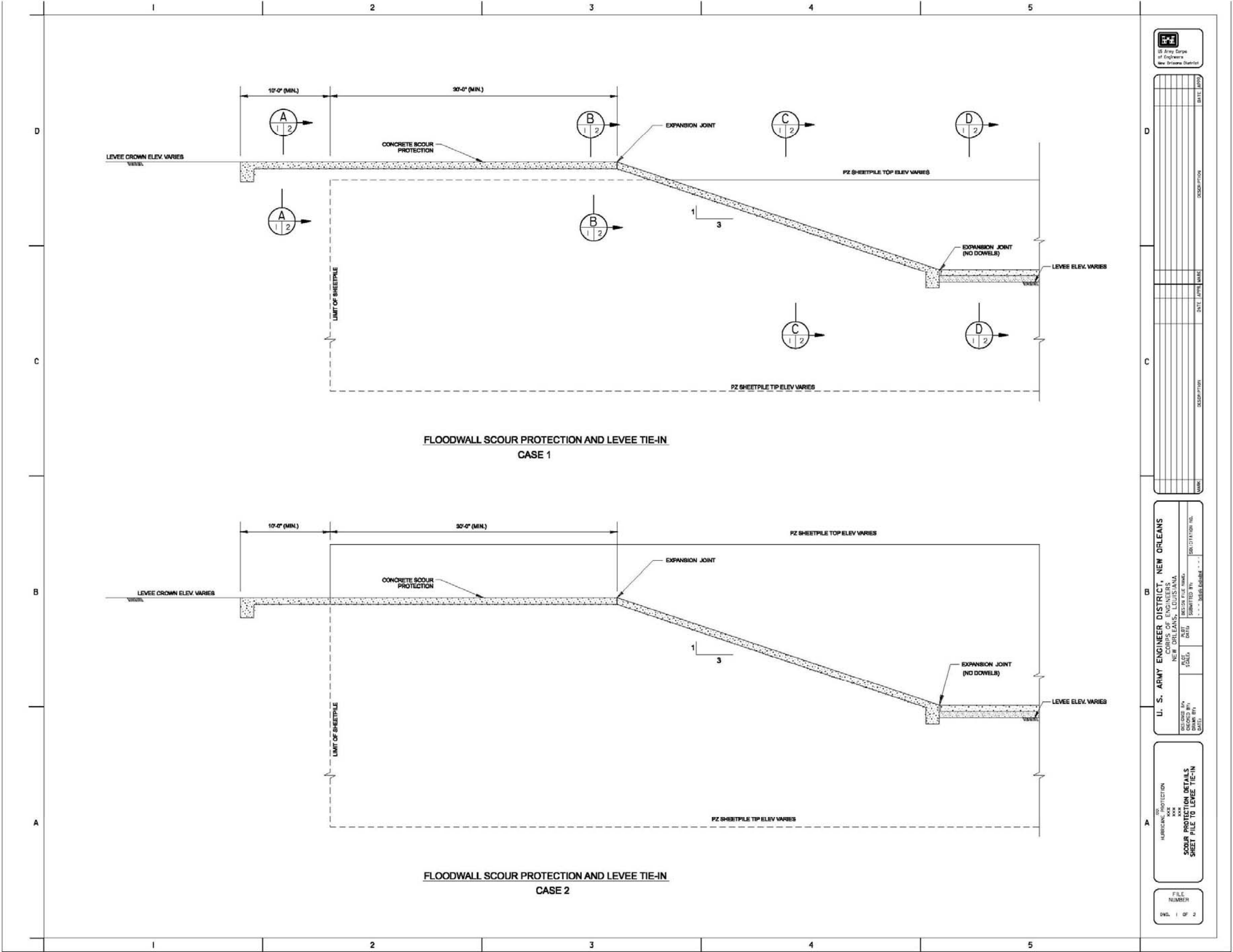
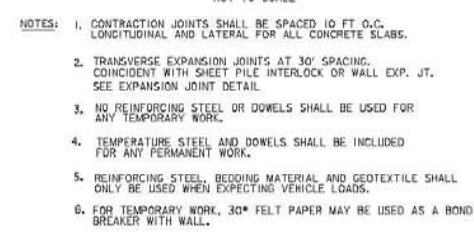
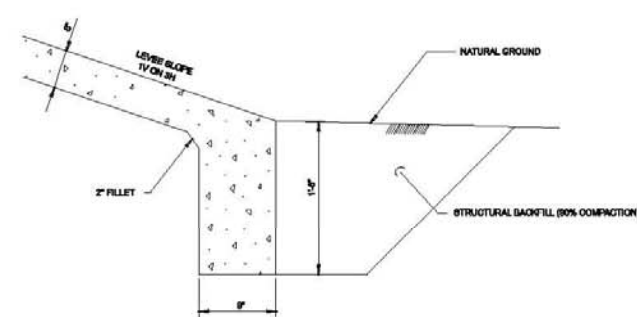


C. SAMPLE SCOUR PROTECTION DETAILS

Some sample details utilized by TFG are shown on the following plates. These drawings show work typical to date, however, future ERDC and IPET reports shall be used for guidance.



[illegible]

DESIGNED BY DATE	PLAT FOUR	DESIGN FILE NAME SUBMITTED BY	SOC. CITATION NO. - - - - -
10/1/54	400		

A

XXX	XXX
XXX	XXX
HURRICANE PROTECTION	
XXX	XXX
XXX	XXX
EXPRESSION PAD, SCOUR PROTECTION DETAILS	

**THIS GUIDANCE IS THE MINIMUM REQUIREMENTS NECESSARY.
SITE SPECIFIC FACTORS,MUST BE INVESTIGATED TO ACCOUNT FOR
GEOTECHNICAL, HYDRAULIC, AND MAINTENANCE VARIANCES.**

1. FLOODWALL OVERTOPPING CONCRETE SCOUR PROTECTION:

- A. LIMITS OF SCOUR PROTECTION ON THE PROTECTED SIDE OF I-WALLS:
MINIMUM OF 8 FEET OF TOTAL SCOUR PROTECTION
MINIMUM OF 5 FEET DOWN SLOPING EMBANKMENTS
- B. CONCRETE PAVEMENT WITH VEHICULAR TRAFFIC (1/2 TON TRUCKS, CARS):
6-7 INCHES LIGHTLY REINFORCED CONCRETE
6 INCH BEDDING
SEPARATOR GEOTEXTILE FABRIC BETWEEN BEDDING AND SOIL
PROPER DESIGN AND LAYOUT OF EXPANSION, AND CONTROL JOINTS ARE
NECESSARY FOR DIFFERENTIAL MOVEMENT
- C. CONCRETE PAVEMENT NO WITH VEHICULAR TRAFFIC:
5-6 INCHES LIGHTLY REINFORCED CONCRETE, BEDDING AND GEOTEXTILE ARE OPTIONAL
ENGINEERING JUDGMENT, PROPER DESIGN AND LAYOUT OF EXPANSION, AND CONTROL JOINTS
ARE NECESSARY FOR DIFFERENTIAL MOVEMENT.
- D. CONCRETE KEYS:
PROPER LOCATION OF THE CONCRETE KEYS NEEDS TO BE CONSIDERED TO PREVENT
SLIDING AND POTENTIAL PIPING UNDER THE PAVEMENT.
- E. SCOUR PROTECTION MATERIALS:
OPTIONAL MATERIALS SHOULD BE INVESTIGATED FOR SITE SPECIFIC CONDITIONS.
- F. FLOOD SIDE SCOUR PROTECTION OR WAVE RUN UP BERMS MUST BE CONSIDERED WHERE
WAVE POTENTIAL EXIST.
- G. TYPICAL DETAILS ARE THE MINIMUM REQUIREMENTS FOR CONCRETE PAVING PROTECTION.

2. FLOODWALL TO LEVEE TIE-IN GUIDANCE AND DETAILS:

- A. TIE-IN DETAILS FOR I-WALLS OR T-WALLS THAT END INTO A LEVEE SECTION MUST FOLLOW THIS GUIDANCE.**
 - B. AS A MINIMUM, UNCAPPED SHEET PILING MUST EXTEND 30 FEET PASS THE END OF THE FLOODWALL INTO THE LEVEE SECTION. PROPER EARTHEN COVER AND SCOUR PROTECTION IS MANDATORY. FUTURE SETTLEMENT SHOULD BE ACCOUNTED FOR IN DETAILING SCOUR PROTECTION OVER SHEETING PILING AND ADJACENT FLOODWALLS.**
- 3. TYPICAL FLOODWALLS DETAILS SHOULD BE USED FOR TRANSITIONS FROM T-WALL OR I-WALL TO THE UNCAPPED SHEET PILING (TYPICAL SLIP JOINT). LENGTHS OF I-WALL MONOLITHS, BETWEEN EXPANSION JOINTS, SHOULD GENERALLY BE 30 FEET AND END AT THE NEAREST SHEET PILE INTERLOCK.**
- 4. TIE-IN LIMITS AND DETAILS AS SHOWN ON THE TYPICAL DETAILS ARE MINIMUMS.**

1 2 3 4 5

GEOTEXTILE SEPARATOR FABRIC

1. THE GEOTEXTILE SEPARATOR FABRIC SHALL BE A WOVEN PERVIOUS SHEET MADE WITH PLASTIC YARN AS DEFINED BY ASTM D 883. THE GEOTEXTILES SHALL MEET THE REQUIREMENTS LISTED IN TABLE 1.

TABLE 1
REQUIREMENTS FOR SEPARATOR GEOTEXTILE

PROPERTY	TEST PROCEDURE	ACCEPTABLE VALUES
GRAB BREAKING LOAD	ASTM D 4632	200 POUNDS MINIMUM IN ANY PRINCIPLE DIRECTION
SEAM STRENGTH (**)	ASTM D 4632	100 POUNDS,MINIMUM
ELONGATION AT BREAK	ASTM D 4632	15 PERCENT MINIMUM IN ANY PRINCIPLE DIRECTION
APPARENT OPENING SIZE (AOS)	ASTM D 4751	NO FINER THAN THE U.S. STANDARD SIEVE NO. 50 AND NO COARSER THAN THE U.S. STANDARD SIEVE NO. 30
PERMITTIVITY FLOW RATE	ASTM D 4491 ASTM D 4491	0.35 PER SECOND MINIMUM MINIMUM OF 40 GALLONS PER MINUTE PER SQUARE FOOT

(*) VALUE REPRESENTS MINIMUM AVERAGE ROLL VALUE OF NEW GEOTEXTILE RECEIVED FROM THE MANUFACTURER OR DISTRIBUTOR.

(**) ALL OF THE SAMPLES SHALL YIELD TEST VALUES THAT ARE GREATER THAN THE MINIMUM VALUE THAT IS SPECIFIED.

OPTIONAL SCOUR MATERIALS:

(SCOUR PROTECTION MUST BE DESIGNED FOR THE INTENDED PURPOSE, PERFORMANCE AND QUALITY WHILE CONSIDERING LONG-TERM MAINTENANCE NEEDS.)

- LIGHTLY REINFORCED CONCRETE PAVEMENT
- RECOMMENDED GABIONS
- ANCHORMAT CONCRETE REVETMENTS.
- ROCK FILLED GEOGRID PANELS.
- ARTICULATED CONCRETE BLOCK
- ASPHALT CONCRETE PAVEMENT

OTHER MATERIALS:

- LIGHT WEIGHT STONE RIPRAP IS NOT RECOMMENDED (HYDRAULIC FACTORS).
- LARGER STONE RIPRAP MUST BE SPECIFICALLY DESIGNED FOR SITE CONDITIONS.
- FOUNDATIONS SETTLEMENT MUST BE CONSIDERED.
- GROUTED-IN RIPRAP OVER BEDDING MATERIALS IS AN ACCEPTABLE OPTION AS INTERIM SCOUR PROTECTION AREAS (LEEVE TIE-IN) WHERE LONG TERM EMBANKMENT SETTLEMENT IS EXPECTED.

STONE BEDDING

IF THE FOUNDATION IS ERODABLE OR THE WAVES ARE FREQUENTLY OCCURRING OR SEVERE, THEN A FILTER MAY HAVE TO BE DESIGNED. DEPENDS ON THE LEVEL OF PROTECTION AFFORDED BY THE GROUT INTO THE RIPRAP. HYDRAULICS BRANCH SHOULD BE CONSULTED. RECOMMEND A COARSE MATERIAL BE USED UNDER THE BEDDING.

NOTE: SEE PAGE CRITERIA ARE PRESENTED IN EM 1110-2-1913. EACH BEDDING MATERIAL SYSTEM SHOULD BE DESIGNED TO BE USED WITH A SPECIFIC RANGE OF RIPRAP GRADATIONS, FOUNDATION CONDITIONS, AND CHANNEL CONDITIONS.

1. BEDDING MATERIAL

BEDDING MATERIAL UNDER RIPRAP SHALL BE 100 PERCENT CRUSHED STONE AND SHALL SHOW AN ABRASION LOSS OF NOT MORE THAN 40 PERCENT WHEN TESTED IN ACCORDANCE WITH ASTM C 131 AND A SOUNDNESS LOSS OF NOT MORE THAN 15 PERCENT WHEN SUBJECTED TO 5 CYCLES OF THE MAGNESIUM SULFATE SOUNDNESS TEST IN ACCORDANCE WITH ASTM C 88. BEDDING SHALL CONFORM TO THE FOLLOWING GRADATION WHEN TESTED IN ACCORDANCE WITH ASTM C 136:

NOTE: THE LARGEST SIZE APPROPRIATE FOR THE RIPRAP BEING SHOULD BE USED SO THAT THE MATERIAL DOES NOT GET WASHED THROUGH THE RIPRAP. DELETE THE OTHER 2 GRADATIONS.

RIPRAP BEDDING

US SIEVE	GRADE A	GRADE B	GRADE D
2 ½-INCH	---	---	100
2-INCH	---	100	90 - 100
1 ½-INCH	100	85-100	---
1-INCH	90-100	---	35 - 70
¾-INCH	---	35-70	---
½-INCH	25-60	---	10-30
⅜-INCH	---	10-30	---
NO. 4	0-10	0-5	0-5
NO. 8	0-5	---	---
NO. 200	0-1	0-1	0-1

STONE BEDDING UNDER CONCRETE PAVING

2. BEDDING

BEDDING MATERIAL UNDER CONCRETE PAVING SHALL SHOW AN ABRASION LOSS OF NOT MORE THAN 40 PERCENT WHEN TESTED IN ACCORDANCE WITH ASTM C 131 AND A SOUNDNESS LOSS OF NOT MORE THAN 15 PERCENT WHEN SUBJECTED TO 5 CYCLES OF THE MAGNESIUM SULFATE SOUNDNESS TEST IN ACCORDANCE WITH ASTM C 88.

BEDDING SHALL MEET ONE OF THE FOLLOWING:

2.1 CRUSHED STONE

CRUSHED STONE SHALL CONSIST OF 100 PERCENT STONE AND SHALL MEET THE FOLLOWING REQUIREMENTS WHEN TESTED IN ACCORDANCE WITH ASTM C 136 AND ASTM C 117:

US SIEVE	PERCENT PASSING
1 ½-INCH	100
1-INCH	90 - 100
¾-INCH	70 - 100
NO. 4	35 - 65
NO. 40	12 - 32
NO. 200	0 - 8

THE FRACTION OF STONE PASSING THE NO. 40 SIEVE SHALL COMPLY WITH THE FOLLOWING REQUIREMENTS:

LIQUID LIMIT (MAX.) 25
PLASTICITY INDEX (MAX.) 4

2.2 RECYCLED PORTLAND CEMENT CONCRETE:
RECYCLED PORTLAND CEMENT CONCRETE SHALL BE 100 PERCENT CRUSHED PORTLAND CEMENT CONCRETE OR WILL BE PERMITTED IN COMBINATION WITH AN APPROVED STONE FOR BASE COURSE. AFTER BEING CRUSHED, THE RECYCLED PORTLAND CEMENT CONCRETE OR THE COMBINATION OF STONE AND RECYCLED PORTLAND CEMENT CONCRETE SHALL COMPLY WITH THE FOLLOWING GRADATION.

US SIEVE	PERCENT PASSING
1 ½-INCH	100
1-INCH	90 - 100
¾-INCH	70 - 100
NO. 4	35 - 65
NO. 40	12 - 32
NO. 200	0 - 8

THE FRACTION OF RECYCLED PORTLAND CEMENT CONCRETE PASSING THE NO. 40 SIEVE SHALL BE NON-PLASTIC.

NOTES:
FOR SLOPE PAVEMENT WHERE TRAFFIC MAY PASS USE PARAGRAPHS UNDER 2.
FOR SLOPE PAVEMENT WHERE TRAFFIC WILL NOT PASS, BEDDING IS NOT RECOMMENDED.
IF ENGINEER ELECTS TO USE IT, USE THE PARAGRAPHS UNDER 2.
FOR GROUTED RIPRAP, USE PARAGRAPH 1.

The right margin contains administrative information from the US Army Corps of Engineers New Orleans District. It includes a logo at the top left, followed by project details like "DESIGNED BY:", "OWN BY:", "CHK'D BY:", "SUBMITTED BY:", "FILE NAME:", "DATE:", "CONTRACT NO.", "PILOT SCALE:", and "PLOT DATE:". Below this is a section for "U. S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS" with a website link. At the bottom right, there is a green box labeled "SHEET IDENTIFICATION NUMBER".

US ARMY CORPS
OF ENGINEERS

NEW ORLEANS DISTRICT

DESIGNED BY:
OWN BY:
CHK'D BY:
SUBMITTED BY:
FILE NAME:
DATE:
CONTRACT NO.:
PILOT SCALE:
PLOT DATE:

U. S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
http://www.usace.army.mil

SHEET
IDENTIFICATION
NUMBER