - | LT50 | LT50 | 13,100 | - | 4,200 | 12,600 | 10,900 |
| LPV16.2 | 12,500 | 100 | 200 | 8,200 | - | - | 2,900 | - |
| LPV17.2 | 19,800 | 10,400 | 15,700 | 22,700 | - | 100 | 2,000 | 3,000 |
| LPV18.2 | 2,000 | LT50 | LT50 | 16,400 | - | - | 7,700 | - |
| LPV19.2 | 60,700 | - | - | - | - | - | - | 600 |
| LPV20.1 | 91,400 | - | - | - | - | - | 100 | 400 |
| LPV20.2 | 108,900 | - | - | - | - | - | - | 162,000 |

## Table 2-3b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #3

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV00.2 | 280 | Aug-09 | 12,200 | 130 | 85,500 | 920 | 24,400 | 260 |
| LPV01.1 | 260 | Jul-09 | 12,900 | 150 | 90,500 | 1,040 | 25,900 | 300 |
| LPV01.2 | 810 | Nov-10 | 18,300 | 70 | 128,400 | 480 | 36,700 | 140 |
| LPV02.2 | 410 | Jul-09 | 9,200 | 70 | 64,100 | 470 | 18,300 | 130 |
| LPV09.2 | 1,230 | May-10 | 4,800 | 10 | 33,500 | 80 | 9,600 | 20 |
| LPV09a.2 | 350 | May-09 | - | - | - | - | - | - |
| LPV12a.2 | 330 | Aug-09 | - | - | - | - | - | - |
| LPV16.2 | 270 | Jan-10 | 1,300 | 10 | 8,800 | 100 | 2,500 | 30 |
| LPV17.2 | 840 | Oct-10 | 2,000 | LT10 | 13,800 | 50 | 4,000 | 10 |
| LPV18.2 | 390 | Sep-09 | 200 | LT10 | 1,400 | 10 | 400 | LT10 |
| LPV19.2 | 350 | Sep-09 | 6,100 | 50 | 42,500 | 360 | 12,100 | 100 |
| LPV20.1 | 720 | Nov-08 | 9,100 | 40 | 64,000 | 270 | 18,300 | 80 |
| LPV20.2 | 830 | Aug-10 | 10,900 | 40 | 76,200 | 280 | 21,800 | 80 |

## Table 2-3c. Steel Demand (Tons) by Project Period in IER #3

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV00.2 | 280 | Aug-09 | - | - | - | - | - | - |
| LPV01.1 | 260 | Jul-09 | - | - | - | - | - | - |
| LPV01.2 | 810 | Nov-10 | - | - | - | - | - | - |
| LPV02.2 | 410 | Jul-09 | - | - | - | - | - | - |
| LPV09.2 | 1,230 | May-10 | 13,430 | 30 | - | - | - | - |
| LPV09a.2 | 350 | May-09 | 340 | LT10 | - | - | - | - |
| LPV12a.2 | 330 | Aug-09 | 530 | LT10 | - | - | - | - |
| LPV16.2 | 270 | Jan-10 | 160 | LT10 | - | - | - | - |
| LPV17.2 | 840 | Oct-10 | 460 | LT10 | - | - | - | - |
| LPV18.2 | 390 | Sep-09 | 330 | LT10 | - | - | - | - |
| LPV19.2 | 350 | Sep-09 | - | - | - | - | - | - |
| LPV20.1 | 720 | Nov-08 | - | - | - | - | - | - |
| LPV20.2 | 830 | Aug-10 | - | - | - | - | - | - |

## Table 2-3d. Concrete Demand (Cubic Yards) by Project Period in IER #3

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV00.2 | 280 | Aug-09 | - | - | - | - | - | - |
| LPV01.1 | 260 | Jul-09 | - | - | - | - | - | - |
| LPV01.2 | 810 | Nov-10 | - | - | - | - | - | - |
| LPV02.2 | 410 | Jul-09 | - | - | - | - | - | - |
| LPV09.2 | 1,230 | May-10 | 9,140 | 20 | 18,280 | 40 | 18,280 | 40 |
| LPV09a.2 | 350 | May-09 | - | - | - | - | - | - |
| LPV12a.2 | 330 | Aug-09 | LT10 | LT10 | LT10 | LT10 | LT10 | LT10 |
| LPV16.2 | 270 | Jan-10 | 20 | LT10 | 40 | LT10 | 40 | LT10 |
| LPV17.2 | 840 | Oct-10 | 2,080 | LT10 | 4,160 | 10 | 4,160 | 10 |
| LPV18.2 | 390 | Sep-09 | LT10 | LT10 | LT10 | LT10 | LT10 | LT10 |
| LPV19.2 | 350 | Sep-09 | - | - | - | - | - | - |
| LPV20.1 | 720 | Nov-08 | - | - | - | - | - | - |
| LPV20.2 | 830 | Aug-10 | - | - | - | - | - | - |

## Table 2-3e. Aggregate Demand (Tons) by Project Period in IER #3

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV00.2 | 280 | Aug-09 | - | - | - | - | - | - |
| LPV01.1 | 260 | Jul-09 | - | - | - | - | - | - |
| LPV01.2 | 810 | Nov-10 | - | - | - | - | - | - |
| LPV02.2 | 410 | Jul-09 | - | - | - | - | - | - |
| LPV09.2 | 1,230 | May-10 | 13,820 | 30 | 27,640 | 70 | 27,640 | 70 |
| LPV09a.2 | 350 | May-09 | - | - | - | - | - | - |
| LPV12a.2 | 330 | Aug-09 | LT10 | LT10 | LT10 | LT10 | LT10 | LT10 |
| LPV16.2 | 270 | Jan-10 | 30 | LT10 | 60 | LT10 | 60 | LT10 |
| LPV17.2 | 840 | Oct-10 | 3,140 | 10 | 6,290 | 20 | 6,290 | 20 |
| LPV18.2 | 390 | Sep-09 | LT10 | LT10 | LT10 | LT10 | LT10 | LT10 |
| LPV19.2 | 350 | Sep-09 | - | - | - | - | - | - |
| LPV20.1 | 720 | Nov-08 | - | - | - | - | - | - |
| LPV20.2 | 830 | Aug-10 | - | - | - | - | - | - |

## Table 2-3f. Concrete Pile Demand (Tons) by Project Period in IER #3

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV00.2 | 280 | Aug-09 | - | - | - | - | - | - |
| LPV01.1 | 260 | Jul-09 | - | - | - | - | - | - |
| LPV01.2 | 810 | Nov-10 | - | - | - | - | - | - |
| LPV02.2 | 410 | Jul-09 | - | - | - | - | - | - |
| LPV09.2 | 1,230 | May-10 | 25,900 | 60 | - | - | - | - |
| LPV09a.2 | 350 | May-09 | 5,260 | 50 | - | - | - | - |
| LPV12a.2 | 330 | Aug-09 | 3,360 | 30 | - | - | - | - |
| LPV16.2 | 270 | Jan-10 | 780 | LT10 | - | - | - | - |
| LPV17.2 | 840 | Oct-10 | 530 | LT10 | - | - | - | - |
| LPV18.2 | 390 | Sep-09 | 2,040 | 20 | - | - | - | - |
| LPV19.2 | 350 | Sep-09 | - | - | - | - | - | - |
| LPV20.1 | 720 | Nov-08 | 20 | LT10 | - | - | - | - |
| LPV20.2 | 830 | Aug-10 | - | - | - | - | - | - |

## Table 2-3g. Rock Demand (Tons) by Project Period in IER #3

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV00.2 | 280 | Aug-09 | - | - | - | - | 150 | LT10 |
| LPV01.1 | 260 | Jul-09 | - | - | - | - | 300 | LT10 |
| LPV01.2 | 810 | Nov-10 | - | - | - | - | 329,990 | 1,220 |
| LPV02.2 | 410 | Jul-09 | - | - | - | - | 230 | LT10 |
| LPV09.2 | 1,230 | May-10 | - | - | - | - | 54,150 | 130 |
| LPV09a.2 | 350 | May-09 | - | - | - | - | 13,190 | 110 |
| LPV12a.2 | 330 | Aug-09 | - | - | - | - | 10,850 | 100 |
| LPV16.2 | 270 | Jan-10 | - | - | - | - | - | - |
| LPV17.2 | 840 | Oct-10 | - | - | - | - | 3,000 | 10 |
| LPV18.2 | 390 | Sep-09 | - | - | - | - | - | - |
| LPV19.2 | 350 | Sep-09 | - | - | - | - | 600 | LT10 |
| LPV20.1 | 720 | Nov-08 | - | - | - | - | 390 | LT10 |
| LPV20.2 | 830 | Aug-10 | - | - | - | - | 162,000 | 590 |

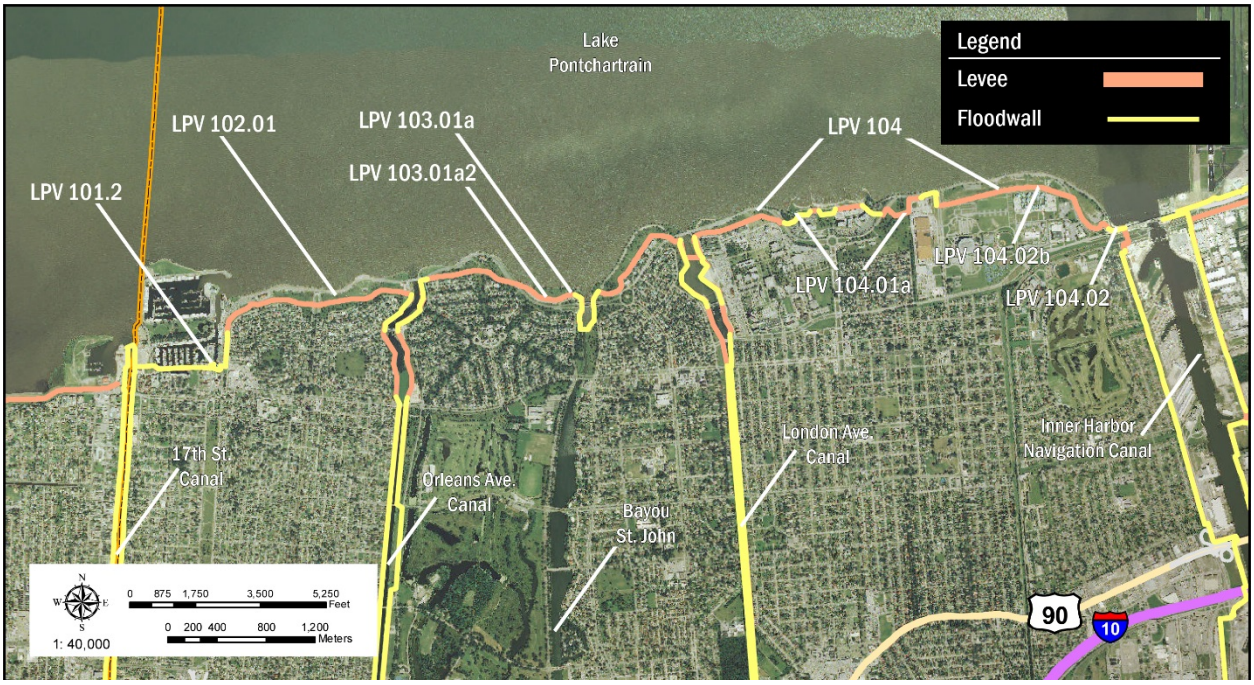
## 2.4 IER #4 – New Orleans Lakefront Levee, West of Inner Harbor Navigation Canal, Orleans Parish, Louisiana

The construction actions for IER #4 rebuild approximately 4.4 miles of earthen levee, 7,600 feet of floodwall, 16 vehicle access gates, and one sector gate along the Lake Pontchartrain waterfront in Orleans Parish. Details of these actions are available at www.nolaenvironmental.gov.

Individual contracts included in IER #4 are listed below, and figure 2-4 provides an overview of the projects.

| | |
|---|---|
| LPV101.02 | Lakefront Levee OEB -17th St. Canal to Topaz St.- Phase 2 |
| LPV102.01 | Lake Marina Ave to Orleans Canal |
| LPV103.01a | Lakefront Levee OEB -LPV 101-103.01A |
| LPV103.01a2 | Lakefront Levee OEB – Orleans Canal to London Ave |
| LPV104 | Lakefront Levee East Bank London Outfall Canal to Inner Harbor Navigation Canal |
| LPV104.01a | Lakefront Levee OEB- London Ave Canal to IHNC – Phase 1A |
| LPV104.02 | Lakefront Levee OEB –London Ave Canal to IHNC – Phase 2 |
| LPV104.02b | LPV 104.02b Orleans Metro Seepage Cutoff |

## Figure 2-4. IER # 4 Project Area




## Table 2-4a. Materials Quantities for Construction Reaches in IER #4

| Reach | Earthen Fill CY | Concrete CY | Aggregate Tons | Sheet Pile SF | H-Pile VLF | Pipe Pile VLF | Concrete Pile VLF | Rock Tons |
|---|---|---|---|---|---|---|---|---|
| LPV101.02 | - | 300 | 500 | 46,600 | 85,900 | - | 17,000 | - |
| LPV102.01 | 26,600 | - | - | - | - | - | - | - |
| LPV103.01a | 7,400 | - | - | - | - | - | - | - |
| LPV103.01a2 | - | 300 | 400 | 46,900 | 85,500 | - | 17,000 | - |
| LPV104 | 64,900 | - | - | - | - | - | - | - |
| LPV104.01a | 170,000 | 6,000 | 9,100 | 3,000 | 48,900 | - | - | - |
| LPV104.02 | 14,800 | 1,900 | 2,900 | 17,700 | 22,400 | - | - | 500 |
| LPV104.02b | 10,300 | - | - | 68,600 | - | - | - | - |

## Table 2-4b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #4

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV101.02 | 720 | Aug-09 | - | - | - | - | - | - |
| LPV102.01 | 200 | Oct-07 | 2,700 | 40 | 18,600 | 280 | 5,300 | 80 |
| LPV103.01a | 470 | Aug-09 | 700 | LT10 | 5,200 | 30 | 1,500 | LT10 |
| LPV103.01a2 | 300 | Jul-10 | - | - | - | - | - | - |
| LPV104 | 270 | Jul-07 | 6,500 | 70 | 45,400 | 500 | 13,000 | 140 |
| LPV104.01a | 380 | Nov-09 | 17,000 | 130 | 119,000 | 940 | 34,000 | 270 |
| LPV104.02 | 440 | Feb-10 | 1,500 | 10 | 10,400 | 70 | 3,000 | 20 |
| LPV104.02b | 120 | Feb-13 | 1,000 | 30 | 7,200 | 180 | 2,100 | 50 |

## Table 2-4c. Steel Demand (Tons) by Project Period in IER #4

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV101.02 | 720 | Aug-09 | 4,760 | 20 | - | - | - | - |
| LPV102.01 | 200 | Oct-07 | - | - | - | - | - | - |
| LPV103.01a | 470 | Aug-09 | - | - | - | - | - | - |
| LPV103.01a2 | 300 | Jul-10 | 4,740 | 50 | - | - | - | - |
| LPV104 | 270 | Jul-07 | - | - | - | - | - | - |
| LPV104.01a | 380 | Nov-09 | 2,240 | 20 | - | - | - | - |
| LPV104.02 | 440 | Feb-10 | 1,350 | LT10 | - | - | - | - |
| LPV104.02b | 120 | Feb-13 | 1,370 | 30 | - | - | - | - |

## Table 2-4d. Concrete Demand (Cubic Yards) by Project Period in IER #4

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV101.02 | 720 | Aug-09 | 60 | LT10 | 130 | LT10 | 130 | LT10 |
| LPV102.01 | 200 | Oct-07 | - | - | - | - | - | - |
| LPV103.01a | 470 | Aug-09 | - | - | - | - | - | - |
| LPV103.01a2 | 300 | Jul-10 | 60 | LT10 | 120 | LT10 | 120 | LT10 |
| LPV104 | 270 | Jul-07 | - | - | - | - | - | - |
| LPV104.01a | 380 | Nov-09 | 1,200 | LT10 | 2,400 | 20 | 2,400 | 20 |
| LPV104.02 | 440 | Feb-10 | 380 | LT10 | 760 | LT10 | 760 | LT10 |
| LPV104.02b | 120 | Feb-13 | - | - | - | - | - | - |

## Table 2-4e. Aggregate Demand (Tons) by Project Period in IER #4

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV101.02 | 720 | Aug-09 | 100 | LT10 | 190 | LT10 | 190 | LT10 |
| LPV102.01 | 200 | Oct-07 | - | - | - | - | - | - |
| LPV103.01a | 470 | Aug-09 | - | - | - | - | - | - |
| LPV103.01a2 | 300 | Jul-10 | 90 | LT10 | 170 | LT10 | 170 | LT10 |
| LPV104 | 270 | Jul-07 | - | - | - | - | - | - |
| LPV104.01a | 380 | Nov-09 | 1,810 | 10 | 3,630 | 30 | 3,630 | 30 |
| LPV104.02 | 440 | Feb-10 | 570 | LT10 | 1,150 | LT10 | 1,150 | LT10 |
| LPV104.02b | 120 | Feb-13 | - | - | - | - | - | - |

## Table 2-4f. Concrete Pile Demand (Tons) by Project Period in IER #4

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV101.02 | 720 | Aug-09 | 4,530 | 20 | - | - | - | - |
| LPV102.01 | 200 | Oct-07 | - | - | - | - | - | - |
| LPV103.01a | 470 | Aug-09 | - | - | - | - | - | - |
| LPV103.01a2 | 300 | Jul-10 | 4,530 | 50 | - | - | - | - |
| LPV104 | 270 | Jul-07 | - | - | - | - | - | - |
| LPV104.01a | 380 | Nov-09 | - | - | - | - | - | - |
| LPV104.02 | 440 | Feb-10 | - | - | - | - | - | - |
| LPV104.02b | 120 | Feb-13 | - | - | - | - | - | - |

## Table 2-4g. Rock Demand (Tons) by Project Period in IER #4

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV101.02 | 720 | Aug-09 | - | - | - | - | - | - |
| LPV102.01 | 200 | Oct-07 | - | - | - | - | - | - |
| LPV103.01a | 470 | Aug-09 | - | - | - | - | - | - |
| LPV103.01a2 | 300 | Jul-10 | - | - | - | - | - | - |
| LPV104 | 270 | Jul-07 | - | - | - | - | - | - |
| LPV104.01a | 380 | Nov-09 | - | - | - | - | - | - |
| LPV104.02 | 440 | Feb-10 | - | - | - | - | 460 | LT10 |
| LPV104.02b | 120 | Feb-13 | - | - | - | - | - | - |

## 2.5 IER #5 – Outfall Canal Closure Structures, 17th Street Canal, Orleans Avenue Canal, and London Avenue Canal, Orleans and Jefferson Parishes, Louisiana

The construction actions for IER #5 and IERS #5.a provide new closure structures and pumping stations for each of three canals (17th Street Canal, Orleans Avenue Canal, and London Avenue Canal) all under a single construction project, PCCP-01. Details of these actions in the Final IER and supplement are available at www.nolaenvironmental.gov.

Individual contracts included in IER #5 and IERS #5.a are listed below, and figure 2-5 provides an overview of the projects.

PCCP-01 PCCP -Pump Stations for Outfall Canal Closures

**Figure 2-5. IER #5 and IERS #5.a Project Area**

**Table 2-5a. Materials Quantities for Construction Reach in IER #5**

| Reach | Earthen Fill CY | Concrete CY | Aggregate Tons | Sheet Pile SF | H-Pile VLF | Pipe Pile VLF | Concrete Pile VLF | Rock Tons |
|---|---|---|---|---|---|---|---|---|
| PCCP-01 | 256,000 | 110,000 | 166,300 | 950,000 | 126,000 | 138,100 | - | 82,000 |

### Table 2-5b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #5

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| PCCP-01 | 1,390 | May-13 | 25,600 | 60 | 179,200 | 390 | 51,200 | 110 |

### Table 2-5c. Steel Demand (Tons) by Project Period in IER #5

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| PCCP-01 | 1,390 | May-13 | 33,310 | 70 | - | - | - | - |

### Table 2-5d. Concrete Demand (Cubic Yards) by Project Period in IER #5

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| PCCP-01 | 1,390 | May-13 | 22,000 | 50 | 44,000 | 90 | 44,000 | 90 |

### Table 2-5e. Aggregate Demand (Tons) by Project Period in IER #5

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| PCCP-01 | 1,390 | May-13 | 33,260 | 70 | 66,530 | 140 | 66,530 | 140 |

This project did not require concrete pile for construction. Table 2-5f has been omitted.

### Table 2-5g. Rock Demand (Tons) by Project Period in IER #5

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| PCCP-01 | 1,390 | May-13 | - | - | - | - | 82,000 | 180 |

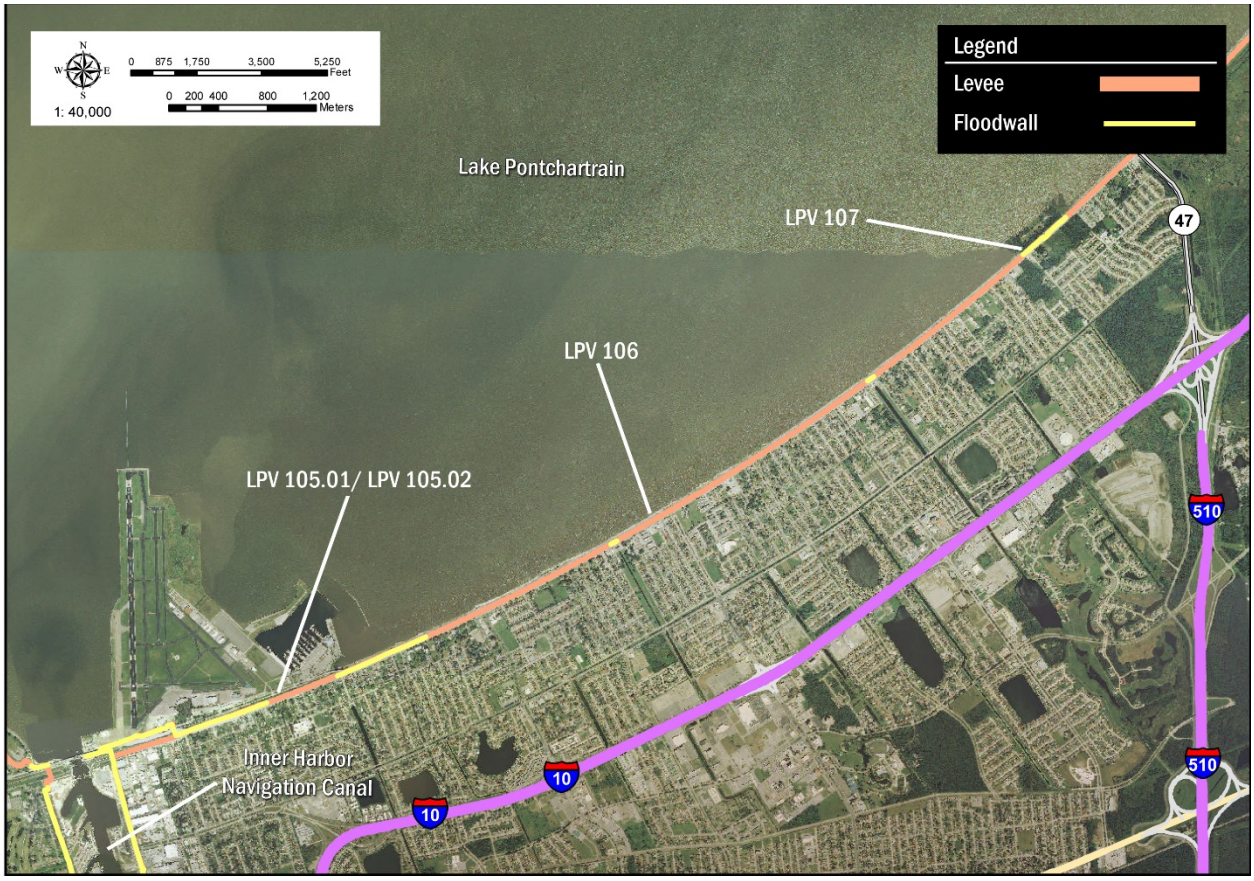
## 2.6 IER #6 – New Orleans East, Orleans Parish, Louisiana

The construction actions for IER #6 and IERS #6 provide 6 miles of levee or 1.9 miles of levee and conversion of 4.1 miles of levees to floodwall and replacement of two miles of floodwalls and four floodgates. Details of these actions are available in the Final IER and supplement at www.nolaenvironmental.gov.

Individual contracts included in IER #6 and IERS #6 are listed below, and figure 2-6 provides an overview of the projects. Note: The LPV 106.01 Breakwater / Foreshore Protection NOE Lakefront Levee contract was not included in this analysis because to date this contract has not been awarded. However, in the future if CEMVN receives authorization to construct future levee lifts, the LPV 106 rock dyke may be included, but an additional NEPA document would discuss the related impacts.

| | |
|---|---|
| LPV105.01 | Lakefront Airport Floodwalls- West |
| LPV105.02 | T-Wall Existing Alignment-Lakefront Airport- East |
| LPV106 | Raise Levee- Paris Rd to Lakefront Airport |
| LPV107 | Replace Gate at Lincoln Beach |

**Figure 2-6. IER # 6 and IERS #6 Project Area**



## Table 2-6a. Materials Quantities for Construction Reaches in IER #6

| Reach | Earthen Fill CY | Concrete CY | Aggregate Tons | Sheet Pile SF | H-Pile VLF | Pipe Pile VLF | Concrete Pile VLF | Rock Tons |
|---|---|---|---|---|---|---|---|---|
| LPV105.01 | - | 1,400 | 2,100 | 89,100 | 43,200 | - | - | - |
| LPV105.02 | 5,100 | 3,900 | 5,900 | 387,500 | 114,200 | - | - | 100 |
| LPV106 | 3,600 | 2,500 | 3,800 | 933,900 | 13,000 | - | - | - |
| LPV107 | 1,600 | 3,800 | 5,700 | 47,200 | - | - | 31,100 | - |

## Table 2-6b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #6

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV105.01 | 430 | Apr-10 | - | - | - | - | - | - |
| LPV105.02 | 860 | May-10 | 500 | LT10 | 3,600 | 10 | 1,000 | LT10 |
| LPV106 | 560 | May-10 | 400 | LT10 | 2,500 | 10 | 700 | LT10 |
| LPV107 | 430 | May-10 | 200 | LT10 | 1,200 | LT10 | 300 | LT10 |

## Table 2-6c. Steel Demand (Tons) by Project Period in IER #6

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV105.01 | 430 | Apr-10 | 3,700 | 30 | - | - | - | - |
| LPV105.02 | 860 | May-10 | 12,830 | 40 | - | - | - | - |
| LPV106 | 560 | May-10 | 19,260 | 100 | - | - | - | - |
| LPV107 | 430 | May-10 | 940 | LT10 | - | - | - | - |

## Table 2-6d. Concrete Demand (Cubic Yards) by Project Period in IER #6

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV105.01 | 430 | Apr-10 | 280 | LT10 | 560 | LT10 | 560 | LT10 |
| LPV105.02 | 860 | May-10 | 790 | LT10 | 1,570 | LT10 | 1,570 | LT10 |
| LPV106 | 560 | May-10 | 500 | LT10 | 990 | LT10 | 990 | LT10 |
| LPV107 | 430 | May-10 | 750 | LT10 | 1,510 | 10 | 1,510 | 10 |

## Table 2-6e. Aggregate Demand (Tons) by Project Period in IER #6

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV105.01 | 430 | Apr-10 | 420 | LT10 | 840 | LT10 | 840 | LT10 |
| LPV105.02 | 860 | May-10 | 1,190 | LT10 | 2,370 | LT10 | 2,370 | LT10 |
| LPV106 | 560 | May-10 | 750 | LT10 | 1,500 | LT10 | 1,500 | LT10 |
| LPV107 | 430 | May-10 | 1,140 | LT10 | 2,280 | 20 | 2,280 | 20 |

## Table 2-6f. Concrete Pile Demand (Tons) by Project Period in IER #6

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV105.01 | 430 | Apr-10 | - | - | - | - | - | - |
| LPV105.02 | 860 | May-10 | - | - | - | - | - | - |
| LPV106 | 560 | May-10 | - | - | - | - | - | - |
| LPV107 | 430 | May-10 | 8,300 | 60 | - | - | - | - |

## Table 2-6g. Rock Demand (Tons) by Project Period in IER #6

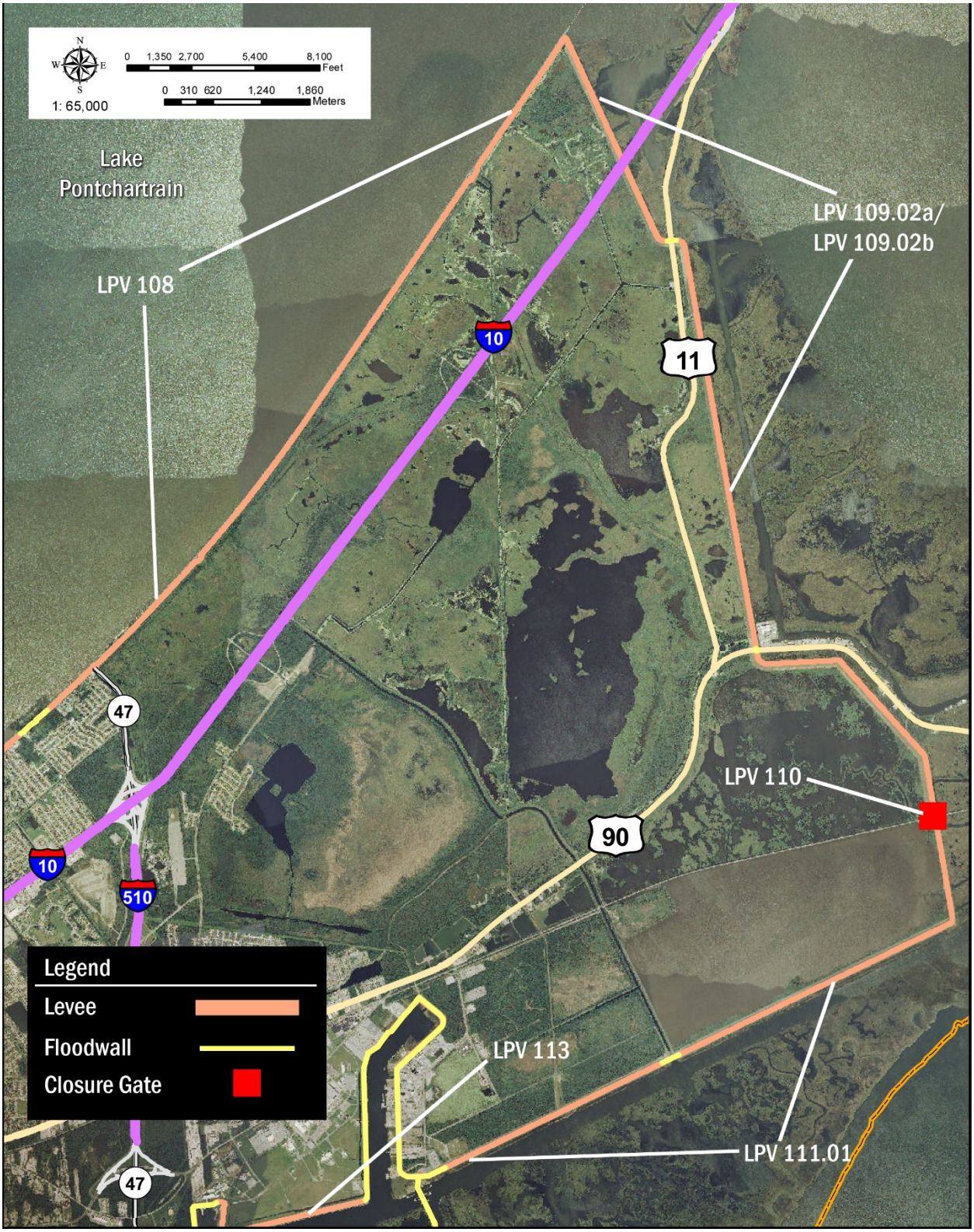
| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV105.01 | 430 | Apr-10 | - | - | - | - | - | - |
| LPV105.02 | 860 | May-10 | - | - | - | - | 80 | LT10 |
| LPV106 | 560 | May-10 | - | - | - | - | - | - |
| LPV107 | 430 | May-10 | - | - | - | - | - | - |

## 2.7 IER #7 – New Orleans East, Orleans Parish, Louisiana

The construction actions for IER #7 and IERS #7 provide 19.3 miles of levee and three floodgates. Details of these actions are available in the Final IER and supplement at www.nolaenvironmental.gov. Individual contracts included in IER #7 and IERS #7 are listed below, and figure 2-7 provides an overview of the projects. Note: The LPV 111.02 Raise wall at Pump Station #15 CSXRR to Michoud contract quantity information was combined with LPV 111.01 contract.

| | |
|---|---|
| LPV108 | Levee Raise-Paris Rd to South Point |
| LPV109.02a | Levee raise to 100-Year Elevation/ US11 & US 90 Gates & Crossing |
| LPV109.02b | I-10 Floodwall & Crossing |
| LPV110 | Modify CSX RR Gate |
| LPV111.01 | 100 Year Levee Raise-CSX RR to Michoud Canal |
| LPV113 | Citrus Back Levee (Michoud Canal to Slip) |

**Figure 2-7. IER # 7 and IERS #7 Project Area**



## Table 2-7a. Materials Quantities for Construction Reaches in IER #7

| Reach | Earthen Fill CY | Concrete CY | Aggregate Tons | Sheet Pile SF | H-Pile VLF | Pipe Pile VLF | Concrete Pile VLF | Rock Tons |
|---|---|---|---|---|---|---|---|---|
| LPV108 | 225,000 | 2,100 | 3,200 | 19,600 | - | - | 15,200 | - |
| LPV109.02a | 2,949,000 | 100 | 200 | 62,100 | 29,000 | - | - | 330,500 |
| LPV109.02b | 67,600 | - | - | 8,800 | 29,000 | - | - | 28,400 |
| LPV110 | - | 1,800 | 2,700 | 3,900 | 8,400 | - | - | - |
| LPV111.01 | 1,838,300 | 11,000 | 16,600 | 46,600 | 141,200 | - | - | - |
| LPV113 | 192,000 | 200 | 300 | - | - | - | - | 16,000 |

## Table 2-7b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #7

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV108 | 530 | Dec-08 | 22,500 | 130 | 157,500 | 890 | 45,000 | 250 |
| LPV109.02a | 410 | Apr-10 | 294,900 | 2,160 | 2,064,300 | 15,100 | 589,800 | 4,320 |
| LPV109.02b | 450 | Apr-10 | 6,800 | 50 | 47,300 | 320 | 13,500 | 90 |
| LPV110 | 500 | Apr-10 | - | - | - | - | - | - |
| LPV111.01 | 450 | Apr-10 | 183,800 | 1,230 | 1,286,800 | 8,580 | 367,700 | 2,450 |
| LPV113 | 380 | Aug-09 | 19,200 | 150 | 134,400 | 1,060 | 38,400 | 300 |

## Table 2-7c. Steel Demand (Tons) by Project Period in IER #7

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV108 | 530 | Dec-08 | 390 | LT10 | - | - | - | - |
| LPV109.02a | 410 | Apr-10 | 2,530 | 20 | - | - | - | - |
| LPV109.02b | 450 | Apr-10 | 1,470 | LT10 | - | - | - | - |
| LPV110 | 500 | Apr-10 | 450 | LT10 | - | - | - | - |
| LPV111.01 | 450 | Apr-10 | 7,220 | 50 | - | - | - | - |
| LPV113 | 380 | Aug-09 | - | - | - | - | - | - |

## Table 2-7d. Concrete Demand (Cubic Yards) by Project Period in IER #7

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV108 | 530 | Dec-08 | 430 | LT10 | 860 | LT10 | 860 | LT10 |
| LPV109.02a | 410 | Apr-10 | 20 | LT10 | 40 | LT10 | 40 | LT10 |
| LPV109.02b | 450 | Apr-10 | - | - | - | - | - | - |
| LPV110 | 500 | Apr-10 | 360 | LT10 | 720 | LT10 | 720 | LT10 |
| LPV111.01 | 450 | Apr-10 | 2,200 | 10 | 4,400 | 30 | 4,400 | 30 |
| LPV113 | 380 | Aug-09 | 40 | LT10 | 70 | LT10 | 70 | LT10 |

## Table 2-7e. Aggregate Demand (Tons) by Project Period in IER #7

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV108 | 530 | Dec-08 | 650 | LT10 | 1,300 | LT10 | 1,300 | LT10 |
| LPV109.02a | 410 | Apr-10 | 30 | LT10 | 60 | LT10 | 60 | LT10 |
| LPV109.02b | 450 | Apr-10 | - | - | - | - | - | - |
| LPV110 | 500 | Apr-10 | 540 | LT10 | 1,090 | LT10 | 1,090 | LT10 |
| LPV111.01 | 450 | Apr-10 | 3,320 | 20 | 6,650 | 40 | 6,650 | 40 |
| LPV113 | 380 | Aug-09 | 60 | LT10 | 110 | LT10 | 110 | LT10 |

## Table 2-7f. Concrete Pile Demand (Tons) by Project Period in IER #7

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV108 | 530 | Dec-08 | 4,070 | 20 | - | - | - | - |
| LPV109.02a | 410 | Apr-10 | - | - | - | - | - | - |
| LPV109.02b | 450 | Apr-10 | - | - | - | - | - | - |
| LPV110 | 500 | Apr-10 | - | - | - | - | - | - |
| LPV111.01 | 450 | Apr-10 | - | - | - | - | - | - |
| LPV113 | 380 | Aug-09 | - | - | - | - | - | - |

## Table 2-7g. Rock Demand (Tons) by Project Period in IER #7

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV108 | 530 | Dec-08 | - | - | - | - | - | - |
| LPV109.02a | 410 | Apr-10 | - | - | - | - | 330,500 | 2,420 |
| LPV109.02b | 450 | Apr-10 | - | - | - | - | 28,420 | 190 |
| LPV110 | 500 | Apr-10 | - | - | - | - | - | - |
| LPV111.01 | 450 | Apr-10 | - | - | - | - | - | - |
| LPV113 | 380 | Aug-09 | - | - | - | - | 15,980 | 130 |

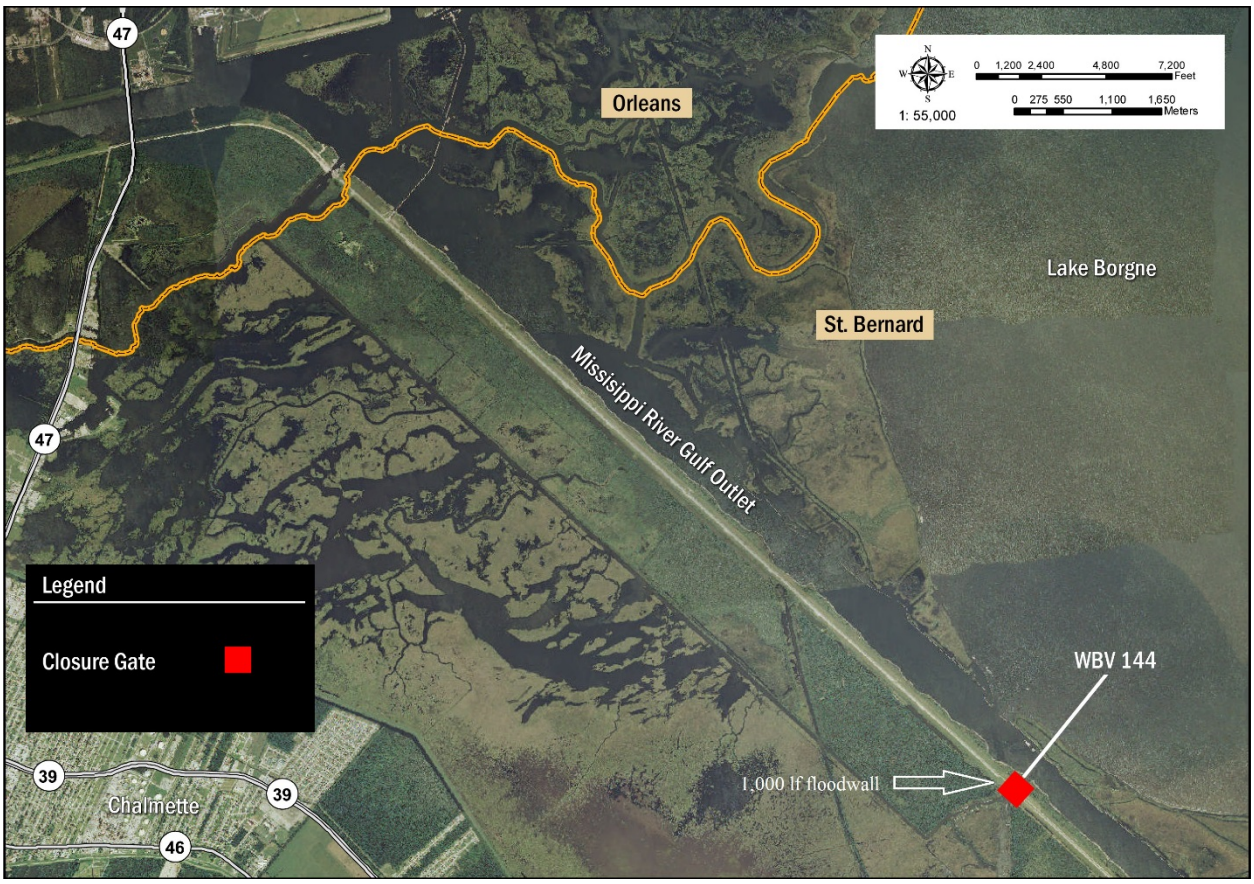
## 2.8 IER #8 – Bayou Dupre Control Structure, St. Bernard Parish, Louisiana

The construction action for IER #8 requires the replacement of approximately 1,000 linear feet of floodwalls and the replacement of the Bayou Dupre navigable floodgates. This project was completed under one construction project LPV 144, Bayou Dupre Floodgate Structure. Details of this action are available in the Final IER at www.nolaenvironmental.gov.

Individual contracts included in IER #8 are listed below, and figure 2-8 provides an overview of the projects.

LPV144 Chalmette Loop Levee and Floodgate, St. Bernard Parish

**Figure 2-8. IER #8 and IERS #8,9,10.a Project Area**



## Table 2-8a. Materials Quantities for Construction Reaches in IER #8

| Reach | Earthen Fill CY | Concrete CY | Aggregate Tons | Sheet Pile SF | H-Pile VLF | Pipe Pile VLF | Concrete Pile VLF | Rock Tons |
|---|---|---|---|---|---|---|---|---|
| LPV144 | 3,300 | 17,300 | 26,100 | 75,500 | 23,600 | 21,700 | 1,000 | 9,900 |

## Table 2-8b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #8

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV144 | 450 | Feb-10 | 300 | LT10 | 2,300 | 20 | 700 | LT10 |

## Table 2-8c. Steel Demand (Tons) by Project Period in IER #8

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV144 | 450 | Feb-10 | 3,930 | 30 | - | - | - | - |

## Table 2-8d. Concrete Demand (Cubic Yards) by Project Period in IER #8

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV144 | 450 | Feb-10 | 3,460 | 20 | 6,920 | 50 | 6,920 | 50 |

## Table 2-8e. Aggregate Demand (Tons) by Project Period in IER #8

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV144 | 450 | Feb-10 | 5,230 | 30 | 10,460 | 70 | 10,460 | 70 |

## Table 2-8f. Concrete Pile Demand (Tons) by Project Period in IER #8

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV144 | 450 | Feb-10 | 270 | LT10 | - | - | - | - |

## Table 2-8g. Rock Demand (Tons) by Project Period in IER #8

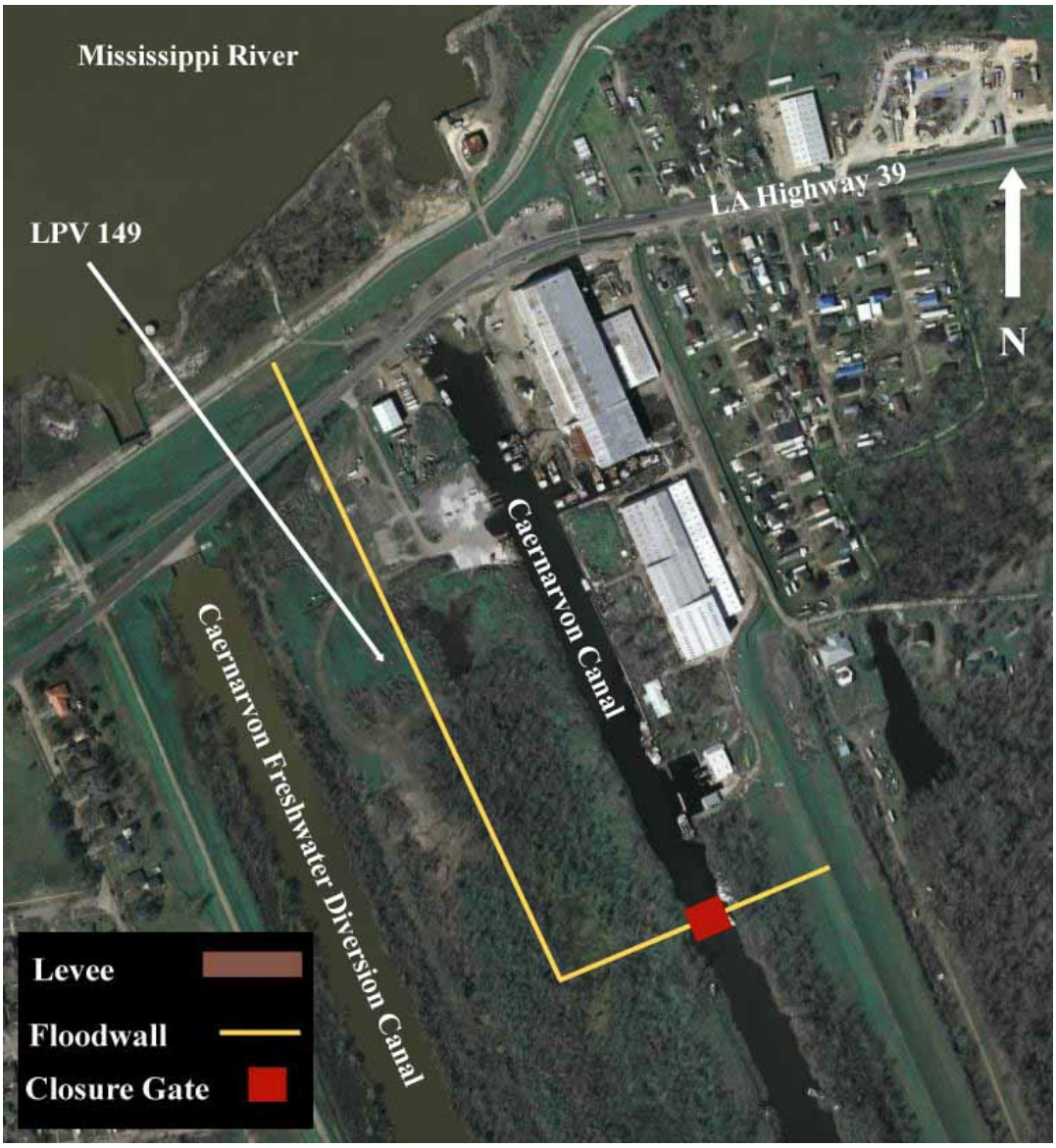
| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV144 | 450 | Feb-10 | - | - | - | - | 9,900 | 70 |

IER #9 – Caernarvon Floodwall, St. Bernard Parish, Louisiana
The construction actions for IER #9 involve the construction of three floodgates and approximately 1,500 feet of floodwall, and the tie-in to the Mississippi River levee. This project was completed under a single construction project: LPV 149, Caernarvon Floodwall. Details of the actions are available in the Final IER at www.nolaenvironmental.gov.

Individual contracts included in IER #9 are listed below, and figure 2-9 provides an overview of the projects.

LPV149 Chalmette Loop Levee, St. Bernard Parish

**Figure 2-9. IER # 9 Project Area**



## Table 2-9a. Materials Quantities for Construction Reaches in IER #9

| Reach | Earthen Fill CY | Concrete CY | Aggregate Tons | Sheet Pile SF | H-Pile VLF | Pipe Pile VLF | Concrete Pile VLF | Rock Tons |
|---|---|---|---|---|---|---|---|---|
| LPV149 | 130,000 | 30,900 | 46,700 | 120,800 | 209,200 | - | 16,800 | 6,400 |

## Table 2-9b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #9

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV149 | 530 | Jun-10 | 13,000 | 70 | 91,000 | 520 | 26,000 | 150 |

## Table 2-9c. Steel Demand (Tons) by Project Period in IER #9

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV149 | 530 | Jun-10 | 11,720 | 70 | - | - | - | - |

## Table 2-9d. Concrete Demand (Cubic Yards) by Project Period in IER #9

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV149 | 530 | Jun-10 | 6,170 | 30 | 12,350 | 70 | 12,350 | 70 |

## Table 2-9e. Aggregate Demand (Tons) by Project Period in IER #9

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV149 | 530 | Jun-10 | 9,330 | 50 | 18,670 | 110 | 18,670 | 110 |

## Table 2-9f. Concrete Pile Demand (Tons) by Project Period in IER #9

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV149 | 530 | Jun-10 | 4,490 | 30 | - | - | - | - |

## Table 2-9g. Rock Demand (Tons) by Project Period in IER #9

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV149 | 530 | Jun-10 | - | - | - | - | 6,380 | 40 |

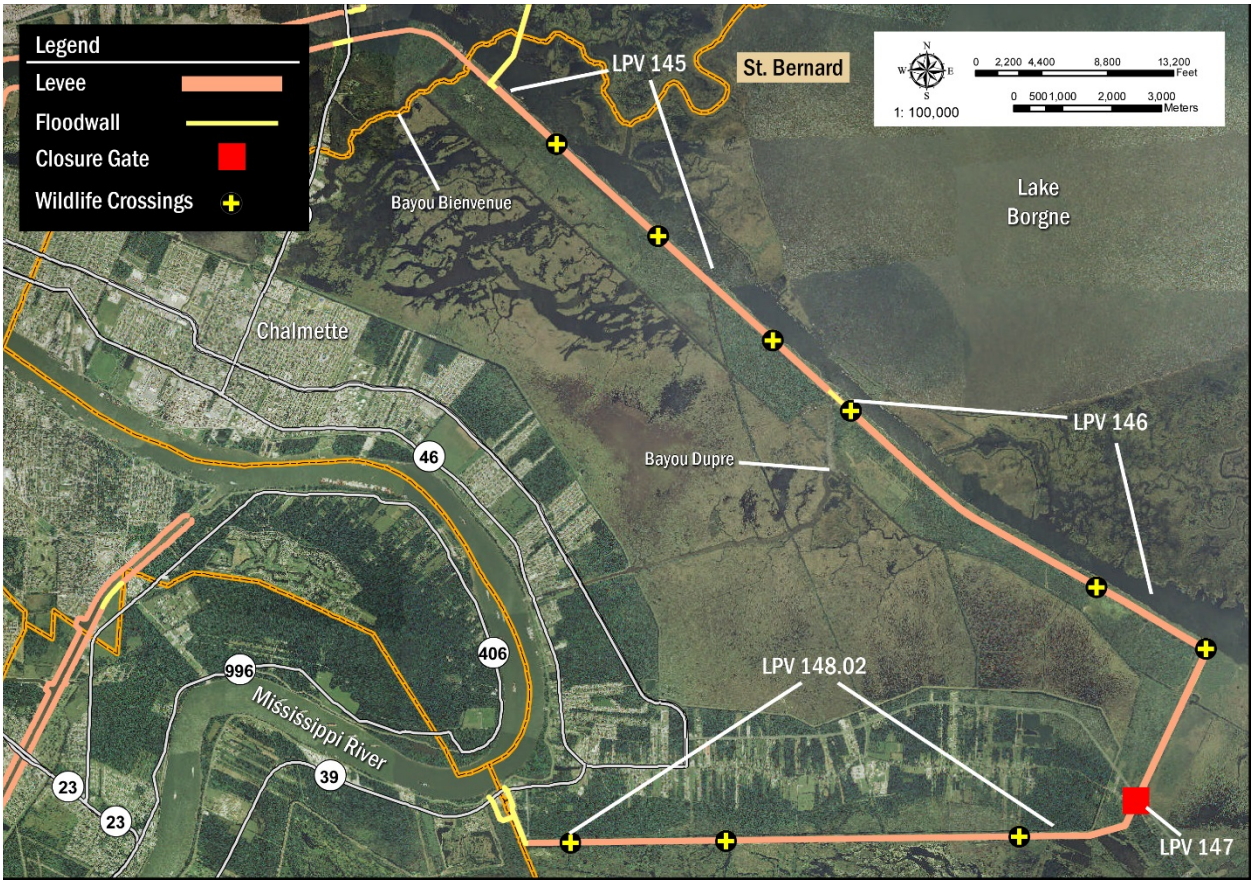
## 2.9 IER #10 – Chalmette Loop, St. Bernard Parish, Louisiana

The construction actions for IER #10 provide 100-year level of risk reduction for 22 miles of T-walls constructed atop the existing Chalmette Loop levee, nine wildlife access gates, and three floodgates. This project was completed under four discrete construction projects: LPV 145, Bayou Bienvenue to Bayou Dupre Levee; LPV 146, Bayou Dupre to Hwy 46 Levee; LPV 147, Hwy 46 Crossing and Bayou Road Flood Gate; and LPV 148.02, Verret to Caernarvon Levee. Details of the actions are available in the Final IER at www.nolaenvironmental.gov.

Individual contracts included in IER 10 are listed below, and figure 2-10 provides an overview of the projects. IERS #8,9,10.a, construction of an access road, were not included in this assessment because the contract had not been awarded during the time of this analysis. However, preliminary plans and specifications estimated that an additional 3,900 tons of rock would be utilized for LPV 146 and LPV 148 and most likely trucked to the site from a commercial source. Also the bridge construction at Bayou Bienvenue was not complete during this transportation analysis, however plans and specifications show material estimates of approximately 453 cubic yards of embankment, 8,098 LF of concrete piling, and 110 tons of riprap rock that could be delivered to site by truck.

| | |
|---|---|
| LPV145 | Chalmette Loop: Bayou Bienvenue to Bayou Dupre Levee, St. Bernard Parish |
| LPV146 | Chalmette Loop: Bayou Dupre to Hwy 46 Levee |
| LPV147 | Chalmette Loop: Hwy 46 Crossing and Bayou Road Flood Gate |
| LPV148.02 | Chalmette Loop: Verret to Caernarvon Levee |

## Figure 2-10. IER # 10 Project Area




## Table 2-10a. Materials Quantities for Construction Reaches in IER #10

| Reach | Earthen Fill CY | Concrete CY | Aggregate Tons | Sheet Pile SF | H-Pile VLF | Pipe Pile VLF | Concrete Pile VLF | Rock Tons |
|---|---|---|---|---|---|---|---|---|
| LPV145 | 30,000 | 86,500 | 130,800 | 909,500 | 1,197,700 | - | - | 236,000 |
| LPV146 | 203,400 | 105,300 | 159,200 | 1,387,100 | 1,555,500 | - | - | 154,300 |
| LPV147 | 88,000 | 1,700 | 2,600 | 16,900 | 19,100 | - | - | - |
| LPV148.02 | 21,000 | 160,000 | 241,900 | 1,741,900 | 2,933,800 | - | - | 250,000 |

## Table 2-10b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #10

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV145 | 730 | Jul-09 | 3,000 | 10 | 21,000 | 90 | 6,000 | 20 |
| LPV146 | 680 | Aug-09 | 20,300 | 90 | 142,400 | 630 | 40,700 | 180 |
| LPV147 | 360 | Apr-10 | 8,800 | 70 | 61,600 | 510 | 17,600 | 150 |
| LPV148.02 | 650 | Feb-10 | 2,100 | LT10 | 14,700 | 70 | 4,200 | 20 |

### Table 2-10c. Steel Demand (Tons) by Project Period in IER #10

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV145 | 730 | Jul-09 | 71,490 | 290 | - | - | - | - |
| LPV146 | 680 | Aug-09 | 96,960 | 430 | - | - | - | - |
| LPV147 | 360 | Apr-10 | 1,190 | LT10 | - | - | - | - |
| LPV148.02 | 650 | Feb-10 | 165,390 | 760 | - | - | - | - |

### Table 2-10d. Concrete Demand (Cubic Yards) by Project Period in IER #10

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV145 | 730 | Jul-09 | 17,310 | 70 | 34,620 | 140 | 34,620 | 140 |
| LPV146 | 680 | Aug-09 | 21,060 | 90 | 42,130 | 190 | 42,130 | 190 |
| LPV147 | 360 | Apr-10 | 340 | LT10 | 680 | LT10 | 680 | LT10 |
| LPV148.02 | 650 | Feb-10 | 32,000 | 150 | 64,000 | 300 | 64,000 | 300 |

### Table 2-10e. Aggregate Demand (Tons) by Project Period in IER #10

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV145 | 730 | Jul-09 | 26,170 | 110 | 52,340 | 220 | 52,340 | 220 |
| LPV146 | 680 | Aug-09 | 31,850 | 140 | 63,700 | 280 | 63,700 | 280 |
| LPV147 | 360 | Apr-10 | 510 | LT10 | 1,030 | LT10 | 1,030 | LT10 |
| LPV148.02 | 650 | Feb-10 | 48,380 | 220 | 96,770 | 450 | 96,770 | 450 |

The projects do not require concrete pile for construction. Table 2-10f has been omitted.

### Table 2-10g. Rock Demand (Tons) by Project Period in IER #10

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| LPV145 | 730 | Jul-09 | - | - | - | - | 236,000 | 970 |
| LPV146 | 680 | Aug-09 | - | - | - | - | 154,300 | 680 |
| LPV147 | 360 | Apr-10 | - | - | - | - | - | - |
| LPV148.02 | 650 | Feb-10 | - | - | - | - | 250,000 | 1,150 |

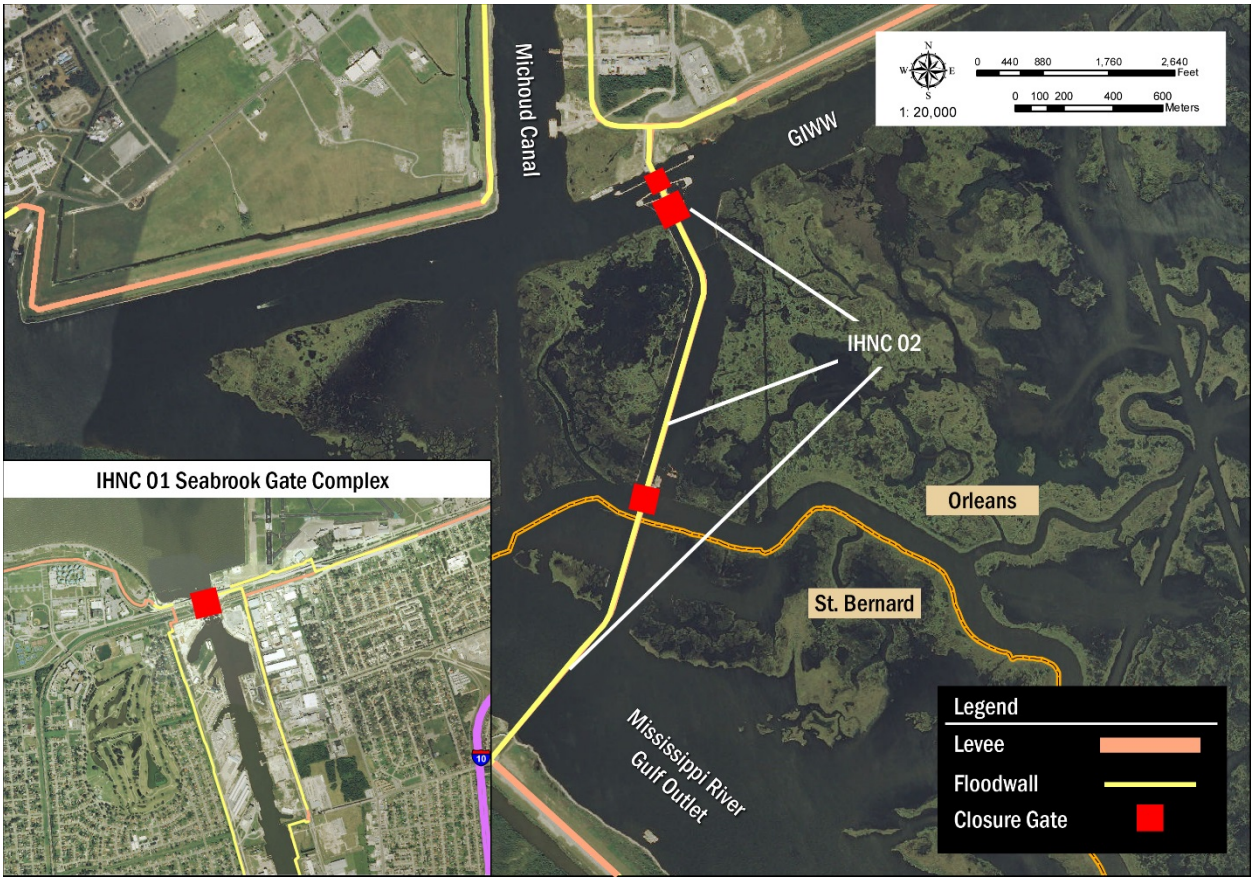
## 2.10 IER #11 – Improved Protection on the Inner Harbor Navigation Canal, Orleans and St. Bernard Parishes, Louisiana

The construction actions under IER #11 would provide structural barriers to prevent damaging storm surges from entering the IHNC from Lake Pontchartrain and/or the Gulf Intracoastal Waterway (GIWW)-Mississippi River Gulf Outlet (MRGO)-Lake Borgne complex ("Lake Borgne complex"). The first contract IHNC01, referred to as "Borgne Barrier," encompasses constructing a 2 mile floodwall, a sector and barge gate across the GIWW, and a vertical lift gate across Bayou Bienvenue was bult to provide a barrier to address storm surge from the Lake Borgne. The second contract IHNC02, referred to as "Seabrook Complex" includes one sector gate and two vertical lift gates across the IHNC to provide a barrier to address storm surge from the Lake Pontchartrain. Several design changes occurred throughout the project and they were described in supplemental IERS #11.a, 11.b, 11.c, and 11.d. Details of these constructed actions are available at www.nolaenvironmental.gov.

Individual contracts included in IER #11, IHNC01 and IHNC02, are listed below, and figure 2-11 provides an overview of the projects.

| | |
|---|---|
| IHNC01 | IHNC-1 Protection from Lake Pontchartrain |
| IHNC02a | GIWW Bypass Monolith Structure |
| IHNC02b | GIWW Sector Gate Monolith Structure |
| IHNC02c | IHNC02 Access Channel Closure Walls |
| IHNC02d | IHNC02 Bayou Bienvenue Vertical Lift Gate Leaf Fabrication |
| IHNC02e | IHNC02 Bayou Bienvenue Vertical Lift Gate Bridge and Tower Fabrication and Mechanical Installation |
| IHNC02f | IHNC02 Bayou Bienvenue Control House |
| IHNC02g | IHNC02 Bayou Bienvenue Vertical Lift Gate Monolith Structure |
| IHNC02h | IHNC02 Floodwall |
| IHNC02i | IHNC02 GIWW Approach Walls, South Approach Walls, Gate Related Structures and Miscellaneous Metal |
| IHNC02j | IHNC02 Mississippi River Gulf Outlet Fill to EL -21 |
| IHNC02k | IHNC02 North Shore Complex |
| IHNC02l | North T-Wall (NTW) |
| IHNC02m | IHNC02 Scour Stone |
| IHNC02n | South T-Wall |
| IHNC02o | IHNC02 South Vehicle Access Ramp and Splash Pads |
| IHNC02p | IHNC02 Concrete Barge Gate Feature |
| IHNC02q | Shoreline Protection |
| LPV117.02 | IHNC Emergency Interim Repair Reach II |

## Figure 2-11. IER # 11 Project Area



## Table 2-11a. Materials Quantities for Construction Reaches in IER #11 have two of IHNC02e

| Reach | Earthen Fill CY | Concrete CY | Aggregate Tons | Sheet Pile SF | H-Pile VLF | Pipe Pile VLF | Concrete Pile VLF | Rock Tons |
|---|---|---|---|---|---|---|---|---|
| IHNC01 | 1,200 | 34,400 | 51,900 | 61,600 | 57,000 | 22,100 | 7,700 | 40,000 |
| IHNC02a | - | 9,400 | 14,200 | 46,700 | - | - | 47,700 | - |
| IHNC02b | - | 35,000 | 52,900 | 46,200 | - | 74,100 | - | 48,200 |
| IHNC02c | - | - | - | 48,600 | - | 400 | - | 3,000 |
| IHNC02d | - | - | - | - | - | - | - | - |
| IHNC02e | - | - | - | - | - | - | - | - |
| IHNC02e | - | - | - | - | - | - | - | - |
| IHNC02f | - | LT50 | 100 | - | - | - | - | - |
| IHNC02g | - | 7,900 | 12,000 | 18,000 | - | 2,400 | 16,400 | 13,500 |
| IHNC02h | - | 176,700 | 267,200 | - | - | 160,000 | 336,700 | - |
| IHNC02i | - | 19,300 | 29,100 | - | - | 12,300 | 28,400 | - |
| IHNC02j | - | - | - | 63,000 | - | - | - | 355,400 |
| IHNC02k | 14,200 | 3,000 | 4,500 | 4,900 | 23,600 | 3,300 | - | 2,700 |
| IHNC02l | - | 6,400 | 9,700 | 34,600 | 10,400 | 19,600 | - | - |
| IHNC02m | - | - | - | - | - | - | - | 232,000 |
| IHNC02n | - | 6,500 | 9,900 | 22,500 | 8,600 | 18,700 | - | - |
| IHNC02o | 10,000 | 1,800 | 2,800 | - | 12,000 | - | - | 2,400 |
| IHNC02p | - | 2,800 | 4,200 | - | - | - | - | - |
| IHNC02q | - | - | - | - | - | - | - | 46,700 |
| LPV117.02 | - | 500 | 800 | 49,000 | - | - | - | 1,000 |

## Table 2-11b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #11

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| IHNC01 | 710 | Jul-10 | 100 | LT10 | 800 | LT10 | 200 | LT10 |
| IHNC02a | 520 | Feb-09 | - | - | - | - | - | - |
| IHNC02b | 620 | Mar-10 | - | - | - | - | - | - |
| IHNC02c | 70 | Mar-12 | - | - | - | - | - | - |
| IHNC02d | 290 | May-10 | - | - | - | - | - | - |
| IHNC02e | 390 | Nov-10 | - | - | - | - | - | - |
| IHNC02e | 330 | May-11 | - | - | - | - | - | - |
| IHNC02f | 160 | Aug-11 | - | - | - | - | - | - |
| IHNC02g | 460 | Jan-10 | - | - | - | - | - | - |
| IHNC02h | 610 | Feb-09 | - | - | - | - | - | - |
| IHNC02i | 410 | Jul-11 | - | - | - | - | - | - |
| IHNC02j | 160 | Feb-09 | - | - | - | - | - | - |
| IHNC02k | 320 | Nov-11 | 1,400 | 10 | 9,900 | 90 | 2,800 | 30 |
| IHNC02l | 600 | Feb-09 | - | - | - | - | - | - |
| IHNC02m | 330 | Mar-11 | - | - | - | - | - | - |
| IHNC02n | 600 | Feb-09 | - | - | - | - | - | - |
| IHNC02o | 190 | Nov-11 | 1,000 | 20 | 7,000 | 110 | 2,000 | 30 |
| IHNC02p | 1,140 | Oct-09 | - | - | - | - | - | - |
| IHNC02q | 100 | Jan-12 | - | - | - | - | - | - |
| LPV117.02 | 120 | Dec-09 | - | - | - | - | - | - |

## Table 2-11c. Steel Demand (Tons) by Project Period in IER #11

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| IHNC01 | 710 | Jul-10 | 5,160 | 20 | - | - | - | - |
| IHNC02a | 520 | Feb-09 | 930 | LT10 | - | - | - | - |
| IHNC02b | 620 | Mar-10 | 5,590 | 30 | - | - | - | - |
| IHNC02c | 70 | Mar-12 | 1,000 | 40 | - | - | - | - |
| IHNC02d | 290 | May-10 | - | - | - | - | - | - |
| IHNC02e | 390 | Nov-10 | - | - | - | - | - | - |
| IHNC02e | 330 | May-11 | - | - | - | - | - | - |
| IHNC02f | 160 | Aug-11 | - | - | - | - | - | - |
| IHNC02g | 460 | Jan-10 | 510 | LT10 | - | - | - | - |
| IHNC02h | 610 | Feb-09 | 10,080 | 50 | - | - | - | - |
| IHNC02i | 410 | Jul-11 | 770 | LT10 | - | - | - | - |
| IHNC02j | 160 | Feb-09 | 1,260 | 20 | - | - | - | - |
| IHNC02k | 320 | Nov-11 | 1,360 | 10 | - | - | - | - |
| IHNC02l | 600 | Feb-09 | 2,390 | 10 | - | - | - | - |
| IHNC02m | 330 | Mar-11 | - | - | - | - | - | - |
| IHNC02n | 600 | Feb-09 | 2,020 | 10 | - | - | - | - |
| IHNC02o | 190 | Nov-11 | 530 | LT10 | - | - | - | - |
| IHNC02p | 1,140 | Oct-09 | - | - | - | - | - | - |
| IHNC02q | 100 | Jan-12 | - | - | - | - | - | - |
| LPV117.02 | 120 | Dec-09 | 980 | 20 | - | - | - | - |

## Table 2-11d. Concrete Demand (Cubic Yards) by Project Period in IER #11

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| IHNC01 | 710 | Jul-10 | 6,870 | 30 | 13,740 | 60 | 13,740 | 60 |
| IHNC02a | 520 | Feb-09 | 1,880 | 10 | 3,760 | 20 | 3,760 | 20 |
| IHNC02b | 620 | Mar-10 | 7,000 | 30 | 14,000 | 70 | 14,000 | 70 |
| IHNC02c | 70 | Mar-12 | - | - | - | - | - | - |
| IHNC02d | 290 | May-10 | - | - | - | - | - | - |
| IHNC02e | 390 | Nov-10 | - | - | - | - | - | - |
| IHNC02e | 330 | May-11 | - | - | - | - | - | - |
| IHNC02f | 160 | Aug-11 | LT10 | LT10 | 10 | LT10 | 10 | LT10 |
| IHNC02g | 460 | Jan-10 | 1,590 | 10 | 3,180 | 20 | 3,180 | 20 |
| IHNC02h | 610 | Feb-09 | 35,340 | 170 | 70,690 | 350 | 70,690 | 350 |
| IHNC02i | 410 | Jul-11 | 3,860 | 30 | 7,710 | 60 | 7,710 | 60 |
| IHNC02j | 160 | Feb-09 | - | - | - | - | - | - |
| IHNC02k | 320 | Nov-11 | 600 | LT10 | 1,190 | 10 | 1,190 | 10 |
| IHNC02l | 600 | Feb-09 | 1,290 | LT10 | 2,570 | 10 | 2,570 | 10 |
| IHNC02m | 330 | Mar-11 | - | - | - | - | - | - |
| IHNC02n | 600 | Feb-09 | 1,310 | LT10 | 2,610 | 10 | 2,610 | 10 |
| IHNC02o | 190 | Nov-11 | 370 | LT10 | 730 | 10 | 730 | 10 |
| IHNC02p | 1,140 | Oct-09 | 560 | LT10 | 1,120 | LT10 | 1,120 | LT10 |
| IHNC02q | 100 | Jan-12 | - | - | - | - | - | - |
| LPV117.02 | 120 | Dec-09 | 100 | LT10 | 200 | LT10 | 200 | LT10 |

## Table 2-11e. Aggregate Demand (Tons) by Project Period in IER #11

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| IHNC01 | 710 | Jul-10 | 10,390 | 40 | 20,780 | 90 | 20,780 | 90 |
| IHNC02a | 520 | Feb-09 | 2,840 | 20 | 5,690 | 30 | 5,690 | 30 |
| IHNC02b | 620 | Mar-10 | 10,580 | 50 | 21,170 | 100 | 21,170 | 100 |
| IHNC02c | 70 | Mar-12 | - | - | - | - | - | - |
| IHNC02d | 290 | May-10 | - | - | - | - | - | - |
| IHNC02e | 390 | Nov-10 | - | - | - | - | - | - |
| IHNC02e | 330 | May-11 | - | - | - | - | - | - |
| IHNC02f | 160 | Aug-11 | 10 | LT10 | 20 | LT10 | 20 | LT10 |
| IHNC02g | 460 | Jan-10 | 2,400 | 20 | 4,800 | 30 | 4,800 | 30 |
| IHNC02h | 610 | Feb-09 | 53,440 | 260 | 106,880 | 530 | 106,880 | 530 |
| IHNC02i | 410 | Jul-11 | 5,830 | 40 | 11,660 | 90 | 11,660 | 90 |
| IHNC02j | 160 | Feb-09 | - | - | - | - | - | - |
| IHNC02k | 320 | Nov-11 | 900 | LT10 | 1,800 | 20 | 1,800 | 20 |
| IHNC02l | 600 | Feb-09 | 1,940 | LT10 | 3,890 | 20 | 3,890 | 20 |
| IHNC02m | 330 | Mar-11 | - | - | - | - | - | - |
| IHNC02n | 600 | Feb-09 | 1,980 | LT10 | 3,950 | 20 | 3,950 | 20 |
| IHNC02o | 190 | Nov-11 | 550 | LT10 | 1,110 | 20 | 1,110 | 20 |
| IHNC02p | 1,140 | Oct-09 | 850 | LT10 | 1,690 | LT10 | 1,690 | LT10 |
| IHNC02q | 100 | Jan-12 | - | - | - | - | - | - |
| LPV117.02 | 120 | Dec-09 | 150 | LT10 | 310 | LT10 | 310 | LT10 |

## Table 2-11f. Concrete Pile Demand (Tons) by Project Period in IER #11

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| IHNC01 | 710 | Jul-10 | 4,680 | 20 | - | - | - | - |
| IHNC02a | 520 | Feb-09 | 12,740 | 70 | - | - | - | - |
| IHNC02b | 620 | Mar-10 | - | - | - | - | - | - |
| IHNC02c | 70 | Mar-12 | - | - | - | - | - | - |
| IHNC02d | 290 | May-10 | - | - | - | - | - | - |
| IHNC02e | 390 | Nov-10 | - | - | - | - | - | - |
| IHNC02e | 330 | May-11 | - | - | - | - | - | - |
| IHNC02f | 160 | Aug-11 | - | - | - | - | - | - |
| IHNC02g | 460 | Jan-10 | 9,960 | 60 | - | - | - | - |
| IHNC02h | 610 | Feb-09 | 204,870 | 1,010 | - | - | - | - |
| IHNC02i | 410 | Jul-11 | 17,290 | 130 | - | - | - | - |
| IHNC02j | 160 | Feb-09 | - | - | - | - | - | - |
| IHNC02k | 320 | Nov-11 | - | - | - | - | - | - |
| IHNC02l | 600 | Feb-09 | - | - | - | - | - | - |
| IHNC02m | 330 | Mar-11 | - | - | - | - | - | - |
| IHNC02n | 600 | Feb-09 | - | - | - | - | - | - |
| IHNC02o | 190 | Nov-11 | - | - | - | - | - | - |
| IHNC02p | 1,140 | Oct-09 | - | - | - | - | - | - |
| IHNC02q | 100 | Jan-12 | - | - | - | - | - | - |
| LPV117.02 | 120 | Dec-09 | - | - | - | - | - | - |

## Table 2-11g. Rock Demand (Tons) by Project Period in IER #11

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| IHNC01 | 710 | Jul-10 | - | - | - | - | 40,000 | 170 |
| IHNC02a | 520 | Feb-09 | - | - | - | - | - | - |
| IHNC02b | 620 | Mar-10 | - | - | - | - | 48,230 | 230 |
| IHNC02c | 70 | Mar-12 | - | - | - | - | 3,000 | 130 |
| IHNC02d | 290 | May-10 | - | - | - | - | - | - |
| IHNC02e | 390 | Nov-10 | - | - | - | - | - | - |
| IHNC02e | 330 | May-11 | - | - | - | - | - | - |
| IHNC02f | 160 | Aug-11 | - | - | - | - | - | - |
| IHNC02g | 460 | Jan-10 | - | - | - | - | 13,550 | 90 |
| IHNC02h | 610 | Feb-09 | - | - | - | - | - | - |
| IHNC02i | 410 | Jul-11 | - | - | - | - | - | - |
| IHNC02j | 160 | Feb-09 | - | - | - | - | 355,410 | 6,660 |
| IHNC02k | 320 | Nov-11 | - | - | - | - | 2,670 | 30 |
| IHNC02l | 600 | Feb-09 | - | - | - | - | - | - |
| IHNC02m | 330 | Mar-11 | - | - | - | - | 232,040 | 2,110 |
| IHNC02n | 600 | Feb-09 | - | - | - | - | - | - |
| IHNC02o | 190 | Nov-11 | - | - | - | - | 2,410 | 40 |
| IHNC02p | 1,140 | Oct-09 | - | - | - | - | - | - |
| IHNC02q | 100 | Jan-12 | - | - | - | - | 46,680 | 1,400 |
| LPV117.02 | 120 | Dec-09 | - | - | - | - | 990 | 20 |

## 2.11 IER #12 – GIWW, Harvey and Algiers Levees and Floodwalls, Jefferson, Orleans, and Plaquemines Parishes, Louisiana

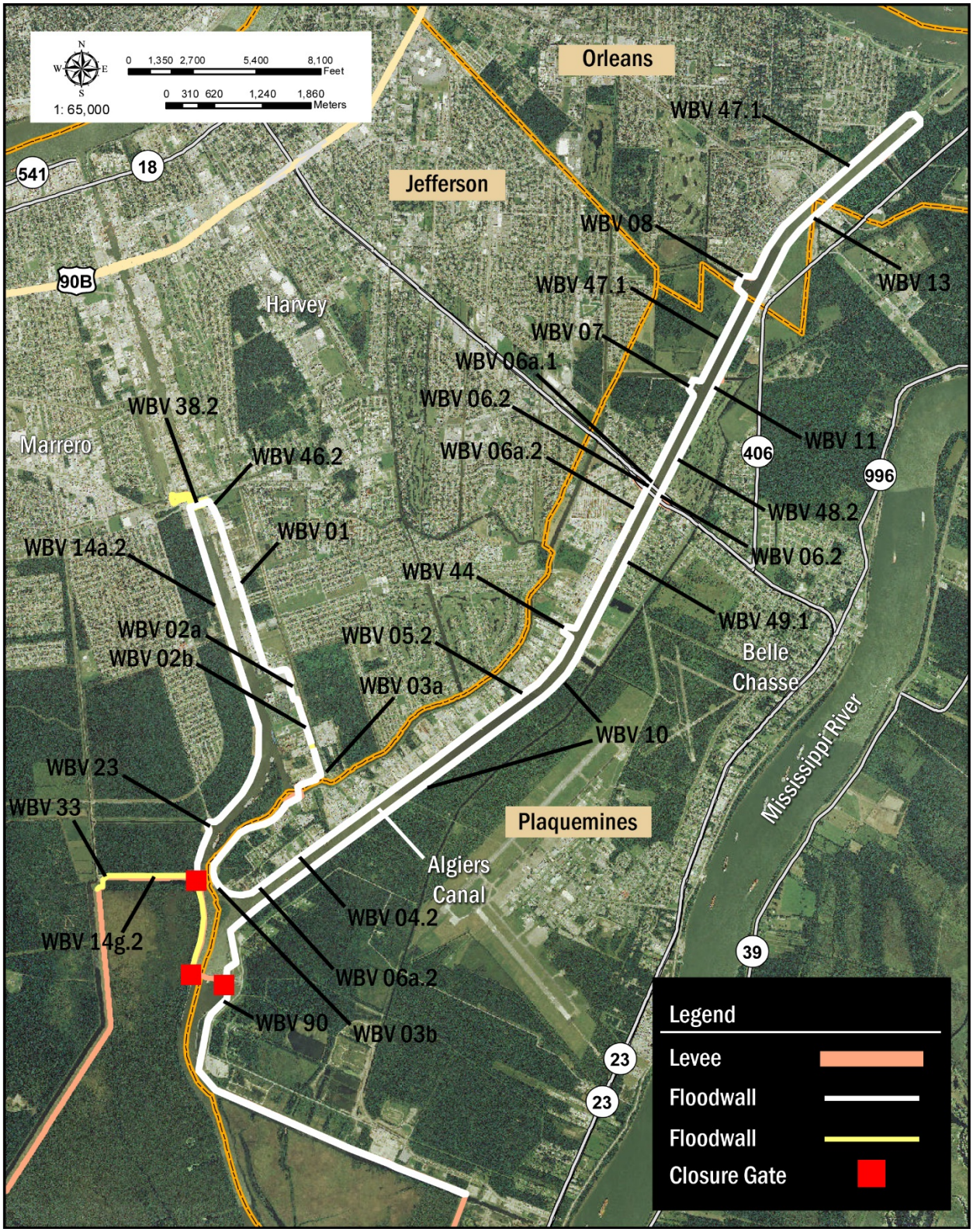
The constructed action for IER # 12 consisted of constructing the West Closure Complex which consists of a pump station, sector gate, and approximately 3 miles of levee and floodwall to provide 100-year level of risk reduction fronting protection for pump stations and backflow prevention. Existing pump stations in the detention basin behind the surge barrier also received fronting protection (El. 8.5 ft, less than 100-year level of risk reduction) and backflow prevention. Several design changes occurred throughout the project and they were described in supplemental IERS #12, 12.a, and 12/13. Details of the constructed actions are available in the IER at www.nolaenvironmental.gov.

Individual contracts included in IER #12 are listed below, and figure 2-12 provides an overview of the projects.

| | |
|---|---|
| WBV01 | Contract 1, Sector Gate to Boomtown Floodwall |
| WBV02a | US Minerals to Boomtown Casino, East of Harvey Canal Floodwall |
| WBV02b | Boomtown Casino to Hero Pumping Station East of Harvey Canal Floodwall |
| WBV03a | Contract 3a, Hero PS to Algiers Canal |
| WBV03b | Contract 3b, Hero PS to Algiers Canal |
| WBV04.2 | Belle Chasse Hwy to Hero Cutoff - Reach 1 - Phase 2 |
| WBV05.2 | Belle Chasse Hwy to Hero Cutoff - Reach 2 - Phase 2 |
| WBV06.2 | Belle Chasse Hwy to Hero Cutoff - Reach 3 & 4 - Phase 2 |
| WBV06a.1 | West of Algiers Canal Levee Enlargement, Belle Chase Hwy to Hero Cut-Off |
| WBV06a.2 | Belle Chasse Hwy to Hero Cutoff - Phase 2 |
| WBV07 | Planters PS Fronting Protection and Modifications |
| WBV08 | S&WB PS #13 Fronting Protection and Modifications |
| WBV10 | Belle Chasse PS #1 (Plaquemines PS) Fronting Protection and Modifications |
| WBV11 | Belle Chasse PS #2 Fronting Protection and Modifications |
| WBV13 | S&WB PS #11 Fronting Protection and Modifications |
| WBV14a.2 | Estelle PS to Vicinity of LaPalco Overpass - Phase 2 |
| WBV14g.2 | Estelle PS Vicinity Floodwalls |
| WBV23 | New Estelle PS Floodwall Modifications |

| | |
|---|---|
| WBV33 | Old Estelle PS Fronting Protection and Modifications |
| WBV38.2 | Cousins PS - Phase 2 |
| WBV44 | Whitney Barataria PS Floodwall Modifications |
| WBV46.2 | Cousins Canal Walls - Destrehan Bridge to Sector Gate |
| WBV47.1 | Algiers Lock to Belle Chase Hwy (West) - Phase 1 |
| WBV48.2 | Belle Chase Hwy to Algiers Lock (West) - Phase 2 |
| WBV49.1 | Hero Levee to Belle Chase Hwy (East) - Phase 1 |
| WBV90 | GIWW West Closure Complex |

**Figure 2-12. IER #12, IERS #12, IERS #12.a and IERS #12/13 Project Area**



## Table 2-12a. Materials Quantities for Construction Reaches in IER #12

| Reach | Earthen Fill CY | Concrete CY | Aggregate Tons | Sheet Pile SF | H-Pile VLF | Pipe Pile VLF | Concrete Pile VLF | Rock Tons |
|---|---|---|---|---|---|---|---|---|
| WBV01 | - | 41,200 | 62,300 | 369,200 | 719,800 | - | 6,200 | - |
| WBV02a | - | 18,900 | 28,600 | 245,200 | 261,900 | - | - | - |
| WBV02b | - | 18,700 | 28,200 | 261,600 | 213,800 | - | - | - |
| WBV03a | - | 500 | 700 | 33,200 | 96,900 | - | - | 2,800 |
| WBV03b | 453,300 | 400 | 700 | 43,900 | 70,200 | - | - | - |
| WBV04.2 | - | 200 | 300 | 17,300 | - | - | 20,100 | - |
| WBV05.2 | - | - | - | 9,200 | - | - | 18,700 | - |
| WBV06.2 | 800 | 3,200 | 4,900 | 48,600 | 52,700 | - | - | LT50 |
| WBV06a.1 | 230,800 | - | - | 24,500 | - | - | - | - |
| WBV06a.2 | 58,300 | - | - | - | - | - | - | - |
| WBV07 | 6,000 | 3,300 | 5,000 | 23,000 | 26,200 | - | 13,200 | 5,600 |
| WBV08 | 9,300 | LT50 | LT50 | 27,200 | 30,100 | - | 13,900 | - |
| WBV10 | 6,500 | 200 | 300 | 12,400 | 22,700 | - | 14,800 | 4,800 |
| WBV11 | 2,800 | 200 | 300 | 9,800 | 13,200 | - | 7,100 | - |
| WBV13 | 4,200 | 200 | 200 | 21,100 | 24,300 | - | 12,400 | - |
| WBV14a.2 | 270,400 | 200 | 300 | 14,400 | 18,600 | - | - | 400 |
| WBV14g.2 | 2,400 | 12,400 | 18,800 | 140,800 | 212,600 | - | - | - |
| WBV23 | - | 400 | 600 | 28,300 | 16,300 | - | - | LT50 |
| WBV33 | 4,200 | 300 | 500 | 9,400 | 50,800 | - | - | 1,100 |
| WBV38.2 | 1,800 | 1,400 | 2,200 | - | 15,100 | - | 1,000 | 1,600 |
| WBV44 | 2,800 | 500 | 800 | 58,200 | 24,000 | - | - | - |
| WBV46.2 | - | 1,900 | 2,900 | 6,200 | 12,900 | - | - | - |
| WBV47.1 | 132,300 | - | - | - | - | - | - | - |
| WBV48.2 | 31,800 | - | - | - | - | - | - | - |
| WBV49.1 | 21,800 | - | - | - | - | - | - | - |
| WBV90 | - | 132,800 | 200,800 | 294,800 | 34,900 | 295,500 | 210,800 | 312,600 |

## Table 2-12b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #12

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV01 | 810 | Feb-08 | - | - | - | - | - | - |
| WBV02a | 680 | Jul-08 | - | - | - | - | - | - |
| WBV02b | 410 | Jul-07 | - | - | - | - | - | - |
| WBV03a | 1,030 | Jul-08 | - | - | - | - | - | - |
| WBV03b | 560 | Dec-08 | 45,300 | 240 | 317,300 | 1,700 | 90,700 | 490 |
| WBV04.2 | 460 | Oct-10 | - | - | - | - | - | - |
| WBV05.2 | 420 | Oct-10 | - | - | - | - | - | - |
| WBV06.2 | 880 | Dec-10 | 100 | LT10 | 600 | LT10 | 200 | LT10 |
| WBV06a.1 | 660 | Jan-08 | 23,100 | 110 | 161,600 | 730 | 46,200 | 210 |
| WBV06a.2 | 250 | Oct-10 | 5,800 | 70 | 40,800 | 490 | 11,700 | 140 |
| WBV07 | 720 | Dec-09 | 600 | LT10 | 4,200 | 20 | 1,200 | LT10 |
| WBV08 | 1,120 | Oct-09 | 900 | LT10 | 6,500 | 20 | 1,900 | LT10 |
| WBV10 | 1,510 | Sep-09 | 700 | LT10 | 4,600 | LT10 | 1,300 | LT10 |
| WBV11 | 720 | Nov-10 | 300 | LT10 | 1,900 | LT10 | 600 | LT10 |
| WBV13 | 1,340 | Oct-09 | 400 | LT10 | 3,000 | LT10 | 800 | LT10 |
| WBV14a.2 | 530 | Dec-10 | 27,000 | 150 | 189,200 | 1,070 | 54,100 | 310 |
| WBV14g.2 | 610 | Sep-09 | 200 | LT10 | 1,700 | LT10 | 500 | LT10 |
| WBV23 | 510 | Apr-10 | - | - | - | - | - | - |
| WBV33 | 680 | Oct-09 | 400 | LT10 | 2,900 | 10 | 800 | LT10 |
| WBV38.2 | 1,060 | Nov-10 | 200 | LT10 | 1,300 | LT10 | 400 | LT10 |
| WBV44 | 340 | Aug-10 | 300 | LT10 | 1,900 | 20 | 600 | LT10 |
| WBV46.2 | 480 | May-10 | - | - | - | - | - | - |
| WBV47.1 | 260 | Nov-10 | 13,200 | 150 | 92,600 | 1,070 | 26,500 | 310 |
| WBV48.2 | 130 | Nov-10 | 3,200 | 70 | 22,200 | 510 | 6,400 | 150 |
| WBV49.1 | 210 | Nov-10 | 2,200 | 30 | 15,300 | 220 | 4,400 | 60 |
| WBV90 | 1,220 | Jul-09 | - | - | - | - | - | - |

## Table 2-12c. Steel Demand (Tons) by Project Period in IER #12

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV01 | 810 | Feb-08 | 39,420 | 150 | - | - | - | - |
| WBV02a | 680 | Jul-08 | 16,560 | 70 | - | - | - | - |
| WBV02b | 410 | Jul-07 | 14,750 | 110 | - | - | - | - |
| WBV03a | 1,030 | Jul-08 | 4,970 | 10 | - | - | - | - |
| WBV03b | 560 | Dec-08 | 4,000 | 20 | - | - | - | - |
| WBV04.2 | 460 | Oct-10 | 350 | LT10 | - | - | - | - |
| WBV05.2 | 420 | Oct-10 | 180 | LT10 | - | - | - | - |
| WBV06.2 | 880 | Dec-10 | 3,320 | 10 | - | - | - | - |
| WBV06a.1 | 660 | Jan-08 | 490 | LT10 | - | - | - | - |
| WBV06a.2 | 250 | Oct-10 | - | - | - | - | - | - |
| WBV07 | 720 | Dec-09 | 1,630 | LT10 | - | - | - | - |
| WBV08 | 1,120 | Oct-09 | 1,880 | LT10 | - | - | - | - |
| WBV10 | 1,510 | Sep-09 | 1,260 | LT10 | - | - | - | - |
| WBV11 | 720 | Nov-10 | 780 | LT10 | - | - | - | - |
| WBV13 | 1,340 | Oct-09 | 1,500 | LT10 | - | - | - | - |
| WBV14a.2 | 530 | Dec-10 | 1,110 | LT10 | - | - | - | - |
| WBV14g.2 | 610 | Sep-09 | 12,280 | 60 | - | - | - | - |
| WBV23 | 510 | Apr-10 | 1,290 | LT10 | - | - | - | - |
| WBV33 | 680 | Oct-09 | 2,450 | 10 | - | - | - | - |
| WBV38.2 | 1,060 | Nov-10 | 670 | LT10 | - | - | - | - |
| WBV44 | 340 | Aug-10 | 2,230 | 20 | - | - | - | - |
| WBV46.2 | 480 | May-10 | 700 | LT10 | - | - | - | - |
| WBV47.1 | 260 | Nov-10 | - | - | - | - | - | - |
| WBV48.2 | 130 | Nov-10 | - | - | - | - | - | - |
| WBV49.1 | 210 | Nov-10 | - | - | - | - | - | - |
| WBV90 | 1,220 | Jul-09 | 26,070 | 60 | - | - | - | - |

## Table 2-12d. Concrete Demand (Cubic Yards) by Project Period in IER #12

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV01 | 810 | Feb-08 | 8,240 | 30 | 16,470 | 60 | 16,470 | 60 |
| WBV02a | 680 | Jul-08 | 3,790 | 20 | 7,580 | 30 | 7,580 | 30 |
| WBV02b | 410 | Jul-07 | 3,740 | 30 | 7,470 | 50 | 7,470 | 50 |
| WBV03a | 1,030 | Jul-08 | 90 | LT10 | 190 | LT10 | 190 | LT10 |
| WBV03b | 560 | Dec-08 | 90 | LT10 | 170 | LT10 | 170 | LT10 |
| WBV04.2 | 460 | Oct-10 | 40 | LT10 | 70 | LT10 | 70 | LT10 |
| WBV05.2 | 420 | Oct-10 | - | - | - | - | - | - |
| WBV06.2 | 880 | Dec-10 | 650 | LT10 | 1,300 | LT10 | 1,300 | LT10 |
| WBV06a.1 | 660 | Jan-08 | - | - | - | - | - | - |
| WBV06a.2 | 250 | Oct-10 | - | - | - | - | - | - |
| WBV07 | 720 | Dec-09 | 660 | LT10 | 1,330 | LT10 | 1,330 | LT10 |
| WBV08 | 1,120 | Oct-09 | LT10 | LT10 | LT10 | LT10 | 10 | LT10 |
| WBV10 | 1,510 | Sep-09 | 40 | LT10 | 80 | LT10 | 80 | LT10 |
| WBV11 | 720 | Nov-10 | 40 | LT10 | 90 | LT10 | 90 | LT10 |
| WBV13 | 1,340 | Oct-09 | 30 | LT10 | 60 | LT10 | 60 | LT10 |
| WBV14a.2 | 530 | Dec-10 | 40 | LT10 | 80 | LT10 | 80 | LT10 |
| WBV14g.2 | 610 | Sep-09 | 2,490 | 10 | 4,970 | 20 | 4,970 | 20 |
| WBV23 | 510 | Apr-10 | 80 | LT10 | 150 | LT10 | 150 | LT10 |
| WBV33 | 680 | Oct-09 | 60 | LT10 | 130 | LT10 | 130 | LT10 |
| WBV38.2 | 1,060 | Nov-10 | 290 | LT10 | 580 | LT10 | 580 | LT10 |
| WBV44 | 340 | Aug-10 | 100 | LT10 | 200 | LT10 | 200 | LT10 |
| WBV46.2 | 480 | May-10 | 390 | LT10 | 780 | LT10 | 780 | LT10 |
| WBV47.1 | 260 | Nov-10 | - | - | - | - | - | - |
| WBV48.2 | 130 | Nov-10 | - | - | - | - | - | - |
| WBV49.1 | 210 | Nov-10 | - | - | - | - | - | - |
| WBV90 | 1,220 | Jul-09 | 26,560 | 70 | 53,120 | 130 | 53,120 | 130 |

## Table 2-12e. Aggregate Demand (Tons) by Project Period in IER #12

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV01 | 810 | Feb-08 | 12,450 | 50 | 24,910 | 90 | 24,910 | 90 |
| WBV02a | 680 | Jul-08 | 5,730 | 30 | 11,460 | 50 | 11,460 | 50 |
| WBV02b | 410 | Jul-07 | 5,650 | 40 | 11,290 | 80 | 11,290 | 80 |
| WBV03a | 1,030 | Jul-08 | 140 | LT10 | 280 | LT10 | 280 | LT10 |
| WBV03b | 560 | Dec-08 | 130 | LT10 | 260 | LT10 | 260 | LT10 |
| WBV04.2 | 460 | Oct-10 | 50 | LT10 | 110 | LT10 | 110 | LT10 |
| WBV05.2 | 420 | Oct-10 | - | - | - | - | - | - |
| WBV06.2 | 880 | Dec-10 | 980 | LT10 | 1,960 | LT10 | 1,960 | LT10 |
| WBV06a.1 | 660 | Jan-08 | - | - | - | - | - | - |
| WBV06a.2 | 250 | Oct-10 | - | - | - | - | - | - |
| WBV07 | 720 | Dec-09 | 1,000 | LT10 | 2,010 | LT10 | 2,010 | LT10 |
| WBV08 | 1,120 | Oct-09 | LT10 | LT10 | LT10 | LT10 | LT10 | LT10 |
| WBV10 | 1,510 | Sep-09 | 60 | LT10 | 130 | LT10 | 130 | LT10 |
| WBV11 | 720 | Nov-10 | 70 | LT10 | 140 | LT10 | 140 | LT10 |
| WBV13 | 1,340 | Oct-09 | 50 | LT10 | 90 | LT10 | 90 | LT10 |
| WBV14a.2 | 530 | Dec-10 | 60 | LT10 | 130 | LT10 | 130 | LT10 |
| WBV14g.2 | 610 | Sep-09 | 3,760 | 20 | 7,520 | 40 | 7,520 | 40 |
| WBV23 | 510 | Apr-10 | 110 | LT10 | 230 | LT10 | 230 | LT10 |
| WBV33 | 680 | Oct-09 | 100 | LT10 | 200 | LT10 | 200 | LT10 |
| WBV38.2 | 1,060 | Nov-10 | 440 | LT10 | 870 | LT10 | 870 | LT10 |
| WBV44 | 340 | Aug-10 | 150 | LT10 | 310 | LT10 | 310 | LT10 |
| WBV46.2 | 480 | May-10 | 590 | LT10 | 1,180 | LT10 | 1,180 | LT10 |
| WBV47.1 | 260 | Nov-10 | - | - | - | - | - | - |
| WBV48.2 | 130 | Nov-10 | - | - | - | - | - | - |
| WBV49.1 | 210 | Nov-10 | - | - | - | - | - | - |
| WBV90 | 1,220 | Jul-09 | 40,160 | 100 | 80,320 | 200 | 80,320 | 200 |

## Table 2-12f. Concrete Pile Demand (Tons) by Project Period in IER #12

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV01 | 810 | Feb-08 | 1,660 | LT10 | - | - | - | - |
| WBV02a | 680 | Jul-08 | - | - | - | - | - | - |
| WBV02b | 410 | Jul-07 | - | - | - | - | - | - |
| WBV03a | 1,030 | Jul-08 | - | - | - | - | - | - |
| WBV03b | 560 | Dec-08 | - | - | - | - | - | - |
| WBV04.2 | 460 | Oct-10 | 5,380 | 40 | - | - | - | - |
| WBV05.2 | 420 | Oct-10 | 5,000 | 40 | - | - | - | - |
| WBV06.2 | 880 | Dec-10 | - | - | - | - | - | - |
| WBV06a.1 | 660 | Jan-08 | - | - | - | - | - | - |
| WBV06a.2 | 250 | Oct-10 | - | - | - | - | - | - |
| WBV07 | 720 | Dec-09 | 3,520 | 10 | - | - | - | - |
| WBV08 | 1,120 | Oct-09 | 3,710 | LT10 | - | - | - | - |
| WBV10 | 1,510 | Sep-09 | 3,940 | LT10 | - | - | - | - |
| WBV11 | 720 | Nov-10 | 1,910 | LT10 | - | - | - | - |
| WBV13 | 1,340 | Oct-09 | 3,310 | LT10 | - | - | - | - |
| WBV14a.2 | 530 | Dec-10 | - | - | - | - | - | - |
| WBV14g.2 | 610 | Sep-09 | - | - | - | - | - | - |
| WBV23 | 510 | Apr-10 | - | - | - | - | - | - |
| WBV33 | 680 | Oct-09 | - | - | - | - | - | - |
| WBV38.2 | 1,060 | Nov-10 | 260 | LT10 | - | - | - | - |
| WBV44 | 340 | Aug-10 | - | - | - | - | - | - |
| WBV46.2 | 480 | May-10 | - | - | - | - | - | - |
| WBV47.1 | 260 | Nov-10 | - | - | - | - | - | - |
| WBV48.2 | 130 | Nov-10 | - | - | - | - | - | - |
| WBV49.1 | 210 | Nov-10 | - | - | - | - | - | - |
| WBV90 | 1,220 | Jul-09 | 56,270 | 140 | - | - | - | - |

## Table 2-12g. Rock Demand (Tons) by Project Period in IER #12

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV01 | 810 | Feb-08 | - | - | - | - | - | - |
| WBV02a | 680 | Jul-08 | - | - | - | - | - | - |
| WBV02b | 410 | Jul-07 | - | - | - | - | - | - |
| WBV03a | 1,030 | Jul-08 | - | - | - | - | 2,820 | LT10 |
| WBV03b | 560 | Dec-08 | - | - | - | - | - | - |
| WBV04.2 | 460 | Oct-10 | - | - | - | - | - | - |
| WBV05.2 | 420 | Oct-10 | - | - | - | - | - | - |
| WBV06.2 | 880 | Dec-10 | - | - | - | - | LT10 | LT10 |
| WBV06a.1 | 660 | Jan-08 | - | - | - | - | - | - |
| WBV06a.2 | 250 | Oct-10 | - | - | - | - | - | - |
| WBV07 | 720 | Dec-09 | - | - | - | - | 5,610 | 20 |
| WBV08 | 1,120 | Oct-09 | - | - | - | - | - | - |
| WBV10 | 1,510 | Sep-09 | - | - | - | - | 4,820 | LT10 |
| WBV11 | 720 | Nov-10 | - | - | - | - | - | - |
| WBV13 | 1,340 | Oct-09 | - | - | - | - | - | - |
| WBV14a.2 | 530 | Dec-10 | - | - | - | - | 360 | LT10 |
| WBV14g.2 | 610 | Sep-09 | - | - | - | - | - | - |
| WBV23 | 510 | Apr-10 | - | - | - | - | 20 | LT10 |
| WBV33 | 680 | Oct-09 | - | - | - | - | 1,130 | LT10 |
| WBV38.2 | 1,060 | Nov-10 | - | - | - | - | 1,600 | LT10 |
| WBV44 | 340 | Aug-10 | - | - | - | - | - | - |
| WBV46.2 | 480 | May-10 | - | - | - | - | - | - |
| WBV47.1 | 260 | Nov-10 | - | - | - | - | - | - |
| WBV48.2 | 130 | Nov-10 | - | - | - | - | - | - |
| WBV49.1 | 210 | Nov-10 | - | - | - | - | - | - |
| WBV90 | 1,220 | Jul-09 | - | - | - | - | 312,580 | 770 |

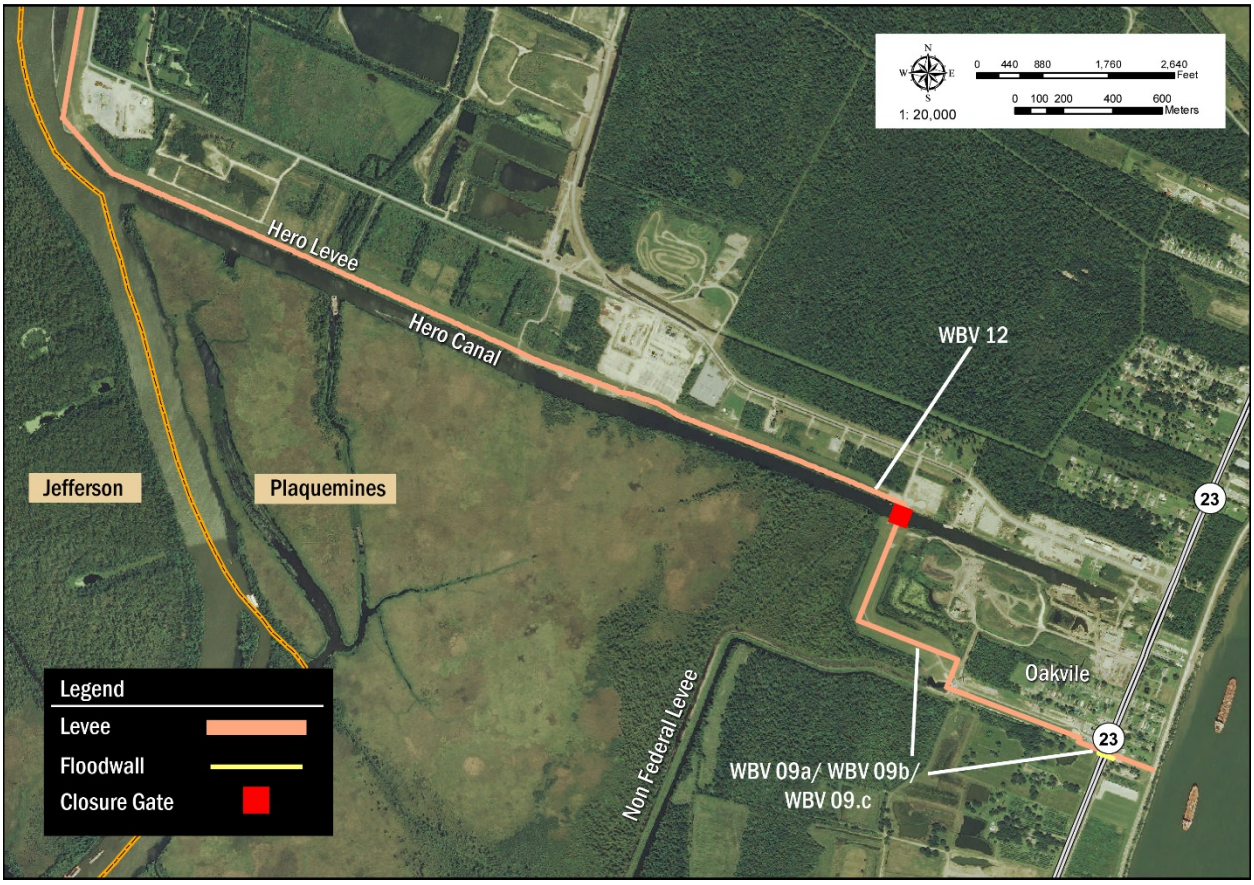
## *2.12 IER #13 – Hero Canal Levee and Eastern Terminus, Plaquemines Parish, Louisiana*

The constructed actions for IER #13 include raising approximately nine miles of earthen levees, replacing over 3,000 feet of floodwalls, rebuilding or modifying four drainage structures, closing one drainage structure, and modifying one railroad gate. Some design changes occurred throughout the project and they were described in supplemental IERS 13.a.
Details of the constructed action are available in the Final IER at www.nolaenvironmental.gov.

Individual contracts included in IER #13 are listed below, and figure 2-13 provides an overview of the projects.

| | |
|---|---|
| WBV09.c | Hero Canal to Oakville – Highway Structures |
| WBV09a | Hero Canal to Oakville - Levees |
| WBV09b | Hero Canal to Oakville - Structures |
| WBV12 | Hero Canal Reach 1 - 2nd Enlargement |

**Figure 2-13. IER #13 and IERS #13.a Project Area**



## Table 2-13a. Materials Quantities for Construction Reaches in IER #13

| Reach | Earthen Fill CY | Concrete CY | Aggregate Tons | Sheet Pile SF | H-Pile VLF | Pipe Pile VLF | Concrete Pile VLF | Rock Tons |
|---|---|---|---|---|---|---|---|---|
| WBV09.c | 6,800 | 600 | 900 | 19,800 | 20,400 | - | 700 | - |
| WBV09a | 363,000 | LT50 | 100 | 20,200 | 25,900 | - | LT50 | 6,600 |
| WBV09b | 20,700 | 300 | 500 | 23,000 | 49,400 | - | 8,400 | 37,500 |
| WBV12 | 284,400 | - | - | 62,300 | - | - | - | 1,600 |

## Table 2-13b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #13

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV09.c | 1,080 | Jul-10 | 700 | LT10 | 4,800 | 10 | 1,400 | LT10 |
| WBV09a | 480 | Jul-10 | 36,300 | 230 | 254,100 | 1,590 | 72,600 | 450 |
| WBV09b | 470 | Feb-10 | 2,100 | 10 | 14,500 | 90 | 4,100 | 30 |
| WBV12 | 2,050 | Apr-09 | 28,400 | 40 | 199,100 | 290 | 56,900 | 80 |

## Table 2-13c. Steel Demand (Tons) by Project Period in IER #13

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV09.c | 1,080 | Jul-10 | 1,300 | LT10 | - | - | - | - |
| WBV09a | 480 | Jul-10 | 1,560 | LT10 | - | - | - | - |
| WBV09b | 470 | Feb-10 | 2,660 | 20 | - | - | - | - |
| WBV12 | 2,050 | Apr-09 | 1,250 | LT10 | - | - | - | - |

## Table 2-13d. Concrete Demand (Cubic Yards) by Project Period in IER #13

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV09.c | 1,080 | Jul-10 | 110 | LT10 | 230 | LT10 | 230 | LT10 |
| WBV09a | 480 | Jul-10 | LT10 | LT10 | 10 | LT10 | 10 | LT10 |
| WBV09b | 470 | Feb-10 | 60 | LT10 | 130 | LT10 | 130 | LT10 |
| WBV12 | 2,050 | Apr-09 | - | - | - | - | - | - |

## Table 2-13e. Aggregate Demand (Tons) by Project Period in IER #13

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV09.c | 1,080 | Jul-10 | 170 | LT10 | 350 | LT10 | 350 | LT10 |
| WBV09a | 480 | Jul-10 | 10 | LT10 | 20 | LT10 | 20 | LT10 |
| WBV09b | 470 | Feb-10 | 100 | LT10 | 190 | LT10 | 190 | LT10 |
| WBV12 | 2,050 | Apr-09 | - | - | - | - | - | - |

## Table 2-13f. Concrete Pile Demand (Tons) by Project Period in IER #13

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV09.c | 1,080 | Jul-10 | 190 | LT10 | - | - | - | - |
| WBV09a | 480 | Jul-10 | 10 | LT10 | - | - | - | - |
| WBV09b | 470 | Feb-10 | 2,240 | 10 | - | - | - | - |
| WBV12 | 2,050 | Apr-09 | - | - | - | - | - | - |

## Table 2-13g. Rock Demand (Tons) by Project Period in IER #13

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV09.c | 1,080 | Jul-10 | - | - | - | - | - | - |
| WBV09a | 480 | Jul-10 | - | - | - | - | 6,600 | 40 |
| WBV09b | 470 | Feb-10 | - | - | - | - | 37,450 | 240 |
| WBV12 | 2,050 | Apr-09 | - | - | - | - | 1,580 | LT10 |

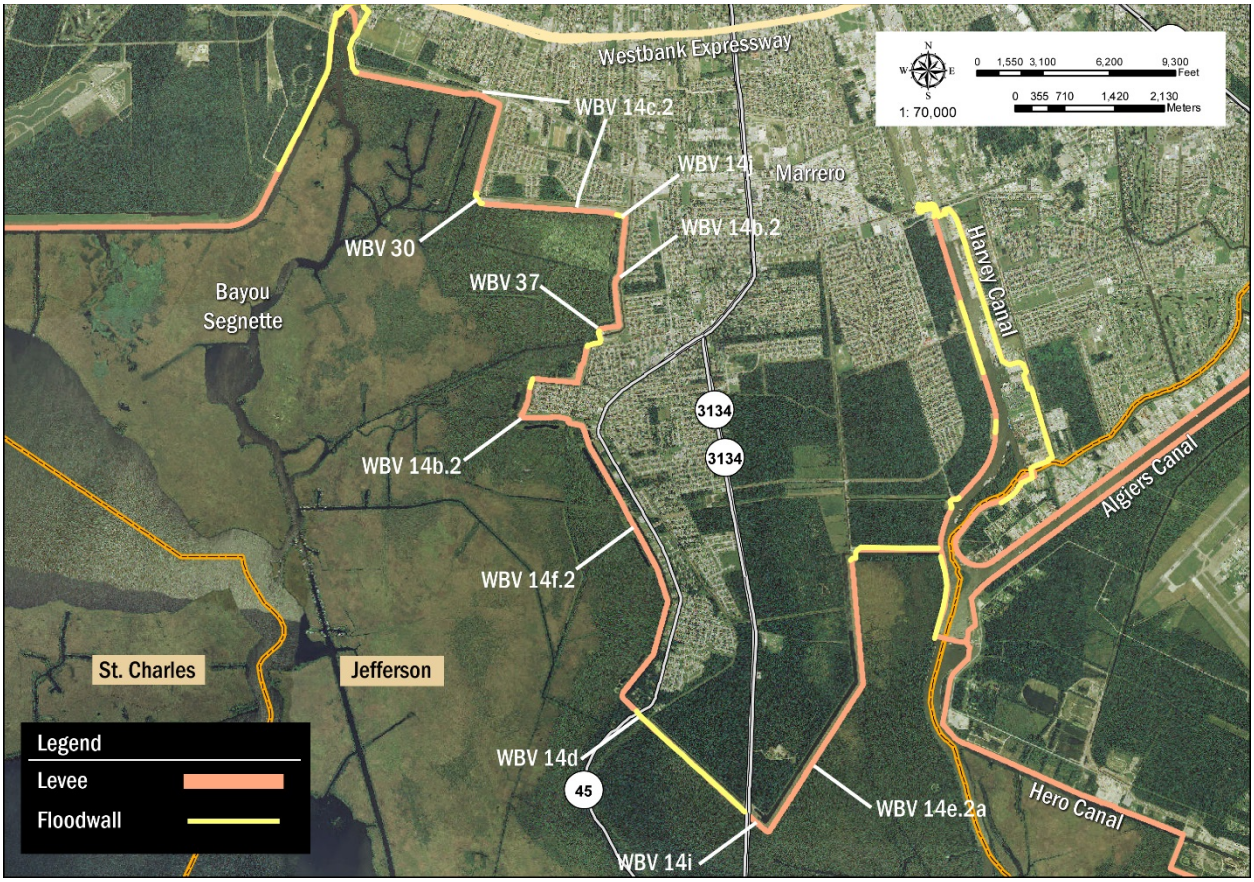
## 2.13 IER #14 – Westwego to Harvey Levee, Jefferson Parish, Louisiana

The constructed actions for IER #14 increased the elevation of five existing levee reaches to meet the 100-year level of risk reduction and replaced all existing pumping station fronting protection floodwalls with higher floodwall. Details of the constructed action are available in the Final IER at www.nolaenvironmental.gov.

Individual contracts included in IER #14 are listed below, and figure 2-14 provides an overview of the projects.

| | |
|---|---|
| WBV14b.1 | WBV-14b.1 Orleans Village to Hwy 45 Levee, Phase 1 |
| WBV14b.2 | Orleans Village to Hwy 45 Levee - Phase 2 |
| WBV14c.1 | Westwego to Harvey Canal, New Westwego Pumping Station to Orleans Village, Third Enlargement |
| WBV14c.2 | New Westwego PS to Vicinity Orleans Village - Phase 2 |
| WBV14d | V- Line Floodwall |
| WBV14e.1 | Westwego to Harvey Canal, V-Line Levee East of Vertex, Third Enlargement |
| WBV14e.2a | Westwego to Harvey Canal, V-Line Levee, East of Vertex, Phase 2 First Enlargement |
| WBV14f.2 | Hwy 45 Levee - Phase 2 |
| WBV14i | WBV-14i V-Line Levee, LA 3134 Highway Crossing |
| WBV14j | Westwego to Harvey Utility Crossings and Misc. Sector Gate Retrofits |
| WBV30 | Westminister PS Fronting Protection and Modifications |
| WBV37 | Ames / Mt. Kennedy Pump Station |

## Figure 2-14. IER #14 and IERS #14.a Project Area




## Table 2-14a. Materials Quantities for Construction Reaches in IER #14

| Reach | Earthen Fill CY | Concrete CY | Aggregate Tons | Sheet Pile SF | H-Pile VLF | Pipe Pile VLF | Concrete Pile VLF | Rock Tons |
|---|---|---|---|---|---|---|---|---|
| WBV14b.1 | 84,900 | - | - | - | - | - | - | 700 |
| WBV14b.2 | 245,800 | - | - | - | - | - | - | - |
| WBV14c.1 | 266,200 | - | - | - | - | - | - | - |
| WBV14c.2 | 972,800 | 1,000 | 1,500 | 13,000 | 8,800 | - | - | - |
| WBV14d | 75,800 | 9,700 | 14,700 | 210,000 | - | - | 128,600 | - |
| WBV14e.1 | 164,100 | - | - | - | - | - | - | - |
| WBV14e.2a | 391,200 | - | - | - | - | - | - | - |
| WBV14f.2 | 84,000 | - | - | - | - | - | - | LT50 |
| WBV14i | 6,800 | 6,200 | 9,300 | 2,900 | 3,500 | - | - | - |
| WBV14j | - | 2,900 | 4,400 | 66,900 | 11,000 | - | 7,600 | - |
| WBV30 | 2,900 | 100 | 200 | 22,500 | 21,100 | - | - | 400 |
| WBV37 | 4,600 | 5,200 | 7,900 | 53,000 | 42,200 | - | - | 600 |

## Table 2-14b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #14

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV14b.1 | 140 | Jan-08 | 8,500 | 180 | 59,400 | 1,270 | 17,000 | 360 |
| WBV14b.2 | 490 | Oct-09 | 24,600 | 150 | 172,100 | 1,050 | 49,200 | 300 |
| WBV14c.1 | 520 | Mar-08 | 26,600 | 150 | 186,300 | 1,070 | 53,200 | 310 |
| WBV14c.2 | 530 | Jun-10 | 97,300 | 550 | 680,900 | 3,850 | 194,600 | 1,100 |
| WBV14d | 590 | Jul-09 | 7,600 | 40 | 53,100 | 270 | 15,200 | 80 |
| WBV14e.1 | 250 | Jun-08 | 16,400 | 200 | 114,800 | 1,380 | 32,800 | 390 |
| WBV14e.2a | 620 | Jan-10 | 39,100 | 190 | 273,800 | 1,320 | 78,200 | 380 |
| WBV14f.2 | 240 | Sep-09 | - | - | - | - | - | - |
| WBV14f.2 | 1,690 | Sep-09 | 8,400 | 10 | 58,800 | 100 | 16,800 | 30 |
| WBV14i | 720 | Apr-10 | 700 | LT10 | 4,800 | 20 | 1,400 | LT10 |
| WBV14j | 350 | Dec-10 | - | - | - | - | - | - |
| WBV30 | 680 | Oct-09 | 300 | LT10 | 2,000 | LT10 | 600 | LT10 |
| WBV37 | 800 | Jun-10 | 500 | LT10 | 3,200 | 10 | 900 | LT10 |

## Table 2-14c. Steel Demand (Tons) by Project Period in IER #14

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV14b.1 | 140 | Jan-08 | - | - | - | - | - | - |
| WBV14b.2 | 490 | Oct-09 | - | - | - | - | - | - |
| WBV14c.1 | 520 | Mar-08 | - | - | - | - | - | - |
| WBV14c.2 | 530 | Jun-10 | 650 | LT10 | - | - | - | - |
| WBV14d | 590 | Jul-09 | 4,200 | 20 | - | - | - | - |
| WBV14e.1 | 250 | Jun-08 | - | - | - | - | - | - |
| WBV14e.2a | 620 | Jan-10 | - | - | - | - | - | - |
| WBV14f.2 | 240 | Sep-09 | - | - | - | - | - | - |
| WBV14f.2 | 1,690 | Sep-09 | - | - | - | - | - | - |
| WBV14i | 720 | Apr-10 | 210 | LT10 | - | - | - | - |
| WBV14j | 350 | Dec-10 | 1,830 | 20 | - | - | - | - |
| WBV30 | 680 | Oct-09 | 1,390 | LT10 | - | - | - | - |
| WBV37 | 800 | Jun-10 | 2,940 | 10 | - | - | - | - |

## Table 2-14d. Concrete Demand (Cubic Yards) by Project Period in IER #14

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV14b.1 | 140 | Jan-08 | - | - | - | - | - | - |
| WBV14b.2 | 490 | Oct-09 | - | - | - | - | - | - |
| WBV14c.1 | 520 | Mar-08 | - | - | - | - | - | - |
| WBV14c.2 | 530 | Jun-10 | 200 | LT10 | 400 | LT10 | 400 | LT10 |
| WBV14d | 590 | Jul-09 | 1,940 | LT10 | 3,880 | 20 | 3,880 | 20 |
| WBV14e.1 | 250 | Jun-08 | - | - | - | - | - | - |
| WBV14e.2a | 620 | Jan-10 | - | - | - | - | - | - |
| WBV14f.2 | 240 | Sep-09 | - | - | - | - | - | - |
| WBV14f.2 | 1,690 | Sep-09 | - | - | - | - | - | - |
| WBV14i | 720 | Apr-10 | 1,240 | LT10 | 2,470 | 10 | 2,470 | 10 |
| WBV14j | 350 | Dec-10 | 580 | LT10 | 1,160 | LT10 | 1,160 | LT10 |
| WBV30 | 680 | Oct-09 | 30 | LT10 | 50 | LT10 | 50 | LT10 |
| WBV37 | 800 | Jun-10 | 1,040 | LT10 | 2,080 | LT10 | 2,080 | LT10 |

## Table 2-14e. Aggregate Demand (Tons) by Project Period in IER #14

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV14b.1 | 140 | Jan-08 | - | - | - | - | - | - |
| WBV14b.2 | 490 | Oct-09 | - | - | - | - | - | - |
| WBV14c.1 | 520 | Mar-08 | - | - | - | - | - | - |
| WBV14c.2 | 530 | Jun-10 | 300 | LT10 | 600 | LT10 | 600 | LT10 |
| WBV14d | 590 | Jul-09 | 2,930 | 10 | 5,870 | 30 | 5,870 | 30 |
| WBV14e.1 | 250 | Jun-08 | - | - | - | - | - | - |
| WBV14e.2a | 620 | Jan-10 | - | - | - | - | - | - |
| WBV14f.2 | 240 | Sep-09 | - | - | - | - | - | - |
| WBV14f.2 | 1,690 | Sep-09 | - | - | - | - | - | - |
| WBV14i | 720 | Apr-10 | 1,870 | LT10 | 3,740 | 20 | 3,740 | 20 |
| WBV14j | 350 | Dec-10 | 880 | LT10 | 1,750 | 20 | 1,750 | 20 |
| WBV30 | 680 | Oct-09 | 40 | LT10 | 80 | LT10 | 80 | LT10 |
| WBV37 | 800 | Jun-10 | 1,580 | LT10 | 3,150 | 10 | 3,150 | 10 |

## Table 2-14f. Concrete Pile Demand (Tons) by Project Period in IER #14

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV14b.1 | 140 | Jan-08 | - | - | - | - | - | - |
| WBV14b.2 | 490 | Oct-09 | - | - | - | - | - | - |
| WBV14c.1 | 520 | Mar-08 | - | - | - | - | - | - |
| WBV14c.2 | 530 | Jun-10 | - | - | - | - | - | - |
| WBV14d | 590 | Jul-09 | 34,340 | 170 | - | - | - | - |
| WBV14e.1 | 250 | Jun-08 | - | - | - | - | - | - |
| WBV14e.2a | 620 | Jan-10 | - | - | - | - | - | - |
| WBV14f.2 | 240 | Sep-09 | - | - | - | - | - | - |
| WBV14f.2 | 1,690 | Sep-09 | - | - | - | - | - | - |
| WBV14i | 720 | Apr-10 | - | - | - | - | - | - |
| WBV14j | 350 | Dec-10 | 2,030 | 20 | - | - | - | - |
| WBV30 | 680 | Oct-09 | - | - | - | - | - | - |
| WBV37 | 800 | Jun-10 | - | - | - | - | - | - |

## Table 2-14g. Rock Demand (Tons) by Project Period in IER #14

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV14b.1 | 140 | Jan-08 | - | - | - | - | 660 | 10 |
| WBV14b.2 | 490 | Oct-09 | - | - | - | - | - | - |
| WBV14c.1 | 520 | Mar-08 | - | - | - | - | - | - |
| WBV14c.2 | 530 | Jun-10 | - | - | - | - | - | - |
| WBV14d | 590 | Jul-09 | - | - | - | - | - | - |
| WBV14e.1 | 250 | Jun-08 | - | - | - | - | - | - |
| WBV14e.2a | 620 | Jan-10 | - | - | - | - | - | - |
| WBV14f.2 | 240 | Sep-09 | - | - | - | - | - | - |
| WBV14f.2 | 1,690 | Sep-09 | - | - | - | - | 10 | LT10 |
| WBV14i | 720 | Apr-10 | - | - | - | - | - | - |
| WBV14j | 350 | Dec-10 | - | - | - | - | - | - |
| WBV30 | 680 | Oct-09 | - | - | - | - | 410 | LT10 |
| WBV37 | 800 | Jun-10 | - | - | - | - | 640 | LT10 |

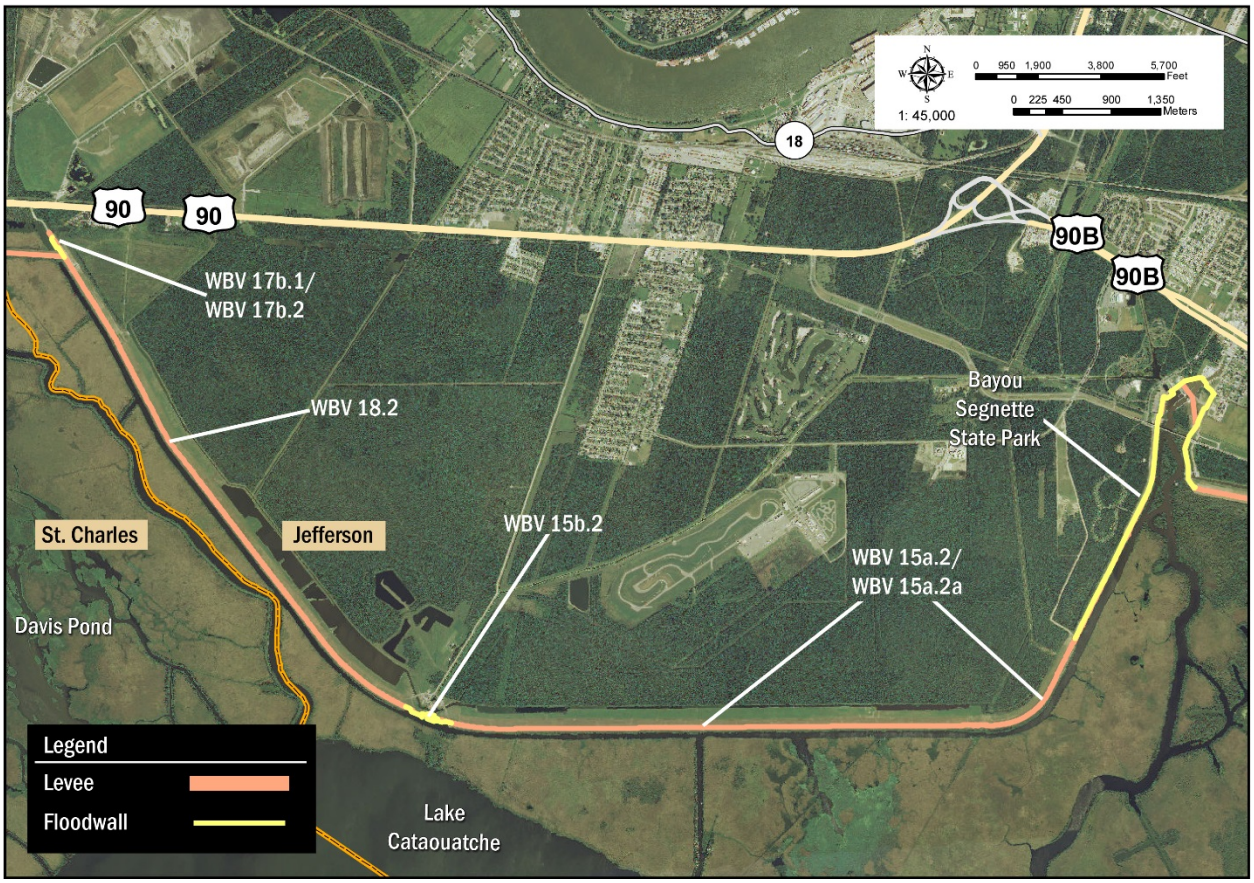
## *2.14IER #15 – Lake Cataouatche Levee, Jefferson Parish, Louisiana*

The constructed actions for IER #15 increased the elevation of approximately 8 miles of the Lake Cataouatche Levee and the Lake Cataouatche Pumping Station fronting protection to meet the 100-year level of risk reduction. Some design changes occurred throughout the project and they were described in supplemental IERS 15.a. Details of the constructed action are available in the Final IER at www.nolaenvironmental.gov.

Individual contracts included in IER #15 are listed below, and figure 2-15 provides an overview of the projects.

| | |
|---|---|
| WBV15a.2 | Lake Cataouatche PS to Segnette State Park - Phase 2 |
| WBV15a.2a | Lake Cataouatche Pump Station to Segnette State Park at Chevron Pipeline |
| WBV15b.2 | Lake Cataouatche PS Fronting Protection, Modifications – Phase 2 |
| WBV17b.1 | Station 160+00 to Hwy 90 – Phase 1 |
| WBV17b.2 | Station 160+00 to Hwy 90 – Phase 2 |
| WBV18.2 | Hwy 90 to Lake Cataouatche PS – Phase 2 |

## Figure 2-15. IER #15, IERS #15.a and IERS #15.b Project Area




## Table 2-15a. Materials Quantities for Construction Reaches in IER #15

| Reach | Earthen Fill CY | Concrete CY | Aggregate Tons | Sheet Pile SF | H-Pile VLF | Pipe Pile VLF | Concrete Pile VLF | Rock Tons |
|---|---|---|---|---|---|---|---|---|
| WBV15a.2 | 794,100 | - | - | - | - | - | - | 48,200 |
| WBV15a.2a | 91,800 | - | - | - | - | - | - | 17,700 |
| WBV15b.2 | 23,500 | 500 | 700 | 62,800 | 18,200 | - | 53,900 | 4,400 |
| WBV17b.1 | 225,000 | - | - | 32,000 | - | - | - | 2,000 |
| WBV17b.2 | 170,500 | - | - | - | - | - | - | - |
| WBV18.2 | - | - | - | - | - | - | - | - |

Note: Embankment for WBV18.2 was on-site, no other materials used to construct this project.

## Table 2-15b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #15

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV15a.2 | 630 | Feb-10 | 79,400 | 380 | 555,900 | 2,650 | 158,800 | 760 |
| WBV15a.2a | 400 | Feb-12 | 9,200 | 70 | 64,300 | 480 | 18,400 | 140 |
| WBV15b.2 | 1,610 | Apr-09 | 2,400 | LT10 | 16,500 | 30 | 4,700 | LT10 |
| WBV17b.1 | 610 | Mar-08 | 22,500 | 110 | 157,500 | 770 | 45,000 | 220 |
| WBV17b.2 | 370 | Nov-10 | 17,000 | 140 | 119,300 | 970 | 34,100 | 280 |
| WBV18.2 | 760 | Sep-09 | - | - | - | - | - | - |

Note: Embankment for WBV18.2 was on-site, no other materials used to construct this project.

## Table 2-15c. Steel Demand (Tons) by Project Period in IER #15

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV15a.2 | 630 | Feb-10 | - | - | - | - | - | - |
| WBV15a.2a | 400 | Feb-12 | - | - | - | - | - | - |
| WBV15b.2 | 1,610 | Apr-09 | 2,070 | LT10 | - | - | - | - |
| WBV17b.1 | 610 | Mar-08 | 640 | LT10 | - | - | - | - |
| WBV17b.2 | 370 | Nov-10 | - | - | - | - | - | - |
| WBV18.2 | 760 | Sep-09 | - | - | - | - | - | - |

## Table 2-15d. Concrete Demand (Cubic Yards) by Project Period in IER #15

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV15a.2 | 630 | Feb-10 | - | - | - | - | - | - |
| WBV15a.2a | 400 | Feb-12 | - | - | - | - | - | - |
| WBV15b.2 | 1,610 | Apr-09 | 90 | LT10 | 180 | LT10 | 180 | LT10 |
| WBV17b.1 | 610 | Mar-08 | - | - | - | - | - | - |
| WBV17b.2 | 370 | Nov-10 | - | - | - | - | - | - |
| WBV18.2 | 760 | Sep-09 | - | - | - | - | - | - |

## Table 2-15e. Aggregate Demand (Tons) by Project Period in IER #15

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV15a.2 | 630 | Feb-10 | - | - | - | - | - | - |
| WBV15a.2a | 400 | Feb-12 | - | - | - | - | - | - |
| WBV15b.2 | 1,610 | Apr-09 | 140 | LT10 | 280 | LT10 | 280 | LT10 |
| WBV17b.1 | 610 | Mar-08 | - | - | - | - | - | - |
| WBV17b.2 | 370 | Nov-10 | - | - | - | - | - | - |
| WBV18.2 | 760 | Sep-09 | - | - | - | - | - | - |

## Table 2-15f. Concrete Pile Demand (Tons) by Project Period in IER #15

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV15a.2 | 630 | Feb-10 | - | - | - | - | - | - |
| WBV15a.2a | 400 | Feb-12 | - | - | - | - | - | - |
| WBV15b.2 | 1,610 | Apr-09 | 14,400 | 30 | - | - | - | - |
| WBV17b.1 | 610 | Mar-08 | - | - | - | - | - | - |
| WBV17b.2 | 370 | Nov-10 | - | - | - | - | - | - |
| WBV18.2 | 760 | Sep-09 | - | - | - | - | - | - |

## Table 2-15g. Rock Demand (Tons) by Project Period in IER #15

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV15a.2 | 630 | Feb-10 | - | - | - | - | 48,220 | 230 |
| WBV15a.2a | 400 | Feb-12 | - | - | - | - | 17,660 | 130 |
| WBV15b.2 | 1,610 | Apr-09 | - | - | - | - | 4,430 | LT10 |
| WBV17b.1 | 610 | Mar-08 | - | - | - | - | 1,980 | LT10 |
| WBV17b.2 | 370 | Nov-10 | - | - | - | - | - | - |
| WBV18.2 | 760 | Sep-09 | - | - | - | - | - | - |

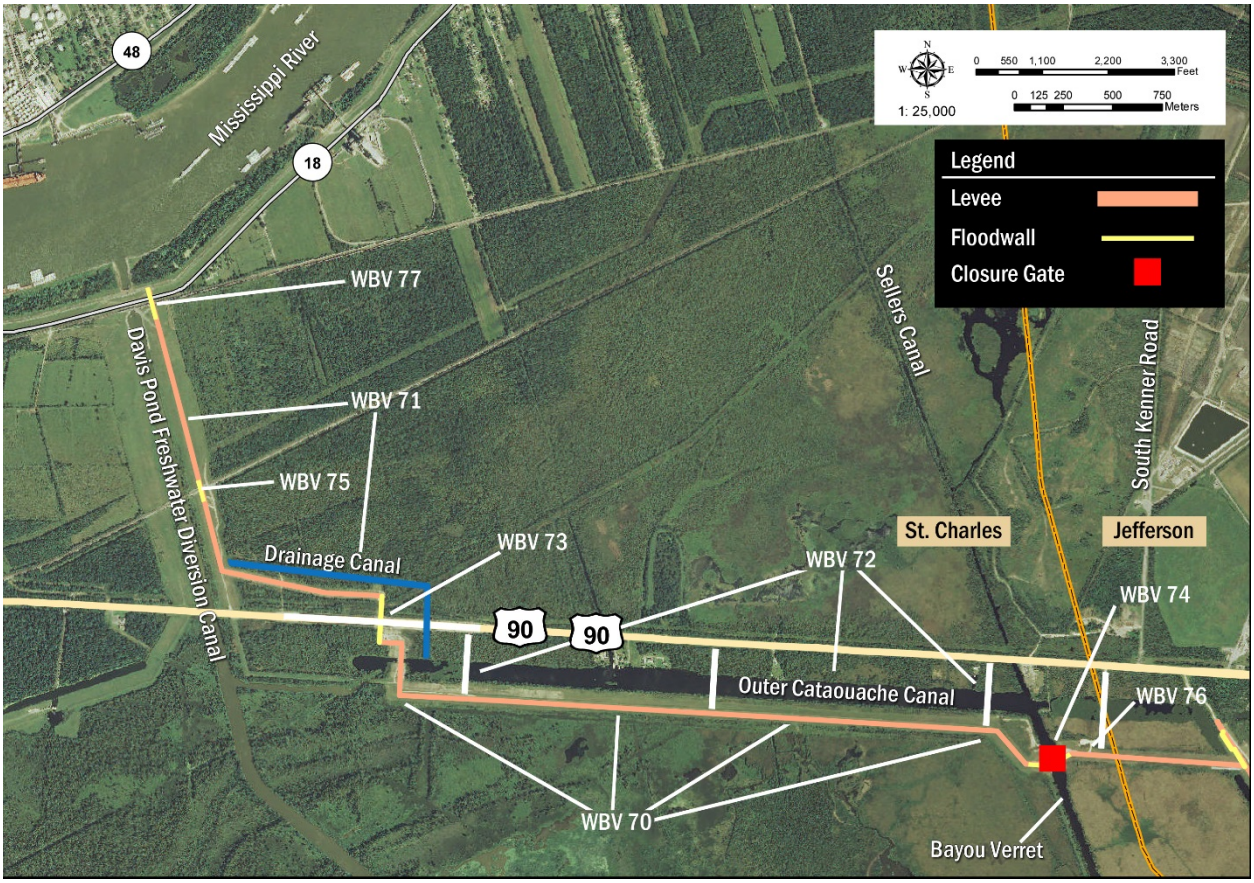
## 2.15 IER #16 – Western Tie-In, Jefferson and St. Charles Parishes, Louisiana

The constructed actions for IER #16 required construction of new levee, floodwall, and closure structures to complete the western terminus of the WBV Project; although authorized, the western tie in (connecting to the Mississippi River Levee) was never completed. The constructed action followed an alignment south of Hwy 90 and south of the Outer Cataouatche Canal and then north along the eastern side of the Davis Pond Freshwater Diversion Canal to the Mississippi River Levee. The western tie in was completed in 11 construction contracts: WBV 70, 71, 72, 73, 74, 75, 76, 77, 81, 82, and 83. Several design changes occurred throughout the project and they were described in supplemental IERS 16.a. Details of the constructed action are available at www.nolaenvironmental.gov.

Individual contracts included in IER #16 are listed below, and figure 2-16 provides an overview of the projects.

| | |
|---|---|
| WBV70 | Western Tie-In Levees ( South ) |
| WBV71 | Western Tie-In Levees ( North ) |
| WBV72 | Western Tie-In Levees ( East – West ) |
| WBV73 | Western Tie-In Hwy 90 X-ing |
| WBV74 | Western Tie-In Sector Gate / Drainage |
| WBV75 | Western Tie-In Railroad |
| WBV76 | Western Tie-in Hwy 90 Pump Station |
| WBV77 | Western Tie-in UP Railroad and LA-18 Crossing |
| WBV81 | Chevron 30-inch pipeline relocation along Algiers Canal |
| WBV82 | Gulf South 12-inch pipeline relocation along Algiers Canal |
| WBV83 | AT&T submarine lines relocation along Algiers Canal |

## Figure 2-16. IER #16, IERS #16.a and IERS #16.b Project Area




## Table 2-16a. Materials Quantities for Construction Reaches in IER #16

| Reach | Earthen Fill CY | Concrete CY | Aggregate Tons | Sheet Pile SF | H-Pile VLF | Pipe Pile VLF | Pile VLF | Rock Tons |
|---|---|---|---|---|---|---|---|---|
| WBV70 | - | - | 621,300 | - | - | - | - | - |
| WBV71 | 127,500 | - | - | - | - | - | - | - |
| WBV72 | 890,600 | 100 | 100 | - | - | - | 15,700 | 1,900 |
| WBV73 | 47,700 | 2,400 | 3,600 | 63,400 | 59,900 | - | 164,100 | 500 |
| WBV74 | 70,300 | 400 | 500 | 30,500 | 50,700 | - | - | 34,700 |
| WBV75 | 3,900 | 100 | 100 | 16,100 | 2,900 | - | - | - |
| WBV76 | 7,500 | 100 | 100 | - | 6,200 | - | - | 400 |
| WBV77 | 9,600 | 100 | 100 | 25,200 | 4,400 | 100 | 300 | - |
| WBV81 | 3,200 | - | - | 4,900 | 10,800 | - | - | - |
| WBV82 | 1,400 | - | - | 7,900 | 4,500 | - | - | - |
| WBV83 | 3,600 | 200 | 300 | 8,900 | 1,800 | - | - | 8,200 |

## Table 2-16b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #16

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV70 | 380 | Oct-09 | - | - | - | - | - | - |
| WBV71 | 1,040 | Sep-09 | 12,700 | 40 | 89,200 | 260 | 25,500 | 70 |
| WBV72 | 930 | Mar-10 | 89,100 | 290 | 623,500 | 2,010 | 178,100 | 570 |
| WBV73 | 1,170 | Jul-10 | 4,800 | 10 | 33,400 | 90 | 9,500 | 20 |
| WBV74 | 760 | May-10 | 7,000 | 30 | 49,200 | 190 | 14,100 | 60 |
| WBV75 | 280 | Jun-11 | 400 | LT10 | 2,800 | 30 | 800 | LT10 |
| WBV76 | 790 | Jan-11 | 800 | LT10 | 5,300 | 20 | 1,500 | LT10 |
| WBV77 | 460 | Jul-11 | 1,000 | LT10 | 6,700 | 40 | 1,900 | 10 |
| WBV81 | 250 | Mar-13 | 300 | LT10 | 2,200 | 30 | 600 | LT10 |
| WBV82 | 300 | Dec-12 | 100 | LT10 | 1,000 | 10 | 300 | LT10 |
| WBV83 | 960 | Feb-13 | 400 | LT10 | 2,500 | LT10 | 700 | LT10 |

## Table 2-16c. Steel Demand (Tons) by Project Period in IER #16

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV70 | 380 | Oct-09 | - | - | - | - | - | - |
| WBV71 | 1,040 | Sep-09 | - | - | - | - | - | - |
| WBV72 | 930 | Mar-10 | - | - | - | - | - | - |
| WBV73 | 1,170 | Jul-10 | 3,930 | 10 | - | - | - | - |
| WBV74 | 760 | May-10 | 2,870 | 10 | - | - | - | - |
| WBV75 | 280 | Jun-11 | 450 | LT10 | - | - | - | - |
| WBV76 | 790 | Jan-11 | 280 | LT10 | - | - | - | - |
| WBV77 | 460 | Jul-11 | 710 | LT10 | - | - | - | - |
| WBV81 | 250 | Mar-13 | 580 | LT10 | - | - | - | - |
| WBV82 | 300 | Dec-12 | 360 | LT10 | - | - | - | - |
| WBV83 | 960 | Feb-13 | 260 | LT10 | - | - | - | - |

## Table 2-16d. Concrete Demand (Cubic Yards) by Project Period in IER #16

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV70 | 380 | Oct-09 | - | - | - | - | - | - |
| WBV71 | 1,040 | Sep-09 | - | - | - | - | - | - |
| WBV72 | 930 | Mar-10 | 20 | LT10 | 40 | LT10 | 40 | LT10 |
| WBV73 | 1,170 | Jul-10 | 480 | LT10 | 960 | LT10 | 960 | LT10 |
| WBV74 | 760 | May-10 | 70 | LT10 | 140 | LT10 | 140 | LT10 |
| WBV75 | 280 | Jun-11 | 20 | LT10 | 40 | LT10 | 40 | LT10 |
| WBV76 | 790 | Jan-11 | 10 | LT10 | 20 | LT10 | 20 | LT10 |
| WBV77 | 460 | Jul-11 | 10 | LT10 | 30 | LT10 | 30 | LT10 |
| WBV81 | 250 | Mar-13 | - | - | - | - | - | - |
| WBV82 | 300 | Dec-12 | - | - | - | - | - | - |
| WBV83 | 960 | Feb-13 | 40 | LT10 | 90 | LT10 | 90 | LT10 |

## Table 2-16e. Aggregate Demand (Tons) by Project Period in IER #16

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV70 | 380 | Oct-09 | 124,260 | 980 | 248,520 | 1,960 | 248,520 | 1,960 |
| WBV71 | 1,040 | Sep-09 | - | - | - | - | - | - |
| WBV72 | 930 | Mar-10 | 30 | LT10 | 60 | LT10 | 60 | LT10 |
| WBV73 | 1,170 | Jul-10 | 730 | LT10 | 1,450 | LT10 | 1,450 | LT10 |
| WBV74 | 760 | May-10 | 110 | LT10 | 220 | LT10 | 220 | LT10 |
| WBV75 | 280 | Jun-11 | 30 | LT10 | 50 | LT10 | 50 | LT10 |
| WBV76 | 790 | Jan-11 | 20 | LT10 | 30 | LT10 | 30 | LT10 |
| WBV77 | 460 | Jul-11 | 20 | LT10 | 40 | LT10 | 40 | LT10 |
| WBV81 | 250 | Mar-13 | - | - | - | - | - | - |
| WBV82 | 300 | Dec-12 | - | - | - | - | - | - |
| WBV83 | 960 | Feb-13 | 70 | LT10 | 130 | LT10 | 130 | LT10 |

## Table 2-16f. Concrete Pile Demand (Tons) by Project Period in IER #16

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV70 | 380 | Oct-09 | - | - | - | - | - | - |
| WBV71 | 1,040 | Sep-09 | - | - | - | - | - | - |
| WBV72 | 930 | Mar-10 | 4,190 | 10 | - | - | - | - |
| WBV73 | 1,170 | Jul-10 | 43,820 | 110 | - | - | - | - |
| WBV74 | 760 | May-10 | - | - | - | - | - | - |
| WBV75 | 280 | Jun-11 | - | - | - | - | - | - |
| WBV76 | 790 | Jan-11 | - | - | - | - | - | - |
| WBV77 | 460 | Jul-11 | 80 | LT10 | - | - | - | - |
| WBV81 | 250 | Mar-13 | - | - | - | - | - | - |
| WBV82 | 300 | Dec-12 | - | - | - | - | - | - |
| WBV83 | 960 | Feb-13 | - | - | - | - | - | - |

## Table 2-16g. Rock Demand (Tons) by Project Period in IER #16

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV70 | 380 | Oct-09 | - | - | - | - | - | - |
| WBV71 | 1,040 | Sep-09 | - | - | - | - | - | - |
| WBV72 | 930 | Mar-10 | - | - | - | - | 1,920 | LT10 |
| WBV73 | 1,170 | Jul-10 | - | - | - | - | 480 | LT10 |
| WBV74 | 760 | May-10 | - | - | - | - | 34,710 | 140 |
| WBV75 | 280 | Jun-11 | - | - | - | - | - | - |
| WBV76 | 790 | Jan-11 | - | - | - | - | 390 | LT10 |
| WBV77 | 460 | Jul-11 | - | - | - | - | - | - |
| WBV81 | 250 | Mar-13 | - | - | - | - | - | - |
| WBV82 | 300 | Dec-12 | - | - | - | - | - | - |
| WBV83 | 960 | Feb-13 | - | - | - | - | 8,160 | 30 |

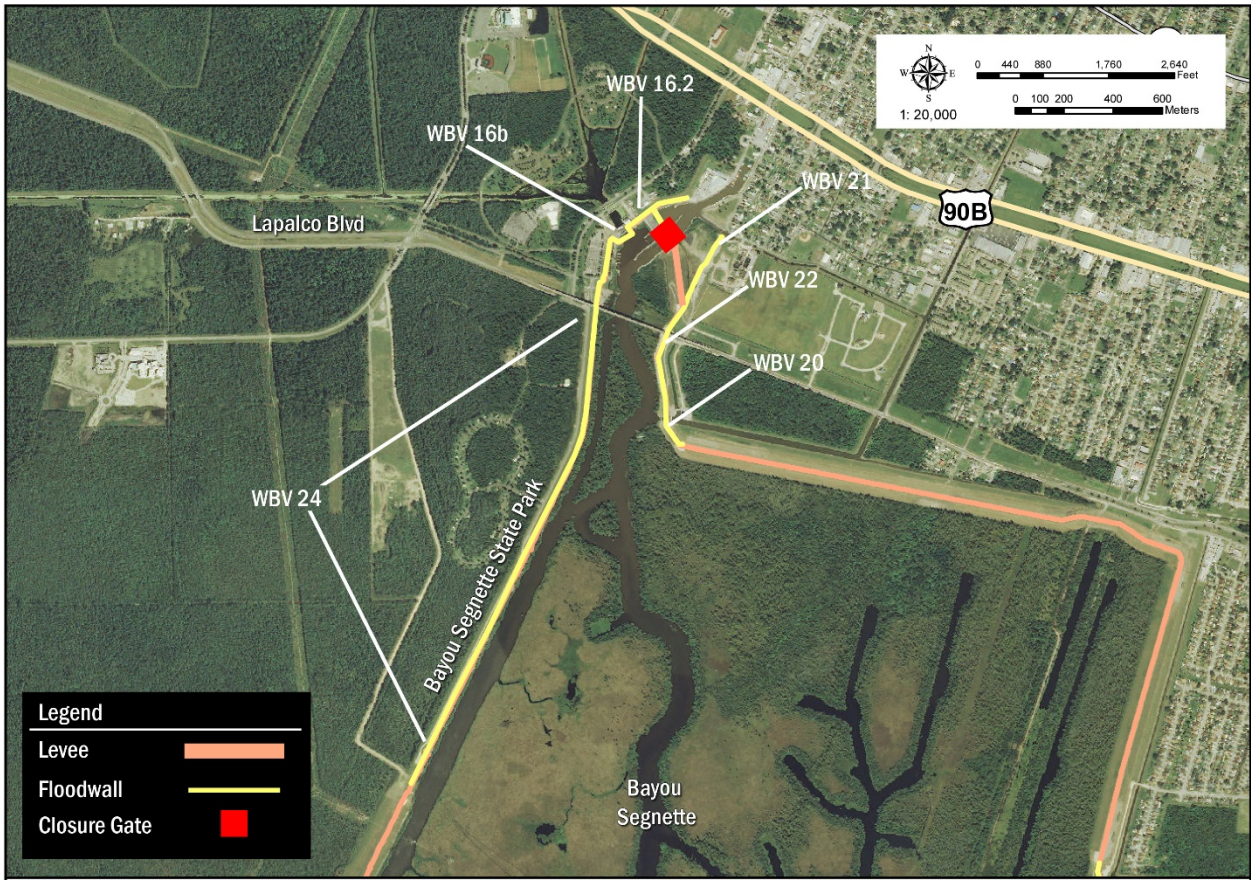
## *2.16 IER #17 – Company Canal Floodwall, Jefferson Parish, Louisiana*

The constructed action for IER #17 provides 100-year level of risk reduction for the Company Canal Floodwall from the Bayou Segnette State Park to the New Westwego Pumping Station. The existing floodwall is approximately 15,000 feet long and includes fronting protection for two pumping stations. A segment of the constructed action is on a new alignment; details of the constructed action are available in the Final IER at www.nolaenvironmental.gov.

Individual contracts included in IER #17 are listed below, and figure 2-17 provides an overview of the projects.

| | |
|---|---|
| WBV16.2 | Bayou Segnette Complex |
| WBV16b | Segnette PS Fronting Protection and Modifications |
| WBV20 | New Westwego PS Fronting Protection and Modifications |
| WBV21 | Old Westwego PS Fronting Protection and Modifications |
| WBV22 | Westwego Floodwall |
| WBV24 | Segnette State Park Floodwall |

**Figure 2-17. IER #17 Project Area**



## Table 2-17a. Materials Quantities for Construction Reaches in IER #17

| Reach | Earthen Fill CY | Concrete CY | Aggregate Tons | Sheet Pile SF | H-Pile VLF | Pipe Pile VLF | Concrete Pile VLF | Rock Tons |
|---|---|---|---|---|---|---|---|---|
| WBV16.2 | 108,700 | 1,900 | 2,900 | 42,500 | 60,400 | - | - | 37,900 |
| WBV16b | 1,900 | 3,700 | 5,600 | 30,500 | 27,300 | 7,300 | 4,300 | 700 |
| WBV20 | 14,400 | - | - | 35,800 | 22,600 | 2,200 | - | 400 |
| WBV21 | 1,700 | 500 | 700 | 8,400 | 5,700 | - | - | 500 |
| WBV22 | 18,400 | 3,800 | 5,700 | 59,000 | 70,100 | - | - | 4,100 |
| WBV24 | 38,600 | 1,600 | 2,400 | 325,600 | 12,100 | - | 202,700 | - |

## Table 2-17b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #17

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV16.2 | 1,180 | Feb-10 | 10,900 | 30 | 76,100 | 190 | 21,700 | 60 |
| WBV16b | 900 | Feb-10 | 200 | LT10 | 1,300 | LT10 | 400 | LT10 |
| WBV20 | 1,260 | Oct-09 | 1,400 | LT10 | 10,100 | 20 | 2,900 | LT10 |
| WBV21 | 460 | Apr-10 | 200 | LT10 | 1,200 | LT10 | 300 | LT10 |
| WBV22 | 400 | Nov-09 | 1,800 | 10 | 12,900 | 100 | 3,700 | 30 |
| WBV24 | 1,010 | Jan-10 | 3,900 | 10 | 27,000 | 80 | 7,700 | 20 |

## Table 2-17c. Steel Demand (Tons) by Project Period in IER #17

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV16.2 | 1,180 | Feb-10 | 3,540 | LT10 | - | - | - | - |
| WBV16b | 900 | Feb-10 | 2,290 | LT10 | - | - | - | - |
| WBV20 | 1,260 | Oct-09 | 1,860 | LT10 | - | - | - | - |
| WBV21 | 460 | Apr-10 | 420 | LT10 | - | - | - | - |
| WBV22 | 400 | Nov-09 | 4,300 | 30 | - | - | - | - |
| WBV24 | 1,010 | Jan-10 | 7,050 | 20 | - | - | - | - |

## Table 2-17d. Concrete Demand (Cubic Yards) by Project Period in IER #17

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV16.2 | 1,180 | Feb-10 | 390 | LT10 | 770 | LT10 | 770 | LT10 |
| WBV16b | 900 | Feb-10 | 740 | LT10 | 1,480 | LT10 | 1,480 | LT10 |
| WBV20 | 1,260 | Oct-09 | - | - | - | - | - | - |
| WBV21 | 460 | Apr-10 | 100 | LT10 | 190 | LT10 | 190 | LT10 |
| WBV22 | 400 | Nov-09 | 750 | LT10 | 1,500 | 10 | 1,500 | 10 |
| WBV24 | 1,010 | Jan-10 | 310 | LT10 | 630 | LT10 | 630 | LT10 |

## Table 2-17e. Aggregate Demand (Tons) by Project Period in IER #17

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV16.2 | 1,180 | Feb-10 | 580 | LT10 | 1,160 | LT10 | 1,160 | LT10 |
| WBV16b | 900 | Feb-10 | 1,120 | LT10 | 2,240 | LT10 | 2,240 | LT10 |
| WBV20 | 1,260 | Oct-09 | - | - | - | - | - | - |
| WBV21 | 460 | Apr-10 | 140 | LT10 | 290 | LT10 | 290 | LT10 |
| WBV22 | 400 | Nov-09 | 1,130 | LT10 | 2,270 | 20 | 2,270 | 20 |
| WBV24 | 1,010 | Jan-10 | 470 | LT10 | 950 | LT10 | 950 | LT10 |

## Table 2-17f. Concrete Pile Demand (Tons) by Project Period in IER #17

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV16.2 | 1,180 | Feb-10 | - | - | - | - | - | - |
| WBV16b | 900 | Feb-10 | 1,140 | LT10 | - | - | - | - |
| WBV20 | 1,260 | Oct-09 | - | - | - | - | - | - |
| WBV21 | 460 | Apr-10 | - | - | - | - | - | - |
| WBV22 | 400 | Nov-09 | - | - | - | - | - | - |
| WBV24 | 1,010 | Jan-10 | 54,120 | 160 | - | - | - | - |

## Table 2-17g. Rock Demand (Tons) by Project Period in IER #17

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| WBV16.2 | 1,180 | Feb-10 | - | - | - | - | 37,890 | 100 |
| WBV16b | 900 | Feb-10 | - | - | - | - | 710 | LT10 |
| WBV20 | 1,260 | Oct-09 | - | - | - | - | 360 | LT10 |
| WBV21 | 460 | Apr-10 | - | - | - | - | 510 | LT10 |
| WBV22 | 400 | Nov-09 | - | - | - | - | 4,120 | 30 |
| WBV24 | 1,010 | Jan-10 | - | - | - | - | - | - |

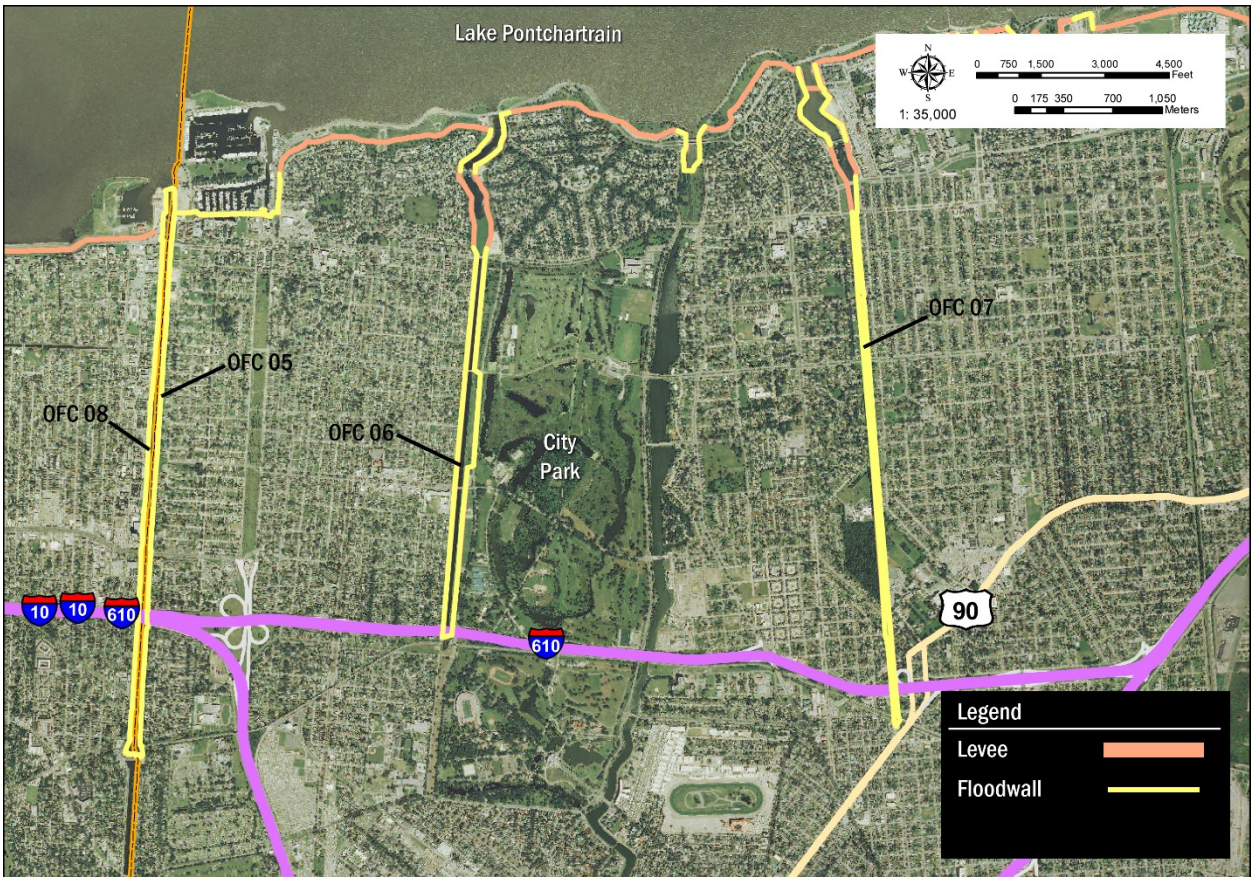
## 2.17 IER #27 – Outfall Canal Remediation on the 17th Street, Orleans Avenue and London Avenue Canals, Jefferson and Orleans Parish, Louisiana

The constructed action for IER #27 would provide 100-year level of risk reduction for the 17th Street, Orleans Avenue, and London Avenue Canals by remediation of the levees and floodwalls along these canals. The constructed action results from a need to reduce flood risk and water damage to residences, businesses, and other infrastructure with the project area. Remediation involves methods such as installing deep soil mixing, net embankment increase/concrete slab, sheetpile cutoff wall, or stability berms to strengthen the canal walls in order to facilitate interior drainage at current and future capacities. Several design changes occurred throughout the project and they were described in supplemental IERS 27.a; details of the constructed action are available in the Final IERs at www.nolaenvironmental.gov.

Individual contracts included in IER #27 are listed below, and figure 2-18 provides an overview of the projects.

| | |
|---|---|
| OFC05 | OFC05 17th Street Canal, Orleans |
| OFC06 | Remediation of Canal Walls for the Orleans Avenue Canal OFC-06 |
| OFC07 | Remediation OFC07 17th St & London Ave |
| OFC08 | Stability Remediation Outfall Canals |

## Figure 2-18. IER #27 and IERS #27.a Outfall Canal Remediation Area




## Table 2-18a. Materials Quantities for Construction Reaches in IER #27

| Reach | Earthen Fill CY | Concrete CY | Aggregate Tons | Sheet Pile SF | H-Pile VLF | Pipe Pile VLF | Concrete Pile VLF | Rock Tons |
|---|---|---|---|---|---|---|---|---|
| OFC05 | 17,800 | 700 | 1,100 | - | - | - | - | 500 |
| OFC06 | 59,600 | - | - | - | - | - | - | - |
| OFC07 | - | - | - | 212,900 | - | - | - | - |
| OFC08 | - | - | - | - | - | - | - | 14,800 |

## Table 2-18b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #27

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| OFC05 | 180 | Dec-10 | 1,800 | 30 | 12,500 | 210 | 3,600 | 60 |
| OFC06 | 100 | Jan-11 | 6,000 | 180 | 41,700 | 1,250 | 11,900 | 360 |
| OFC07 | 230 | Mar-14 | - | - | - | - | - | - |
| OFC08 | 230 | Jul-14 | - | - | - | - | - | - |

## Table 2-18c. Steel Demand (Tons) by Project Period in IER #27

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| OFC05 | 180 | Dec-10 | - | - | - | - | - | - |
| OFC06 | 100 | Jan-11 | - | - | - | - | - | - |
| OFC07 | 230 | Mar-14 | 4,260 | 60 | - | - | - | - |
| OFC08 | 230 | Jul-14 | - | - | - | - | - | - |

## Table 2-18d. Concrete Demand (Cubic Yards) by Project Period in IER #27

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| OFC05 | 180 | Dec-10 | 150 | LT10 | 300 | LT10 | 300 | LT10 |
| OFC06 | 100 | Jan-11 | - | - | - | - | - | - |
| OFC07 | 230 | Mar-14 | - | - | - | - | - | - |
| OFC08 | 230 | Jul-14 | - | - | - | - | - | - |

## Table 2-18e. Aggregate Demand (Tons) by Project Period in IER #27

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| OFC05 | 180 | Dec-10 | 230 | LT10 | 450 | LT10 | 450 | LT10 |
| OFC06 | 100 | Jan-11 | - | - | - | - | - | - |
| OFC07 | 230 | Mar-14 | - | - | - | - | - | - |
| OFC08 | 230 | Jul-14 | - | - | - | - | - | - |

None of the projects require concrete pile for construction. Table 2-18f has been omitted.

## Table 2-18g. Rock Demand (Tons) by Project Period in IER #27

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| OFC05 | 180 | Dec-10 | - | - | - | - | 520 | LT10 |
| OFC06 | 100 | Jan-11 | - | - | - | - | - | - |
| OFC07 | 230 | Mar-14 | - | - | - | - | - | - |
| OFC08 | 230 | Jul-14 | - | - | - | - | 14,770 | 190 |

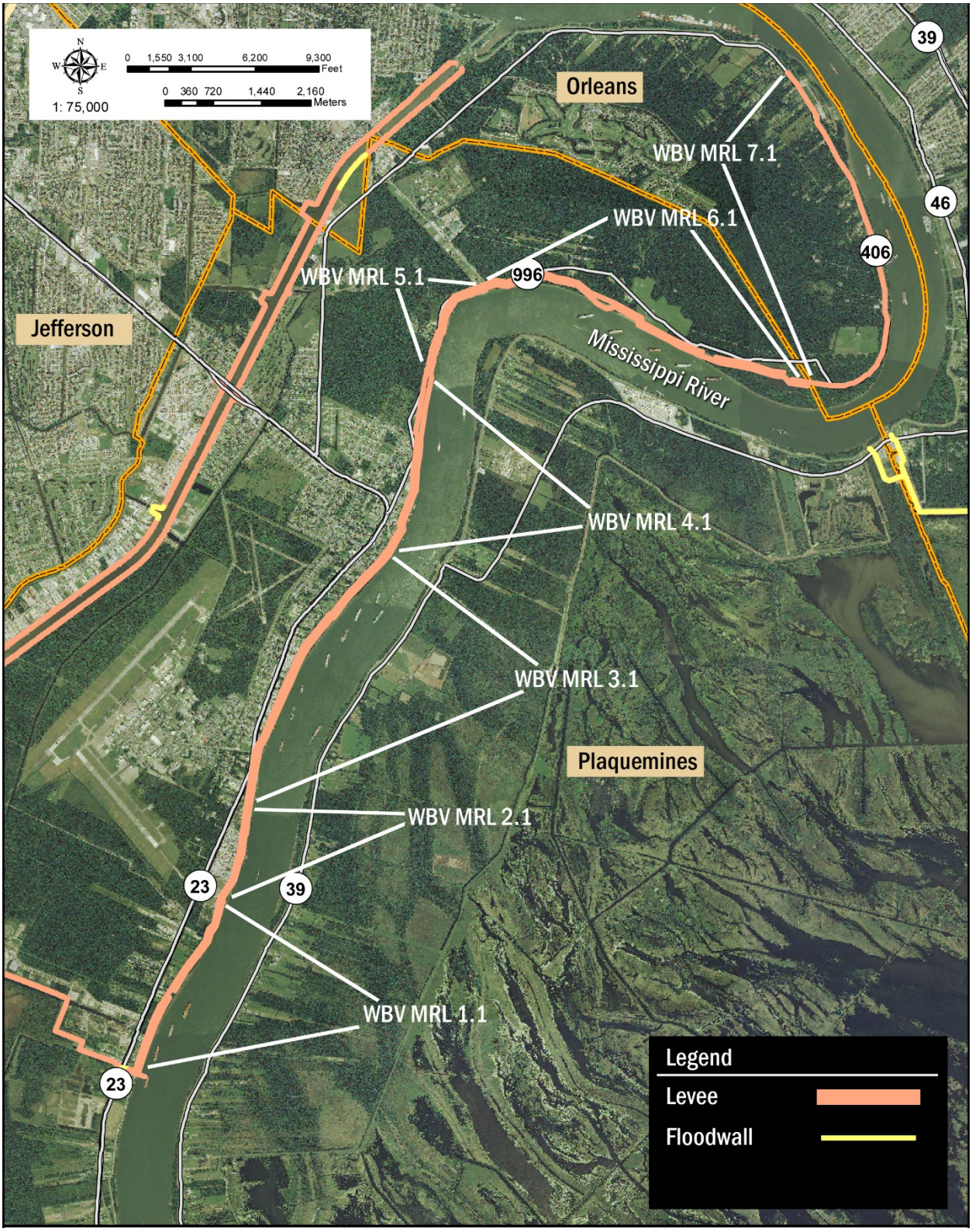
## 2.18 IER #33 West Bank and Vicinity and Mississippi River Levees Co-Located Levees, Plaquemines and Orleans Parish, Louisiana

The constructed action for IER #33 would provide 100-year level of risk reduction along the West Bank and Vicinity -Mississippi River Levee (WBV-MRL) Co-Located Project. The MRL on the west bank of the Mississippi River, from the Eastern Tie-in of the WBV project with the MRL at Oakville in Plaquemines Parish to a point approximately 15.5 miles upriver southeast of the Algiers Lock in Orleans Parish, was not of sufficient height to reduce risk from hurricane-driven storm surges traveling either up or across the Mississippi River. Several design changes occurred throughout the project and they were described in supplemental IERS 33.a; details of the constructed action are available in the Final IERs at www.nolaenvironmental.gov.

Individual contracts included in IER #33 are listed below, and figure 2-19 provides an overview of the projects.

| | |
|---|---|
| MRL1.1 | WBV MRL 1.1 |
| MRL2.2 | WBV MRL 2.2 Oak Point to Augusta |
| MRL3.1 | WBV MRL 3.1 Engineered Alternative Measures Belle Chase to Oak Point |
| MRL3.2 | WBV MRL 3.2 Belle Chasse to Oak Point |
| MRL4.1 | WBV MRL 4.1 Engineered Alternative Measures English Turn to Belle Chase |
| MRL6.1 | Parish Line to English Turn |
| MRL7.1 | WBV MRL 7.1 Engineered Alternative Measures West Crossover PT to Parish Line |

**Figure 2-19. IER #33 and IERS #33.a WBV-MRL Co-Located Project Area**



## Table 2-19a. Materials Quantities for Construction Reaches in IER #33

| Reach | Earthen Fill CY | Concrete CY | Aggregate Tons | Sheet Pile SF | H-Pile VLF | Pipe Pile VLF | Concrete Pile VLF | Rock Tons |
|---|---|---|---|---|---|---|---|---|
| MRL 1.1 | 131,100 | 500 | 700 | - | - | - | - | - |
| MRL 2.2 | LT50 | 25,400 | 38,300 | LT50 | - | 100 | - | - |
| MRL 3.1 | 78,900 | 200 | 400 | - | - | - | - | - |
| MRL 3.2 | 271,100 | 283,100 | 428,100 | 26,200 | - | 30,200 | - | - |
| MRL 4.1 | 70,000 | 400 | 500 | - | - | - | - | - |
| MRL 6.1 | 93,600 | - | - | - | - | - | - | - |
| MRL 7.1 | 29,200 | 100 | 200 | - | - | - | - | LT50 |

## Table 2-19b. Earthen Fill Demand (Cubic Yards) by Project Period in IER #33

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| MRL 1.1 | 200 | Apr-11 | 13,100 | 200 | 91,700 | 1,380 | 26,200 | 390 |
| MRL 2.2 | 750 | Oct-13 | LT10 | LT10 | LT10 | LT10 | LT10 | LT10 |
| MRL 3.1 | 220 | Apr-11 | 7,900 | 110 | 55,300 | 750 | 15,800 | 220 |
| MRL 3.2 | 630 | Dec-13 | 27,100 | 130 | 189,800 | 900 | 54,200 | 260 |
| MRL 4.1 | 270 | Apr-11 | 7,000 | 80 | 49,000 | 540 | 14,000 | 160 |
| MRL 6.1 | 200 | Apr-11 | 9,400 | 140 | 65,500 | 980 | 18,700 | 280 |
| MRL 7.1 | 370 | Feb-11 | 2,900 | 20 | 20,400 | 170 | 5,800 | 50 |

## Table 2-19c. Steel Demand (Tons) by Project Period in IER #33

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| MRL 1.1 | 200 | Apr-11 | - | - | - | - | - | - |
| MRL 2.2 | 750 | Oct-13 | LT10 | LT10 | - | - | - | - |
| MRL 3.1 | 220 | Apr-11 | - | - | - | - | - | - |
| MRL 3.2 | 630 | Dec-13 | 2,430 | 10 | - | - | - | - |
| MRL 4.1 | 270 | Apr-11 | - | - | - | - | - | - |
| MRL 6.1 | 200 | Apr-11 | - | - | - | - | - | - |
| MRL 7.1 | 370 | Feb-11 | - | - | - | - | - | - |

## Table 2-19d. Concrete Demand (Cubic Yards) by Project Period in IER #33

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| MRL 1.1 | 200 | Apr-11 | 90 | LT10 | 180 | LT10 | 180 | LT10 |
| MRL 2.2 | 750 | Oct-13 | 5,070 | 20 | 10,140 | 40 | 10,140 | 40 |
| MRL 3.1 | 220 | Apr-11 | 50 | LT10 | 100 | LT10 | 100 | LT10 |
| MRL 3.2 | 630 | Dec-13 | 56,630 | 270 | 113,260 | 540 | 113,260 | 540 |
| MRL 4.1 | 270 | Apr-11 | 70 | LT10 | 140 | LT10 | 140 | LT10 |
| MRL 6.1 | 200 | Apr-11 | - | - | - | - | - | - |
| MRL 7.1 | 370 | Feb-11 | 20 | LT10 | 40 | LT10 | 40 | LT10 |

## Table 2-19e. Aggregate Demand (Tons) by Project Period in IER #33

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| MRL 1.1 | 200 | Apr-11 | 140 | LT10 | 280 | LT10 | 280 | LT10 |
| MRL 2.2 | 750 | Oct-13 | 7,670 | 30 | 15,330 | 60 | 15,330 | 60 |
| MRL 3.1 | 220 | Apr-11 | 70 | LT10 | 140 | LT10 | 140 | LT10 |
| MRL 3.2 | 630 | Dec-13 | 85,620 | 410 | 171,250 | 820 | 171,250 | 820 |
| MRL 4.1 | 270 | Apr-11 | 110 | LT10 | 210 | LT10 | 210 | LT10 |
| MRL 6.1 | 200 | Apr-11 | - | - | - | - | - | - |
| MRL 7.1 | 370 | Feb-11 | 30 | LT10 | 60 | LT10 | 60 | LT10 |

None of the projects require concrete pile for construction. Table 2-19f has been omitted.

## Table 2-19g. Rock Demand (Tons) by Project Period in IER #33

| | | | First Third | | Second Third | | Final Third | |
|---|---|---|---|---|---|---|---|---|
| Reach | Project Duration | NTP Mo & Yr | Total In Period | Total Per Day | Total In Period | Total Per Day | Total In Period | Total Per Day |
| MRL 1.1 | 200 | Apr-11 | - | - | - | - | - | - |
| MRL 2.2 | 750 | Oct-13 | - | - | - | - | - | - |
| MRL 3.1 | 220 | Apr-11 | - | - | - | - | - | - |
| MRL 3.2 | 630 | Dec-13 | - | - | - | - | - | - |
| MRL 4.1 | 270 | Apr-11 | - | - | - | - | - | - |
| MRL 6.1 | 200 | Apr-11 | - | - | - | - | - | - |
| MRL 7.1 | 370 | Feb-11 | - | - | - | - | 10 | LT10 |

# 3 Transportation Alternatives

Both NEPA and the President's Council on Environmental Quality (CEQ) regulations require that the CEMVN consider and evaluate appropriate alternatives to proposed actions that have the potential for significant effects on the environment. Section 102(2)(E) of NEPA provides that all agencies of the Federal Government shall "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." The 2009 Transportation Report provides a discussion of the maximum and likely scenarios and provides material quantity estimates to be moved using different modes of transportation. The maximum and likely scenario provided a bracket of the potential impacts of the HSDRRS on the transportation system. See CED Phase I, Appendix F report for this discussion.

The CED Phase II and this final/updated Transportation Report provides information on the effects the construction of the HSDDRS has had on the transportation system by using actual quantity and material source data for the 150 contract reaches used to develop the system. The same format that was presented in the CED Phase I is used to detail the impacts in this final CED Phase II. The major difference between the two studies is that the CED Phase I 2009 Transportation Report ESTIMATED quantity and source of material and mode of transportation while this CED Phase II Transportation Report uses ACTUAL quantity and source information while using some of the assumptions regarding the mode of transportation.

## *3.1 Constructed Action*

The LPV portion of the HSDRRS projects consist of earthen levees, new T-wall floodwalls, roadway and railroad floodgates, sector gates, vertical lift gates, pump structures, and elevation of highway and roadway ramps to provide the 100 year level of risk reduction for the east bank of the New Orleans metropolitan area. LPV projects provide greater than 126 miles of risk reduction improvements, with approximately 43 miles of improvements directly along the northern shore of Lake Pontchartrain (see figure 1-2 in the CED Phase II ). The WBV portion of the HSDRRS consists of various projects providing 100-year level of risk reduction for the west bank parishes and communities. The projects include earthen levees, new T-wall floodwalls, roadway and railroad floodgates, sector gates, pump structures, and elevated highway and roadway ramps. WBV projects provide approximately 91 miles of 100-year risk reduction improvements from the western tie-in to the MRL near the Davis Pond Diversion to the MRL tie-in at Oakville (see figure 2-1 in the CED Phase II). The WBV portion of HSDRRS reduces risk in the communities of Ama, Waggaman, Avondale, Bridge City, Westwego, Marrero, Harvey, Gretna, Algiers, Belle Chasse, Oakville, and surrounding areas.

The transportation analysis identifies impacts to the road network from the delivery of all materials used to build the HSDRRS via truck or barge. Specifically, this analysis assesses impacts to the road network from transport of six materials types including earthen fill (borrow material), steel (sheet pile, H-pile and pipe pile), concrete, aggregate, concrete pile and rock. Transport of materials via rail to a terminal and then trucked or barged to site was not a mode analyzed for delivery because this mode is often too costly or unavailable. A scenario of trucks driving long distances on highways is reflected under the constructed action. Additionally because none of the projects have direct rail access, and materials would need to be transported from a New Orleans rail terminal to the project site via truck, local truck trips and miles would be captured using either transportation method.

For all of the material types, the number of trips required for material delivery to project sites represents a one-way trip. The total truck miles generated for delivery of materials includes the miles to the site and back to the source location. Round trip miles are required to assess roadway impacts in both directions. Trips and miles for some contracts may be slightly overestimated due to rounding used in the model. For instance, if there were 10 trips per week to deliver steel over a 20 week period, the actual number of daily trips per week is 0.5. The model rounds this number up to 1.0, thereby over-counting by 10 trips. In all, the overestimate/underestimate due to rounding has a very minimal effect on the trip count for all the material types.

### 3.1.1 Earthen Fill

Trucks were used to haul earthen fill from four government-furnished borrow sites (listed below) or from contractor-furnished borrow sites to the HSDDRS construction sites (see Appendix D for specific project location and borrow pit maps). Several contractor-furnished sites consist of multiple pits which are combined into one for the transportation analysis e.g. Willow Bend Phase 1 and Phase 2 are combined for assessing transportation impacts and shown as “Willow Bend”). The 16 contractor-furnished borrow sites provided the majority of the earthen fill needed to build the HSDRRS utilizing approximately 17.3 million CY of material. Government-furnished pits account for approximately 3.6 million CY of material. Transportation routes were identified for

each borrow site and their respective contract reach.[6] The Government-furnished borrow sites are:

- Maynard
- Churchill Farms Pit A
- Bonnet Carre Spillway
- Westbank N (also called Walker Road)

The 16 Contractor-furnished borrow sites are:

- River Birch Phase 2
- Pearlington Dirt Phase 1/Pearlington Dirt Phase 2
- Eastover/Eastover Phase II
- Acosta/Acosta 2
- 3C Riverside/3C Riverside Phase 3
- River Birch-South Kenner Avenue
- Willow Bend/Willow Bend Phase II
- Tammany Holding
- Contreras (DK Aggregates)
- Port Bienville
- River Birch Landfill Expansion
- Idlewild Stage 2/Idlewild Stage 1
- Citrus Lands
- Florissant
- Plaquemines Dirt and Clay
- Big Shake

All of the borrow sites are located in Louisiana except for Port Bienville and Pearlington Dirt which are located in Mississippi. Miles of truck trips delivering material from Mississippi are included in the "local" truck mile since these sites are near the Louisiana border. Four contracts used borrow sites in Mississippi including LPV109.02a, LPV111.01, LPV01.2 and LPV20.2.

### 3.1.2 Steel

Steel includes Sheet Pile, H-Pile, and Pipe Pile which were transported from a variety of suppliers around the United States located in areas from Armorel and Blytheville, AR to East Chicago, IN, Petersburg, VA and Meridian and Bay St. Louis, MS. Quantity and suppliers of steel materials for 150 contracts were identified by searching the Engineering and Design Plans and Specifications, Construction Submittals and Narrative Completion Reports. Additionally, project and construction managers, engineers, contractors and others helped determine the steel suppliers and mill locations. According to these sources, the majority of the steel used to construct the HSDRRS came from the following 18 cities:

- Armorel, AR
- Bay Saint Louis, MS

[6] Route and miles distance based on the GIS software.

- Birmingham, AL
- Blytheville, AR
- Delcambre, LA
- East Chicago, IN
- East Columbia City, IN
- Hazelwood, MO
- Houma, LA
- Iuka, MS
- Jacksonville, FL
- Meridian, MS
- O'Fallon, MO
- Pearland, TX
- Petersburg, VA
- Picayune, MS
- Roanoke, VA
- St. Louis, MO

In determining the transport method used for steel delivery (truck or barge), assumptions were made based upon best professional judgment for contracts that did not have documented mode of transport on file. For example, steel materials were assumed to be delivered by barge (if the supplier had barge waterway access) directly to projects having direct water access (e.g., Chalmette Loop, IHNC, Harvey Canal). Additionally for contracts lacking details on how materials were delivered, steel is assumed to be delivered by barge to a local marine terminal for projects that require more than 10,000 tons. Two marine terminals were used, one on the eastbank of New Orleans at Napoleon Avenue wharf and the other on the westbank at Westbank Steel wharf, and unloaded for local truck delivery to the project sites. Those projects that require less than 10,000 tons of steel were assumed to be supplied by truck.

### 3.1.3 Concrete and Aggregate

Concrete suppliers for 150 contracts were identified by searching Engineering and Design Plans and Specifications, Construction Submittals and Narrative Completion Reports. Additionally, project and construction managers, engineers, contractors and others helped determine the aggregate and concrete suppliers and batch plant locations. All concrete required to construct the HSDRRS was supplied by major local ready-mix plants or prepared at batch units on site. Aggregate was assumed to be delivered from Franklinton, Louisiana by truck directly to ready-mix plants or to batch sites. Once blended, the ready-mix concrete would be driven to the construction project within 90 minutes to ensure quality of pour. All projects requiring concrete were supplied by one of the ready-mix plants listed below or by on-site batch plants. Here is a list of concrete ready-mix plants used for HSDRRS:

- LaFarge Concrete plants throughout the region
- Carlo Ditta Conrete plants throughout the region

- Metro Materials
- Nairn Conrete
- Baker Ready Mix

On-site batch plants were used to mix concrete for six projects: Chalmette Loop Levee reaches LPV 144, LPV 145, LPV 146, LPV147, LPV 148.02 and the GIWW West Closure Complex, WBV 90.

Aggregate was delivered to six on-site batch plants, four of which were at project sites having direct water access. For these four projects, aggregate was assumed to be shipped by barge from Smithland, Kentucky. For projects without direct water access, aggregate would be supplied via truck from Franklinton, Louisiana. In both cases, the aggregate would be blended with cement and water at the project site.

### 3.1.4 Rock

A vast majority of rock was shipped by barge to New Orleans from a variety of location sources including sites in Smithland, Kentucky and Pine Bluff, Arkansas.

If direct water access to the construction site was available, rock would be barged directly to the site. Most of the rock used for foreshore protection on Lake Pontchartrain would be shipped on light-loaded 500-ton barges directly to the project (all LPV levee foreshore protection projects). Rock was also barged to WBV project sites having direct water access. If no direct water access was available for the project, rock was barged to local New Orleans marine terminal, offloaded onto trucks and then trucked to the construction sites. If the rock supplier did not have access to a navigable waterway, the material was assumed to be trucked to the project site.

### 3.1.5 Concrete Pile

Concrete pile supplied to projects with direct water access would be transported via barge from Gulf-Coast Pre-Stress, Pass Christian, Mississippi and offloaded at construction sites (e.g., Chalmette Loop, IHNC, Harvey Canal). Contracts without direct water access would be trucked to site from Pass Christian, Mississippi or from known suppliers such as Boykin Brothers, Baton Rouge, LA, Metro Materials, Wentzville, MO or Pre Stress Pile, Hattiesburg, MS.

## 3.2 Constructed Action - Miles Traveled By Mode and Material

Tables 3-16 to 3-20 provide summary information on miles, trips, and mode of transportation used to transport materials to project sites. These tables are:

- Table 3-16: Constructed Scenario - Miles Traveled By Mode and Material shows local and non-local round-trip miles required to deliver project materials. Local and non-local miles are provided for each material class. Table 3-16 also includes tons of each type of material shipped by barge directly to the project site. An overwhelming share of the total local miles driven to deliver HSDRRS construction material is from the delivery of borrow material.
- Table 3-17. Constructed Scenario - Trips By Mode and Material shows the total number of trips required to deliver project materials. Trips are provided for each material class, by each mode of transportation. Again, the number of trips taken to deliver borrow

material approaches 1.2 million which is the vast majority of trips to deliver HSDRRS construction material.

- Table 3-18. Summary Table of Local Truck Miles By IER parses the local miles data provided in table 3-16, aggregated to the IER level. Construction of IER #7, increasing levee height in New Orleans East, is responsible for just under one-quarter of all local miles traveled for delivery of all types of HSDRRS construction material.
- Table 3-19. Summary Table of Non-Local Truck Miles By IER parses the non-local truck miles data provided in table 3-17, aggregated to the IER level. Under this alternative, as shown in the table, non-local truck miles for borrow and concrete materials is zero since there materials came from local sources.
- Table 3-20. Summary Table of Miles By Mode of Transportation shows the number of local truck miles, non-local truck miles and barge miles incurred in the transportation of project materials. These data also are aggregated to the IER level.

In addition to the tables, figures 3-10, 3-11, and 3-12 graphically depict the magnitude of and differences between truck miles, truck trips, and delivery timing for all materials included in the analysis.

Figure 3-10 Truck Miles Traveled shows both local and non-local truck round trip miles traveled for the delivery of materials to project sites. Data used to generate this figure are directly traceable to table 3-16. As shown in the figure, the local miles traveled for the delivery of earthen fill, or borrow (over 44 million miles), vastly outnumber the local miles traveled for the delivery of all other project materials. GIS routing of trips for delivery of borrow and concrete provide a sound basis for estimating the vast majority of miles driven via truck for delivery of materials to project sites. New routes were developed for borrow and concrete since many of the routes defined in 2009 Transportation Report changed based upon the borrow site changing or a change in the concrete ready-mix plant. For the other material types, a less systematic method is used to estimate local truck miles which included using the route established in the 2009 Transportation Report. The steel, concrete pile, aggregate and rock truck miles represent just over 10% of the total local truck miles traveled to build the HSDRRS.

Figure 3-11 Truck Trips shows all truck trips summarized by material. Data used to generate this figure are directly traceable to table 3-17. As shown in the figure, the number of borrow deliveries (just under 1.2 million) is significantly higher than the number of deliveries for all other materials combined.

Figure 3-12 Truck Trips Distributed Across Schedule shows truck deliveries per day for all project materials distributed across a master schedule, beginning July 2007. The distribution of truck trips across the schedule is based on:

- individual project Notice to Proceed date;
- individual project construction duration; and
- individual project sequencing of demand timing for materials (see introduction to section 2 for a discussion of the separation of materials demand schedule separation).

The figure shows daily borrow deliveries of:

- over 1,000 for 45 weeks;
- over 2,000 for 22 weeks;
- over 3,000 for 0 weeks; and
- over 4,000 for 0 weeks.

Figure 3-12 also depicts the magnitude of the differences between the number of borrow deliveries and the number of deliveries for all other materials combined.

Tables 3-21 through 3-25 provide information on a project-by-project basis. Data shown in the tables mirrors that of tables 3-16 through 3-20, though the data are shown at the project level, rather than aggregated to the IER level. Table titles are:

- Table 3-21. Local Truck Miles By Construction Project
- Table 3-22. Local Truck Trips By Construction Project
- Table 3-24. Non-Local Truck Trips and Barge Trips By Construction Project
- Table 3-25. Miles By Mode of Transportation by Project

**Table 3-16. Miles Traveled By Mode and Material**

| | Quantity | Units | Truck Miles (Local) | Truck Miles (Non-Local) | Barge Miles |
|---|---|---|---|---|---|
| Borrow (trucked) | 17,319,700 | CY | 44,236,900 | | |
| Steel Sheet Pile (trucked) | 70,000 | Tons | 191,300 | 3,914,700 | |
| Steel H-Pile (trucked) | 59,200 | Tons | 155,500 | 2,927,500 | |
| Steel Pipe Pile (trucked) | 4,100 | Tons | 6,700 | 87,900 | |
| Steel (SP,HP,PP barged to project site) | 489,500 | Tons | | | 114,800 |
| Steel (SP,HP,PP barged & intermodal) | 119,300 | Tons | 170,500 | | 18,700 |
| Concrete Pile (trucked) | 227,700 | Tons | 698,300 | 1,330,500 | |
| Concrete Pile (barged to project site) | 330,300 | Tons | | | 5,900 |
| Ready-Mix Concrete | 1,044,800 | CY | 1,841,300 | | |
| On-Site Batch Concrete | 514,700 | CY | | | |
| Aggregate (barged to project batch plants) | 517,000 | Tons | | | 85,500 |
| Aggregate (trucked to project batch plants) | 882,500 | Tons | 1,361,400 | 1,336,400 | |
| Aggregate (trucked to ready-mix plants) | 1,579,800 | Tons | 2,466,700 | 8,430,100 | |
| Rock (barged to project site) | 2,619,500 | Tons | | | 682,000 |
| Rock (barged & intermodal) | 387,100 | Tons | 509,800 | | 40,600 |
| Rock (trucked to project site) | 36,900 | Tons | 32,700 | 1,322,800 | |
| TOTAL MILES | | | 51,671,100 | 19,349,900 | 947,600 |

## Table 3-17. Trips By Mode and Material

| | Quantity | Units | Truck Trips | Barge Trips |
|---|---|---|---|---|
| Borrow (trucked) | 17,319,700 | CY | 1,194,500 | |
| Steel Sheet Pile (trucked) | 70,000 | Tons | 3,500 | |
| Steel H-Pile (trucked) | 59,200 | Tons | 2,700 | |
| Steel Pipe Pile (trucked) | 4,100 | Tons | 100 | |
| Steel (SP,HP,PP barged to project site) | 489,500 | Tons | | 85 |
| Steel (SP,HP,PP barged & intermodal) | 119,300 | Tons | 6,100 | 14 |
| Concrete Pile (trucked) | 227,700 | Tons | 11,400 | |
| Concrete Pile (barged to project site) | 330,300 | Tons | | 71 |
| Ready-Mix Concrete | 1,055,900 | CY | 105,600 | |
| On-Site Batch Concrete | 503,700 | CY | | |
| Aggregate (barged to project batch plants) | 517,000 | Tons | | 45 |
| Aggregate (trucked to project batch plants) | 882,500 | Tons | 39,200 | |
| Aggregate (trucked to ready-mix plants) | 1,579,800 | Tons | 70,200 | |
| Rock (barged to project site) | 2,619,500 | Tons | | 552 |
| Rock (barged & intermodal) | 387,100 | Tons | 17,200 | 47 |
| Rock (trucked to project site) | 36,900 | Tons | 1,600 | |
| TOTAL TRIPS | | | 1,452,100 | 814 |

**Figure 3-10 Truck Miles Traveled**

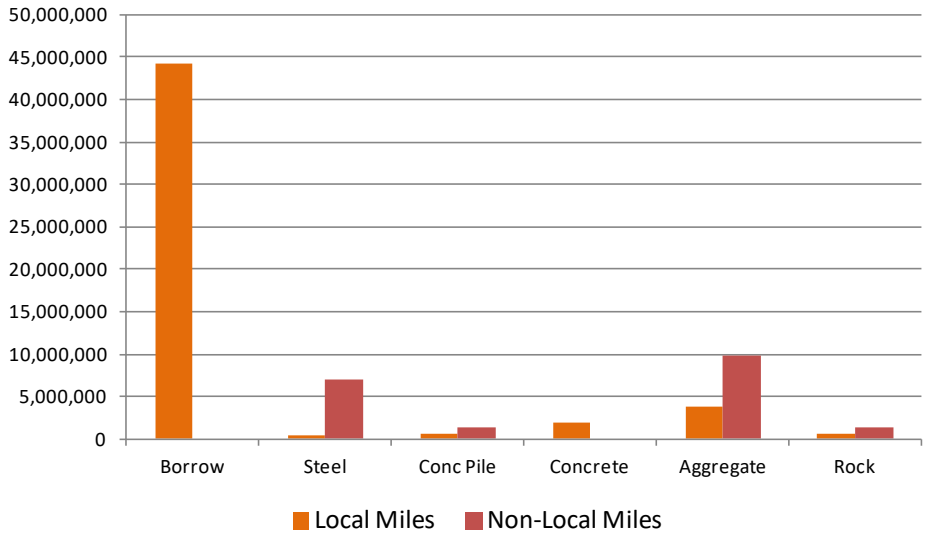



**Figure 3-11**

**Truck Trips**

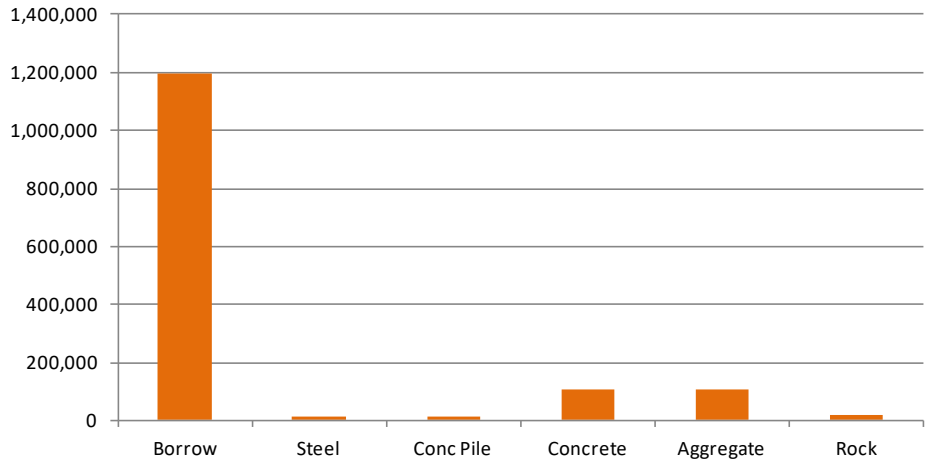
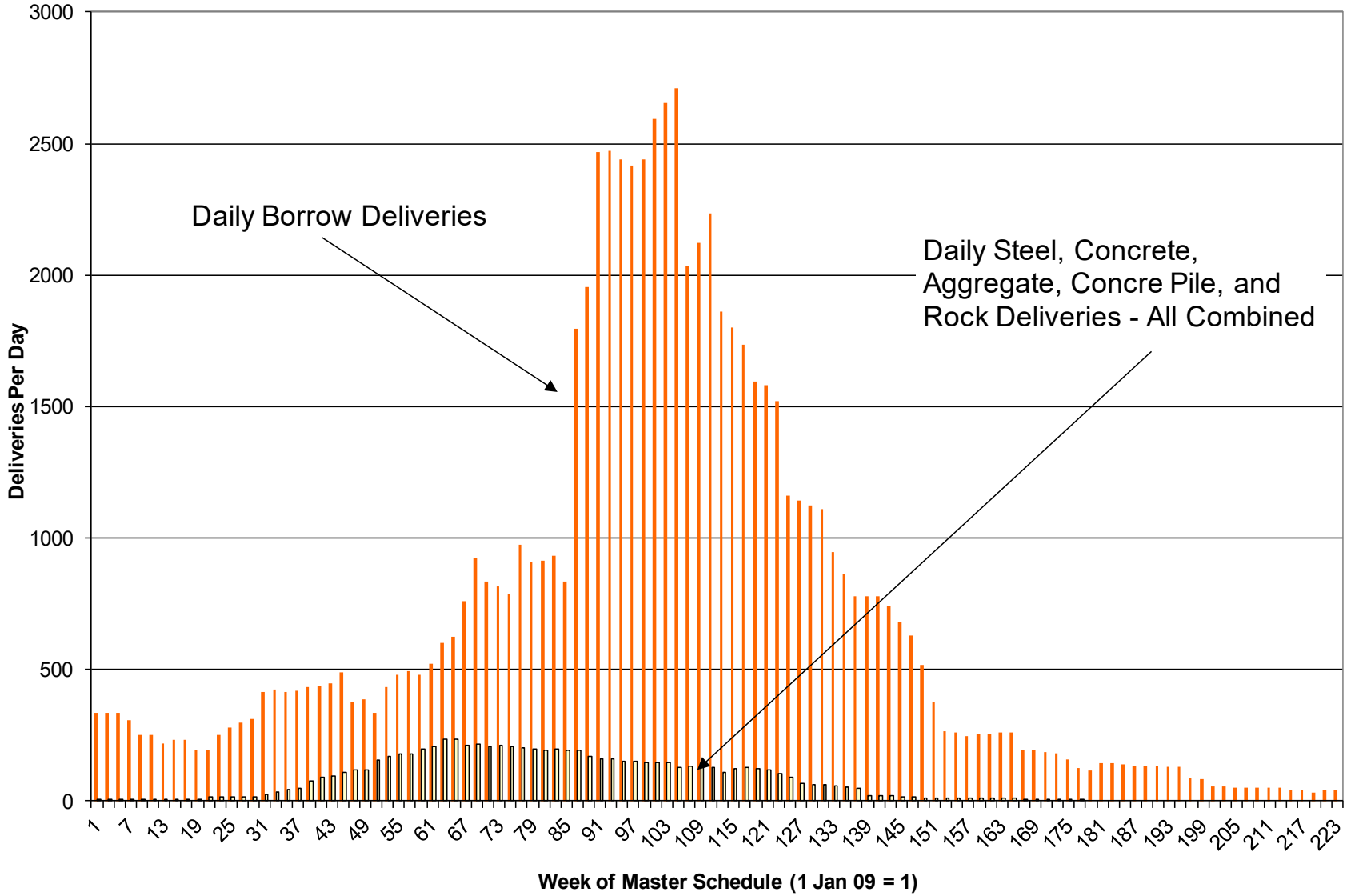


**Figure 3-12 Truck Trips Distributed Across Majority of Schedule**



## Table 3-18. Summary Table of Local Truck Miles By IER

| IER | Earthen Fill Local Truck Miles | Steel Local Truck Miles | Conc Pile Local Truck Miles | Concrete Local Truck Miles | Aggregate Local Truck Miles | Rock Local Truck Miles | Total Truck Miles Local |
|---|---|---|---|---|---|---|---|
| 1 | 3,923,400 | 26,550 | 3,800 | 1,770 | 5,010 | 2,710 | 3,963,240 |
| 2 | 344,010 | 72,590 | 4,910 | 155,920 | 145,900 | - | 723,330 |
| 3 | 3,688,690 | 17,900 | 33,480 | 54,150 | 133,000 | 180 | 3,927,400 |
| 4 | 1,246,100 | 36,340 | 2,720 | 11,380 | 20,120 | 90 | 1,316,750 |
| 5 | 1,282,940 | 46,610 | - | 142,160 | 260,200 | - | 1,731,910 |
| 6 | 34,690 | 76,030 | 7,610 | 14,260 | 27,370 | - | 159,960 |
| 7 | 12,291,170 | 43,820 | 3,730 | 22,090 | 16,810 | 492,370 | 12,869,990 |
| 8 | 2,270 | 10,400 | 350 | - | - | - | 13,020 |
| 9 | 610,290 | - | - | 1,010 | 73,010 | - | 684,310 |
| 10 | 324,910 | 3,580 | - | 249,190 | 382,490 | - | 960,170 |
| 11 | 61,830 | 2,250 | 36,030 | 317,400 | 713,850 | - | 1,131,360 |
| 12 | 2,923,210 | 57,080 | 29,800 | 114,760 | 246,680 | 4,110 | 3,375,640 |
| 13 | 929,560 | 29,040 | 9,490 | 3,460 | 2,200 | - | 973,750 |
| 14 | 7,691,870 | 31,380 | 130,950 | 54,670 | 59,400 | 1,140 | 7,969,410 |
| 15 | 1,322,450 | 2,170 | 53,620 | 1,600 | 1,090 | - | 1,380,930 |
| 16 | 2,718,690 | 26,570 | 190,400 | 7,840 | 979,770 | 31,790 | 3,955,060 |
| 17 | 785,860 | 35,240 | 191,360 | 11,970 | 27,020 | 1,670 | 1,053,120 |
| 27 | 305,220 | 5,220 | - | 2,490 | 1,770 | 8,440 | 323,140 |
| 33 | 3,749,770 | 1,260 | - | 675,150 | 732,440 | - | 5,158,620 |
| Total | 44,236,900 | 524,000 | 698,300 | 1,841,300 | 3,828,100 | 542,500 | 51,671,100 |

## Table 3-19. Summary Table of Non-Local Truck Miles By IER

| IER | Earthen Fill Truck Miles Non-Local | Steel Truck Miles Non-Local | Conc Pile Truck Miles Non-Local | Concrete Truck Miles Non-Local | Aggregate Truck Miles Non-Local | Rock Truck Miles Non-Local | Total Truck Miles Non-Local |
|---|---|---|---|---|---|---|---|
| 1 | - | 660,600 | 5,300 | - | 17,100 | 33,800 | 716,800 |
| 2 | - | 290,800 | 7,100 | - | 497,400 | - | 795,300 |
| 3 | - | 90,300 | 56,700 | - | 453,400 | 1,000 | 601,400 |
| 4 | - | 875,100 | 52,600 | - | 68,600 | - | 996,300 |
| 5 | - | - | - | - | 887,000 | - | 887,000 |
| 6 | - | 1,162,000 | 39,200 | - | 93,300 | - | 1,294,500 |
| 7 | - | 591,700 | 19,200 | - | 66,100 | - | 677,000 |
| 8 | - | 155,100 | 1,300 | - | - | - | 156,400 |
| 9 | - | - | - | - | 248,900 | - | 248,900 |
| 10 | - | - | - | - | 1,304,000 | - | 1,304,000 |
| 11 | - | 95,000 | 141,700 | - | 2,454,300 | - | 2,691,000 |
| 12 | - | 667,300 | 168,000 | - | 841,000 | 200 | 1,676,500 |
| 13 | - | 320,500 | 11,500 | - | 7,500 | - | 339,500 |
| 14 | - | 459,500 | 171,600 | - | 202,500 | - | 833,600 |
| 15 | - | 29,900 | 167,000 | - | 3,700 | - | 200,600 |
| 16 | - | 668,500 | 228,400 | - | 26,500 | 1,282,600 | 2,206,000 |
| 17 | - | 613,200 | 260,800 | - | 92,100 | 5,300 | 971,400 |
| 27 | - | 198,900 | - | - | 6,000 | - | 204,900 |
| 33 | - | 51,700 | - | - | 2,497,000 | - | 2,548,700 |
| Total | - | 6,930,100 | 1,330,400 | - | 9,766,400 | 1,322,900 | 19,349,800 |

## Table 3-20. Summary Table of Miles By Mode of Transportation

| IER | Total Truck Miles Local | Total Truck Miles Non-Local | Total Barge Miles | Total |
|---|---|---|---|---|
| 1 | 3,963,240 | 716,800 | 4,181 | 4,684,221 |
| 2 | 723,330 | 795,300 | 25,844 | 1,544,474 |
| 3 | 3,927,400 | 601,400 | 220,233 | 4,749,033 |
| 4 | 1,316,750 | 996,300 | 659 | 2,313,709 |
| 5 | 1,731,910 | 887,000 | 46,650 | 2,665,560 |
| 6 | 159,960 | 1,294,500 | 3,415 | 1,457,875 |
| 7 | 12,869,990 | 677,000 | 35,925 | 13,582,915 |
| 8 | 13,020 | 156,400 | 9,500 | 178,920 |
| 9 | 684,310 | 248,900 | 5,304 | 938,514 |
| 10 | 960,170 | 1,304,000 | 91,906 | 2,356,076 |
| 11 | 1,131,360 | 2,691,000 | 205,776 | 4,028,136 |
| 12 | 3,375,640 | 1,676,500 | 202,873 | 5,255,013 |
| 13 | 973,750 | 339,500 | 19,860 | 1,333,110 |
| 14 | 7,969,410 | 833,600 | 4,295 | 8,807,305 |
| 15 | 1,380,930 | 200,600 | 31,820 | 1,613,350 |
| 16 | 3,955,060 | 2,206,000 | 9,690 | 6,170,750 |
| 17 | 1,053,120 | 971,400 | 24,916 | 2,049,436 |
| 27 | 323,140 | 204,900 | 2,023 | 530,063 |
| 33 | 5,158,620 | 2,548,700 | 2,380 | 7,709,700 |
| Total | 51,671,110 | 19,349,800 | 947,249 | 71,968,159 |

## Table 3-21. Local Truck Miles By Construction Project

| IER | Project | Earthen Fill Local Truck Miles | Steel Local Truck Miles | Conc Pile Local Truck Miles | Concrete Local Truck Miles | Aggregate Local Truck Miles | Rock Local Truck Miles |
|---|---|---|---|---|---|---|---|
| 1 | LPV03d.2 | 225,300 | 50 | - | 10 | 220 | - |
| 1 | LPV04.1 | 815,300 | - | - | - | - | - |
| 1 | LPV04.2A | 280,800 | 1,200 | - | 300 | 390 | 870 |
| 1 | LPV04.2B | 1,448,700 | - | - | 110 | 150 | 390 |
| 1 | LPV05.2A | 93,400 | - | 1,880 | - | - | - |
| 1 | LPV05.2B | 683,500 | - | - | 170 | 350 | - |
| 1 | LPV06a.2 | 23,700 | 1,790 | 150 | - | - | 770 |
| 1 | LPV06b.2 | 15,700 | 1,670 | - | 190 | 340 | - |
| 1 | LPV06c.2 | 25,200 | 2,810 | - | 150 | 270 | - |
| 1 | LPV06e.2 | 70,100 | 7,570 | - | 400 | 1,510 | 90 |
| 1 | LPV06f.2 | 24,500 | 930 | - | 10 | 130 | - |
| 1 | LPV07b.2 | 11,100 | 4,420 | - | 240 | 610 | 570 |
| 1 | LPV07b.2a | - | - | 1,770 | - | - | - |
| 1 | LPV07c.2 | 168,900 | 3,900 | - | 130 | 550 | 20 |
| 1 | LPV07d.2 | 37,200 | 2,210 | - | 40 | 510 | - |
| 2 | LPV03.2A | 257,300 | 11,920 | - | 48,020 | 28,570 | - |
| 2 | LPV03.2B | 86,700 | 60,670 | 4,910 | 107,900 | 117,330 | - |
| 3 | LPV00.2 | 277,900 | - | - | - | - | - |
| 3 | LPV01.1 | 537,200 | - | - | - | - | - |
| 3 | LPV01.2 | 1,103,900 | - | - | - | - | - |
| 3 | LPV02.2 | 248,900 | - | - | - | - | 180 |
| 3 | LPV09.2 | 201,300 | 13,610 | - | 46,770 | 108,100 | - |
| 3 | LPV09a.2 | - | 830 | 13,070 | - | - | - |
| 3 | LPV12a.2 | - | 1,090 | 11,000 | 10 | 10 | - |
| 3 | LPV16.2 | 56,200 | 420 | 1,950 | 90 | 250 | - |
| 3 | LPV17.2 | 95,100 | 1,110 | 1,330 | 7,230 | 24,600 | - |
| 3 | LPV18.2 | 4,500 | 840 | 6,090 | 40 | 40 | - |
| 3 | LPV19.2 | 178,500 | - | - | - | - | - |
| 3 | LPV20.1 | 306,600 | - | 40 | - | - | - |
| 3 | LPV20.2 | 678,600 | - | - | - | - | - |
| 4 | LPV101.2 | - | 11,480 | 2,720 | 420 | 750 | - |
| 4 | LPV102.01 | 98,000 | - | - | - | - | - |
| 4 | LPV103.01A | 27,400 | - | - | - | - | - |
| 4 | LPV103.01A2 | - | 11,430 | - | 530 | 680 | - |
| 4 | LPV104 | 270,400 | - | - | - | - | - |
| 4 | LPV104.01a | 777,700 | 6,580 | - | 7,270 | 14,190 | - |
| 4 | LPV104.02 | 60,700 | 3,740 | - | 3,150 | 4,490 | 90 |

## Table 3-21 (cont.). Local Truck Miles By Construction Project

| IER | Project | Earthen Fill Local Truck Miles | Steel Local Truck Miles | Conc Pile Local Truck Miles | Concrete Local Truck Miles | Aggregate Local Truck Miles | Rock Local Truck Miles |
|---|---|---|---|---|---|---|---|
| 4 | LPV104.02b | 11,900 | 3,100 | - | - | - | - |
| 5 | PCCP-01 | 1,282,900 | 46,610 | - | 142,160 | 260,200 | - |
| 6 | LPV105.01 | - | 9,940 | - | 1,750 | 3,300 | - |
| 6 | LPV105.02 | 31,400 | 19,690 | - | 4,910 | 9,280 | 10 |
| 6 | LPV106 | 1,800 | 44,230 | - | 4,040 | 5,880 | - |
| 6 | LPV107 | 1,400 | 2,170 | 7,610 | 3,570 | 8,910 | - |
| 7 | LPV108 | 168,900 | 900 | 3,730 | 3,990 | 5,070 | - |
| 7 | LPV109.02a | 6,869,200 | 8,610 | - | 230 | 240 | 453,360 |
| 7 | LPV109.02b | 98,100 | 6,110 | - | - | - | 39,010 |
| 7 | LPV110 | - | 1,740 | - | 3,040 | 4,260 | - |
| 7 | LPV111.01 | 4,594,300 | 26,450 | - | 14,730 | 6,800 | - |
| 7 | LPV113 | 560,600 | - | - | 110 | 440 | - |
| 8 | LPV144 | 2,300 | 10,400 | 350 | - | - | - |
| 9 | LPV149 | 610,300 | - | - | 1,010 | 73,010 | - |
| 10 | LPV145 | 213,900 | - | - | - | - | - |
| 10 | LPV146 | 50,700 | - | - | 94,000 | - | - |
| 10 | LPV147 | 56,100 | 3,580 | - | 1,490 | 4,020 | - |
| 10 | LPV148.02 | 4,200 | - | - | 153,710 | 378,470 | - |
| 11 | IHNC01 | 4,100 | - | - | 57,030 | 81,260 | - |
| 11 | IHNC02 | 57,800 | - | 36,030 | 260,230 | 631,390 | - |
| 11 | LPV117.02 | - | 2,250 | - | 150 | 1,200 | - |
| 12 | WBV01 | - | - | - | 42,910 | 97,420 | - |
| 12 | WBV02a | - | - | - | 23,060 | 44,810 | - |
| 12 | WBV02b | - | 19,360 | - | 22,730 | 44,170 | - |
| 12 | WBV03a | - | - | - | 610 | 1,110 | 4,100 |
| 12 | WBV03b | 1,465,200 | - | - | 620 | 1,030 | - |
| 12 | WBV04.2 | - | - | - | 270 | 430 | - |
| 12 | WBV05.2 | - | - | - | - | - | - |
| 12 | WBV06.2 | 3,400 | 13,790 | - | 4,780 | 7,660 | - |
| 12 | WBV06a.1 | 401,800 | - | - | - | - | - |
| 12 | WBV06a.2 | 88,200 | - | - | - | - | - |
| 12 | WBV07 | 7,800 | 1,670 | 12,060 | 4,720 | 7,850 | - |
| 12 | WBV08 | 15,900 | - | 10,770 | 30 | 30 | - |
| 12 | WBV10 | 8,200 | - | - | 690 | 500 | - |
| 12 | WBV11 | 17,700 | - | 5,880 | 420 | 530 | - |
| 12 | WBV13 | 26,100 | 1,390 | - | 230 | 360 | - |
| 12 | WBV14a.2 | 560,000 | - | - | 160 | 500 | - |
| 12 | WBV14g.2 | 12,600 | 17,620 | - | 10,850 | 29,410 | - |
| 12 | WBV23 | - | - | - | 330 | 890 | 10 |

## Table 3-21 (cont.). Local Truck Miles By Construction Project

| IER | Project | Earthen Fill Local Truck Miles | Steel Local Truck Miles | Conc Pile Local Truck Miles | Concrete Local Truck Miles | Aggregate Local Truck Miles | Rock Local Truck Miles |
|---|---|---|---|---|---|---|---|
| 12 | WBV33 | 9,700 | 710 | - | 290 | 770 | - |
| 12 | WBV38.2 | 3,000 | - | 1,100 | 530 | 3,410 | - |
| 12 | WBV44 | 16,600 | - | - | 820 | 1,200 | - |
| 12 | WBV46.2 | - | 2,530 | - | 720 | 4,600 | - |
| 12 | WBV47.1 | 218,200 | - | - | - | - | - |
| 12 | WBV48.2 | 44,200 | - | - | - | - | - |
| 12 | WBV49.1 | 24,600 | - | - | - | - | - |
| 12 | WBV90 | - | - | - | - | - | - |
| 13 | WBV09.c | 500 | 5,600 | 750 | 2,400 | 1,360 | - |
| 13 | WBV09a | 25,800 | 6,720 | 30 | 110 | 80 | - |
| 13 | WBV09b | 2,000 | 11,360 | 8,720 | 940 | 760 | - |
| 13 | WBV12 | 901,300 | 5,360 | - | - | - | - |
| 14 | WBV14b.1 | 359,500 | - | - | - | - | 390 |
| 14 | WBV14b.2 | 698,300 | - | - | - | - | - |
| 14 | WBV14c.1 | 486,100 | - | - | - | - | - |
| 14 | WBV14c.2 | 3,149,700 | 2,350 | - | 890 | 2,340 | - |
| 14 | WBV14d | 431,000 | 16,880 | 130,950 | 15,150 | 22,940 | - |
| 14 | WBV14e.1 | 774,500 | - | - | - | - | - |
| 14 | WBV14e.2a | 1,325,400 | - | - | - | - | - |
| 14 | WBV14f.2 | 435,000 | - | - | - | - | 10 |
| 14 | WBV14i | 14,800 | 920 | - | 9,790 | 14,620 | - |
| 14 | WBV14j | - | 2,390 | - | 23,250 | 6,860 | - |
| 14 | WBV30 | 10,400 | 5,050 | - | 100 | 310 | 250 |
| 14 | WBV37 | 7,200 | 3,780 | - | 5,480 | 12,320 | 490 |
| 15 | WBV15a.2 | 451,400 | - | - | - | - | - |
| 15 | WBV15a.2a | 303,300 | - | - | - | - | - |
| 15 | WBV15b.2 | 91,300 | - | 53,620 | 1,600 | 1,090 | - |
| 15 | WBV17b.1 | 58,200 | 2,170 | - | - | - | - |
| 15 | WBV17b.2 | 418,300 | - | - | - | - | - |
| 15 | WBV18.2 | - | - | - | - | - | - |
| 16 | WBV70 | - | - | - | - | 972,000 | - |
| 16 | WBV71 | 323,100 | - | - | - | - | - |
| 16 | WBV72 | 2,151,300 | - | 15,690 | 250 | 220 | - |
| 16 | WBV73 | 144,900 | 11,770 | 174,440 | 5,640 | 5,690 | 530 |
| 16 | WBV74 | 20,600 | 8,910 | - | 970 | 850 | 31,260 |
| 16 | WBV75 | 11,500 | 1,540 | - | 190 | 210 | - |
| 16 | WBV76 | 18,200 | - | - | 140 | 120 | - |
| 16 | WBV77 | 17,700 | 2,370 | 270 | 290 | 160 | - |
| 16 | WBV81 | 8,000 | - | - | - | - | - |
| 16 | WBV82 | 7,600 | 1,150 | - | - | - | - |

## Table 3-21 (cont.). Local Truck Miles By Construction Project

| IER | Project | Earthen Fill Local Truck Miles | Steel Local Truck Miles | Conc Pile Local Truck Miles | Concrete Local Truck Miles | Aggregate Local Truck Miles | Rock Local Truck Miles |
|---|---|---|---|---|---|---|---|
| 16 | WBV83 | 15,800 | 830 | - | 370 | 520 | - |
| 17 | WBV16.2 | 483,300 | - | - | 1,980 | 4,550 | - |
| 17 | WBV16b | 1,800 | - | 3,810 | 3,950 | 8,780 | - |
| 17 | WBV20 | 63,400 | 6,930 | - | - | - | - |
| 17 | WBV21 | 7,400 | 1,600 | - | 490 | 1,120 | 180 |
| 17 | WBV22 | 81,400 | 4,150 | - | 3,810 | 8,870 | 1,490 |
| 17 | WBV24 | 148,500 | 22,560 | 187,550 | 1,750 | 3,700 | - |
| 27 | OFC05 | 89,300 | - | - | 2,490 | 1,770 | 300 |
| 27 | OFC06 | 215,900 | - | - | - | - | - |
| 27 | OFC07 | - | 5,220 | - | - | - | - |
| 27 | OFC08 | - | - | - | - | - | 8,150 |
| 33 | MRL 1.1 | 1,101,900 | - | - | 150 | 1,080 | - |
| 33 | MRL 2.2 | 50 | 160 | - | 57,880 | 59,970 | - |
| 33 | MRL 3.1 | 494,300 | - | - | 520 | 560 | - |
| 33 | MRL 3.2 | 955,200 | 1,090 | - | 615,990 | 669,770 | - |
| 33 | MRL 4.1 | 379,400 | - | - | 320 | 830 | - |
| 33 | MRL 6.1 | 621,900 | - | - | - | - | - |
| 33 | MRL 7.1 | 197,100 | - | - | 290 | 240 | - |

## Table 3-22. Local Truck Trips By Construction Project

| IER | Project | Earthen Fill Local Truck Trips | Steel Local Truck Trips | Conc Pile Local Truck Trips | Concrete Local Truck Trips | Aggregate Local Truck Trips | Rock Local Truck Trips |
|---|---|---|---|---|---|---|---|
| 1 | LPV03d.2 | 4,700 | LT5 | - | 10 | 10 | - |
| 1 | LPV04.1 | 51,000 | - | - | - | - | - |
| 1 | LPV04.2A | 13,700 | 50 | - | 20 | 10 | 60 |
| 1 | LPV04.2B | 34,600 | - | - | 10 | LT5 | 40 |
| 1 | LPV05.2A | 13,500 | - | 30 | - | - | - |
| 1 | LPV05.2B | 37,400 | - | - | 10 | 10 | - |
| 1 | LPV06a.2 | 500 | 60 | LT5 | - | - | 60 |
| 1 | LPV06b.2 | 300 | 20 | - | 10 | 10 | - |
| 1 | LPV06c.2 | 500 | 40 | - | 10 | 10 | - |
| 1 | LPV06e.2 | 1,600 | 200 | - | 60 | 40 | 10 |
| 1 | LPV06f.2 | 500 | 30 | - | LT5 | LT5 | - |
| 1 | LPV07b.2 | 300 | 150 | - | 30 | 20 | 40 |
| 1 | LPV07b.2a | - | - | 30 | - | - | - |
| 1 | LPV07c.2 | 5,400 | 110 | - | 20 | 20 | LT5 |
| 1 | LPV07d.2 | 800 | 50 | - | 20 | 10 | - |
| 2 | LPV03.2A | 4,600 | 330 | - | 1,210 | 810 | - |
| 2 | LPV03.2B | 2,800 | 1,720 | 80 | 4,960 | 3,330 | - |
| 3 | LPV00.2 | 8,400 | - | - | - | - | - |
| 3 | LPV01.1 | 8,900 | - | - | - | - | - |
| 3 | LPV01.2 | 12,700 | - | - | - | - | - |
| 3 | LPV02.2 | 6,300 | - | - | - | - | 10 |
| 3 | LPV09.2 | 3,300 | 670 | - | 4,570 | 3,070 | - |
| 3 | LPV09a.2 | - | 20 | 260 | - | - | - |
| 3 | LPV12a.2 | - | 30 | 170 | LT5 | LT5 | - |
| 3 | LPV16.2 | 800 | 10 | 40 | 10 | 10 | - |
| 3 | LPV17.2 | 1,400 | 20 | 30 | 1,040 | 700 | - |
| 3 | LPV18.2 | 100 | 20 | 100 | LT5 | LT5 | - |
| 3 | LPV19.2 | 4,200 | - | - | - | - | - |
| 3 | LPV20.1 | 6,300 | - | LT5 | - | - | - |
| 3 | LPV20.2 | 7,500 | - | - | - | - | - |
| 4 | LPV101.2 | - | 240 | 230 | 30 | 20 | - |
| 4 | LPV102.01 | 1,800 | - | - | - | - | - |
| 4 | LPV103.01A | 500 | - | - | - | - | - |
| 4 | LPV103.01A2 | - | 240 | - | 30 | 20 | - |
| 4 | LPV104 | 4,500 | - | - | - | - | - |
| 4 | LPV104.01a | 11,700 | 110 | - | 600 | 400 | - |
| 4 | LPV104.02 | 1,000 | 70 | - | 190 | 130 | 20 |

## Table 3-22 (cont.) Local Truck Trips By Construction Project

| IER | Project | Earthen Fill Local Truck Trips | Steel Local Truck Trips | Conc Pile Local Truck Trips | Concrete Local Truck Trips | Aggregate Local Truck Trips | Rock Local Truck Trips |
|---|---|---|---|---|---|---|---|
| 4 | LPV104.02 | 1,000 | 70 | - | 190 | 130 | 20 |
| 4 | LPV104.02b | 700 | 70 | - | - | - | - |
| 5 | PCCP-01 | 17,700 | 1,670 | - | 11,000 | 7,390 | - |
| 6 | LPV105.01 | - | 190 | - | 140 | 90 | - |
| 6 | LPV105.02 | 400 | 640 | - | 390 | 260 | LT5 |
| 6 | LPV106 | 200 | 960 | - | 250 | 170 | - |
| 6 | LPV107 | 100 | 50 | 420 | 380 | 250 | - |
| 7 | LPV108 | 15,500 | 20 | 200 | 210 | 140 | - |
| 7 | LPV109.02a | 203,400 | 130 | - | 10 | 10 | 14,690 |
| 7 | LPV109.02b | 4,700 | 70 | - | - | - | 1,260 |
| 7 | LPV110 | - | 20 | - | 180 | 120 | - |
| 7 | LPV111.01 | 126,800 | 360 | - | 1,100 | 740 | - |
| 7 | LPV113 | 13,200 | - | - | 20 | 10 | - |
| 8 | LPV144 | 200 | 170 | 10 | - | - | - |
| 9 | LPV149 | 9,000 | - | - | 3,090 | 2,070 | - |
| 10 | LPV145 | 2,100 | - | - | - | - | - |
| 10 | LPV146 | 14,000 | - | - | - | - | - |
| 10 | LPV147 | 6,100 | 60 | - | - | 110 | - |
| 10 | LPV148.02 | 1,400 | - | - | - | 10,750 | - |
| 11 | IHNC01 | 80 | - | - | 3,440 | 2,310 | - |
| 11 | IHNC02 | 1,700 | - | 1,500 | 26,890 | 18,070 | - |
| 11 | LPV117.02 | - | 50 | - | 50 | 30 | - |
| 12 | WBV01 | - | - | - | 4,120 | 2,770 | - |
| 12 | WBV02a | - | - | - | 1,890 | 1,270 | - |
| 12 | WBV02b | - | 740 | - | 1,870 | 1,250 | - |
| 12 | WBV03a | - | - | - | 50 | 30 | 130 |
| 12 | WBV03b | 31,300 | - | - | 40 | 30 | - |
| 12 | WBV04.2 | - | - | - | 20 | 10 | - |
| 12 | WBV05.2 | - | - | - | - | - | - |
| 12 | WBV06.2 | 100 | 170 | - | 320 | 220 | - |
| 12 | WBV06a.1 | 15,900 | - | - | - | - | - |
| 12 | WBV06a.2 | 4,000 | - | - | - | - | - |
| 12 | WBV07 | 400 | 20 | 180 | 330 | 220 | - |
| 12 | WBV08 | 600 | - | 190 | LT5 | LT5 | - |
| 12 | WBV10 | 400 | - | - | 20 | 10 | - |
| 12 | WBV11 | 200 | - | 100 | 20 | 20 | - |
| 12 | WBV13 | 300 | 20 | - | 20 | 10 | - |
| 12 | WBV14a.2 | 18,600 | - | - | 20 | 10 | - |

## Table 3-22 (cont.) Local Truck Trips By Construction Project

| IER | Project | Earthen Fill Local Truck Trips | Steel Local Truck Trips | Conc Pile Local Truck Trips | Concrete Local Truck Trips | Aggregate Local Truck Trips | Rock Local Truck Trips |
|---|---|---|---|---|---|---|---|
| 12 | WBV14g.2 | 200 | 750 | - | 1,240 | 840 | - |
| 12 | WBV23 | - | - | - | 40 | 30 | LT5 |
| 12 | WBV33 | 300 | 10 | - | 30 | 20 | - |
| 12 | WBV38.2 | 200 | - | 10 | 140 | 100 | - |
| 12 | WBV44 | 200 | - | - | 50 | 30 | - |
| 12 | WBV46.2 | - | 40 | - | 190 | 130 | - |
| 12 | WBV47.1 | 9,100 | - | - | - | - | - |
| 12 | WBV48.2 | 2,200 | - | - | - | - | - |
| 12 | WBV49.1 | 1,500 | - | - | - | - | - |
| 12 | WBV90 | - | - | - | - | - | - |
| 13 | WBV09.c | 500 | 70 | 10 | 60 | 40 | - |
| 13 | WBV09a | 25,000 | 80 | LT5 | LT5 | LT5 | - |
| 13 | WBV09b | 1,400 | 130 | 110 | 30 | 20 | - |
| 13 | WBV12 | 19,600 | 60 | - | - | - | - |
| 14 | WBV14b.1 | 5,900 | - | - | - | - | 30 |
| 14 | WBV14b.2 | 17,000 | - | - | - | - | - |
| 14 | WBV14c.1 | 18,400 | - | - | - | - | - |
| 14 | WBV14c.2 | 67,100 | 30 | - | 100 | 70 | - |
| 14 | WBV14d | 5,200 | 210 | 1,720 | 970 | 650 | - |
| 14 | WBV14e.1 | 11,300 | - | - | - | - | - |
| 14 | WBV14e.2a | 27,000 | - | - | - | - | - |
| 14 | WBV14f.2 | 5,800 | - | - | - | - | LT5 |
| 14 | WBV14i | 500 | 10 | - | 620 | 420 | - |
| 14 | WBV14j | - | 90 | 100 | 290 | 190 | - |
| 14 | WBV30 | 200 | 70 | - | 10 | 10 | 20 |
| 14 | WBV37 | 300 | 50 | - | 520 | 350 | 30 |
| 15 | WBV15a.2 | 37,000 | - | - | - | - | - |
| 15 | WBV15a.2a | 24,100 | - | - | - | - | - |
| 15 | WBV15b.2 | 1,600 | - | 720 | 50 | 30 | - |
| 15 | WBV17b.1 | 15,500 | 30 | - | - | - | - |
| 15 | WBV17b.2 | 11,800 | - | - | - | - | - |
| 15 | WBV18.2 | - | - | - | - | - | - |
| 16 | WBV70 | - | - | - | - | 27,610 | - |
| 16 | WBV71 | 8,800 | - | - | - | - | - |
| 16 | WBV72 | 61,400 | - | 210 | 10 | 10 | - |
| 16 | WBV73 | 3,300 | 200 | 2,190 | 240 | 160 | 20 |
| 16 | WBV74 | 4,800 | 140 | - | 40 | 20 | 1,540 |
| 16 | WBV75 | 300 | 20 | - | 10 | 10 | - |
| 16 | WBV76 | 500 | - | - | LT5 | LT5 | - |
| 16 | WBV77 | 700 | 40 | LT5 | 10 | LT5 | - |

## Table 3-22 (cont.) Local Truck Trips By Construction Project

| IER | Project | Earthen Fill Local Truck Trips | Steel Local Truck Trips | Conc Pile Local Truck Trips | Concrete Local Truck Trips | Aggregate Local Truck Trips | Rock Local Truck Trips |
|---|---|---|---|---|---|---|---|
| 16 | WBV81 | 200 | - | - | - | - | - |
| 16 | WBV82 | 100 | 20 | - | - | - | - |
| 16 | WBV83 | 200 | 10 | - | 20 | 10 | - |
| 17 | WBV16.2 | 7,500 | - | - | 190 | 130 | - |
| 17 | WBV16b | 100 | - | 60 | 370 | 250 | - |
| 17 | WBV20 | 1,000 | 100 | - | - | - | - |
| 17 | WBV21 | 100 | 20 | - | 50 | 30 | 20 |
| 17 | WBV22 | 1,300 | 60 | - | 380 | 250 | 180 |
| 17 | WBV24 | 2,700 | 350 | 2,710 | 160 | 110 | - |
| 27 | OFC05 | 1,200 | - | - | 70 | 50 | 20 |
| 27 | OFC06 | 4,100 | - | - | - | - | - |
| 27 | OFC07 | - | 210 | - | - | - | - |
| 27 | OFC08 | - | - | - | - | - | 660 |
| 33 | MRL 1.1 | 9,100 | - | - | 50 | 30 | - |
| 33 | MRL 2.2 | LT5 | LT5 | - | 2,540 | 1,700 | - |
| 33 | MRL 3.1 | 5,400 | - | - | 20 | 20 | - |
| 33 | MRL 3.2 | 18,700 | 30 | - | 28,310 | 19,030 | - |
| 33 | MRL 4.1 | 4,800 | - | - | 40 | 20 | - |
| 33 | MRL 6.1 | 6,500 | - | - | - | - | - |
| 33 | MRL 7.1 | 2,000 | - | - | 10 | 10 | - |

## Table 3-23. Non-Local Truck Miles and Barge Miles By Construction Project

| IER | Project | Steel Truck Miles Non-Local | Steel Barge Miles | Conc Pile Truck Miles Non-Local | Conc Pile Barge Miles | Aggregate Truck Miles Non-Local | Aggregate Barge Miles | Rock Truck Miles Non-Local | Rock Barge Miles |
|---|---|---|---|---|---|---|---|---|---|
| 1 | LPV03d.2 | 1,000 | - | - | - | 740 | - | - | - |
| 1 | LPV04.1 | - | - | - | - | - | - | - | - |
| 1 | LPV04.2A | 49,000 | - | - | - | 1,320 | - | - | 950 |
| 1 | LPV04.2B | - | - | - | - | 500 | - | - | 950 |
| 1 | LPV05.2A | - | - | 2,670 | - | - | - | - | - |
| 1 | LPV05.2B | - | - | - | - | 1,200 | - | - | - |
| 1 | LPV06a.2 | 41,160 | - | 200 | - | - | - | - | 950 |
| 1 | LPV06b.2 | 24,390 | - | - | - | 1,160 | - | - | - |
| 1 | LPV06c.2 | 34,750 | - | - | - | 910 | - | - | - |
| 1 | LPV06e.2 | 188,940 | - | - | - | 5,140 | - | - | 950 |
| 1 | LPV06f.2 | 25,220 | - | - | - | 440 | - | - | - |
| 1 | LPV07b.2 | 141,970 | - | - | - | 2,070 | - | 33,820 | - |
| 1 | LPV07b.2a | - | - | 2,420 | - | - | - | - | - |
| 1 | LPV07c.2 | 106,220 | - | - | - | 1,870 | - | - | 380 |
| 1 | LPV07d.2 | 47,940 | - | - | - | 1,730 | - | - | - |
| 2 | LPV03.2A | 290,800 | - | - | 80 | 97,410 | - | - | 4,400 |
| 2 | LPV03.2B | - | 4,260 | 7,090 | - | 399,970 | - | - | 17,100 |
| 3 | LPV00.2 | - | - | - | - | - | - | - | 1,150 |
| 3 | LPV01.1 | - | - | - | - | - | - | - | 1,900 |
| 3 | LPV01.2 | - | - | - | - | - | - | - | 125,400 |
| 3 | LPV02.2 | - | - | - | - | - | - | 1,000 | - |
| 3 | LPV09.2 | - | 2,840 | - | 500 | 368,520 | - | - | 20,900 |
| 3 | LPV09a.2 | 18,000 | - | 24,840 | - | - | - | - | 5,700 |
| 3 | LPV12a.2 | 21,280 | - | 15,880 | - | 40 | - | - | 6,600 |
| 3 | LPV16.2 | 8,460 | - | 3,710 | - | 850 | - | - | - |
| 3 | LPV17.2 | 34,560 | - | 2,520 | - | 83,870 | - | - | 1,150 |
| 3 | LPV18.2 | 7,990 | - | 9,650 | - | 120 | - | - | - |
| 3 | LPV19.2 | - | - | - | - | - | - | - | 1,900 |
| 3 | LPV20.1 | - | - | 80 | - | - | - | - | 1,900 |
| 3 | LPV20.2 | - | - | - | - | - | - | - | 50,290 |
| 4 | LPV101.2 | 224,660 | - | 52,590 | - | 2,550 | - | - | - |
| 4 | LPV102.01 | - | - | - | - | - | - | - | - |
| 4 | LPV103.01A | - | - | - | - | - | - | - | - |
| 4 | LPV103.01A2 | 223,720 | - | - | 80 | 2,330 | - | - | - |
| 4 | LPV104 | - | - | - | - | - | - | - | - |
| 4 | LPV104.01a | 214,700 | - | - | - | 48,380 | - | - | - |
| 4 | LPV104.02 | 80,900 | - | - | - | 15,320 | - | - | 580 |
| 4 | LPV104.02b | 131,100 | - | - | - | - | - | - | - |
| 5 | PCCP-01 | - | 4,460 | - | - | 887,040 | - | - | 42,190 |
| 6 | LPV105.01 | 174,660 | - | - | - | 11,240 | - | - | - |
| 6 | LPV105.02 | - | 2,840 | - | - | 31,650 | - | - | 580 |
| 6 | LPV106 | 942,400 | - | - | - | 20,060 | - | - | - |
| 6 | LPV107 | 44,980 | - | 39,180 | - | 30,360 | - | - | - |
| 7 | LPV108 | 18,680 | - | 19,190 | - | 17,300 | - | - | - |
| 7 | LPV109.02a | 119,550 | - | - | - | 820 | - | - | 26,600 |

## Table 3-23 (cont). Non-Local Truck Miles and Barge Miles By Construction Project

| IER | Project | Steel Truck Miles Non-Local | Steel Barge Miles | Conc Pile Truck Miles Non-Local | Conc Pile Barge Miles | Aggregate Truck Miles Non-Local | Aggregate Barge Miles | Rock Truck Miles Non-Local | Rock Barge Miles |
|---|---|---|---|---|---|---|---|---|---|
| 7 | LPV109.02b | 69,120 | - | - | - | - | - | - | 1,730 |
| 7 | LPV110 | 21,490 | - | - | - | 14,520 | - | - | - |
| 7 | LPV111.01 | 362,840 | - | - | - | 31,980 | - | - | - |
| 7 | LPV113 | - | - | - | - | 1,510 | - | - | 7,600 |
| 8 | LPV144 | 155,060 | - | 1,350 | - | - | 5,700 | - | 3,800 |
| 9 | LPV149 | - | 1,420 | - | 80 | 248,900 | - | - | 3,800 |
| 10 | LPV145 | - | 8,520 | - | - | - | 20,900 | - | 670 |
| 10 | LPV146 | - | 12,780 | - | - | - | 26,600 | - | 430 |
| 10 | LPV147 | - | 1,420 | - | - | 13,720 | - | - | - |
| 10 | LPV148.02 | - | 19,880 | - | - | 1,290,240 | - | - | 700 |
| 11 | IHNC01 | - | 5,880 | - | 80 | 277,030 | - | - | 12,200 |
| 11 | IHNC02 | - | 15,380 | 141,730 | 3,590 | 2,173,230 | - | - | 166,750 |
| 11 | LPV117.02 | 95,000 | - | - | - | 4,080 | - | - | 1,900 |
| 12 | WBV01 | - | 5,680 | - | 80 | 332,110 | - | - | - |
| 12 | WBV02a | - | 2,840 | - | - | 152,760 | - | - | - |
| 12 | WBV02b | - | 1,420 | - | - | 150,600 | - | - | - |
| 12 | WBV03a | - | 2,840 | - | - | 3,780 | - | - | 1,100 |
| 12 | WBV03b | - | 2,840 | - | - | 3,520 | - | - | - |
| 12 | WBV04.2 | - | 1,420 | - | 170 | 1,460 | - | - | - |
| 12 | WBV05.2 | - | 1,420 | - | 80 | - | - | - | - |
| 12 | WBV06.2 | 230,130 | - | - | - | 26,130 | - | - | 1,150 |
| 12 | WBV06a.1 | - | 1,420 | - | - | - | - | - | - |
| 12 | WBV06a.2 | - | - | - | - | - | - | - | - |
| 12 | WBV07 | 43,700 | 2,480 | 17,780 | - | 26,760 | - | - | 2,300 |
| 12 | WBV08 | - | 1,420 | 17,510 | - | 110 | - | - | - |
| 12 | WBV10 | - | 1,420 | - | 80 | 1,690 | - | - | 1,900 |
| 12 | WBV11 | - | 1,420 | 131,500 | - | 1,810 | - | - | - |
| 12 | WBV13 | 41,800 | 1,420 | - | 80 | 1,210 | - | - | - |
| 12 | WBV14a.2 | - | 1,420 | - | - | 1,700 | - | - | 180 |
| 12 | WBV14g.2 | 267,430 | 1,420 | - | - | 100,270 | - | - | - |
| 12 | WBV23 | - | 1,420 | - | - | 3,020 | - | 150 | - |
| 12 | WBV33 | 17,800 | 1,420 | - | - | 2,620 | - | - | 20 |
| 12 | WBV38.2 | - | 1,420 | 1,250 | - | 11,630 | - | - | 1,900 |
| 12 | WBV44 | - | 1,420 | - | - | 4,100 | - | - | - |
| 12 | WBV46.2 | 66,460 | - | - | - | 15,680 | - | - | - |
| 12 | WBV47.1 | - | - | - | - | - | - | - | - |
| 12 | WBV48.2 | - | - | - | - | - | - | - | - |
| 12 | WBV49.1 | - | - | - | - | - | - | - | - |
| 12 | WBV90 | - | 4,260 | - | 1,000 | - | 32,300 | - | 119,700 |
| 13 | WBV09.c | 62,040 | - | 910 | - | 4,640 | - | - | - |
| 13 | WBV09a | 74,260 | - | 30 | - | 270 | - | - | 360 |
| 13 | WBV09b | 125,020 | - | 10,570 | - | 2,600 | - | - | 17,600 |
| 13 | WBV12 | 59,220 | - | - | - | - | - | - | 1,900 |
| 14 | WBV14b.1 | - | - | - | - | - | - | - | 950 |
| 14 | WBV14b.2 | - | - | - | - | - | - | - | - |

## Table 3-23 (cont). Non-Local Truck Miles and Barge Miles By Construction Project

| IER | Project | Steel Truck Miles Non-Local | Steel Barge Miles | Conc Pile Truck Miles Non-Local | Conc Pile Barge Miles | Aggregate Truck Miles Non-Local | Aggregate Barge Miles | Rock Truck Miles Non-Local | Rock Barge Miles |
|---|---|---|---|---|---|---|---|---|---|
| 14 | WBV14c.1 | - | - | - | - | - | - | - | - |
| 14 | WBV14c.2 | 31,020 | - | - | - | 7,970 | - | - | - |
| 14 | WBV14d | 210,000 | - | 162,070 | - | 78,220 | - | - | - |
| 14 | WBV14e.1 | - | - | - | - | - | - | - | - |
| 14 | WBV14e.2a | - | - | - | - | - | - | - | - |
| 14 | WBV14f.2 | - | - | - | - | - | - | - | - |
| 14 | WBV14i | 13,220 | - | - | - | 49,840 | - | - | - |
| 14 | WBV14j | 86,480 | - | 9,580 | - | 23,390 | - | - | - |
| 14 | WBV30 | 65,800 | - | - | - | 1,060 | - | - | 30 |
| 14 | WBV37 | 53,000 | 1,420 | - | - | 42,010 | - | - | 950 |
| 15 | WBV15a.2 | - | - | - | - | - | - | - | 19,000 |
| 15 | WBV15a.2a | - | - | - | - | - | - | - | 7,600 |
| 15 | WBV15b.2 | - | 1,420 | 167,000 | - | 3,730 | - | - | 1,900 |
| 15 | WBV17b.1 | 29,890 | - | - | - | - | - | - | 1,900 |
| 15 | WBV17b.2 | - | - | - | - | - | - | - | - |
| 15 | WBV18.2 | - | - | - | - | - | - | - | - |
| 16 | WBV70 | - | - | - | - | - | - | - | - |
| 16 | WBV71 | - | - | - | - | - | - | - | - |
| 16 | WBV72 | - | - | 21,140 | - | 750 | - | - | 1,150 |
| 16 | WBV73 | 314,490 | - | 206,820 | - | 19,390 | - | 17,490 | - |
| 16 | WBV74 | 247,100 | - | - | - | 2,890 | - | 1,265,060 | - |
| 16 | WBV75 | 22,460 | - | - | - | 720 | - | - | - |
| 16 | WBV76 | - | 1,420 | - | - | 420 | - | - | 1,900 |
| 16 | WBV77 | 70,300 | - | 400 | - | 540 | - | - | - |
| 16 | WBV81 | - | 1,420 | - | - | - | - | - | - |
| 16 | WBV82 | 1,900 | - | - | - | - | - | - | - |
| 16 | WBV83 | 12,220 | - | - | - | 1,780 | - | - | 3,800 |
| 17 | WBV16.2 | - | 1,420 | - | - | 15,520 | - | - | 15,200 |
| 17 | WBV16b | - | 3,980 | 5,380 | - | 29,920 | - | - | 1,900 |
| 17 | WBV20 | 87,150 | - | - | - | - | - | - | 50 |
| 17 | WBV21 | 20,680 | - | - | - | 3,830 | - | 5,260 | - |
| 17 | WBV22 | 108,910 | 1,420 | - | - | 30,240 | - | - | 950 |
| 17 | WBV24 | 396,480 | - | 255,440 | - | 12,610 | - | - | - |
| 27 | OFC05 | - | - | - | - | 6,020 | - | - | 580 |
| 27 | OFC06 | - | - | - | - | - | - | - | - |
| 27 | OFC07 | 198,940 | - | - | - | - | - | - | - |
| 27 | OFC08 | - | - | - | - | - | - | - | 1,450 |
| 33 | MRL 1.1 | - | - | - | - | 3,680 | - | - | - |
| 33 | MRL 2.2 | 1,880 | - | - | - | 204,430 | - | - | - |
| 33 | MRL 3.1 | - | - | - | - | 1,920 | - | - | - |
| 33 | MRL 3.2 | 49,840 | 180 | - | - | 2,283,300 | - | - | - |
| 33 | MRL 4.1 | - | - | - | - | 2,840 | - | - | - |
| 33 | MRL 6.1 | - | - | - | - | - | - | - | - |
| 33 | MRL 7.1 | - | - | - | - | 810 | - | - | 2,200 |

**Table 3-24. Non-Local Truck Trips and Barge Trips By Construction Project**

| IER | Proj ID | Steel Truck Trips Non-Local | Steel Barge Trips | Conc Pile Truck Trips Non-Local | Conc Pile Barge Trips | Aggrgte Truck Trips Non-Local | Aggrgte Barge Trips | Rock Barge Trips |
|---|---|---|---|---|---|---|---|---|
| 1 | LPV03d.2 | LT5 | - | - | - | 6 | - | - |
| 1 | LPV04.1 | - | - | - | - | - | - | - |
| 1 | LPV04.2A | 50 | - | - | - | 10 | - | LT5 |
| 1 | LPV04.2B | - | - | - | - | LT5 | - | LT5 |
| 1 | LPV05.2A | - | - | 30 | - | - | - | - |
| 1 | LPV05.2B | - | - | - | - | 10 | - | - |
| 1 | LPV06a.2 | 60 | - | LT5 | - | - | - | LT5 |
| 1 | LPV06b.2 | 20 | - | - | - | 10 | - | - |
| 1 | LPV06c.2 | 40 | - | - | - | 8 | - | - |
| 1 | LPV06e.2 | 200 | - | - | - | 40 | - | LT5 |
| 1 | LPV06f.2 | 30 | - | - | - | LF5 | - | - |
| 1 | LPV07b.2 | 150 | - | - | - | 20 | - | - |
| 1 | LPV07b.2a | - | - | 30 | - | - | - | - |
| 1 | LPV07c.2 | 110 | - | - | - | 20 | - | LT5 |
| 1 | LPV07d.2 | 50 | - | - | - | 10 | - | - |
| 2 | LPV03.2A | 330 | - | - | LT5 | 810 | - | LT5 |
| 2 | LPV03.2B | - | LT5 | 80 | - | 3,330 | - | 9 |
| 3 | LPV00.2 | - | - | - | - | - | - | LT5 |
| 3 | LPV01.1 | - | - | - | - | - | - | LT5 |
| 3 | LPV01.2 | - | - | - | - | - | - | 70 |
| 3 | LPV02.2 | - | - | - | - | - | - | - |
| 3 | LPV09.2 | - | LT5 | - | 6 | 3,070 | - | 10 |
| 3 | LPV09a.2 | 20 | - | 260 | - | - | - | LT5 |
| 3 | LPV12a.2 | 30 | - | 170 | - | 0 | - | LT5 |
| 3 | LPV16.2 | 9 | - | 40 | - | 7 | - | - |
| 3 | LPV17.2 | 20 | - | 30 | - | 700 | - | LT5 |
| 3 | LPV18.2 | 20 | - | 100 | - | LT5 | - | - |
| 3 | LPV19.2 | - | - | - | - | - | - | LT5 |
| 3 | LPV20.1 | - | - | LT5 | - | - | - | LT5 |
| 3 | LPV20.2 | - | - | - | - | - | - | 30 |
| 4 | LPV101.2 | 240 | - | 230 | - | 20 | - | - |
| 4 | LPV102.01 | - | - | - | - | - | - | - |
| 4 | LPV103.01A | - | - | - | - | - | - | - |
| 4 | LPV103.01A2 | 240 | - | - | LT5 | 20 | - | - |
| 4 | LPV104 | - | - | - | - | - | - | - |
| 4 | LPV104.01a | 110 | - | - | - | 400 | - | - |
| 4 | LPV104.02 | 70 | - | - | - | 130 | - | LT5 |
| 4 | LPV104.02b | 70 | - | - | - | - | - | - |
| 5 | PCCP-01 | - | LT5 | - | - | 7,390 | - | 20 |

**Table 3-24 (cont.) Non-Local Truck Trips and Barge Trips By Construction Project**

| IER | Proj ID | Steel Truck Trips Non-Local | Steel Barge Trips | Conc Pile Truck Trips Non-Local | Conc Pile Barge Trips | Aggrgte Truck Trips Non-Local | Aggrgte Barge Trips | Rock Barge Trips |
|---|---|---|---|---|---|---|---|---|
| 6 | LPV105.01 | 190 | - | - | - | 90 | - | - |
| 6 | LPV105.02 | - | LT5 | - | - | 260 | - | LT5 |
| 6 | LPV106 | 960 | - | - | - | 170 | - | - |
| 6 | LPV107 | 50 | - | 420 | - | 250 | - | - |
| 7 | LPV108 | 20 | - | 200 | - | 140 | - | - |
| 7 | LPV109.02a | 130 | - | - | - | 7 | - | 30 |
| 7 | LPV109.02b | 70 | - | - | - | - | - | LT5 |
| 7 | LPV110 | 20 | - | - | - | 120 | - | - |
| 7 | LPV111.01 | 360 | - | - | - | 740 | - | - |
| 7 | LPV113 | - | - | - | - | 10 | - | LT5 |
| 8 | LPV144 | 170 | - | 10 | - | - | 3 | 2 |
| 9 | LPV149 | - | LT5 | - | LT5 | 2,070 | - | LT5 |
| 10 | LPV145 | - | 6 | - | - | - | 10 | 50 |
| 10 | LPV146 | - | 9 | - | - | - | 10 | 30 |
| 10 | LPV147 | - | LT5 | - | - | 110 | - | - |
| 10 | LPV148.02 | - | 10 | - | - | 10,750 | - | 50 |
| 11 | IHNC01 | - | LT5 | - | LT5 | 2,310 | - | 8 |
| 11 | IHNC02 | - | 20 | 1,500 | 40 | 18,070 | - | 150 |
| 11 | LPV117.02 | 50 | - | | - | 30 | - | LT5 |
| 12 | WBV01 | - | LT5 | - | LT5 | 2,770 | - | - |
| 12 | WBV02a | - | LT5 | - | - | 1,270 | - | - |
| 12 | WBV02b | - | LT5 | - | - | 1,250 | - | - |
| 12 | WBV03a | - | LT5 | - | - | 30 | - | LT5 |
| 12 | WBV03b | - | LT5 | - | - | 30 | - | - |
| 12 | WBV04.2 | - | LT5 | - | LT5 | 10 | - | - |
| 12 | WBV05.2 | - | LT5 | - | LT5 | - | - | - |
| 12 | WBV06.2 | 170 | - | - | - | 220 | - | LT5 |
| 12 | WBV06a.1 | - | LT5 | - | - | - | - | - |
| 12 | WBV06a.2 | - | - | - | - | - | - | - |
| 12 | WBV07 | 20 | LT5 | 180 | - | 220 | - | LT5 |
| 12 | WBV08 | - | LT5 | 190 | - | 1 | - | - |
| 12 | WBV10 | - | LT5 | - | LT5 | 10 | - | LT5 |
| 12 | WBV11 | - | LT5 | 100 | - | 20 | - | - |
| 12 | WBV13 | 20 | LT5 | - | LT5 | 10 | - | - |
| 12 | WBV14a.2 | - | LT5 | - | - | 10 | - | LT5 |
| 12 | WBV14g.2 | 140 | LT5 | - | - | 840 | - | - |
| 12 | WBV23 | - | LT5 | - | - | 30 | - | - |
| 12 | WBV33 | 9 | LT5 | - | - | 20 | - | LT5 |
| 12 | WBV38.2 | - | LT5 | 10 | - | 100 | - | LT5 |
| 12 | WBV44 | - | LT5 | - | - | 30 | - | - |

**Table 3-24 (cont.) Non-Local Truck Trips and Barge Trips By Construction Project**

| IER | Proj ID | Steel Truck Trips Non-Local | Steel Barge Trips | Conc Pile Truck Trips Non-Local | Conc Pile Barge Trips | Aggrgte Truck Trips Non-Local | Aggrgte Barge Trips | Rock Barge Trips |
|---|---|---|---|---|---|---|---|---|
| 12 | WBV46.2 | 40 | - | - | - | 130 | - | - |
| 12 | WBV47.1 | - | - | - | - | - | - | - |
| 12 | WBV48.2 | - | - | - | - | - | - | - |
| 12 | WBV49.1 | - | - | - | - | - | - | - |
| 12 | WBV90 | - | LT5 | - | 10 | - | 20 | 60 |
| 13 | WBV09.c | 70 | - | 10 | - | 40 | - | - |
| 13 | WBV09a | 80 | - | LT5 | - | LT5 | - | LT5 |
| 13 | WBV09b | 130 | - | 110 | - | 20 | - | 8 |
| 13 | WBV12 | 60 | - | - | - | - | - | LT5 |
| 13 | WBV12a | - | - | - | - | - | - | - |
| 13 | WBV12b | - | - | - | - | - | - | - |
| 13 | WBV12c | - | - | - | - | - | - | - |
| 14 | WBV14b.1 | - | - | - | - | - | - | LT5 |
| 14 | WBV14b.2 | - | - | - | - | - | - | - |
| 14 | WBV14c.1 | - | - | - | - | - | - | - |
| 14 | WBV14c.2 | 30 | - | - | - | 70 | - | - |
| 14 | WBV14d | 210 | - | 1,720 | - | 650 | - | - |
| 14 | WBV14e.1 | - | - | - | - | - | - | - |
| 14 | WBV14e.2a | - | - | - | - | - | - | - |
| 14 | WBV14f.2 | - | - | - | - | - | - | - |
| 14 | WBV14i | 10 | - | - | - | 420 | - | - |
| 14 | WBV14j | 90 | - | 100 | - | 190 | - | - |
| 14 | WBV30 | 70 | - | - | - | 9 | - | LT5 |
| 14 | WBV37 | 50 | LT5 | - | - | 350 | - | LT5 |
| 15 | WBV15a.2 | - | - | - | - | - | - | 10 |
| 15 | WBV15a.2a | - | - | - | - | - | - | LT5 |
| 15 | WBV15b.2 | - | LT5 | 720 | - | 30 | - | LT5 |
| 15 | WBV17b.1 | 30 | - | - | - | - | - | LT5 |
| 15 | WBV17b.2 | - | - | - | - | - | - | - |
| 15 | WBV18.2 | - | - | - | - | - | - | - |
| 16 | WBV70 | - | - | - | - | 27,610 | - | - |
| 16 | WBV71 | - | - | - | - | - | - | - |
| 16 | WBV72 | - | - | 210 | - | 6 | - | LT5 |
| 16 | WBV73 | 200 | - | 2,190 | - | 160 | - | - |
| 16 | WBV74 | 140 | - | - | - | 20 | - | - |
| 16 | WBV75 | 20 | - | - | - | 6 | - | - |
| 16 | WBV76 | - | LT5 | - | - | LT5 | - | LT5 |
| 16 | WBV77 | 40 | - | LT5 | - | LT5 | - | - |
| 16 | WBV81 | - | LT5 | - | - | - | - | - |
| 16 | WBV82 | 20 | - | - | - | - | - | - |

**Table 3-24 (cont.) Non-Local Truck Trips and Barge Trips By Construction Project**

| IER | Proj ID | Steel Truck Trips Non-Local | Steel Barge Trips | Conc Pile Truck Trips Non-Local | Conc Pile Barge Trips | Aggrgte Truck Trips Non-Local | Aggrgte Barge Trips | Rock Barge Trips |
|---|---|---|---|---|---|---|---|---|
| 16 | WBV83 | 10 | - | - | - | 10 | - | LT5 |
| 17 | WBV16.2 | - | LT5 | - | - | 130 | - | 8 |
| 17 | WBV16b | - | LT5 | 60 | - | 250 | - | LT5 |
| 17 | WBV20 | 100 | - | - | - | - | - | LT5 |
| 17 | WBV21 | 20 | - | - | - | 30 | - | - |
| 17 | WBV22 | 60 | LT5 | - | - | 250 | - | LT5 |
| 17 | WBV24 | 350 | - | 2,710 | - | 110 | - | - |
| 27 | OFC05 | - | - | - | - | 50 | - | LT5 |
| 27 | OFC06 | - | - | - | - | - | - | - |
| 27 | OFC07 | 210 | - | - | - | - | - | - |
| 27 | OFC08 | - | - | - | - | - | - | LT5 |
| 33 | MRL 1.1 | - | - | - | - | 30 | - | - |
| 33 | MRL 2.2 | LT5 | - | - | - | 1,700 | - | - |
| 33 | MRL 3.1 | - | - | - | - | 20 | - | - |
| 33 | MRL 3.2 | 30 | LT5 | - | - | 19,030 | - | - |
| 33 | MRL 4.1 | - | - | - | - | 20 | - | - |
| 33 | MRL 6.1 | - | - | - | - | - | - | - |
| 33 | MRL 7.1 | - | - | - | - | 7 | - | LT5 |

## Table 3-25. Miles By Mode of Transportation by Project

| IER | Project | Total Truck Miles Local | Total Truck Miles Non-Local | Total Barge Miles |
|---|---|---|---|---|
| 1 | LPV03d.2 | 225,600 | 1,740 | - |
| 1 | LPV04.1 | 815,300 | - | - |
| 1 | LPV04.2A | 283,600 | 50,320 | 950 |
| 1 | LPV04.2B | 1,449,300 | 500 | 950 |
| 1 | LPV05.2A | 95,300 | 2,670 | - |
| 1 | LPV05.2B | 684,000 | 1,200 | - |
| 1 | LPV06a.2 | 26,400 | 41,360 | 950 |
| 1 | LPV06b.2 | 17,900 | 25,550 | - |
| 1 | LPV06c.2 | 28,400 | 35,660 | - |
| 1 | LPV06e.2 | 79,700 | 194,080 | 950 |
| 1 | LPV06f.2 | 25,600 | 25,650 | - |
| 1 | LPV07b.2 | 16,900 | 177,860 | - |
| 1 | LPV07b.2a | 1,800 | 2,420 | - |
| 1 | LPV07c.2 | 173,500 | 108,090 | 380 |
| 1 | LPV07d.2 | 40,000 | 49,670 | - |
| 2 | LPV03.2A | 345,800 | 388,220 | 4,480 |
| 2 | LPV03.2B | 377,500 | 407,060 | 21,360 |
| 3 | LPV00.2 | 277,900 | - | 1,150 |
| 3 | LPV01.1 | 537,200 | - | 1,900 |
| 3 | LPV01.2 | 1,103,900 | - | 125,400 |
| 3 | LPV02.2 | 249,100 | 1,000 | - |
| 3 | LPV09.2 | 369,800 | 368,520 | 24,240 |
| 3 | LPV09a.2 | 13,900 | 42,840 | 5,700 |
| 3 | LPV12a.2 | 12,100 | 37,200 | 6,600 |
| 3 | LPV16.2 | 58,900 | 13,020 | - |
| 3 | LPV17.2 | 129,400 | 120,940 | 1,150 |
| 3 | LPV18.2 | 11,500 | 17,760 | - |
| 3 | LPV19.2 | 178,500 | - | 1,900 |
| 3 | LPV20.1 | 306,600 | 80 | 1,900 |
| 3 | LPV20.2 | 678,600 | - | 50,290 |
| 4 | LPV101.2 | 15,400 | 279,800 | - |
| 4 | LPV102.01 | 98,000 | - | - |
| 4 | LPV103.01A | 27,400 | - | - |
| 4 | LPV103.01A2 | 12,600 | 226,050 | 80 |
| 4 | LPV104 | 270,400 | - | - |
| 4 | LPV104.01a | 805,700 | 263,080 | |
| 4 | LPV104.02 | 72,200 | 96,220 | 580 |
| 4 | LPV104.02b | 15,000 | 131,100 | - |
| 5 | PCCP-01 | 1,731,900 | 887,040 | 46,660 |

## Table 3-25 (cont.). Miles By Mode of Transportation by Project

| IER | Project | Total Truck Miles Local | Total Truck Miles Non-Local | Total Barge Miles |
|---|---|---|---|---|
| 6 | LPV105.01 | 15,000 | 185,900 | - |
| 6 | LPV105.02 | 65,300 | 31,650 | 3,420 |
| 6 | LPV106 | 56,000 | 962,460 | - |
| 6 | LPV107 | 23,600 | 114,510 | - |
| 7 | LPV108 | 182,600 | 55,170 | - |
| 7 | LPV109.02a | 7,331,600 | 120,370 | 26,600 |
| 7 | LPV109.02b | 143,200 | 69,120 | 1,730 |
| 7 | LPV110 | 9,000 | 36,020 | - |
| 7 | LPV111.01 | 4,642,300 | 394,820 | - |
| 7 | LPV113 | 561,200 | 1,510 | 7,600 |
| 8 | LPV144 | 13,100 | 156,400 | 9,500 |
| 9 | LPV149 | 684,300 | 248,900 | 5,300 |
| 10 | LPV145 | 213,900 | - | 30,090 |
| 10 | LPV146 | 144,700 | - | 39,810 |
| 10 | LPV147 | 65,200 | 13,720 | 1,420 |
| 10 | LPV148.02 | 536,400 | 1,290,240 | 20,580 |
| 11 | IHNC01 | 142,400 | 277,030 | 18,160 |
| 11 | IHNC02 | 985,500 | 2,292,410 | 185,720 |
| 11 | LPV117.02 | 3,600 | 99,080 | 1,900 |
| 12 | WBV01 | 140,300 | 332,110 | 5,760 |
| 12 | WBV02a | 67,900 | 152,760 | 2,840 |
| 12 | WBV02b | 86,300 | 150,600 | 1,420 |
| 12 | WBV03a | 5,800 | 3,780 | 3,940 |
| 12 | WBV03b | 1,466,900 | 3,520 | 2,840 |
| 12 | WBV04.2 | 700 | 1,460 | 1,590 |
| 12 | WBV05.2 | - | - | 1,500 |
| 12 | WBV06.2 | 29,600 | 256,250 | 1,150 |
| 12 | WBV06a.1 | 401,800 | - | 1,420 |
| 12 | WBV06a.2 | 88,200 | - | - |
| 12 | WBV07 | 34,100 | 88,240 | 4,780 |
| 12 | WBV08 | 26,700 | 17,620 | 1,420 |
| 12 | WBV10 | 9,400 | 1,690 | 3,400 |
| 12 | WBV11 | 24,500 | 133,300 | 1,420 |
| 12 | WBV13 | 28,100 | 43,010 | 1,500 |
| 12 | WBV14a.2 | 560,700 | 1,700 | 1,600 |
| 12 | WBV14g.2 | 70,500 | 367,690 | 1,420 |
| 12 | WBV23 | 1,200 | 3,180 | 1,420 |
| 12 | WBV33 | 11,500 | 20,420 | 1,440 |
| 12 | WBV38.2 | 8,000 | 12,880 | 3,320 |
| 12 | WBV44 | 18,600 | 4,100 | 1,420 |

**Table 3-25 (cont.). Miles By Mode of Transportation by Project**

| IER | Project | Total Truck Miles Local | Total Truck Miles Non-Local | Total Barge Miles |
|---|---|---|---|---|
| 12 | WBV46.2 | 7,800 | 82,130 | - |
| 12 | WBV47.1 | 218,200 | - | - |
| 12 | WBV48.2 | 44,200 | - | - |
| 12 | WBV49.1 | 24,600 | - | - |
| 12 | WBV90 | - | - | 157,260 |
| 13 | WBV09.c | 10,600 | 67,580 | - |
| 13 | WBV09a | 32,700 | 74,560 | 360 |
| 13 | WBV09b | 23,800 | 138,190 | 17,600 |
| 13 | WBV12 | 906,700 | 59,220 | 1,900 |
| 14 | WBV14b.1 | 359,900 | - | 950 |
| 14 | WBV14b.2 | 698,300 | - | - |
| 14 | WBV14c.1 | 486,100 | - | - |
| 14 | WBV14c.2 | 3,155,300 | 38,990 | - |
| 14 | WBV14d | 616,900 | 450,290 | - |
| 14 | WBV14e.1 | 774,500 | - | - |
| 14 | WBV14e.2a | 1,325,400 | - | - |
| 14 | WBV14f.2 | 435,000 | - | 950 |
| 14 | WBV14i | 40,100 | 63,060 | - |
| 14 | WBV14j | 32,500 | 119,440 | - |
| 14 | WBV30 | 16,100 | 66,860 | 30 |
| 14 | WBV37 | 29,300 | 95,010 | 2,370 |
| 15 | WBV15a.2 | 451,400 | - | 19,000 |
| 15 | WBV15a.2a | 303,300 | - | 7,600 |
| 15 | WBV15b.2 | 147,600 | 170,730 | 3,320 |
| 15 | WBV17b.1 | 60,400 | 29,890 | 1,900 |
| 15 | WBV17b.2 | 418,300 | - | - |
| 15 | WBV18.2 | - | - | - |
| 16 | WBV70 | 972,000 | - | - |
| 16 | WBV71 | 323,100 | - | - |
| 16 | WBV72 | 2,167,500 | 21,890 | 1,150 |
| 16 | WBV73 | 343,000 | 558,200 | - |
| 16 | WBV74 | 62,600 | 1,515,050 | - |
| 16 | WBV75 | 13,400 | 23,180 | - |
| 16 | WBV76 | 18,500 | 420 | 3,320 |
| 16 | WBV77 | 20,800 | 71,240 | - |
| 16 | WBV81 | 8,000 | - | 1,420 |
| 16 | WBV82 | 8,800 | 1,900 | - |
| 16 | WBV83 | 17,500 | 14,000 | 3,800 |

**Table 3-25 (cont.). Miles By Mode of Transportation by Project**

| IER | Project | Total Truck Miles Local | Total Truck Miles Non-Local | Total Barge Miles |
|---|---|---|---|---|
| 17 | WBV16.2 | 489,800 | 15,520 | 16,620 |
| 17 | WBV16b | 18,300 | 35,300 | 5,880 |
| 17 | WBV20 | 70,300 | 87,150 | 50 |
| 17 | WBV21 | 10,800 | 29,770 | - |
| 17 | WBV22 | 99,700 | 139,150 | 2,370 |
| 17 | WBV24 | 364,100 | 664,530 | - |
| 27 | OFC05 | 93,800 | 6,020 | 580 |
| 27 | OFC06 | 215,900 | - | - |
| 27 | OFC07 | 5,200 | 198,940 | - |
| 27 | OFC08 | 8,100 | - | 1,450 |
| 33 | MRL 1.1 | 1,103,100 | 3,680 | - |
| 33 | MRL 2.2 | 118,100 | 206,310 | - |
| 33 | MRL 3.1 | 495,400 | 1,920 | - |
| 33 | MRL 3.2 | 2,242,000 | 2,333,140 | 180 |
| 33 | MRL 4.1 | 380,600 | 2,840 | - |
| 33 | MRL 6.1 | 621,900 | - | - |
| 33 | MRL 7.1 | 197,600 | 810 | 2,200 |

# 4 Effects Analysis Overview

Assessment of the environmental consequences from the transport of materials for the constructed action to and within greater New Orleans focuses on four primary areas:

- Effects to traffic congestion,
- Effects to transportation infrastructure (e.g., road surfaces and bridges),
- Accident risks (increased risks of fatalities, injuries, and property damage accidents), and
- Diesel emissions.

To predict the effects on transportation, the quantities of materials were compiled and converted to trips as described in Section 2. Within a GIS environment, the transportation of all quantities was then modeled via all modes. Section 3 describes combinations of the transportation modes for the various materials evaluated and also provides tables that summarize quantities, trips, and distances traveled for the constructed action. With these trips and distances, the estimated consequences could be evaluated.

Functional classification is the grouping of highways, roads and streets by the character of service they provide and was developed for transportation planning purposes. Basic to this construct is the recognition that each class has a different capacity to assimilate increases in truck traffic.

### LADOTD Functional Classification

The Louisiana Department of Transportation and Development (LADOTD) has published a highway functional classification for New Orleans (LADOTD, 2008), segregating the public roads into different categories (1-5, and 8) as follows:

1. Interstate – interstate highways typically receive substantial federal funding and are owned, built, and operated by the state of Louisiana. These roads are controlled access, multiple lane divided highway with the highest rates of speed for traveling in a given area. Interstate 10 is such a road within greater New Orleans.
2. Expressway - an expressway is a divided highway for high-speed traffic with at least partial control of access. The difference between an expressway and the interstate highway or freeway is that expressways have a limited number of driveways and at-grade intersections. The West Bank Expressway (US 90) is an example of this type of road in greater New Orleans.
3. Principal arterial – the principal arterial roads represent the integrated system within greater New Orleans that connect the major centers of activity, are the highest traffic volume corridors, and facilitate the longest trips. These roads carry the major portion of trips entering and leaving the area, as well as the majority of trips simply passing through New Orleans. Airline Highway is an example of a principal arterial road.

   Because of the nature of the travel served by the principal arterial system, almost all fully and partially controlled access roads are part of this functional system including the interstate, other expressways, and other principal arterials (with no control of access).
4. Minor arterial - The minor arterial street system interconnects with and augments the principal arterial system and provides service for trips of moderate length at a somewhat lower level of travel mobility than principal arterials. This system also distributes travel to

geographic areas smaller than those identified with the principal arterial system. Such roads typically carry local bus routes, provide intra-community continuity, but typically would not penetrate identifiable neighborhoods. Airline Highway would be an example of a minor arterial.

5. Urban collector - The collector street system provides land access service and traffic circulation within residential neighborhoods, commercial, and industrial areas. It differs from the arterial system in that roads on the collector system may penetrate residential neighborhoods, distributing trips from the arterials through the area to the ultimate destination. Conversely, the collector street also collects traffic from local streets in residential neighborhoods and channels it into the arterial system.
8. Local roads – The local roads offer the lowest level of mobility and are residential or commercial where service for through-traffic movement is deliberately discouraged. Typically these roads do not have public transportation service and are linked to the urban collectors.

It is important to note that roads frequently change functional classification as the same road passes through residential, commercial, or rural areas. This is because the same road may be a 2-lane 30-mph local road with 4-way stops at most intersections (class 8), transition to a 45-mph minor arterial with 4-lane signalized intersections (class 4), and then transition to a 55-mph principal arterial with no signalized intersections (class 3).

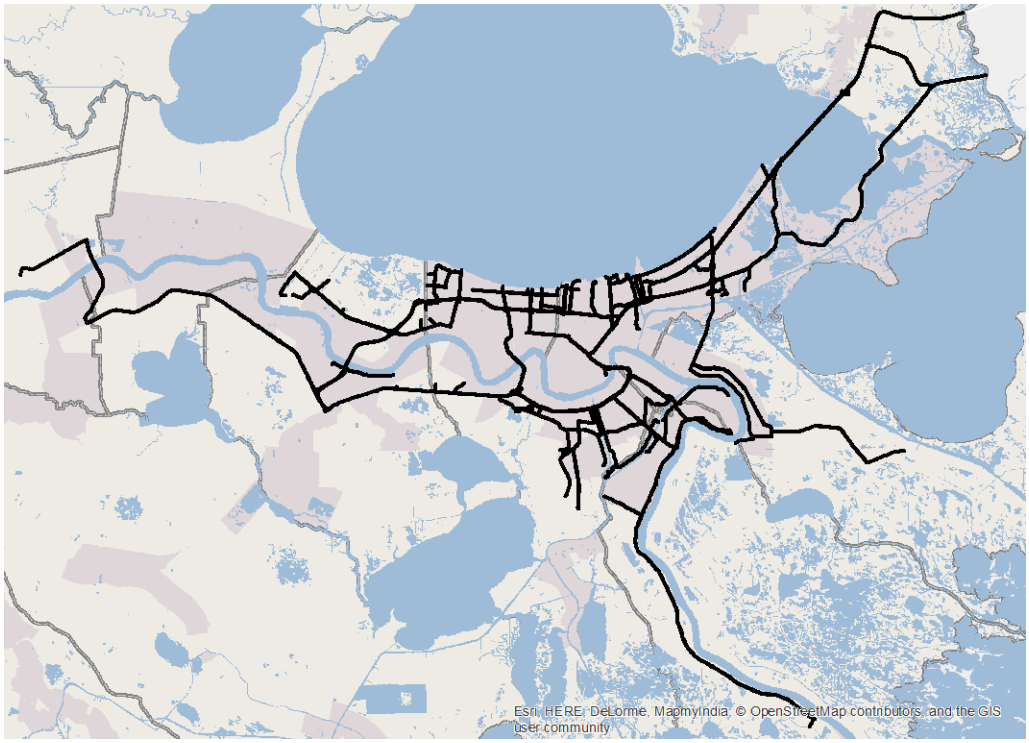
Table 4-1 shows the number of lane miles, sorted by functional classification, identified for the transportation of materials for the constructed action.[7] Examples of each road functional class are shown in the table. The table also shows that there are 394 lane miles of functional class 1 roads (Interstates) used for the materials transportation and 412 lane miles of LADOTD Road Class 3 (Principal Arterial) used for borrow and concrete material transportation. Figure 4-1 depicts the network of roads enumerated in table 4-1 that are included in the routing of project materials deliveries.

[7] Section 1.5 (Materials Delivery Assumptions) described how routes were selected for materials transportation and impact evaluation.

**Table 4-1. Lane Miles of Roads in DOTD Functional Classes Used to Transport Materials**

| LADOTD Road Classification | Class Description | Example of Road | Estimated Number of 12-ft Lane Miles |
|---|---|---|---|
| 1 | Interstate | I-310; I-10 | 394.4 |
| 2 | Expressway | Westbank Expressway | 82.2 |
| 3 | Principal Arterial | Airline Highway | 412.1 |
| 4 | Minor Arterial | Tchoupitoulas Street | 313.8 |
| 5 | Major Urban Collector | Barataria Blvd. | 44.1 |
| 6 | Minor Urban Collector | Veterans Blvd. | 7.4 |
| 7 | Local Road | Kenner Rd. | 45.3 |

**Figure 4-1. Road Network Used for Project Materials Delivery**



## 4.1 Congestion

### 4.1.1 Truck Traffic

The Highway Capacity Manual[8] (HCM) is published by the National Science Foundation's Transportation Research Board (TRB) and provides state-of-the-art techniques for estimating the capacity and determining the level of service for transportation facilities (TRB, 2000). The HCM's analyses are based on determining the capacity of a facility (e.g., road, intersection, exit ramp) compared to the demand to use the facility.

The capacity of a facility is the maximum hourly rate at which vehicles can reasonably be expected to traverse a point or a uniform section of lane or roadway during a given time period under prevailing conditions (TRB, 2000). Capacity analysis examines segments or points of a facility under uniform traffic conditions with the reasonable expectancy that the stated capacity for a given facility is a flow rate that can be achieved repeatedly for peak periods of sufficient demand (TRB, 2000). Passenger cars per hour and vehicles per hour are measures that can define capacity.

Demand is the principal measure of the amount of traffic using a given facility. The traffic demand on the facility is based on either traffic data collected or a projection of traffic anticipated to use the facility due to anticipated developments. These traffic volumes are adjusted for many factors including the types of vehicles in the traffic stream, the grade of the roadway, and the characteristics of the traffic flow during peak times. The methodology, in its simplest form, compares the demand to the capacity and identifies the operational conditions as a "level of service" (Terry, 2009).

#### 4.1.1.1 Regional Planning Commission Traffic Analysis

The RPC was created in 1962 by the Louisiana state legislature and local governing body authorization to fulfill federal and state requirements for regional comprehensive and economic development planning in greater New Orleans. Five of the parishes represented in greater New Orleans (Jefferson, Orleans, Plaquemines, St. Bernard and St. Tammany Parishes) are represented by the RPC. A staff of professionals with broad experience and expertise supports the RPC in urban and regional planning, including transportation analyses.

The development, manipulation and dissemination of transportation-related data is an ongoing task for the RPC. In that role, the RPC advances original data research, collects new data sets, and formulates management strategies to make the data available (RPC, 2007). In addition, the RPC staff create needed subsets of data by maintaining an on-going reconnaissance and transportation surveillance effort including collecting original data (e.g., vehicle counts, travel times, intersection turning movements, and classification of vehicles) (RPC, 2007).

Among the tools used to analyze the compiled data is a computerized transportation demand model. This tool allows the RPC staff to simulate existing and projected traffic volumes for various transportation scenarios. The RPC has also conducted extensive travel surveys in order

[8] The Highway Capacity Manual is a publication of the Transportation Research Board and contains concepts, guidelines, and computational procedures for evaluating the capacity and quality of service of various highway facilities, including freeways, highways, arterial roads, roundabouts, signalized and unsignalized intersections, rural highways, and the effects of transit, pedestrians, and bicycles on the performance of these systems.

to amass up-to-date data on typical travel patterns within greater New Orleans. The Congestion Management Planning Process has gathered comprehensive congestion measurements (travel time data, level of service, volume to capacity ratios, speed) and linked it with existing roadway segments in a geographic information database (GIS) (RPC, 2007) to evaluate expected future traffic conditions of traffic congestion using a Congestion Management Index.

#### 4.1.1.2 Congestion Management Index - Quantifying the Effects to LOS from HSDRRS Construction

Within greater New Orleans, the LADOTD reports ADT data at approximately 300 nodes (LADOTD, 2009); the RPC supplements the LADOTD data with additional traffic count data that typically include directional data as well as vehicle classification (passenger vs. commercial). Because of the quality of the RPC's data, the effects of the HSDRRS-traffic on the existing traffic congestion in greater New Orleans was calculated using the RPC's Congestion Management (CM) Index.

The CM Index has three primary components – Average Daily Traffic (ADT) per Lane, Travel Speed Ratio (Average Speed to Posted Speed), and percent commercially occupied vehicles (% CVO). Each roadway segment on a congestion management (CM) route is assigned an ordinal rank, 1-5, for each of these measures. Ranking categories are predetermined and summarized in the sections below. Those scores are then applied to a formula, in which each of the measures is weighted for its relative importance to overall congestion.

The formula is:

**CM Index = (.75) Travel Speed Ratio Score + (.15) ADT Score + (.10) % CVO Score**

The index is calculated for each segment on the region's 32 CM routes. The routes, segments, and their logical termini were determined by RPC staff in consultation with stakeholders from a variety of agencies. Together they make up a road network that carries the vast majority of the region's vehicle miles traveled. Each CM segment can have a possible Index score of 1-5, with five representing the worst congestion and one representing near-free-flow conditions. The RPC asserts that any score over 3.25 is considered "congested." Since the components of the formula are ranked on an ordinal scale, the Index provides a relative score by which the CM segments can be compared against each other. In this sense the Index provides the RPC with a more specific method for determining which of the region's roadways have the "worst" congestion when compared to other measures. Each component of the formula is briefly described below.

Travel Speed Ratio is calculated as the average observed speed on a road segment divided by the posted speed limit. Average travel speeds are determined through actual drive-time testing utilizing GPS tracking equipment. The higher the ratio, the more quickly traffic moves on a roadway segment. The ordinal scores for Travel Speed Ratio are:

| Score | Travel Speed Ratio |
|---|---|
| 1 | > 1 |
| 2 | ≤ 1 |
| 3 | ≤ 0.75 |
| 4 | ≤ 0.5 |
| 5 | ≤ 0.25 |

Average Daily Traffic (ADT) data are obtained through a variety of sources, including RPC's consultant contracts, the Parishes and municipalities, and LaDOTD's traffic data collection program. ADT per lane rankings are used in order to normalize data on road segments with varying numbers of lanes. The ADT per lane ordinal scores are:

| Score | ADT Per Lane |
|---|---|
| 1 | < 4,999 |
| 2 | ≤ 9,999 |
| 3 | ≤ 14,999 |
| 4 | ≤ 19,999 |
| 5 | ≥ 20,000 |

The percentage of Commercially Operated Vehicles (%COV) is the percentage of total vehicle traffic that is comprised of Class 4 and above vehicles (See FHWA *Traffic Monitoring Guide*, section 4). This data is collected through a variety of sources, including automatic and manual counting methods. The % COV ordinal scores are:

| Score | % COV |
|---|---|
| 1 | < 3.99% |
| 2 | ≤ 6.99% |
| 3 | ≤ 9.99% |
| 4 | ≤ 12.99% |
| 5 | ≥ 13% |

This congestion management index represents the most complete characterization of the existing congestion conditions within greater New Orleans and serves as the basis for estimating the effects to congestion from the HSDRRS construction.

#### 4.1.1.3 Truck Trip Thresholds

An additional method was used to increase the understanding and improve the communication of truck congestion resulting from materials delivery. This method was based on the need to identify individual, highly utilized roads for community-level planning and public awareness. A key component of the analysis was the establishment of truck traffic thresholds. The thresholds were used as a proxy to suggest the level of truck traffic at which the roadway users and adjacent property owners would likely perceive an increase.

Thresholds of project-related truck traffic increases were identified for each functional road class, and are shown in table 4-2. The table shows the functional-class specific thresholds as a total number of trucks within a 12-hour workday, and indicates the frequency a truck would pass a fixed location.

**Table 4-2. Truck Frequency Thresholds by Functional Road Class**

| Functional Road Class | Materials Transportation Trucks Per 12-Hour Workday | Truck Frequency |
|---|---|---|
| 1 | 1,500 | 30 seconds |
| 2 | 1,500 | 30 seconds |
| 3 | 360 | 2 minutes |
| 4 | 240 | 3 minutes |
| 5 | 150 | 5 minutes |
| 6 | 50 | 15 minutes |
| 7 | 50 | 15 minutes |

Source: The Highway Capacity Manual[9] (HCM) is published by the National Science Foundation's Transportation Research Board (TRB).

### 4.1.2 Barge Congestion

Louisiana is located at the intersection of the two largest waterway networks, the Mississippi River System and the Gulf Intracoastal Waterway, comprising 86 percent of the national network in terms of length and 97 percent of the system's overall tonnage (LADOTD, 2003). Louisiana domestic barge tonnage totaled 281 million tons in the Year 2000 (LADOTD, 2003). These

[9] The Highway Capacity Manual is a publication of the Transportation Research Board and contains concepts, guidelines, and computational procedures for evaluating the capacity and quality of service of various highway facilities, including freeways, highways, arterial roads, roundabouts, signalized and unsignalized intersections, rural highways, and the effects of transit, pedestrians, and bicycles on the performance of these systems.

highly developed transportation systems are efficient modes of transportation with increasing economies of scale, especially for low-value, high-volume bulk cargoes.

Water transport has few congestion problems (MARAD, 1994). Waterway operators encounter little traffic other than pleasure boaters who steer clear of commercial traffic, and as a rule, each keeps to their 'own' area within a river. The waterway industry has met the increases in additional cargo demand, by building towboats with greater horsepower that are capable of pushing more barges at a time. The result has been fewer, but bigger, tows often with 15 barges in a single tow (MARAD, 1994).

## 4.2 Infrastructure Impacts

The extent of damage to the existing infrastructure of the New Orleans metropolitan area from the Hurricanes Katrina and Rita has been the subject of ongoing investigation. In Jefferson, Orleans, Plaquemines, and St. Bernard Parishes, much of the roadway network was submerged for at least several days and in many cases for weeks (LADOTD, 2005). The South Louisiana Submerged Roads Program now called Paths to Progress (www.pavinglaroads.com) is addressing more than 60 street repair projects in Jefferson and Orleans parishes but much of the remaining New Orleans metropolitan area has significant maintenance, rehabilitation, and reconstruction issues.[10] These roads are typically receiving a new wearing course as well as other components at an average cost of approximately $500,000 per lane mile (RPC, 2009a).

According to a 2008 report by the Bureau of Governmental Research, a 2004 survey of New Orleans city streets identified 32 percent of New Orleans' streets needed major rehabilitation or total reconstruction and another 34 percent were in need of immediate maintenance prior to Hurricane Katrina (BGR, 2008). The problem allegedly stems from chronic under-funding of necessary maintenance (BRG, 2008). Prior to the disaster, the city was spending $20 million to $30 million a year on major street repairs and reconstruction (BRG, 2008). The City of expects to spend $162 million of locally generated capital funds during the next three years, but spends only $3 million a year on maintenance. The Department of Public Works estimates that it would cost $3 billion to meet rehabilitation and reconstruction needs and another $40 million to $45 million a year to properly maintain the streets (BRG, 2008). While these statistics are only relative to Orleans Parish, they are assumed to be representative of the general pavement conditions within greater New Orleans.

Over the past 10 years LADOTD has funded or conducted extensive studies on the effects of heavy load truck transportation on the roadway infrastructure of Louisiana (Roberts, et al, 2005; Roberts and Kjakfar, 1999; Fletcher, 1997) as well as estimating the effects from inundation during Hurricane Katrina (Gaspard et al, 2007). These references provide relevant examples of analyses of the effects of heavy truckloads on road surfaces as well as bridges in Louisiana. However, the vehicle axle configuration of any particular truck strongly affects roadway and bridge degradation. For example, the unit pavement cost per mile for a 3-axle 54,000 GVWR truck is 50-percent higher than the cost of a 5-axle 80,000 GVWR truck on the same road

[10] Maintenance refers to the least intensive and least costly group of activities – those designed to address minor or spot distress to make the ride more comfortable or to extend the life of the pavement by preventing deterioration. Rehabilitation refers to an intermediate level of roadwork on streets with moderate to severe distress. Reconstruction refers to the most intensive and costly approach. It applies to streets that have deteriorated to the point of failure and involves complete removal and replacement of the surface and substructure of the roadway.

because the per-axle weight is less for the heavier truck (LADOTD, 1999). Projecting actual roadway damage and bridge fatigue is speculative because the fleet of trucks completing the work will be at the discretion contractors that are selected.

### 4.2.1 Truck Damage to Infrastructure

Roadway pavement, bridges, and culverts are designed and constructed to withstand the repeated loadings inflicted by the number of heavy trucks that were anticipated to use the route. The useful life of a new pavement is typically 20 years, at which point the structural integrity has been worn from the roadway and major rehabilitation is required. The total load expected over the pavement's "lifetime" due to heavy truck traffic, is the primary input in calculating the thickness of the pavement (MARAD, 2007). The design of road, bridge, and culvert construction and the robustness thereof are also, in part, based on the anticipated demand for daily usage by large trucks.

The most robust roadway designs are for the facilities designed to carry the largest number of the heaviest loads on a daily basis: the interstate, expressway, and arterial roads. The design loads expected for the minor arterial, urban collector, and local roads do not account for frequent heavy loads. As such, the effect of using the minor arterial, urban collector, and local roads to haul large quantities of heavy loads would be the accelerated wearing of road surfaces, bridges, and culverts. These facilities were simply not designed to support the anticipated heavy truck traffic demand needed for transporting materials for the HSDRRS.

Using GIS-based routing, distances modeled for truck transportation were sorted according to road functional classifications of the transportation routes. Minor arterial, urban collector, and local roads are the least robust surface roads that were used for truck transportation. These three functional classes of roads were designed anticipating the fewest heavy truckloads being applied to their surfaces. According to Louisiana DOTD's "Preliminary Assessment of Pavement Damage Due to Heavier Loads on Louisiana Highways (LADOTD, 1999)," the pavement degradation cost of a 3-axle truck at 54,000 GVWR on a local road is more than 60 times the pavement degradation cost for that same vehicle to travel on an interstate highway.

In addition to the road surfaces themselves, bridges integral to the transportation routes were designed and constructed based on the functional classification of the road they are within. A statewide examination of bridges identified 13,426 bridges in Louisiana including bridges on local roads and those within the national highway system roads (LADOTD, 2003). Of the 10,851 non-National Highway System bridges, 2,320 (21-percent) were structurally deficient[11] and 1,636 (15-percent) were functionally obsolete[12] (LADOTD, 2003). Of the 2,575 bridges within the National Highway System, 105 were classified as structurally deficient and 530 were functionally obsolete (LADOTD, 2003).

There are approximately 96 bridge crossings that are part of the road network likely to be used for materials transportation. Approximately 14 of the crossings are within roadways classified as urban collector (7), or local roads (7). These locations would be the least capable of

[11] "Structurally deficient" means the bridge is in need of rehabilitation in order to carry loads for which it was originally designed (LADOTD, 2003).
[12] "Functionally obsolete" means the bridge is structurally sound, yet in most cases with width and/or clearance restrictions.

withstanding the increased burden of heavy truckloads necessary to transport materials to the construction sites and comprise 15 percent of all bridge crossings.

According to LADOTD's 2005 study "Effects of Hauling Timber, Lignite Coal, and Coke Fuel on Louisiana Highways and Bridges (Roberts et al, 2005)," fatigue costs to state bridges crossed by 80,000 GVWR trucks are minimal because the stresses caused by such loads are within design load. However, parish bridges crossed by the same 80,000 GVWR trucks are subject to substantial damage (Roberts et al, 2005).

### 4.2.2 Barge Damage to Infrastructure

The relatively small number of barge trips needed for delivery of HSDRRS materials is not expected to have any discernable effects to the marine terminal infrastructure in greater New Orleans.

## *4.3 Accident Risks*

While the 2009 Transportation Report could only estimate the number of accidents, the current report can benefit from actual accident data to evaluate the impacts of material transportation. Ideally, USACE would have added a transportation accident reporting requirement to each of its contracts, in which case this report could explicitly count the number of accidents attributable to material transportation activities. Unfortunately, this did not happen. The next best approach is to use the accident data available from the LADOTD, which goes back to the year 2005. This accident data includes a category for accidents involving three-axle trucks, which is assumed to be mostly industrial vehicles like dump trucks.

### 4.3.1 Truck

The downside of using the LADOTD data is that it includes accidents not caused by material transportation activity. However by looking at years prior to HSDRRS construction activities, relative differences in annual accidents can provide insight into the impacts. See Section 5 for the accident risk analysis.

### 4.3.2 Barge

Under 46 USC Part 61, Reporting Marine Casualties, criteria have been established required reporting (by vessel operators and owners) of marine casualties and incidents involving all US flag vessels occurring anywhere in the world and any foreign flag vessel operating on waters subject to the jurisdiction of the US. An incident must be reported within five days if it results in:

- Death of an individual,
- Serious injury to an individual,
- Substantial loss of property,
- Damage affecting the seaworthiness or efficiency of the vessel, or
- Significant harm to the environment.

Saricks and Tompkins' (1999) accident rates for waterway operations were developed by combining data from the Coast Guard's Marine Casualty and Pollution Database and summary information from USACE annual publication Waterborne Commerce of the United States.

Accident types included allisions (striking of/scraping against stationary structures), collisions (between vessels or involving a vessel and another moving vehicle), barge breakaways, fires, explosions, groundings, structural failures, flooding, capsizing, and sinking that occurred in US inland waters or (identifiably) within 100 miles of the coastline (Saricks and Tomkins, 1999).

Their analyses developed unit risk factors for waterway operations (accidents, injuries, and fatalities) that standardized the risk factors to rates per 500-ton shipment mile by waterway type and by state. The ton-mile estimates were divided by the 500-ton shipment weight to produce a unit risk factor similar to "truckload" as shown in table 4-5.

**Table 4-5. Waterborne Vessel Accident Rates per 100 Million Shipment Miles**

| Fatalities | Persons Injured | Property Damage Only |
|---|---|---|
| 1 | 11 | 270 |

## *4.4 Air Quality - Diesel Emissions*

As of December 31, 2015, four parishes surrounding the New Orleans urbanized area (Jefferson, Orleans, Plaquemines and St. Charles parishes) were determined to be in compliance with the new, 8-hour standard for ozone in accordance with the Clean Air Act Amendments of 1990 (RPC, 2009). St. Bernard Parish was designated as an $SO_2$ non-attainment area, effective October 4, 2013 (LDEQ, Dec. 12, 2013). This classification is the result of area-wide air quality modeling studies, and the information is readily available from Louisiana Department of Environmental Quality, Office of Environmental Assessment and Environmental Services. These determinations are based on three consecutive years of air quality monitoring data that demonstrated compliance with the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants. On December 28, 2015, new air quality standards for ozone went into effect as promulgated by the US Environmental Protection Agency and the newer, more stringent standards had impact on the region's ability to meet the NAAQS. The new standard is 0.070 ppm for the 8-hour concentration. With this new standard, all parishes impacted by HSDRRS construction remain in attainment for $O_3$.

There are two primary methods for transporting materials to and within greater New Orleans: truck and barge. However, few construction projects are accessible by barge and all are accessible by truck. To use barge, the material would need to be offloaded from the bulk containers at the project site or at marine terminals, loaded onto trucks, and delivered to the construction projects. In addition, the opportunity to use barge is restricted to the transport of steel, rock, and the aggregate materials used in the production of concrete because no feasible method exists for using barge for earthen material delivery. As such, the emissions from the truck transport for the distribution of earthen borrow within greater New Orleans cannot be reduced by the use of barge.

Sections 4.4.1 and 4.4.2 show the emissions that are estimated to have been produced for truck and barge transportation of materials to and within greater New Orleans.

### 4.4.1 Truck Emissions

The 1990 Federal Clean Air Act Amendments directed the Environmental Protection Agency (EPA) to develop two separate Federal conformity rules. Those rules (promulgated as 40 CFR Parts 51 and 93) are designed to ensure that Federal actions do not cause, or contribute to, air quality violations in areas that do not meet the national ambient air quality standards. The two rules include transportation conformity, which applies to transportation plans, programs, and projects (i.e., projects that involve the building of roads); and general conformity, which applies to all other non-transportation related projects, including the construction of the HSDRRS.

The EPA has set NAAQS for six principal air quality pollutants, called "criteria" pollutants. They are carbon monoxide, nitrogen dioxide, ozone[13], lead, particulates of 10 microns or less in size (PM-10 and PM-2.5), and sulfur dioxide.

The Clean Air Act General Conformity Rule (58 FR 63214, November 30, 1993, Final Rule, Determining Conformity of General Federal Actions to State or Federal Implementation Plans) was designed to ensure that Federal actions do not impede local efforts to control air pollution. It is called a conformity rule because Federal agencies are required to demonstrate that their actions "conform with" (i.e., do not undermine) the approved State Implementation Plan 14 (SIP) for their geographic area. The final rule dictates that a conformity review be performed when a Federal action generates air pollutants in a region that has been designated a non-attainment or maintenance area for one or more of the six NAAQS criteria pollutants.

Orleans, Jefferson, Plaquemines, and St. Charles parishes are in attainment for all NAAQS; St. Bernard Parish, is in attainment for all NAAQS except for sulfur dioxide (SO2). On October 4, 2013, St. Bernard Parish was designated by the EPA as an SO2 non-attainment area under the 1-hour standard. This classification is the result of area-wide air quality modeling studies, and the information is readily available from Louisiana Department of Environmental Quality, Office of Environmental Assessment and Environmental Services. SO2 emissions originate chiefly from point sources, with fossil fuel combustion at electric utilities and other industrial facilities accounting for the majority of total emissions.

The New Orleans Ozone Maintenance Area, which includes all or part of Orleans, Jefferson, Plaquemines, St. Charles, and St. Bernard parishes, is a transportation maintenance area for O3, as previously mentioned (USEPA 2010b). Although transportation conformity regulations do apply for non-attainment and maintenance areas, the nature of the HSDRRS project does not fall under a transportation conformity (USEPA 2010b). The HSDRRS project is a flood risk reduction project not a transportation project such as widening a two lane highway to four lanes with the intention of increasing the overall transportation capacity for the area. The HSDRRS project does not result in short-term or long-term transportation planning for the area. Vehicle emissions consist of construction/hauling vehicles traveling on established roadways and emissions from construction equipment. Therefore, the air emissions generated by the HSDRRS

[13] Ozone is the only parameter not directly emitted into the air but forms in the atmosphere when three atoms of oxygen ($0^3$) are combined by a chemical reaction between oxides of nitrogen (NOx) and volatile organic compounds (VOC) in the presence of sunlight. Motor vehicle exhaust and industrial emissions, gasoline vapors, and chemical solvents are some of the major sources of NOx and VOC, also known as ozone precursors. Strong sunlight and hot weather can cause ground-level ozone to form in harmful concentrations in the air.

[14] A State Implementation Plan (SIP) is the federally-approved plan by which each state identifies how it will attain and/or maintain the health-related primary and welfare-related secondary NAAQS.

actions did not trigger a transportation conformity determination even if they exceed de minimis levels (100 tons per year).

Because of this, no detailed conformity analyses was required[15] for project IERs completed in these parishes. Although not required for a conformity assessment and evaluation of Clean Air Act compliance, the quantification of the mobile source, direct emissions from the materials transportation is necessary to address the cumulative effects under NEPA. The CED Phase I 2009 Transportation Report used the Mobile Source Emission Factor (MOBILE) model to estimate emission factors. MOBILE is an EPA emission factor model for predicting gram per mile emissions of the priority pollutants and other toxics from on-road vehicles under various conditions.[16] The MOBILE model factors developed in the 2009 Transportation Report were used to quantify the emissions from construction materials transportation. This analysis did not include non-road emissions from demolition, construction equipment used to build the HSDRRS, or emissions from materials transportation off of the public roads within temporary work area easements or at construction sites.

In order to use the MOBILE model to quantify on-road emissions from actual materials transport data, three variables needed to be established:

1. Types of trucks assumed to transport materials,
2. Distances those trucks would travel to complete the project, and
3. Rates at which those trucks would emit pollutants [i.e., emissions factors (grams/mile)] during transportation.

The MOBILE model provides only two classes of heavy-duty diesel vehicles (HDDV). Class 8A are the smaller vehicles where their gross vehicle weight restriction is between 33,001-60,000 pounds; Class 8B represents the larger heavy-duty diesel vehicles where the gross vehicle weight restriction is greater than 60,000 pounds. The assumptions made regarding hypothetical distribution of truck miles traveled in each of the classes (HDDV8A and HDDV8B) are shown in table 4-6. The percentages are different for each of the construction materials based on an assumed distribution of truck size in the fleet.

**Table 4-6. Assumed Distances by MOBILE 6.2 HDDV Class**

| | Earthen Fill | Steel | Ready-Mix Concrete | Concrete Pile | Aggregate | Rock |
|---|---|---|---|---|---|---|
| Assumed Percent HDDV8A | 10% | 20% | 60% | 20% | 10% | 20% |
| Assumed Percent HDDV8B | 90% | 80% | 40% | 80% | 90% | 80% |

[15] If one or more of the priority pollutants had not been in attainment, then the proposed actions would have been subject to detailed conformity determinations unless these actions were clearly *de minimis* emissions. Use of the *de minimis* thresholds assures that the conformity rule covers only major Federal actions (USEPA, 1993).
[16] Online at: http://epa.gov/OMSWWW/m6.htm

MOBILE 6.2 was used to generate emission factors for volatile organic hydrocarbon (VOC), carbon monoxide (CO), oxides of nitrogen (NOx), exhaust particulate matter (PM), sulfur dioxide ($SO_2$), ammonia ($NH_3$), and carbon dioxide ($CO_2$). The model calculates emission rates under various conditions affecting in-use emission levels (e.g., ambient temperatures, average traffic speeds).

The model includes default values for a wide range of conditions that affect emissions. These defaults are designed to represent "national average" input data values. For this analysis, additional values were specified in the input file[17] to represent regional atmospheric and climactic conditions for the New Orleans area (e.g., elevation above sea level, time of year, daily high and low temperature, absolute humidity). Based on these input parameters, composite emissions factors or emission rates in grams/mile as well as average fuel efficiency (miles/gallon) were generated by the model, and are shown in table 4-7.

**Table 4-7. Composite Emission Factors and Diesel Fuel Use**

| Pollutant | Vehicle Class from Mobile 6.2 | |
|---|---|---|
| | HDDV8A (33,001 – 60,000 lbs GVWR) Emission Factor (g/mi) | HDDV8B (>60,000 lbs GVWR) Emission Factor (g/mi) |
| VOCs | 0.4010 | 0.4800 |
| NOx | 7.1800 | 8.7220 |
| $CO_2$ | 1,550.2000 | 1,626.6000 |
| CO | 1.7640 | 2.3520 |
| $PM_{10}$ | 0.1655 | 0.1880 |
| $PM_{2.5}$ | 0.1523 | 0.1731 |
| $SO_2$ | 0.0144 | 0.0152 |
| $NH_3$ | 0.0270 | 0.0270 |
| Miles/Gallon | 6.6000 | 6.3000 |

### 4.4.2 Barge (Tug) Emissions

There are different types of tugs and barges that commonly operate on the lower Mississippi: towboats and pushboats. A river tug or pushboat is generally a flat-bottomed boat with a flat bow. The bow meets up against the flat stern of a river barge, the two are secured to each other, and the tug pushes the barge or barges up or down the river. In one variation, the pushboat has a

[17] The input parameters and input file as well as the output file are included as appendix A.

rounded or pointed bow that fits in a notch on the stern of a barge (notch barge) and then commences to push the barge. Less commonly seen are towboats. Unlike a pushboat, the hull of the towboat does not, generally speaking, touch the barge. Instead a long line passes between the towboat and the barge as the towboat pulls the barge forward. Towboats are more commonly used for ocean going barges and on the Great Lakes than they are in the rivers (USEPA, 1999). Tows may be as large as 40 barges per tow on the lower Mississippi River (USEPA, 1999), however table 4-9 summarizes an EPA-published rule of thumb for estimating barge-to-tug ratios per tow.

**Table 4-9. Barges Per Tug Assumptions**

| Tug Horsepower Range | Barges/Tug |
|---|---|
| 3,500 and above | 15 |
| 1,500-3,500 | 10 |
| <1,500 | 5 |

Source: USEPA, 1999.

Strictly speaking, barges do not emit pollutants; emissions come from the tugboats that push or pull them. The EPA has promulgated emissions standards for marine vessel engines and classifies the barge tugs as non-oceangoing ships. The EPA data on non-oceangoing ships indicate that, based on a sample of approximately 100 vessels, the average rated horsepower for tugs was 4,268 hp (USEPA, 2000). The same source provides suggested load factors of 80-percent (cruise speed), 40-percent (slow cruise), and 20-percent (maneuvering) as a percent of the maximum continuous rating. These loading factors represent the varying conditions under which a tug would operate and the corresponding changes in emissions. Table 4-10 provides emission factors in grams emitted per hour of operation assuming EPA's average horsepower of 4,268 HP for non-oceangoing tugs (USEPA, 2000).

**Table 4-10. Emission Factors (grams/hour) For Tugboats**

| NOx | CO | HC | SOx | PM 2.5 | PM 10 | $CO_2$ | $NO_2$ |
|---|---|---|---|---|---|---|---|
| 42,015.6 | 3,501.3 | 1,591.5 | 4,144.3 | 768 | 834.9 | 2,132,610 | 63.66 |

Source: Capital Regional District Air Contaminant Emissions Inventory for 2004 (2008 Revision), 2008.

# 5 Transportation Impacts Assessed

Transportation effects from moving materials to and within greater New Orleans in order to construct HSDRRS projects with a total cost of over $14 billion were felt locally and regionally. It is important to realize that applied numerical models describe processes and make predictions about where, when and how the modeled phenomenon will occur, but have limits because of the assumptions used in the model.

The environmental consequences associated with transporting materials is modeled using project durations and material quantities and is based on standardized truck and barge loading factors, and on unspecified routes to construction projects. This analysis depicts what the effects would be for projects under construction or completed by year 2017 and if all of the simplifying assumptions described in this report were uniformly correct. Predicting traffic or road surface conditions on a particular segment of route, on a given day in the project schedule is not a realistic expectation from this analysis.

The methodology developed to assess the transportation impacts of the constructed action is based on the original analysis documented in the 2009 Transportation Study, which evaluated a range of transportation alternatives. These alternatives included such approaches as maximizing the use of barges or maximizing the use of heavy rail in addition to the most likely scenario for the delivery of materials. For this analysis, only the constructed action is evaluated in terms of effect on congestion, which assesses impacts from delivery of borrow and concrete materials via truck. These two material types make up nearly 90 percent of all delivery trips for construction of the HSDRRS.

## *5.1 Congestion*

Congestion resulting from project implementation was addressed using two methods: 1) RPC's Congestion Management Index (CMI) and 2) defined thresholds at which the public would likely perceive the increase in traffic and identifies specific roads that exceeded those thresholds.

### 5.1.1 Congestion Impacts Evaluated using the CMI

Using the analytical approach discussed in section 4.1 Congestion, effects to local traffic were estimated for the constructed action using the RPC's CMI. Each of the transportation routes are made up of varying road classes as the truck proceeds from origin to destination. In order to assess effects to traffic, each route was parsed into segments by road class based on categories defined by the LADOTD. This allows for an analysis of the effects to traffic at distinct points along the route.

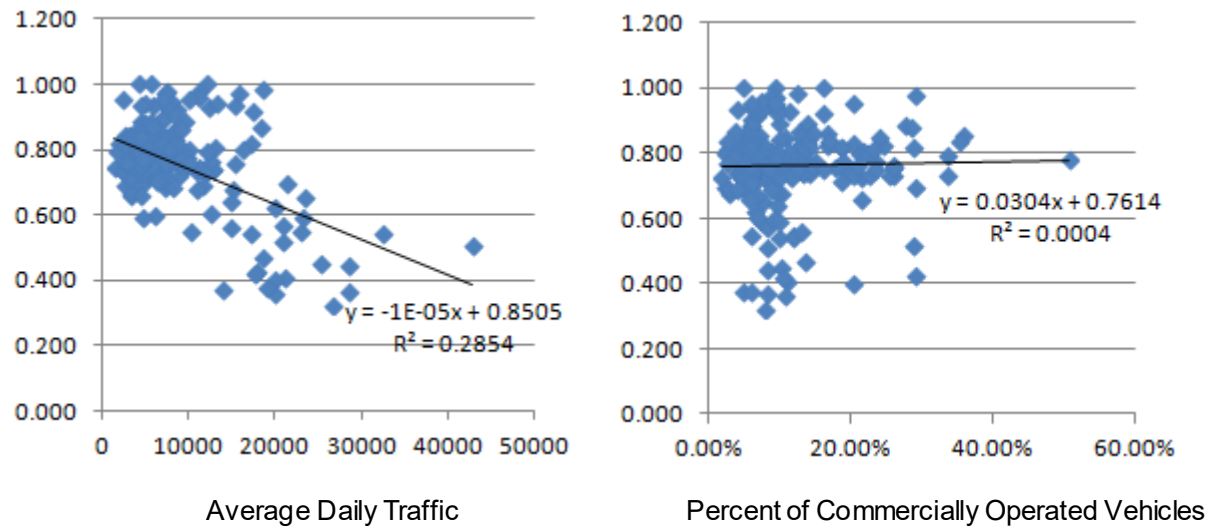
Transportation routes used for the analysis were created using the 2009 Geographic Data Technology Inc.'s (GDT) street data. Since travel logs for each HSDRRS contract were not available, routes were determined based on the known material source to destination associations, using the optimal route from source to target. This optimal route is based on the assumption that truck drivers would maximize their use of highways over local streets. RPC's CMI only exists for the region's major roads (mostly class 5 and higher), so segments that could not be associated to a CMI were excluded from CMI analysis, even though routes were developed to include all roads segments that were available in the 2009 GDT street data.

Transportation schedules are based on the project's award and substantially completed date. Using project duration, the number of trips per day along each route was calculated based on the total quantity of material delivered, assuming a fixed maximum quantity per truck load. For example, for borrow material, the model assumed a maximum quantity of 14.5 cubic yards per truckload and for concrete, the model assumed a maximum quantity of 10 cubic yards per truckload. Furthermore, the model divided the time frame of a project into three phases of equal length. During each phase of a project, the model assumed a different portion of material would be delivered. For borrow, the model assumed 10% of the material is delivered during the beginning phase, 70% of the material is delivered during the middle phase, and 20% is delivered during the end phase. For concrete, the model assumed 20% of the material is delivered during the beginning phase, 40% of the material is delivered during the middle phase, and 40% is delivered during the end phase. The route segments, along with delivery schedules and the demand-driven truck trips, formed the basis for the calculation of incremental changes to the CMI.

To determine the change in CMI, the model calculated the number of daily trips needed to deliver borrow or concrete for each project. The number of days is used to represent the minimum, maximum, and median number of trips per day for all projects and illustrates the best case, worst case, and typical conditions. April 7, 2007 was the date on which the fewest trips were made, while March 8, 2011 was the date on which the most truck trips were made. October 29, 2014 was a date on which a median number of trips were made. Median is defined as a value or quantity (number of truck trips) lying at the midpoint of a frequency distribution of observed values or quantities (number of days project is under construction).

To calculate the changes in CMI for the days representing the minimum, median, and maximum case days, the total number of trips for each roadway segment for each project was added to the average daily traffic count from the without-project CMI. The percent of commercially operated vehicles was recalculated with the added truck trips, and the Travel-to-Speed Ratio was recalculated from the segments in RPC's source data using a linear regression based on the average daily traffic. Average daily traffic was chosen for the linear regression because its coefficient of determination (0.2854), while not high, was significantly higher than that of the percent of commercially operated vehicles (0.0004) as demonstrated in Figure 5-1.

**Figure 5-1 Correlation between Average Daily Traffic per Lane and Fraction of Commercially Operated Vehicles (X axis) to the Travel to Speed Ratio (Y Axis)**




The CMI changes were calculated for each segment for each road class and weighted averages were calculated for each class based on the segment lengths. The results of the analysis are shown in Table 5-1. CMI has a range of 1 to 5, with 5 representing the worst congestion and 1 representing near-free-flow conditions. The RPC asserts that any score over 3.25 is considered "congested." Since the components of the formula are ranked on an ordinal scale, the Index provides a relative score by which the CM segments can be compared against each other.

**Table 5-1 Constructed Action – Changes in CMI**

| | Minimum (4/7/2007) | | | Median (10/29/2014) | | | Maximum (3/8/2011) | | |
|---|---|---|---|---|---|---|---|---|---|
| DOTD Class | Existing | With Project | Change | Existing | With Project | Change | Existing | With Project | Change |
| 1 | 2.47 | 2.47 | 0.00 | 2.47 | 2.75 | 0.28 | 2.47 | 3.12 | 0.65 |
| 2 | 2.77 | 2.77 | 0.00 | 2.77 | 2.77 | 0.00 | 2.77 | 2.95 | 0.17 |
| 3 | 2.22 | 2.22 | 0.00 | 2.22 | 2.22 | 0.00 | 2.22 | 2.26 | 0.04 |
| 4 | 2.06 | 2.06 | 0.00 | 2.06 | 2.06 | 0.00 | 2.06 | 2.07 | 0.01 |

Note: CMIs for Class 5 through Class 7 roads was not available from the RPC as only larger capacity roads were studied.

The median with-project condition CMI is 2.75 for Interstate Highways and 2.77 for Class 2 roads (Expressways), both well under the score of 3.25 which is considered "congested". The median CMI of 2.75 can be explained as half of the days during construction had CMIs above 2.75 for Interstate Highways and half of the days had lower CMIs. The maximum CMI for any class of road was 3.12, which approaches the level that the RPC considers "congested". The maximum score reflects the worst case scenario of road congestion brought about by the HSDRRS construction or the day having the highest level of congestion. Table 5-2 shows percentage change in commercial vehicles for each class using the same distance-based weighted average.

**Table 5-2 Constructed Action – Percent Change in Commercial Vehicles**

| DOTD Class | Minimum | Median | Maximum |
|---|---|---|---|
| 1 | 0.0% | 0.0% | 2.1% |
| 2 | 0.0% | 0.0% | 0.1% |
| 3 | 0.0% | 0.1% | 2.8% |
| 4 | 0.0% | 0.1% | 1.4% |

### 5.1.2 Congestion Impacts Evaluated using Truck Trip Thresholds

Evaluating the traffic impacts using the CMI calculations does not distinguish the predicted impacts to traffic for a particular street. In order to improve the public's understanding of potential traffic delays, a method was developed that uses thresholds at which the public would be likely to perceive the increases in traffic. As introduced in section 4.1.1.5, this analysis identifies the specific roads that exceeded those thresholds and the duration of exceedance. Table 5-4 repeats the information shown in table 4-2, but is included again below to support the following analysis. The table shows the functional-class specific thresholds as a total number of trucks within a 12-hour workday, and indicates the frequency a truck would pass a fixed location. The thresholds are used as a proxy to suggest the level of truck traffic at which the roadway users and adjacent property owners would likely perceive an increase.

**Table 5-4. Truck Frequency Thresholds by Functional Road Class**

| Functional Road Class | Materials Transportation Trucks Per 12-Hour Workday | Truck Frequency |
|---|---|---|
| 1 | 1,500 | 30 seconds |
| 2 | 1,500 | 30 seconds |
| 3 | 360 | 2 minutes |
| 4 | 240 | 3 minutes |
| 5 | 150 | 5 minutes |
| 6 | 50 | 15 minutes |
| 7 | 50 | 15 minutes |

Source: The Highway Capacity Manual[18] (HCM) is published by the National Science Foundation's Transportation Research Board (TRB).

[18] The Highway Capacity Manual is a publication of the Transportation Research Board and contains concepts, guidelines, and computational procedures for evaluating the capacity and quality of service of various highway facilities, including freeways, highways, arterial roads, roundabouts, signalized and unsignalized intersections, rural highways, and the effects of transit, pedestrians, and bicycles on the performance of these systems.

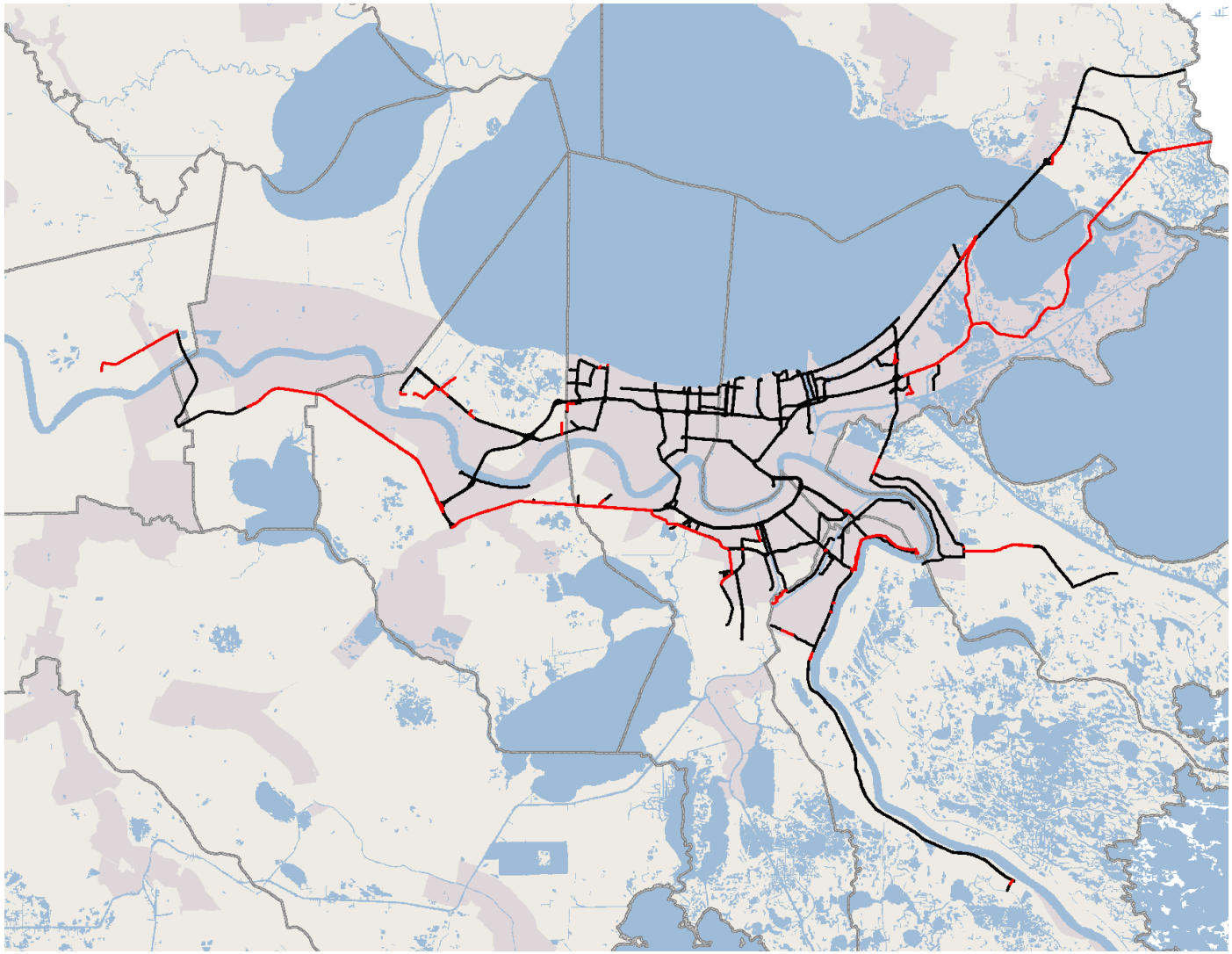
Segments from the modeled road network were examined to determine how many miles of road exceeded the functional-class specific thresholds that are presented in Table 5-4. Table 5-5 below summarizes the miles of road, by functional classification, that exceed the thresholds based on this model. For example, none of the functional class 1 or 2 roads exceed the truck frequency threshold of 1,500 trucks per day during the project schedule. However, 35.9 miles of class 3 roads and 69.4 miles of class 4 roads used for material transport exceed the threshold of 360 trucks/day and 240 trucks/day, respectively.

**Table 5-5. Miles of Roads Exceeding Truck Frequency Thresholds by Functional Class and Alternative**

| DOTD Class | Street Network Miles | Street Network Miles Exceeded |
|---|---|---|
| 1 | 175.2 | 0 |
| 2 | 27.7 | 0 |
| 3 | 204.8 | 35.9 |
| 4 | 258.5 | 69.4 |
| 5 | 44.1 | 7.8 |
| 6 | 7.4 | 4.2 |
| 7 | 45.0 | 19.8 |

The roads exceeding threshold rates are shown in Figure 5-2, with black lines showing the entire roadway network used in the analysis and red lines showing roads within the network that exceeded the declared thresholds. The results indicate the truck frequency exceedance was concentrated in a few specific locations such as roads in New Orleans East, the local roads near the Bonnet Carré Spillway, and U.S. 90 Highway on the Westbank of the Mississippi River.

**Figure 5-2. Roads Exceeding Thresholds**



#### 5.1.2.1 Duration of Truck Frequency Threshold Exceedance

Identifying the roads that exceed the truck frequency thresholds omits two important parameters: the duration of the effect (time) and the magnitude of the exceedance. The duration that truck traffic exceeds the frequency thresholds and the extent to which the thresholds are exceeded is important in characterizing the intensity of the effect. The following four tables (5-6 through 5-9) identify the functional class-specific roads that exceed the truck frequency thresholds shown in Figure 5-2. For the identified roads, the tables provide the number of days the threshold is exceeded, the minimum number of trucks per day that triggered the first exceedance, the maximum number of trucks per day, and the average number of trucks per day. Frequency thresholds were not exceeded in Road Classes 1 and 2 (Interstate and Expressway).

For example, Table 5-6 identifies class 3 (Principal Arterial) roads that exceed the truck frequency threshold of 360 trucks per day. In addition, table 5-6 identifies the number of days the threshold is exceeded as well as the minimum, average, and maximum number of trucks per day for the road in question. For example, Highway 90 (St. Charles) had 368 days in which there were 360 or more delivery HSDRRS trucks per day using the road or had a level of truck traffic at which the roadway users and adjacent property owners would likely perceive an increase. Additionally, during the 10 years of the HSDDRS construction period (2007 through 2017), the minimum number of trucks using this roadway when the exceedance was achieved is 361, the average number was 552 and the maximum number of trucks using Highway 90 in St. Charles Parish was 1,257. Within Tables 5-6 through 5-9, the roadways are sorted in descending order by the number of days the truck thresholds are exceeded. Roads listed in these tables are most affected by increases in truck traffic.

**Table 5-6. DOTD Road Class 3**
**Number of Days Threshold of 360 Material Delivery Trucks Per Day Exceeded**

| | | Statistics for Days on Which Materials Delivery Truck Count Threshold is Exceeded | | |
|---|---|---|---|---|
| Roadway | Number of Days Threshold Exceeded | Minimum Trucks per Day | Average Trucks per Day | Maximum Trucks per Day |
| Highway 90 (St. Charles) | 368 | 361 | 552 | 1,257 |
| Highway 90 (Jefferson) | 285 | 361 | 495 | 765 |
| Paris Rd | 173 | 498 | 537 | 568 |
| Airline Hwy | 169 | 363 | 505 | 640 |
| Lapalco Blvd | 90 | 365 | 419 | 604 |

## Table 5-7. DOTD Road Class 4 Number of Days Threshold of 240 Material Delivery Trucks Per Day Exceeded

| Roadway | Number of Days Threshold Exceeded | Statistics for Days on Which Materials Delivery Truck Count Threshold is Exceeded: Minimum Trucks per Day | Average Trucks per Day | Maximum Trucks per Day |
|---|---|---|---|---|
| Highway 3127 | 613 | 241 | 404 | 938 |
| Chef Menteur Hwy | 422 | 247 | 417 | 982 |
| US Hwy 11 | 345 | 247 | 499 | 988 |
| Highway 90 (St. Tammany) | 265 | 562 | 568 | 743 |
| E LA 46 | 173 | 247 | 283 | 351 |
| Lake Forest Blvd | 173 | 494 | 495 | 495 |
| Highway 23 | 166 | 242 | 289 | 379 |

## Table 5-8. DOTD Road Class 5 Number of Days Threshold of 150 Material Delivery Trucks Per Day Exceeded

| Roadway | Days Threshold is Exceeded | Statistics for Days on Which Materials Delivery Truck Count Threshold is Exceeded: Minimum Trucks per Day | Average Trucks per Day | Maximum Trucks per Day |
|---|---|---|---|---|
| E Point Ct | 411 | 221 | 583 | 990 |
| Howze Rd | 297 | 162 | 208 | 276 |
| Barataria Blvd | 135 | 152 | 179 | 196 |
| Highway 3125 | 68 | 168 | 168 | 168 |

## Table 5-9. DOTD Road Class 6 Number of Days Threshold of 50 Material Delivery Trucks Per Day Exceeded

| Roadway | Days Threshold is Exceeded | Statistics for Days on Which Materials Delivery Truck Count Threshold is Exceeded: Minimum Trucks per Day | Average Trucks per Day | Maximum Trucks per Day |
|---|---|---|---|---|
| Veterans Memorial Blvd | 149 | 75 | 75 | 75 |
| Main St (Belle Chasse) | 125 | 54 | 67 | 101 |
| Ames Blvd | 88 | 94 | 94 | 94 |
| Avenue G | 69 | 66 | 76 | 79 |

## Table 5-10. DOTD Road Class 7 Number of Days Threshold of 50 Material Delivery Trucks Per Day Exceeded

| Roadway | Days Threshold is Exceeded | Statistics for Days on Which Materials Delivery Truck Count Threshold is Exceeded: Minimum Trucks per Day | Average Trucks per Day | Maximum Trucks per Day |
|---|---|---|---|---|
| Walker Rd | 839 | 52 | 107 | 162 |
| Belle Chasse Launch Rd | 630 | 72 | 72 | 72 |
| MacAuthur Ave | 630 | 72 | 78 | 78 |
| Concord Rd | 539 | 60 | 131 | 245 |
| Bayou Rd | 508 | 58 | 112 | 208 |
| Williams Blvd | 458 | 62 | 66 | 74 |
| West X St | 372 | 53 | 108 | 149 |
| James Dr West | 346 | 60 | 137 | 215 |
| Lacrosse Ln | 320 | 82 | 82 | 82 |
| Van Ness Dr | 254 | 66 | 220 | 584 |
| Jourdan Rd | 194 | 68 | 79 | 80 |
| Veterans Memorial Blvd | 149 | 75 | 75 | 75 |
| Belleview Blvd | 149 | 72 | 72 | 72 |
| Michoud Facility Rd | 137 | 69 | 86 | 140 |
| Saturn Blvd | 137 | 69 | 69 | 70 |
| Lower Guide Levee Rd | 133 | 142 | 148 | 148 |
| Duncan St | 129 | 92 | 92 | 94 |
| Frontage Rd | 90 | 142 | 142 | 142 |
| Woodland Dr | 90 | 142 | 142 | 142 |
| South Concord Rd | 80 | 80 | 114 | 146 |
| Main St | 69 | 66 | 66 | 67 |
| Patterson Rd | 69 | 66 | 66 | 66 |
| Hester | 68 | 168 | 168 | 168 |

## 5.2 Infrastructure Degradation

The 2009 Transportation Report listed infrastructure degradation as a potential impact. The large number of heavy trucks added to the typical traffic volumes was thought to potentially cause noticeable damage to travelled streets. This concern was echoed by many of the parish officials.

The Traffic Team assembled visual records of roads being used by trucks delivering materials to project sites. Digital videos were recorded for truck route roads in both directions of travel. Single direction roads were noted when routes were only in one direction, when trucks were making a circuit route. More than 500 total miles of directional truck routes were recorded. To determine the actual routes used the Traffic Team began with roads identified in the Transportation Report. The report linked probable supply locations and project access points by estimating truck delivery trips using major traffic routes and local streets. Many of the predicted routes were used, but some were modified when the projects began. Actual truck routes were identified by the USACE Traffic Team from reports gathered from project engineers and by observations of the team. Additionally some routes were identified by using aerial photos that showed truck access points to project sites. By gathering information about location of borrow sites and the origin of other materials the Traffic Team was able to construct many of the actual routes from material origin points to projects.

For project sites on the East Bank of the Mississippi River in St. Charles, Jefferson, and Orleans Parishes videos were recorded of I-10 and US 61 (Airline Highway). From I-10 trucks exited at interchanges, so videos were made of major collector streets to the Lake Pontchartrain lakefront levees. Trucks hauling borrow to levee projects in St. Charles Parish from the Bonnet Carre Spillway travelled on US 61 to project access roads along US 61, so videos were recorded of these roads. Projects in St. Bernard Parish and in New Orleans East received materials from Slidell and points farther east. Videos were made of I-10, US 90, and LA 11. Almost all of the project access points were from major streets or through an adjacent project, thus minimizing the number of local streets to be travelled and affected.

Deliveries for projects on the West Bank of the Mississippi River travelled on US 90, Lapalco Boulevard, LA 23, LA 39, LA 45, Lafitte-Larose Highway, and other state maintained roads. Borrow sites located west of New Orleans supplied most of the projects in St. Charles and Jefferson Parishes on the West Bank. Videos for each of these roads were recorded. A map showing the routes that were recorded is shown in Figure 5-3.

While recording the video files, the Traffic Team observed that conditions of roads being traveled by delivery trucks generally only show a small amount of degradation, limited to some isolated areas of damage to shoulders and minor rutting. More severe damage was found at White's Road in Mississippi. This is a local road that was being used for access to clay borrow sources at Port Bienville and Pearlington sites. The trucking contractor temporarily accepted maintenance responsibilities for this road while the pits were used. There were few other local roads used for project access which contractors maintained. Because the large majority of roads used are major routes or previously approved truck routes that have adequate strength, the road degradation as result of HSDDRS material delivery appears minimal.

As described in section 4.2, the effects to infrastructure are a function of vehicle axle configuration, load, number of trips, road design, and the pre-project condition of the road. Estimating the impacts to infrastructure is speculative because these essential factors cannot be predicted with certainty. Routes used are uncertain because contractors are allowed to select any route on public roads not specifically prohibited for use by a Parish. Routes that were taken were not logged and shared with USACE. Rational assumptions regarding typical truck equipment can be made, but the effects to infrastructure are more highly correlated to the axle configuration of any particular truck than a vehicle's gross vehicle weight.[19] Contractors were not restricted from using any type of truck, provided they were within the legal weight limits or permitted as overweight. There are multiple axle configurations for dump trucks/flatbeds/cement mixers/etc. with different weights per axle. Estimating the damage to infrastructure, based on a hypothetical fleet of trucks on possible, but not certain routes, necessarily leads to extensive caveats on the use of the results.

When estimating the impacts to roads, the concept of lane-mile is important because lane miles are a typical unit used to measure the surface area of a roadway. For example, a two-lane street that is one mile long has two lane miles, and a four-lane street that is one mile long has four lane miles. The width of lane used for this analysis was assumed to be 12 feet, so the area of a lane-mile would be the 12-foot lane width x 5,280 feet/mile = 63,360 square feet or one lane-mile.

A combination of GDT data and RPC CMI data was used to estimate the number of lanes miles. While the GDT data does not explicitly include a lane count, the CMI data did include a lane count for the roads the RPC monitors. The lane counts were multiplied by the segment length and the results were aggregated by LADOTD road class. For road segments that did not have a lane count in the CMI data, 2 lanes were assumed. Most roads not included in the CMI data were class 5 or higher.

The number of estimated lane-miles, by road classification is summarized in Table 5-10 to provide a class-by-class total number of lane miles. In contrast to the 2009 Transportation report, which estimated 1,292 lane miles and 2.2 million trucks trips based on the Likely Scenario, the Constructed Action estimates 1,300 lane miles and about 1.45 million truck trips. However, it is worth pointing out that the 2009 Transportation study did not include all routes that were eventually used (instead using a scale factor to calculate its lane mile estimates) and the Constructed Action analysis only includes the transportation of borrow and concrete, while the previous report also include steel and aggregate.

[19] As described in section 4.2, the unit pavement cost per mile for a 3-axle 54,000 GVWR truck is 50-percent higher than the cost of a 5-axle 80,000 GVWR truck on the same road (LADOTD, 1999).

**Table 5-10. Local Truck Transportation Distance and Lane Miles by Functional Road Classification**

| LADOTD Road Classification | Class Description | Length in Miles | Estimated Number of 12-ft Lane Miles | Number of Truckloads |
|---|---|---|---|---|
| 1 | Interstate | 175.2 | 394.4 | |
| 2 | Expressway | 27.7 | 82.2 | |
| 3 | Principal Arterial | 204.8 | 412.1 | |
| 4 | Minor Arterial | 258.5 | 313.8 | |
| 5 | Major Urban Collector | 44.1 | 44.1 | |
| 6 | Minor Urban Collector | 7.4 | 7.4 | |
| 7 | Local Road | 45.0 | 45.3 | |
| | | Total | 1,300 | 1,450,000 |

Segments of interstate, expressway, and principal arterial roads (classifications 1, 2, and 3) have the largest number of truck-trips because these are the most-shared links within most routes. However, these road classifications, which make up just under 70 percent of the HSDRRS road network, are the most robust being designed to handle large numbers of trucks on a daily basis. The facility designs for the minor arterial, urban collector, and local roads (classifications 4, 5, 6, and 7) carry fewer trips, and are not designed to support frequent heavy loads. The effect of extensively using the minor arterial, urban collector, and local roads to haul large quantities of heavy loads would accelerate wearing of road surfaces, bridges, and culverts.

As described in section 4.2, the potential to damage infrastructure is not limited to the road surfaces, but also includes bridges. Using GIS layers depicting the bridges within the surface road network (provided by the RPC), an intersection of the alternative-specific routing and the RPC's bridges data was performed in GIS. The results have been sorted by LADOTD road classification and are presented in table 5-11. A buffer of 50 feet was applied during the intersection calculation to adjust for the difference in accuracy between the GDT and RPC datasets. There may bridges that fall outside of this distance from the GDT streets that were omitted from this analysis, but the number is not assumed to be significant.

**Table 5-11. Local Bridges: Materials Routes by Road Type**

| LADOTD Road Classification | Class Description | Number of Bridges |
|---|---|---|
| 1 | Interstate | 14 |
| 2 | Expressway | 4 |
| 3 | Principal Arterial | 36 |
| 4 | Minor Arterial | 28 |
| 5 | Major Urban Collector | 5 |
| 6 | Minor Urban Collector | 2 |
| 7 | Local Road | 7 |
| | Total | 96 |
| Percent Class 1, 2, 3, and 4 | | 85% |
| Percent Class 5, 6, and 7 | | 15% |

More than 56 percent of all bridge crossings are within roads classes 1, 2 or 3. The robustness of design and construction for these crossings should enable them to withstand an increased load of truck traffic. However, 44 percent of bridges are within road classes 4, 5, 6, and 7. These roads are the least able to withstand the effects of large truck traffic and significant increases in loads beyond their design assumptions.

Section 4.2 cites the Submerged Roads Program cost per lane mile (RPC, 2009a) to rehabilitate roads at approximately $500,000 per lane mile and this cost is assumed to include repair to road surfaces and crossings (i.e., bridges) within the roadway. Table 5-12 summarizes the lane mile data from Table 5-10 and approximates a cost to infrastructure for the constructed action assuming that all of the lane miles used in the truck transportation would need repair after the project was complete.

**Table 5-12. Lane Miles by Functional Road Classification**

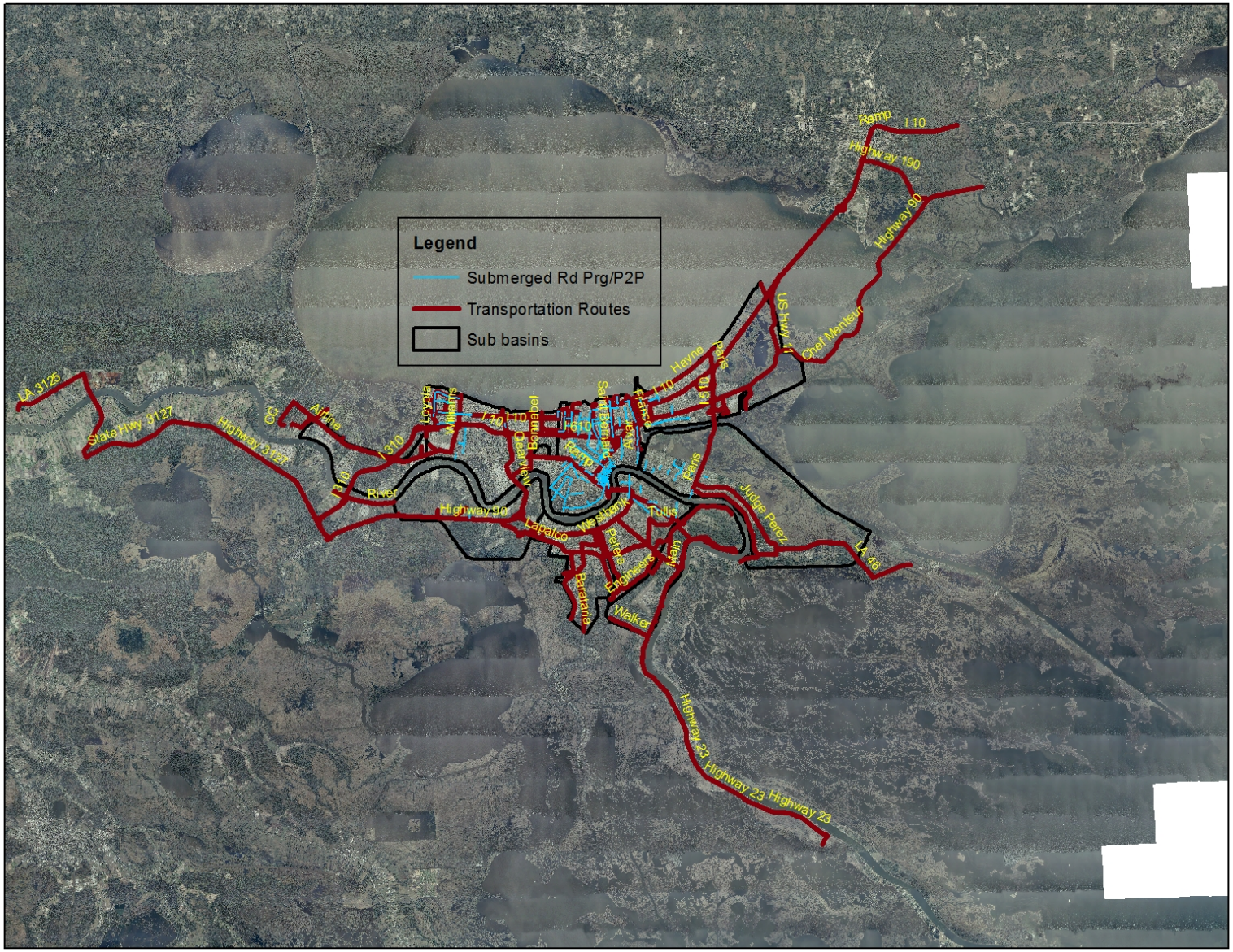
| LADOTD Road Classification | Class Description | Lane Miles |
|---|---|---|
| 1 | Interstate | 394.4 |
| 2 | Expressway | 82.2 |
| 3 | Principal Arterial | 412.1 |
| 4 | Minor Arterial | 313.8 |
| 5 | Major Urban Collector | 44.1 |
| 6 | Minor Urban Collector | 7.4 |
| 7 | Local Road | 45.3 |
| Estimated Total Lane Miles | | 1,299.3 |
| Estimated Total Truckloads (millions) | | 1.2 |
| Estimated Infrastructure Cost ($ millions)[20] | | 649.7 |

Figure 5-3 shows HSDRRS network roads used and exceeding frequency threshold that were repaired under the Paths to Progress/Submerged Road Program (in blue) and include roads connecting the I-10 to Lake Pontchartrain such as Elysian Fields, St. Bernard Avenue, Canal Blvd., West End Blvd., and Downman Road in Orleans Parish and in Jefferson Parish, Loyal, Joe Yenni and West Esplanade near Williams.

Paths to Progress (P2P) is a multi-award winning transportation improvement program to rehabilitate, restore and enhance over 60 roadway segments in Orleans and Jefferson parishes. Many of the roadways repaired were damaged during hurricanes Katrina and Rita and were used as major haul routes for post-storm recovery operations. Paths to Progress is a coordinated effort between the Federal Highway Administration, Louisiana Department of Transportation and development, New Orleans Regional Planning Commission, City of New Orleans, Parish of Jefferson and City of Kenner.

[20] Cost of approximately $500,000 per lane mile based on cost per lane mile from the Submerged Road Program (RPC, 2009a).

**Figure 5-3. Network Roads Repaired through Submerged Road Program/P2P**



## 5.3 Accidents

To address a potential increase of incidents the USACE Traffic Team worked with DOTD, State Police, and Parish officials to apply strategies that addressed safety. Using some of the same information collected to identify congestion, the Team presented information to the DOTD and State Police identifying roads where large truck volumes were present. The DOTD responded with implementation of roadway improvements that reduced the risk of traffic incidents. State Police responded by focusing efforts of truck inspections and traffic regulation enforcement in those areas. Information discussed at meetings was forwarded to Parish officials to make them aware of truck routes and schedules. Public Affairs personnel informed the public of truck operations and construction activities. Information was also made available on the USACE's public website.

While the 2009 Transportation Report could only estimate the number of truck accidents, the current report can benefit from actual accident data to evaluate the impacts of material transportation. Ideally, USACE would have added a transportation accident reporting requirement to each of its contracts, in which case this report could explicitly count the number of accidents attributable to material transportation activities. Unfortunately, this did not happen. The next best approach is to use the accident data available from the LADOTD, which goes back to the year 2005. This accident data includes a category for accidents involving three-axle trucks, which is assumed to be mostly industrial vehicles like dump trucks. The downside of using the LADOTD data is that it includes accidents not caused by material transportation activity. However by looking at years prior to HSDRRS construction activities, relative differences in annual accidents can provide insight into the impacts. Table 5-13 shows the LADTOD accident data for all five parishes included in the transportation network used for the analysis for the years 2005-2014 along with the total number of miles travelled to transport materials in each of those years. Notably, during 2010 and 2011, when transportation activity was at its peak, there were a similar number of accidents compared to prior and subsequent years.

**Table 5-13. Industrial Truck Accidents for Orleans, Jefferson, St. Charles, St. James, St. Tammany, St. John the Baptist, St. Bernard, and Plaquemines Parishes**

| Year | Estimated Miles Traveled | Accidents | | |
|---|---|---|---|---|
| | | Property Damage Only | Injury Only | Fatality |
| 2005 | 0 | 435 | 114 | 4 |
| 2006 | 0 | 512 | 163 | 3 |
| 2007 | 401,625 | 480 | 133 | 7 |
| 2008 | 1,761,788 | 465 | 153 | 2 |
| 2009 | 3,601,864 | 387 | 101 | 1 |

| | | | | |
|---|---|---|---|---|
| 2010 | 15,376,273 | 425 | 128 | 6 |
| 2011 | 18,617,374 | 532 | 137 | 5 |
| 2012 | 2,619,121 | 413 | 124 | 1 |
| 2013 | 926,114 | 376 | 111 | 4 |
| 2014 | 1,184,828 | 420 | 123 | 3 |

Source: LADOTD

Barge accidents are estimated using unit risk factors for waterway operations (accidents, injuries, and fatalities) that standardized the risk factors to rates per 500-ton shipment mile by waterway type and by state. The ton-mile estimates were divided by the 500-ton shipment weight to produce a unit risk factor as shown in table 4-5. Applying the risk factors to the estimated number of barge miles traveled to deliver HSDRRS materials, the expected fatalities, injuries and property damage is shown in Table 5-14.

**Table 5-4. Estimated Barge Accidents**

| Mode | Estimated Miles Traveled | Estimated Accidents | | |
|---|---|---|---|---|
| | | Property Damage Only | Injury Only | Fatality |
| **Barge** | 947,700 | 2.6 | 0.1 | 0.0 |

## 5.4 Emissions

Utilizing the specific distances traveled from section 3, emissions were calculated using the emissions factors described in section 4.4. Emission factors are applied to round trip miles for truck and barge trips. To enhance the comparison, the total distance traveled (miles) and the calculated quantity of diesel fuel needed (gallons) is also provided. Truck miles have also been segregated into local (within greater New Orleans) and non-local miles to indicate the quantity of local emissions. Barge miles include return trips to supplier, many of whom are located well outside the study area.

Orleans, Jefferson, Plaquemines, and St. Charles parishes are in attainment for all NAAQS; St. Bernard Parish, is in attainment for all NAAQS except for sulfur dioxide (SO2). On October 4, 2013, St. Bernard Parish was designated by the EPA as an SO2 non-attainment area under the 1-hour standard. This classification is the result of area-wide air quality modeling studies, and the information is readily available from Louisiana Department of Environmental Quality, Office of Environmental Assessment and Environmental Services. SO2 emissions originate chiefly from point sources, with fossil fuel combustion at electric utilities and other industrial facilities accounting for the majority of total emissions.

The New Orleans Ozone Maintenance Area, which includes all or part of Orleans, Jefferson, Plaquemines, St. Charles, and St. Bernard parishes, is a transportation maintenance area for O3, as previously mentioned (USEPA 2010b). Although transportation conformity regulations do apply for non-attainment and maintenance areas, the nature of the HSDRRS project does not fall under a transportation conformity (USEPA 2010b). The HSDRRS project is a flood risk reduction project not a transportation project such as widening a two lane highway to four lanes with the intention of increasing the overall transportation capacity for the area. The HSDRRS project does not result in short-term or long-term transportation planning for the area. Vehicle emissions consist of construction/hauling vehicles traveling on established roadways and emissions from construction equipment. Therefore, the air emissions generated by the HSDRRS actions did not trigger a transportation conformity determination even if they exceed de minimis levels (100 tons per year).

Table 5-30 estimates what emissions would have been over 8 years of project construction, given factors developed in the MOBILE6.2 model. The emissions, shown in tons, represent truck and barge emissions resulting from delivery of materials needed to build the HSDDRS, over the last 8 years. They are not annual averages but are total emissions since construction beginning in July 2007.

**Table 5-30. Diesel Emissions (tons)**

| Mode | Miles | Gallons of Diesel | VOCs | NOx | $CO_2$ | CO | $PM_{2.5}$ | $PM_{10}$ | $SO_2$ | $NH_3$ |
|---|---|---|---|---|---|---|---|---|---|---|
| Local Truck | 51,671,100.0 | 8,156,565.4 | 26.7 | 485.1 | 91,926.6 | 129.6 | 9.7 | 10.5 | 0.9 | 1.5 |
| Non-Local Truck | 19,349,900.0 | 3,050,537.3 | 10.0 | 180.7 | 34,378.8 | 48.2 | 3.6 | 3.9 | 0.3 | 0.6 |
| Tug / Barge | 947,700.0 | 8,429,062.5 | 196.8 | 5,194.2 | 263,646.6 | 432.9 | 94.9 | 103.2 | 512.3* | N/A |
| TOTALS | 71,968,700.0 | 22,315,460.0 | 233.4 | 5,860.1 | 389,952.0 | 610.7 | 108.3 | 117.7 | 513.5* | 2.0 |

*No separate emission factor used for SO2 for tug emissions. Reported as SOx.

Note: Mode miles are for round-trip deliveries. For barge, this includes tugs pushing empty barges back to the supplier, many of which are well outside the study area.

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# Appendix A – MOBILE 6.2 Input File Parameters and Output File

MOBILE 6.2 INPUT FILE

```
MOBILE6 INPUT FILE : EMISSION FACTOR CALCULATION FOR HSDRRS MATERIALS TRANSPORTATION
*CEMVN NOLA HSDRRS MATERIALS TRANSPORTATION AIR QUALITY MODEL
POLLUTANTS        : HC  CO  NOx CO2
PARTICULATES      : SO4 LEAD SO2 NH3 BRAKE TIRE OCARBON ECARBON GASPM
DATABASE OUTPUT   :
WITH FIELDNAMES   :
EMISSIONS TABLE   : NOLARUN.TB1 REPLACE
*EMISSIONS TABLE  : REPLACE
DATABASE VEHICLES : 11111 11111111 1 111 11111122 111
AGGREGATED OUTPUT :
AIR TOXICS        :
*ALL VALUES FOR AIR TOXICS BELOW ARE DUMMY VALUES FOR THE GASOLINE FUEL PROPERTIES, EMISSIONS ARE FOR DIESEL ONLY
*GAS AROMATIC%    : 25
*GAS OLEFIN%      : 15
*GAS BENZENE%     : 1.5
*E200             : 50
*E300             : 85
*OXYGENATE        : MTBE   15.1    0.50
*                 : ETBE   17.6    0.05
*                 : ETOH   10.0    0.45
*                 : TAME    6.0    0.00
REPORT FILE       : NOLARPT.TXT REPLACE
RUN DATA
EXPRESS HC AS VOC :

FUEL RVP          : 9.0
*FUEL REID VAPOR PRESSURE - SUMMER RVP LIMIT IS 9 PSI OR 7.8 PSI.
MIN/MAX TEMPERATURE: 65.  90.
NO REFUELING      :
EXPAND HDDV EFS   :
EXPAND EXHAUST    :
```

```
EXPAND EVAPORATIVE :
IDLE PM EMISSIONS  :
SCENARIO RECORD    : NEW ORLEANS, LA
CALENDAR YEAR      : 2010
EVALUATION MONTH   : 7
*EVALUATION MONTH 7 IS JULY
ABSOLUTE HUMIDITY  : 130.0
*ABSOLUTE HUMIDITY CONVERSION AT www.vaisala.com/humiditycalculator/vaisala_humidity_calculator.html?lang=eng
ALTITUDE           : 1
*VALUE OF 1 FOR ALTITUDE IS "LOW"
PARTICULATE EF     : PMGZML.CSV PMGDR1.CSV PMGDR2.CSV PMDZML.CSV PMDDR1.CSV PMDDR2.CSV
PARTICLE SIZE      : 10
*REPEAT RUN WITH PARTICLE SIZE 10.0 TO GET THE OTHER DATA SET?
DIESEL SULFUR      : 15.00
*HDDV 8A (GVRW 33,001 - 60,000 LBS) AND 8B (>60,000 LBS GVWR)
*AVERAGE SPEED     : CONDUCT MULTIPLE RUNS WITH THIS ADJUSTED TO ILLUSTRATE THE EFFECT OF SPEED ON EMISSIONS
*DIESEL RQD TO BE <15PPM PER EPA RULE
END OF RUN
```

Mobile 6.2 Output File (NOLARPT.txt)

```
* ##########################
* NEW ORLEANS, LA
* File 1, Run 1, Scenario 1.
* ##########################

* Reading PM Gas Carbon ZML Levels
* from the external data file PMGZML.CSV

* Reading PM Gas Carbon DR1 Levels
* from the external data file PMGDR1.CSV

* Reading PM Gas Carbon DR2 Levels
* from the external data file PMGDR2.CSV

* Reading PM Diesel Zero Mile Levels
* from the external data file PMDZML.CSV

* Reading the First PM Deterioration Rates
* from the external data file PMDDR1.CSV

* Reading the Second PM Deterioration Rates
* from the external data file PMDDR2.CSV
  M 48 Warning:
          there are no sales for vehicle class HDGV8b

* Reading Ammonia (NH3) Basic Emissiion Rates
* from the external data file PMNH3BER.D

* Reading Ammonia (NH3) Sulfur Deterioration Rates
* from the external data file PMNH3SDR.D
```

Calendar Year: 2010
Month: July
Altitude: Low
Minimum Temperature: 65.0 (F)
Maximum Temperature: 90.0 (F)
Absolute Humidity: 130. grains/lb
Nominal Fuel RVP: 9.0 psi
Weathered RVP: 8.6 psi
Fuel Sulfur Content: 30. ppm

Exhaust I/M Program: No
Evap I/M Program: No
ATP Program: No
Reformulated Gas: NA (See Air Toxics Output)

| Vehicle Type: | LDGV | LDGT12 | LDGT34 | LDGT | HDGV | LDDV | LDDT | HDDV | MC | All Veh |
|---|---|---|---|---|---|---|---|---|---|---|
| GVWR: | | <6000 | >6000 | (All) | | | | | | |
| VMT Distribution: | 0.3478 | 0.3890 | 0.1336 | | 0.0359 | 0.0003 | 0.0020 | 0.0860 | 0.0054 | 1.0000 |
| Fuel Economy (mpg): | 24.1 | 18.6 | 14.3 | 17.2 | 9.7 | 32.4 | 17.0 | 7.2 | 50.0 | 16.5 |

Composite Emission Factors (g/mi):

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Composite VOC : | 0.795 | 0.812 | 1.393 | 0.961 | 0.978 | 0.180 | 0.439 | 0.392 | 2.58 | 0.862 |
| Composite CO : | 8.81 | 9.92 | 13.63 | 10.87 | 9.64 | 0.903 | 0.757 | 1.751 | 15.85 | 9.328 |
| Composite NOX : | 0.488 | 0.599 | 0.920 | 0.682 | 2.242 | 0.415 | 0.724 | 6.868 | 0.97 | 1.204 |
| Composite CO2 : | 368.2 | 477.8 | 620.5 | 514.3 | 914.7 | 314.2 | 597.0 | 1417.3 | 177.4 | 553.75 |

Exhaust emissions (g/mi):

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| VOC Start: | 0.153 | 0.195 | 0.309 | 0.224 | | 0.062 | 0.153 | | 0.398 | |
| VOC Running: | 0.169 | 0.208 | 0.349 | 0.244 | | 0.118 | 0.286 | | 1.225 | |
| VOC Total Exhaust: | 0.322 | 0.403 | 0.658 | 0.468 | 0.282 | 0.180 | 0.439 | 0.392 | 1.62 | 0.410 |
| CO Start: | 2.10 | 3.29 | 4.88 | 3.70 | | 0.354 | 0.311 | | 3.386 | |
| CO Running: | 6.71 | 6.63 | 8.75 | 7.17 | | 0.549 | 0.446 | | 12.460 | |
| CO Total Exhaust: | 8.81 | 9.92 | 13.63 | 10.87 | 9.64 | 0.903 | 0.757 | 1.751 | 15.85 | 9.328 |
| NOx Start: | 0.078 | 0.110 | 0.169 | 0.125 | | 0.017 | 0.029 | | 0.306 | |
| NOx Running: | 0.409 | 0.489 | 0.751 | 0.556 | | 0.399 | 0.695 | | 0.667 | |
| NOx Total Exhaust: | 0.488 | 0.599 | 0.920 | 0.682 | 2.242 | 0.415 | 0.724 | 6.868 | 0.97 | 1.204 |

Non-Exhaust Emissions (g/mi):

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Hot Soak Loss: | 0.156 | 0.140 | 0.252 | 0.169 | 0.223 | 0.000 | 0.000 | 0.000 | 0.338 | 0.152 |
| Diurnal Loss: | 0.029 | 0.027 | 0.047 | 0.032 | 0.057 | 0.000 | 0.000 | 0.000 | 0.284 | 0.030 |
| Resting Loss: | 0.074 | 0.077 | 0.149 | 0.095 | 0.142 | 0.000 | 0.000 | 0.000 | 0.332 | 0.082 |
| Running Loss: | 0.207 | 0.155 | 0.278 | 0.187 | 0.265 | 0.000 | 0.000 | 0.000 | 0.000 | 0.179 |
| Crankcase Loss: | 0.008 | 0.010 | 0.010 | 0.010 | 0.010 | 0.000 | 0.000 | 0.000 | 0.000 | 0.009 |
| Refueling Loss: | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Total Non-Exhaust: | 0.474 | 0.409 | 0.735 | 0.494 | 0.696 | 0.000 | 0.000 | 0.000 | 0.953 | 0.452 |

| Veh. Type: | HDDV2B | HDDV3 | HDDV4 | HDDV5 | HDDV6 | HDDV7 | HDDV8A | HDDV8B |
|---|---|---|---|---|---|---|---|---|
| VMT Mix: | 0.0091 | 0.0028 | 0.0028 | 0.0013 | 0.0065 | 0.0094 | 0.0112 | 0.0400 |
| Fuel Economy (mpg): | 12.9 | 11.6 | 10.2 | 9.9 | 8.7 | 7.5 | 6.6 | 6.3 |
| Composite Emission Factors (g/mi): | | | | | | | | |
| Composite VOC : | 0.163 | 0.174 | 0.233 | 0.246 | 0.314 | 0.389 | 0.401 | 0.480 |
| Composite CO : | 0.612 | 0.644 | 0.923 | 0.937 | 1.046 | 1.312 | 1.764 | 2.352 |
| Composite NOX : | 2.454 | 2.569 | 3.632 | 3.787 | 4.787 | 5.971 | 7.170 | 8.722 |
| Composite CO2 : | 789.1 | 875.2 | 1000.9 | 1032.7 | 1171.4 | 1352.5 | 1550.2 | 1626.6 |
| Exhaust emissions (g/mi): | | | | | | | | |
| VOC Total Exhaust: | 0.163 | 0.174 | 0.233 | 0.246 | 0.314 | 0.389 | 0.401 | 0.480 |
| CO Total Exhaust: | 0.612 | 0.644 | 0.923 | 0.937 | 1.046 | 1.312 | 1.764 | 2.352 |
| NOx Total Exhaust: | 2.454 | 2.569 | 3.632 | 3.787 | 4.787 | 5.971 | 7.170 | 8.722 |
| Non-Exhaust Emissions (g/mi): | | | | | | | | |
| Hot Soak Loss: | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Diurnal Loss: | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Resting Loss: | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Running Loss: | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Crankcase Loss: | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Refueling Loss: | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Total Non-Exhaust: | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |