INNER HARBOR NAVIGATION CANAL

LOCK REPLACEMENT PROJECT

ORLEANS PARISH, LOUISIANA

LATERAL FLOOD PROTECTION DDR NO. 2 - ALTERNATIVE STUDY

CONTRACT NO. DACW 29-99-D-0022

PREPARED FOR:

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

PREPARED BY:

Brown Cunningham Gannuch
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2701 KINGMAN ST. METAIRIE, LOUISIANA

October, 2000

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95% SUBMITTAL

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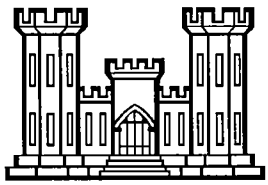

OCTOBER, 2000

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INDUSTRIAL CANAL LOCK REPLACEMENT
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EXECUTIVE SUMMARY

This Alternative Study for the lateral flood protection elements required for the Inner Harbor Navigation Canal Lock Replacement Project was necessitated by the preliminary design results presented in the 50% Detailed Design Report (DDR). The DDR design criteria stipulated that a minimum levee embankment at El. 15.0 N.G.V.D. be provided in all reaches where impact protection is provided. On the west side of the canal, North of Claiborne Ave., where no impact barriers are provided, an embankment elevation of 18.0 was required. In all design reaches, pile supported, reinforced concrete, T-type floodwalls or concrete capped, sheetpile I-walls were evaluated to determine the wall type necessary to extend the flood protection to the required ultimate grade of El. 22.5. The 50% DDR design effort concluded that T walls, with wide bases serving as relieving platforms, were required to support the embankments and provide the necessary slope stability. In addition, large numbers of prestressed, concrete piles were required to support the T walls and embankments and to resist the large lateral loads imparted by design conditions. Due to the number of concrete piles required, a foundation alternative using open ended steel pipe piles was also developed. A detailed review of the stability analyses concluded that the need for large relieving platforms was driven, primarily, by low shear strengths in the adjacent navigation channel and the use of these low strengths at the toe of the required embankment slopes. Based on these results it was concluded that additional study of both the ship lock and barge lock plans was warranted. The goals of this study were:

a.) To determine what reasonable embankment elevations could be provided
b.) To determine if providing a reduced channel width, thereby increasing the distance to the right-of-way, was beneficial to embankment stability
c.) To determine the benefits associated using lightweight embankment materials
d.) To document the cost and reduction in the number of piles required if large diameter steel pipe piles were used
e.) To determine the cost associated with filling the bypass and laying channels on the east side of the new lock so that a wide "green space" could be provided on the protected side of the levee north of Claiborne Ave.
f.) To assess the design impacts associated with using the channel strengths at a point in the channel for stability analyses in lieu of using the strengths at the embankment toe which reduces the bank and embankment strengths

The study did not consider the impacts of the potential changes described above in the area immediately adjacent to and beneath the Judge Seeber bridge at Claiborne Ave. since the design configurations presented in the 50% DDR were developed to alleviate the affects of increased embankment elevations on the existing bridge foundations. The costs presented in the study reflect construction costs associated with 1620 feet of flood protection south of the bridge and 840 feet of protection north of Claiborne Ave. to a point near the new lock.

The Alternative Study clearly demonstrated that significant cost savings could be realized if the embankment elevation criteria was relaxed somewhat and if the channel strength parameters were applied at a different location in stability analyses. In the study stability analyses, the channel strengths were applied at the centerline of the navigation channel instead of at the edge of the channel. With this assumption, the bank strengths were averaged with the channel strengths over a larger portion of the embankment cross-section which resulted the use of higher average shear strengths in stability analyses. The major impact of this assumption was to significantly reduce the amount of embankment which must be supported by the T-wall base to achieve the required slope stability factors of safety. As a result, the required overall width of the T-wall foundations, at locations where I-walls and embankments were not stable, was reduced from as much as 41 feet to 17 feet. In many instances, levee/I-wall configurations were determined to be stable with levee embankments as high as El. 15.0.

For the ship lock plan, levee/T-wall configurations on both the east and west side of the canal were found to meet stability criteria in the area south of Claiborne Ave. On the east side of the canal, embankment elevations of 13.0 on the floodside of the wall and 10.0 on the protected side of the wall were determined to be feasible without reducing the original channel width nor using lightweight fills. Similar results were obtained on the west side of the canal except that the floodside embankment was lowered to El. 12.0. In this area south of Claiborne Ave., a reduced channel width or the use of lightweight fills was necessary to provide a floodside embankment crown at El.15.0 and a minimum T-wall foundation width. On the north side of Claiborne Ave., levee/I-wall configurations with a crown at El. 15.0 were determined to be acceptable without reducing the channel width. With this plan, the only reach that required the use of leightweight fills was near the lock entrance on the west side of the canal. The study also verified that a 175-foot wide "green area" could be provided on the protected side of the levee if the construction channels east of the new lock were filled.

For the barge lock plan, due to the higher channel elevations, levee/I-wall configurations with a crown elevation of 15.0, were deemed adequate east and west side of the canal for all reaches south of the new lock. For this configuration, the use lightweight fills was required along the entire the west side.

District personnel, including elements from the Foundations and the Structures Branches, reviewed the study in detail, to assess not only the cost impacts, but to evaluate slope stability assumptions, seepage implications, deflection of tall I-walls and the frequency and duration that the potentially lower levee embankments would be submerged during Mississippi River high water events. After several detailed discussions among the various design elements, the District decided the following:

1.) **Study Soil Strengths.** The study stability assumptions, which used channel strength parameters at the centerline of the channel, were less conservative than typical levee/embankment design assumptions and should not be used for stability analyses on Mississippi River levees. Additional discussions between

the geotechnical engineers ensued and the existing boring locations were reviewed in detail. The impacts of using the 50% DDR assumptions were clear; i.e. floodwalls with large relieving platforms to support the required embankments. The review of the boring data determined that the upper bank strength parameters could be used closer to the channel than previously assumed, however the use of channel strengths at the channel edge was most appropriate and typical of past design criteria. All future analyses for the design of the embankments should use these locations for application of strength data.

2.) **Lightweight Fills.** Lightweight fill materials should not be utilized in the designs. The District review indicated that the lightweight fill provided little cost benefit but significantly increased seepage potential. Since these embankments may be submerged for long periods, less pervious materials should be utilized for their construction.

3.) **Reduced Channel Widths.** Most of the favorable alternatives did not require reduced channel widths to achieve the necessary stability. Reduced channel widths were not desirable and should not be utilized.

4.) **Lower Embankment Elevations.** The original design criteria which required embankment elevations at El. 15.0 in protected areas and El. 18.0 in unprotected areas will be retained. Further review of hydrograph data indicates that the lower embankment elevations proposed in the study will result in complete submergence of the levee section on nearly an annual basis which was deemed unacceptable. The life cycle cost of protective structures on the unprotected west side of the canal near the lock was deemed too high to justify lowering the elevation design criteria from El. 18.0 to El.15.0.

5.) **I-Wall Configurations.** Further review of the potential lateral deflections associated with proposed I-wall designs in conjunction with embankments at El. 15.0 and lower indicated that the design criteria for this type of design should be changed. The effect of differential embankment elevations on either side of the wall increases adverse deflection potential. In addition, where I-walls have been utilized in the past, embankment elevations were set near the design flood elevation. The design criteria for I-wall designs was changed to require El. 18.0 as the minimum embankment crown elevation on both sides of the wall.

6.) **Deep Seated Failure Analyses.** The effects of unbalanced loads due to deep seated failure potential on final study T-wall designs should be documented prior to proceeding with final designs.

7.) **Green Space Alternatives.** The effects of filling the lock laying channel on the east side of the canal, north of Claiborne Avenue on the required floodwall alignment were not addressed in the original study. The resulting "green space" that could be created is very desirable and the costs associated with channel fills required to create this space must be documented.

Many of these decisions represented changes to the original scope of the study which required additional analyses to determine the designs that would be developed in detail in the final DDR. To document the impacts of these decisions, it was agreed that all analyses in a typical reach be re-evaluated using the "new" criteria. In this regard, all study alternatives for the ship lock plan in the area on the west side of the canal and south of Claiborne Avenue were redone. The results of these revised analyses were extrapolated all of the original study alternatives. In addition, analyses to determine the maximum "green space" area which could be provided on the east side of the canal were also performed. Design plates which depict the geotechnical analyses and resulting typical cross-sections for these study revisions are contained at the end of the study report under Study Revisions. Comparative cost estimates for all original study alternatives, as extrapolated from the revised analyses, and for the required "green space" alternatives are also presented in Study Revisions.

The impact of the decisions made at the end of the Alternative Study are listed below.

Ship Lock Plan

South of Claiborne Ave - Reasonable T-wall design configurations can be provided on both sides of the canal to achieve the required stability. Using the new soils parameter locations and minimum embankment elevations, the minimum base width to provide adequate embankment support was determined to be 21 feet. To accommodate the effect of unbalanced loads on the cutoff sheeting one or two additional piles will be required per 60-foot monolith and the cutoff sheeting must be extended below the potential failure plane.

North of Claiborne Ave - T-wall design configurations are required on the west side of the canal in lieu of the I-wall configurations presented in the study. A levee/I-wall configuration with an embankment at El. 18.0 and a 175-foot wide "green space" on the protected side was determined to be adequate.

Barge Lock Plan

South of Claiborne Ave - Reasonable T-wall design configurations similar to those described above must be provided, in lieu of levee/I-walls, on both sides of the canal to achieve the required stability.

North of Claiborne Ave - T-wall design configurations are required on the west side of the canal in lieu of the I-wall configurations presented in the study. A levee/I-wall configuration with an embankment at El. 18.0 and a 200-foot wide "green space" on the protected side was determined to be adequate.

These designs were determined to best meet the design requirements while providing the most cost effective solutions and will be further developed in the final project DDR.

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LATERAL FLOOD PROTECTION ALTERNATIVE STUDY

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1. GENERAL

A. STUDY AUTHORIZATION

This Alternative Study for the design of lateral flood protection for the proposed Inner Harbor Navigation Canal Lock Replacement Project was prepared for the U. S. Army Corps of Engineers, New Orleans District, under design services contract DACW29-99-D-0022, Task Order No. 1. The scope for this study was prescribed in Amendment No. 2 of the Task Order and is attached in Appendix A. This study forms a part of the Design Documentation Report (DDR) for the lateral flood protection associated with the proposed replacement lock.

B. PURPOSE

This Alternative Study presents the results of various alternatives which were evaluated to determine the impact of changing levee configurations and navigation channel widths on the type and size of the flood protection walls adjacent to the entrance channel for the proposed replacement lock. The study was conducted as part of the Design Documentation Report (DDR) for the lateral flood protection associated with the proposed replacement lock. The need for this study was determined based on the preliminary designs presented in the 50% submittal of the DDR which indicated that large inverted T-type floodwalls supported on prestressed concrete piling were necessary to achieve the required levee embankment stability. In particular, the original DDR embankment design elevations resulted in large numbers of T-wall foundation piling as well as the need to provide a "relieving platform" to support a significant portion of the embankment to achieve adequate stability.

The navigation draft of the new lock has not been finalized hence alternatives for both ship and barge locks were studied. The channel requirements for these alternatives consider typical bottom elevations of -23.0 N.G.V.D. for a barge lock and -37.0 N.G.V.D. for the ship lock alternative. The scope of this study considered both I-wall and T-wall flood protection structures and embankments within the available rights-of-way for both the barge lock and ship lock plans.

The study presents the civil, geotechnical and structural design aspects of the flood protection alternatives investigated. Removal of existing hurricane protection features, provisions for interim hurricane protection, construction considerations and schedule are not focal points for the Study, but will be considered during the completion of the DDR. Quantity takeoffs and comparative construction cost estimates are provided only to assess the relative costs of each alternative.

C. SCOPE

The scope of the study was established by the New Orleans District based on the results of the preliminary design work contained in the 50% DDR submittal. In general, the scope required

that alternative analyses for the lateral flood protection be performed using various levee crown elevations in conjunction with I-type or T-type floodwalls. The scope required that analyses consider T-type floodwalls to provide only minimal support to the required embankments. The levee crown elevations on the flood side of the walls ranged from the natural ground elevation to a maximum of elevation 15.0 N.G.V.D. In general, acceptable crown elevations on the protected side of the wall were to be determined as part of the study. In addition, alternatives which included reducing the required navigation channel width by 50 feet and/or using lightweight fill materials to construct the embankments were also included. The study was to consider areas both north and south of Claiborne Avenue as well as both the ship lock and barge lock plans. All pile foundations were to utilize 24-inch diameter steel piles to minimize the number of piles required.

D. DATUM

All elevations referenced and contained in this Study refer to the National Geodetic Vertical Datum (NGVD). Project horizontal and vertical control and existing bank and channel cross-sections between the existing and proposed locks were furnished by the New Orleans District (NOD).

E. REFERENCES

The 50% DDR Submittal, dated January, 2000, served as the primary reference for this Alternative Study. Deviations from the DDR criteria and assumptions are noted herein, where applicable.

2. GEOTECHNICAL DESIGN

A. GENERAL

Boring and geologic data, testing results, strength parameters and pile capacities considered in the study are contained in the 50% submittal of the DDR.

B. REFERENCES

Geotechnical requirements were determined in accordance with the criteria and guidance contained in Corps of Engineers Manuals, industry standards and other technical references as listed below:

(1) EM 1110-2-1902 Stability of Earth and Rockfill Dams; April 1, 1970.

(2) EM 1110-2-2503 Design of Sheet Pile Cellular Structures, Cofferdams and Retaining Structures; Sept 29, 1989.

Computer Programs:

(3) LMVD Method of Planes Slope Stability With Uplift, Wedge Method; 1998 Version

(4) CWALSHT, Design/Analysis of Anchored or Cantilevered Sheetpile Walls by Classical Methods, October, 1998; X0031

In addition to the criteria contained in the references above, the following project design criteria for this report was mandated by the District:

DESIGN PARAMETERS

ITEM	DESIGN CONDITION	REQ'D SAFETY FACTOR
Slope Stability:	High Water Condition	1.30
	Low Water Condition	1.30
	Sudden Drawdown	1.20
Pile Capacity:	With Pile Test (Q & S Cases)	2.0
	No Pile Test (Q & S Cases)	3.0
Cantilever Wall Stability:	Water to Flowline	Q-Case = 1.5
	Water to Flowline Plus Freeboard	Q-Case = 1.25
	Water to Flowline	S-Case = 1.20
	Water to Flowline Plus Freeboard	S-Case = 1.00

C. DESIGN ASSUMPTIONS

1. Lateral Earth Pressures. Lateral earth pressures for the design of structures were computed assuming clay backfill with a saturated unit weight of 120 pounds per cubic foot and a K_o equal to 0.80 or lightweight fill with a saturated unit weight of 85 pounds per cubic foot and a K_o equal to 0.60. Active and passive pressures for the design of sheet pile retaining structures were computed in accordance with EM 1110-2-2503.

2. Channel Soil Strength Parameters. The soil strengths for the channel area and how these strengths were combined with the data which represents the bank strengths greatly influenced the slope stability analysis results which determined both the type of floodwall to be provided as well as the location of the wall. The computed slope stability factors of safety were largely dependent on the location where bank strengths changed to channel strengths which were much lower. In the slope stability analyses for the 50% DDR submittal, input into the LMVD slope stability program considered that the channel soil strengths began near the toe of the required embankments. Because the program averages the soil strengths in the zone between the locations where the parameters are input, the point where the channel parameters are input is critical to the results. After careful consideration of the strength data provided by the District, the location for the channel parameter input was moved to the channel centerline. The results of the slope stability analyses using this

revision indicate increased bank stability which requires less support from retaining structures and/or T-type floodwalls to achieve the required factors of safety. A specific condition analyzed for the 50 % Design submittal was rerun using the new channel parameter location. The resulting factor of safety for slope stability increased from 1.30 (50% analysis) to 1.38 using the same embankment and floodwall configuration.

3. **Analysis Results.** In general, analyses were performed in accordance with the required scope, however, where the required configurations for selected alternatives could not be achieved, analyses on similar alternatives was discontinued. In lieu of repeating analyses on alternatives that were not feasible, additional alternatives were developed and evaluated based on the alternatives which resulted in I-walls and/or the highest flood side embankment elevations. This approach yielded the most economical alternatives as well the highest embankment elevations which will be inundated by the River less often and will provide the greatest impact protection for the floodwalls.

3. CIVIL DESIGN

A. GENERAL

The civil design aspects covered in this report include site surveys and layouts, floodwall plan location and layout, site grading and drainage, rights-of-way and relocations and coordination with local interests . Survey and right-of-way data utilized in the study are shown in the 50% submittal of the DDR.

B. FLOODWALL GEOMETRY AND LAYOUT

A basic general layout was utilized for the various analyses and geometry considerations for the flood protection alternatives contained in this study. The following configuration was assumed:

- Total crown width - 15 feet
- Distance from floodside edge of crown to centerline of floodwall - 10.5 feet
- Distance from protected side edge of crown to centerline of floodwall - 4.5 feet
- Floodside and protected side embankment elevations varied in each alternative

Cross-sections, which depicted both existing conditions and the proposed channels and embankments and the required scope of work were furnished to the geotechnical engineer. In general, alternative analyses assumed fill placement would be limited to those areas necessary to construct the required embankments, i.e., no channel fill will be placed. Benches in the channel slopes as shown in the plans developed for the 50% DDR were maintained where possible.

C. DESIGN RESULTS

In all design reaches on the east and west sides of the canal, embankment support (i.e. pile supported relieving platforms) were required for stability in both the Ship Lock and Barge Lock alternatives.

Revised channel and embankment plans were developed from this geotechnical information. Minimum base widths, as required to support the floodside embankments were furnished to the structural engineers to develop the foundation and structural requirements for the floodwalls. The base widths provided to the structural engineer reflected the width of the floodwall slab, as measured from the floodside face of the wall, necessary to support the amount of embankment required by the stability analyses. Table 3-1 below depicts floodwall geometry compared to the slope stability requirements.

TABLE 3-1: T-Wall Geometry Requirements

B/L STATION	SHIP LOCK PLAN		BARGE LOCK PLAN	
	BASE WIDTH	ELEVATION SUPPORTED FILL	FLOODSID EBASE WIDTH	ELEVATION SUPPORTED FILL
0+00 WEST	17 FEET	EL. 14.0	17 FEET	EL. 14.0
18+00 WEST	17 FEET	EL. 14.0	17 FEET	EL. 14.0
22+00 WEST	17 FEET	EL. 14.0	17 FEET	EL. 14.0

4. STRUCTURAL DESIGN

A. GENERAL

This section presents a brief summary of the structural design aspects of the alternatives investigated including design criteria and methods of analysis. Design results are shown on the plates which depict details of the alternatives investigated. Typical design calculations and foundation analyses are provided in Appendix B.

B. REFERENCES AND DESIGN AIDS

(1) EM 1110-2-2104 Strength Design for Reinforced-Concrete Hydraulic Structures 30 Jun 92

(2) EM 1110-2-2502 Retaining and Flood Walls 29 Sep 89

(3) EM 1110-2-2906 Design of Pile Foundations 15 Jan 91

(4) American Concrete Institute, Building Code Requirements for Structural Concrete, (ACI 318-95).

(5) American Institute of Steel Construction, Manual of Steel Construction, Allowable Stress Design, (AISC ASD), Ninth Edition, 1989.

(6) American Welding Society, Structural Welding Code, (AWS D1.1-96), 1996.

(7) Computer Program, Computer Aided Structural Engineering (C.A.S.E.) "Pile Group Analysis" (CPGA) (X0080).

C. DESIGN LOADS

1. Dead and Live Loads. The material unit weights, live loads, lateral earth and water pressures and uplift forces which were used for the comparison of alternatives are those listed in the 50% DDR submittal. Lateral earth pressures for lightweight fills considered a saturated unit weight of 85 pounds per cubic foot and a K_o equal to 0.60.

2. Design Parameters.

a. Foundations. A pile capacity factor of safety of 2.0 was utilized in all foundation designs since pile load tests will be performed for the project.

(1.) **Steel Pipe Piles.** Pipe piles were considered as 24-inch diameter, ½-inch wall piles, Grade 35. Structural design factors of safety, allowable stresses and allowable deflections were in accordance with EM 1110-2-2906.

(2.) **Steel Sheet Piles.** Steel sheet piles will be ASTM A328, Grade 38.5. Sheet pile penetrations were determined as part of the geotechnical design. Allowable bending stress was 19.2 ksi (0.5 F_y). In many alternatives, the required size of the sheet piles was dictated by deflection considerations.

b. **Concrete Structures - Required Strength.** All concrete structures were designed in accordance with the requirements of EM 1110-2-2104. A detailed discussion on material strengths, load factors and combinations is contained in the 50% DDR submittal.

D. METHODS OF ANALYSIS

1. **Foundation Loading.** All loads acting on the floodwall monoliths in the various design conditions were determined with user developed spreadsheets. These spreadsheets determined the various loads and provided a summation of forces and moments about given axes as required for input into the CPGA pile analysis.

2. **Pile Analysis.** All pile foundations for the floodwall monoliths were analyzed as rigid base structures using the CORPS library program CPGA which uses the stiffness method of analysis. Preliminary foundation geometry was determined using graphical methods and the resultant forces obtained from the foundation loadings.

3. **Structural Analysis.** Cursory structural analyses were performed with user developed spreadsheets to determine the required size of the floodwall elements. The analyses considered design strips in the base slab equal to the longitudinal pile spacing. Pile forces in each strip were converted to per foot point loads along the base for compatibility with applied structure loadings. Shears and moments in the slab were summed about the face of the wall. Compressive loading due to the weight of the wall was neglected in the design of vertical wall reinforcing.

E. DESIGN RESULTS

The results of the analyses described above are shown on the design plates.

5. COST ESTIMATES

A. GENERAL

Comparative cost estimates prepared for the various alternatives studied for both the Ship Lock and Barge Lock plans are presented in this section. These estimates were not prepared using MCACES format or data bases, however the pricing information reflects cost data obtained from various sources. Whenever possible, historical pricing data was obtained from District personnel. Where specific cost information was not available, estimates were prepared using judgement and experience from previous work. The cost estimates contained herein are intended solely for relative cost comparisons of the various alternatives contained in the study.

B. COST ASSUMPTIONS

1. General. Quantity computations for earthwork were performed using the required channel and embankment and the cross-section information provided by the District. For this study, only four cross-sections were used to determine estimated quantities for the various alternatives:

- Station 0+00 West B/L
- Station 5+00 West B/L
- Station 18+00 West B/L
- Station 22+00 West B/L

The estimated material quantities and costs do not consider the areas beneath and immediately adjacent to the Claiborne Ave. Bridge however, the required structures in this area will likely be similar to that shown in the 50% DDR submittal due to the geometry required to minimize adverse loadings on the exiting bridge footings and supports. The embankments in this area will be based on the alternatives selected for further design on the north and south sides of the bridge.

Costs for mobilization and demolition of the existing floodwalls were not considered in this study. Embankment fill and seepage cutoff sheeting costs consider use of excavated and salvaged materials. Costs for steel pipe piling are based on delivery of full length piles approximately 60 feet long. Where longer lengths are required for geotechnical capacity, an allowance for one splice per long pile was included as a line item.

2. South of Claiborne Ave. This reach includes the existing lock where significant amounts of excavation are required. Quantities for the reach between the St. Claude Ave. Bridge (Sta. -5+00) to the end of the existing lock (Sta. 3+85) were computed using the cross-section at Sta. 0+00. Average end areas were used to develop the quantities to Sta. 5+00. The cross-section at Sta. 5+00 was used to develop the quantities to the end of the reach near Sta. 10+20.

3. **North of Claiborne Ave.** This reach extends from Sta. 15+00 to a point immediately south of the proposed lock. The total length of the reach for quantity estimates is 840 feet. The cross-section at Sta. 18+00 was utilized for the first 500 feet of the reach. The section at Sta. 22+00 was utilized for all estimates north of Sta. 20+00 because a different stability section is required from this location to the proposed lock.

C. COST ESTIMATES

Cost estimates and estimated quantities for the various design alternatives are presented on the following pages.

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

WEST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 1 (ELS. 12.0 AND 10.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	Excavation	CY	292,700	$4.00	$1,170,800
2	Embankment Fill	CY	12,700	$3.50	$44,450
3	24-Inch Riprap	TON	19,500	$30.00	$585,000
4	24-Inch Dia. Steel Pipe Piling	LF	32,800	$60.00	$1,968,000
5	Pipe Pile Splices	EA	270	$500.00	$135,000
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	16,200	$8.00	$129,600
7	Stabilization Concrete	CY	510	$100.00	$51,000
8	Reinforced Concrete in Floodwall Base	CY	3,060	$200.00	$612,000
9	Reinforced Concrete Walls	CY	3,420	$350.00	$1,197,000
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
11	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$5,892,850
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$5,893,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

WEST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 2 (ELS. 10.0 AND 10.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	306,100	$4.00	$1,224,400
2	Embankment Fill	CY	10,000	$3.50	$35,000
3	24-Inch Riprap	TON	21,300	$30.00	$639,000
4	24-Inch Dia. Steel Pipe Piling	LF	31,900	$60.00	$1,914,000
5	Pipe Pile Splices	EA	270	$500.00	$135,000
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	16,200	$8.00	$129,600
7	Stabilization Concrete	CY	510	$100.00	$51,000
8	Reinforced Concrete in Floodwall Base	CY	3,060	$200.00	$612,000
9	Reinforced Concrete Walls	CY	3,330	$350.00	$1,165,500
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
11	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$5,905,500
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$5,906,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

WEST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 3 (ELS. 15.0 & 10.0 RCW)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	243,500	$4.00	$974,000
2	Embankment Fill	CY	17,200	$3.50	$60,200
3	24-Inch Riprap	TON	25,800	$30.00	$774,000
4	24-Inch Dia. Steel Pipe Piling	LF	36,000	$60.00	$2,160,000
5	Pipe Pile Splices	EA	240	$500.00	$120,000
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	16,200	$8.00	$129,600
7	Stabilization Concrete	CY	510	$100.00	$51,000
8	Reinforced Concrete in Floodwall Base	CY	3,060	$200.00	$612,000
9	Reinforced Concrete Walls	CY	3,330	$350.00	$1,165,500
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
11	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$6,046,300
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$6,046,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

WEST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 4 (ELS. 15.0 & 10.0 LWF)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	266,500	$4.00	$1,066,000
2	Embankment Fill	CY	9,000	$3.50	$31,500
3	24-Inch Riprap	TON	20,300	$30.00	$609,000
4	24-Inch Dia. Steel Pipe Piling	LF	32,600	$60.00	$1,956,000
5	Pipe Pile Splices	EA	240	$500.00	$120,000
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	16,200	$8.00	$129,600
7	Stabilization Concrete	CY	510	$100.00	$51,000
8	Reinforced Concrete in Floodwall Base	CY	3,060	$200.00	$612,000
9	Reinforced Concrete Walls	CY	3,330	$350.00	$1,165,500
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
11	I-Wall Concrete	CY	0	$250.00	$0
12	Lightweight Fill	TON	8,650	$18.00	$155,700
				SUBTOTAL	$5,896,300
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$5,896,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

WEST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 5 (ELS. 10.0 AND 12.0 I-WALL)

REDUCED CHANNEL WIDTH

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	241,500	$4.00	$966,000
2	Embankment Fill	CY	13,100	$3.50	$45,850
3	24-Inch Riprap	TON	25,400	$30.00	$762,000
4	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
5	Pipe Pile Splices	EA	0	$500.00	$0
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	0	$8.00	$0
7	Stabilization Concrete	CY	200	$100.00	$20,000
8	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
9	Reinforced Concrete Walls	CY	0	$350.00	$0
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	62,400	$14.50	$904,800
11	I-Wall Concrete	CY	2,560	$250.00	$640,000
				SUBTOTAL	$3,338,650
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$3,339,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

EAST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 1 (ELS. 13.0 AND 10.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	277,100	$4.00	$1,108,400
2	Embankment Fill	CY	25,000	$3.50	$87,500
3	24-Inch Riprap	TON	22,100	$30.00	$663,000
4	24-Inch Dia. Steel Pipe Piling	LF	34,500	$60.00	$2,070,000
5	Pipe Pile Splices	EA	240	$500.00	$120,000
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	16,200	$8.00	$129,600
7	Stabilization Concrete	CY	510	$100.00	$51,000
8	Reinforced Concrete in Floodwall Base	CY	3,060	$200.00	$612,000
9	Reinforced Concrete Walls	CY	3,510	$350.00	$1,228,500
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
11	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$6,070,000
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$6,070,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

EAST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 2 (ELS. 10.0 AND 10.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	277,700	$4.00	$1,110,800
2	Embankment Fill	CY	19,000	$3.50	$66,500
3	24-Inch Riprap	TON	22,400	$30.00	$672,000
4	24-Inch Dia. Steel Pipe Piling	LF	31,900	$60.00	$1,914,000
5	Pipe Pile Splices	EA	270	$500.00	$135,000
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	16,200	$8.00	$129,600
7	Stabilization Concrete	CY	510	$100.00	$51,000
8	Reinforced Concrete in Floodwall Base	CY	3,060	$200.00	$612,000
9	Reinforced Concrete Walls	CY	3,510	$350.00	$1,228,500
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
11	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$5,919,400
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$5,919,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

EAST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 3 (ELS. 3.0 AND 10.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	277,600	$4.00	$1,110,400
2	Embankment Fill	CY	9,600	$3.50	$33,600
3	24-Inch Riprap	TON	21,000	$30.00	$630,000
4	24-Inch Dia. Steel Pipe Piling	LF	37,500	$60.00	$2,250,000
5	Pipe Pile Splices	EA	270	$500.00	$135,000
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	16,200	$8.00	$129,600
7	Stabilization Concrete	CY	510	$100.00	$51,000
8	Reinforced Concrete in Floodwall Base	CY	3,060	$200.00	$612,000
9	Reinforced Concrete Walls	CY	3,510	$350.00	$1,228,500
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
11	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$6,180,100
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$6,180,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

EAST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 4 (ELS. 15.0 AND 10.0 RCW)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	217,800	$4.00	$871,200
2	Embankment Fill	CY	31,100	$3.50	$108,850
3	24-Inch Riprap	TON	25,100	$30.00	$753,000
4	24-Inch Dia. Steel Pipe Piling	LF	37,800	$60.00	$2,268,000
5	Pipe Pile Splices	EA	270	$500.00	$135,000
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	16,200	$8.00	$129,600
7	Stabilization Concrete	CY	510	$100.00	$51,000
8	Reinforced Concrete in Floodwall Base	CY	3,060	$200.00	$612,000
9	Reinforced Concrete Walls	CY	3,510	$350.00	$1,228,500
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
11	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$6,157,150
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$6,157,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

EAST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 5 (ELS. 15.0 & 10.0 LWF)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	277,400	$4.00	$1,109,600
2	Embankment Fill	CY	13,400	$3.50	$46,900
3	24-Inch Riprap	TON	22,200	$30.00	$666,000
4	24-Inch Dia. Steel Pipe Piling	LF	33,500	$60.00	$2,010,000
5	Pipe Pile Splices	EA	240	$500.00	$120,000
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	16,200	$8.00	$129,600
7	Stabilization Concrete	CY	510	$100.00	$51,000
8	Reinforced Concrete in Floodwall Base	CY	3,060	$200.00	$612,000
9	Reinforced Concrete Walls	CY	3,510	$350.00	$1,228,500
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
11	I-Wall Concrete	CY	0	$250.00	$0
12	Lightweight Fill	TON	18,400	$18.00	$331,200
				SUBTOTAL	$6,304,800
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$6,305,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

EAST LEVEE, SO. OF CLAIBORNE - ALT. 6 (ELS. 10.0 AND 12.0 RCW I-WALL)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	217,900	$4.00	$871,600
2	Embankment Fill	CY	25,200	$3.50	$88,200
3	24-Inch Riprap	TON	25,200	$30.00	$756,000
4	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
5	Pipe Pile Splices	EA	0	$500.00	$0
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	0	$8.00	$0
7	Stabilization Concrete	CY	200	$100.00	$20,000
8	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
9	Reinforced Concrete Walls	CY	0	$350.00	$0
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	75,300	$14.50	$1,091,850
11	I-Wall Concrete	CY	2,560	$250.00	$640,000
				SUBTOTAL	$3,467,650
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$3,468,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

EAST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 7 (ELS. 10.0 AND 14.0 LWF I-WALL)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	278,000	$4.00	$1,112,000
2	Embankment Fill	CY	13,000	$3.50	$45,500
3	24-Inch Riprap	TON	20,300	$30.00	$609,000
4	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
5	Pipe Pile Splices	EA	0	$500.00	$0
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	0	$8.00	$0
7	Stabilization Concrete	CY	200	$100.00	$20,000
8	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
9	Reinforced Concrete Walls	CY	0	$350.00	$0
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	62,400	$14.50	$904,800
11	I-Wall Concrete	CY	2,560	$250.00	$640,000
12	Lightweight Fill	TON	17,900	$18.00	$322,200
				SUBTOTAL	$3,653,500
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$3,654,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

WEST SIDE LEVEE, NO. OF CLAIBORNE - ALT. 1 (ELS. 15.0 AND 15.0 I-WALL)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	Excavation	CY	61,000	$4.00	$244,000
2	Embankment Fill	CY	12,900	$3.50	$45,150
3	24-Inch Riprap	TON	36,800	$30.00	$1,104,000
4	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
5	Pipe Pile Splices	EA	0	$500.00	$0
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	0	$8.00	$0
7	Stabilization Concrete	CY	50	$100.00	$5,000
8	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
9	Reinforced Concrete Walls	CY	0	$350.00	$0
10	New I-Wall Steel Sheet Piling (PZ-22)	SF	20,300	$12.50	$253,750
11	I-Wall Concrete	CY	900	$250.00	$225,000
12	Lightweight Fill	TON	3,700	$18.00	$66,600
				SUBTOTAL	$1,943,500
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$1,944,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

WEST SIDE LEVEE, NO. OF CLAIBORNE - ALT. 2 (ELS. 15.0 AND 15.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	Excavation	CY	160,700	$4.00	$642,800
2	Embankment Fill	CY	16,900	$3.50	$59,150
3	24-Inch Riprap	TON	15,700	$30.00	$471,000
4	24-Inch Dia. Steel Pipe Piling	LF	11,700	$60.00	$702,000
5	Pipe Pile Splices	EA	150	$500.00	$75,000
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	6,000	$8.00	$48,000
7	Stabilization Concrete	CY	200	$100.00	$20,000
8	Reinforced Concrete in Floodwall Base	CY	1,130	$200.00	$226,000
9	Reinforced Concrete Walls	CY	1,170	$350.00	$409,500
10	New I-Wall Steel Sheet Piling (PZ-22)	SF	5,600	$12.50	$70,000
11	I-Wall Concrete	CY	260	$250.00	$65,000
12	Lightweight Fill	TON	3,700	$18.00	$66,600
				SUBTOTAL	$2,855,050
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$2,855,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

WEST SIDE LEVEE, NO. OF CLAIBORNE - ALT. 3 (ELS. 12.0 AND 12.0 I-WALL)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	Excavation	CY	159,800	$4.00	$639,200
2	Embankment Fill	CY	14,400	$3.50	$50,400
3	24-Inch Riprap	TON	17,100	$30.00	$513,000
4	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
5	Pipe Pile Splices	EA	0	$500.00	$0
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	0	$8.00	$0
7	Stabilization Concrete	CY	50	$100.00	$5,000
8	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
9	Reinforced Concrete Walls	CY	0	$350.00	$0
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	34,700	$14.50	$503,150
11	I-Wall Concrete	CY	1,080	$250.00	$270,000
12	Lightweight Fill	TON	3,700	$18.00	$66,600
				SUBTOTAL	$2,047,350
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$2,047,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

EAST SIDE LEVEE, NO. OF CLAIBORNE - ALT. 1 (ELS. 15.0 AND 15.0 I-WALL)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	102,800	$4.00	$411,200
2	Embankment Fill	CY	27,800	$3.50	$97,300
3	24-Inch Riprap	TON	30,900	$30.00	$927,000
4	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
5	Pipe Pile Splices	EA	0	$500.00	$0
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	0	$8.00	$0
7	Stabilization Concrete	CY	110	$100.00	$11,000
8	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
9	Reinforced Concrete Walls	CY	0	$350.00	$0
10	New I-Wall Steel Sheet Piling (PZ-22)	SF	29,000	$12.50	$362,500
11	I-Wall Concrete	CY	900	$250.00	$225,000
				SUBTOTAL	$2,034,000
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$2,034,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

EAST SIDE LEVEE, NO. OF CLAIBORNE - ALT. 2 (ELS. 15.0 AND 13.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	209,600	$4.00	$838,400
2	Embankment Fill	CY	19,000	$3.50	$66,500
3	24-Inch Riprap	TON	18,400	$30.00	$552,000
4	24-Inch Dia. Steel Pipe Piling	LF	22,700	$60.00	$1,362,000
5	Pipe Pile Splices	EA	280	$500.00	$140,000
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	8,400	$8.00	$67,200
7	Stabilization Concrete	CY	260	$100.00	$26,000
8	Reinforced Concrete in Floodwall Base	CY	1,320	$200.00	$264,000
9	Reinforced Concrete Walls	CY	2,190	$350.00	$766,500
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
11	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$4,082,600
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$4,083,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

EAST SIDE LEVEE, NO. OF CLAIBORNE - ALT. 3 (ELS. 10.0 AND 14.0 I-WALL)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	209,500	$4.00	$838,000
2	Embankment Fill	CY	22,200	$3.50	$77,700
3	24-Inch Riprap	TON	23,200	$30.00	$696,000
4	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
5	Pipe Pile Splices	EA	0	$500.00	$0
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	0	$8.00	$0
7	Stabilization Concrete	CY	110	$100.00	$11,000
8	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
9	Reinforced Concrete Walls	CY	0	$350.00	$0
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	32,300	$14.50	$468,350
11	I-Wall Concrete	CY	1,330	$250.00	$332,500
				SUBTOTAL	$2,423,550
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$2,424,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

W. SIDE LEVEE, SO. OF CLAIBORNE - ALT. 1 (ELS. 15.0 AND 15.0 LWF I-WALL)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	Excavation	CY	196,600	$4.00	$786,400
2	Embankment Fill	CY	6,500	$3.50	$22,750
3	24-Inch Riprap	TON	17,700	$30.00	$531,000
4	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
5	Pipe Pile Splices	EA	0	$500.00	$0
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	0	$8.00	$0
7	Stabilization Concrete	CY	200	$100.00	$20,000
8	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
9	Reinforced Concrete Walls	CY	0	$350.00	$0
10	New I-Wall Steel Sheet Piling (PZ-22)	SF	39,700	$12.50	$496,250
11	I-Wall Concrete	CY	2,230	$250.00	$557,500
12	Lightweight Fill	TON	17,500	$18.00	$315,000
				SUBTOTAL	$2,728,900
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$2,729,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

WEST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 2 (ELS. 15.0 AND 15.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	196,300	$4.00	$785,200
2	Embankment Fill	CY	27,300	$3.50	$95,550
3	24-Inch Riprap	TON	16,000	$30.00	$480,000
4	24-Inch Dia. Steel Pipe Piling	LF	31,600	$60.00	$1,896,000
5	Pipe Pile Splices	EA	410	$500.00	$205,000
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	16,200	$8.00	$129,600
7	Stabilization Concrete	CY	510	$100.00	$51,000
8	Reinforced Concrete in Floodwall Base	CY	2,550	$200.00	$510,000
9	Reinforced Concrete Walls	CY	3,330	$350.00	$1,165,500
10	New I-Wall Steel Sheet Piling (PZ-22)	SF	0	$12.50	$0
11	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$5,317,850
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$5,318,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

WEST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 3 (ELS. 12.0 AND 12.0 I-WALL)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	195,600	$4.00	$782,400
2	Embankment Fill	CY	16,500	$3.50	$57,750
3	24-Inch Riprap	TON	19,200	$30.00	$576,000
4	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
5	Pipe Pile Splices	EA	0	$500.00	$0
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	0	$8.00	$0
7	Stabilization Concrete	CY	200	$100.00	$20,000
8	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
9	Reinforced Concrete Walls	CY	0	$350.00	$0
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	78,600	$14.50	$1,139,700
11	I-Wall Concrete	CY	2,230	$250.00	$557,500
				SUBTOTAL	$3,133,350
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$3,133,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

WEST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 4 (ELS. 13.0 AND 13.0 I-WALL)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	156,900	$4.00	$627,600
2	Embankment Fill	CY	19,800	$3.50	$69,300
3	24-Inch Riprap	TON	22,900	$30.00	$687,000
4	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
5	Pipe Pile Splices	EA	0	$500.00	$0
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	0	$8.00	$0
7	Stabilization Concrete	CY	200	$100.00	$20,000
8	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
9	Reinforced Concrete Walls	CY	0	$350.00	$0
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	47,800	$14.50	$693,100
11	I-Wall Concrete	CY	2,060	$250.00	$515,000
				SUBTOTAL	$2,612,000
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$2,612,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

E. SIDE LEVEE, SO. OF CLAIBORNE - ALT. 1 (ELS. 15.0 AND 15.0 LWF I-WALL)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	191,700	$4.00	$766,800
2	Embankment Fill	CY	13,900	$3.50	$48,650
3	24-Inch Riprap	TON	21,900	$30.00	$657,000
4	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
5	Pipe Pile Splices	EA	0	$500.00	$0
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	0	$8.00	$0
7	Stabilization Concrete	CY	200	$100.00	$20,000
8	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
9	Reinforced Concrete Walls	CY	0	$350.00	$0
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	42,900	$14.50	$622,050
11	I-Wall Concrete	CY	1,730	$250.00	$432,500
12	Lightweight Fill	TON	32,400	$18.00	$583,200
				SUBTOTAL	$3,130,200
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$3,130,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

EAST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 2 (ELS. 15.0 AND 15.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	189,300	$4.00	$757,200
2	Embankment Fill	CY	43,800	$3.50	$153,300
3	24-Inch Riprap	TON	21,200	$30.00	$636,000
4	24-Inch Dia. Steel Pipe Piling	LF	31,600	$60.00	$1,896,000
5	Pipe Pile Splices	EA	410	$500.00	$205,000
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	16,200	$8.00	$129,600
7	Stabilization Concrete	CY	510	$100.00	$51,000
8	Reinforced Concrete in Floodwall Base	CY	2,550	$200.00	$510,000
9	Reinforced Concrete Walls	CY	3,510	$350.00	$1,228,500
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$14.50	$0
11	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$5,566,600
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$5,567,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

EAST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 3 (ELS. 12.0 AND 12.0 I-WALL)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	190,300	$4.00	$761,200
2	Embankment Fill	CY	34,900	$3.50	$122,150
3	24-Inch Riprap	TON	23,200	$30.00	$696,000
4	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
5	Pipe Pile Splices	EA	0	$500.00	$0
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	0	$8.00	$0
7	Stabilization Concrete	CY	200	$100.00	$20,000
8	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
9	Reinforced Concrete Walls	CY	0	$350.00	$0
10	New I-Wall Steel Sheet Piling (PZ-35)	SF	86,700	$17.00	$1,473,900
11	I-Wall Concrete	CY	2,230	$250.00	$557,500
				SUBTOTAL	$3,630,750
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$3,631,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

EAST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 4 (ELS. 14.0 AND 13.0 I-WALL)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	156,300	$4.00	$625,200
2	Embankment Fill	CY	38,900	$3.50	$136,150
3	24-Inch Riprap	TON	32,500	$30.00	$975,000
4	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
5	Pipe Pile Splices	EA	0	$500.00	$0
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	0	$8.00	$0
7	Stabilization Concrete	CY	200	$100.00	$20,000
8	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
9	Reinforced Concrete Walls	CY	0	$350.00	$0
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	47,800	$14.50	$693,100
11	I-Wall Concrete	CY	2,060	$250.00	$515,000
				SUBTOTAL	$2,964,450
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$2,964,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

WEST SIDE, NO. OF CLAIBORNE - ALT. 1 (ELS. 15.0 AND 15.0 I-WALL)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	Excavation	CY	42,000	$4.00	$168,000
2	Embankment Fill	CY	26,100	$3.50	$91,350
3	24-Inch Riprap	TON	36,200	$30.00	$1,086,000
4	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
5	Pipe Pile Splices	EA	0	$500.00	$0
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	0	$8.00	$0
7	Stabilization Concrete	CY	50	$100.00	$5,000
8	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
9	Reinforced Concrete Walls	CY	0	$350.00	$0
10	New I-Wall Steel Sheet Piling (PZ-22)	SF	20,300	$12.50	$253,750
11	I-Wall Concrete	CY	900	$250.00	$225,000
12	Lightweight Fill	TON	3,500	$18.00	$63,000
				SUBTOTAL	$1,892,100
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$1,892,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

WEST SIDE LEVEE, NO. OF CLAIBORNE - ALT. 2 (ELS. 15.0 AND 15.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	82,300	$4.00	$329,200
2	Embankment Fill	CY	13,600	$3.50	$47,600
3	24-Inch Riprap	TON	16,000	$30.00	$480,000
4	24-Inch Dia. Steel Pipe Piling	LF	11,700	$60.00	$702,000
5	Pipe Pile Splices	EA	150	$500.00	$75,000
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	6,000	$8.00	$48,000
7	Stabilization Concrete	CY	200	$100.00	$20,000
8	Reinforced Concrete in Floodwall Base	CY	1,130	$200.00	$226,000
9	Reinforced Concrete Walls	CY	1,170	$350.00	$409,500
10	New I-Wall Steel Sheet Piling (PZ-22)	SF	5,600	$12.50	$70,000
11	I-Wall Concrete	CY	260	$250.00	$65,000
12	Lightweight Fill	TON	3,700	$18.00	$66,600
				SUBTOTAL	$2,538,900
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$2,539,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

WEST SIDE LEVEE, NO. OF CLAIBORNE - ALT. 3 (ELS. 15.0 AND 15.0 I-WALL)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	50,400	$4.00	$201,600
2	Embankment Fill	CY	12,300	$3.50	$43,050
3	24-Inch Riprap	TON	30,300	$30.00	$909,000
4	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
5	Pipe Pile Splices	EA	0	$500.00	$0
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	0	$8.00	$0
7	Stabilization Concrete	CY	50	$100.00	$5,000
8	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
9	Reinforced Concrete Walls	CY	0	$350.00	$0
10	New I-Wall Steel Sheet Piling (PZ-22)	SF	19,700	$12.50	$246,250
11	I-Wall Concrete	CY	900	$250.00	$225,000
12	Lightweight Fill	TON	39,000	$18.00	$702,000
				SUBTOTAL	$2,331,900
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$2,332,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

WEST SIDE LEVEE, NO. OF CLAIBORNE - ALT. 4 (ELS. 12.0 AND 12.0 I-WALL)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	82,500	$4.00	$330,000
2	Embankment Fill	CY	8,100	$3.50	$28,350
3	24-Inch Riprap	TON	18,300	$30.00	$549,000
4	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
5	Pipe Pile Splices	EA	0	$500.00	$0
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	0	$8.00	$0
7	Stabilization Concrete	CY	50	$100.00	$5,000
8	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
9	Reinforced Concrete Walls	CY	0	$350.00	$0
10	New I-Wall Steel Sheet Piling (PZ-27)	SF	34,700	$14.50	$503,150
11	I-Wall Concrete	CY	1,080	$250.00	$270,000
12	Lightweight Fill	TON	3,700	$18.00	$66,600
				SUBTOTAL	$1,752,100
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$1,752,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

EAST SIDE LEVEE, NO. OF CLAIBORNE - ALT. 1 (ELS. 15.0 AND 15.0 I-WALL)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	24,700	$4.00	$98,800
2	Embankment Fill	CY	34,600	$3.50	$121,100
3	24-Inch Riprap	TON	31,400	$30.00	$942,000
4	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
5	Pipe Pile Splices	EA	0	$500.00	$0
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	0	$8.00	$0
7	Stabilization Concrete	CY	110	$100.00	$11,000
8	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
9	Reinforced Concrete Walls	CY	0	$350.00	$0
10	New I-Wall Steel Sheet Piling (PZ-22)	SF	29,000	$12.50	$362,500
11	I-Wall Concrete	CY	900	$250.00	$225,000
				SUBTOTAL	$1,760,400
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$1,760,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

EAST SIDE LEVEE, NO. OF CLAIBORNE - ALT. 2 (ELS. 15.0 AND 10.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	125,700	$4.00	$502,800
2	Embankment Fill	CY	21,900	$3.50	$76,650
3	24-Inch Riprap	TON	22,300	$30.00	$669,000
4	24-Inch Dia. Steel Pipe Piling	LF	22,800	$60.00	$1,368,000
5	Pipe Pile Splices	EA	280	$500.00	$140,000
6	Seepage Cutoff Sheet Piling (PZ-22)	SF	8,400	$8.00	$67,200
7	Stabilization Concrete	CY	260	$100.00	$26,000
8	Reinforced Concrete in Floodwall Base	CY	1,590	$200.00	$318,000
9	Reinforced Concrete Walls	CY	2,190	$350.00	$766,500
10	New I-Wall Steel Sheet Piling (PZ-22)	SF	0	$12.50	$0
11	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$3,934,150
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$3,934,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

ALTERNATIVE COST SUMMARY

ALTERNATIVE DESCRIPTION SOUTH OF CLAIBORNE AVENUE	ESTIMATED COST
ALTERNATIVE 1 - RECOMMENDED PLAN WEST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 12.0 AND 10.0	**$5,893,000**
ALTERNATIVE 2 WEST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 10.0 AND 10.0	**$5,906,000**
ALTERNATIVE 3 WEST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 10.0 REDUCED CHANNEL WIDTH	**$6,046,000**
ALTERNATIVE 4 WEST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 15.0 & 10.0 LIGHTWEIGHT FILL	**$5,896,000**
ALTERNATIVE 5 WEST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 12.0 AND 10.0 I-WALL CONFIGURATION	**$3,339,000**
ALTERNATIVE 1 - RECOMMENDED PLAN EAST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 13.0 AND 10.0	**$6,070,000**
ALTERNATIVE 2 EAST SIDE, SO. OF CLAIBORNE - LEVEE ATELS. 10.0 AND 10.0	**$5,919,000**
ALTERNATIVE 3 EAST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 3.0 AND 10.0	**$6,180,000**
ALTERNATIVE 4 EAST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 10.0	**$6,157,000**
ALTERNATIVE 5 EAST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 15.0 & 10.0 LIGHTWEIGHT FILL	**$6,305,000**
ALTERNATIVE 6 EAST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 10.0 AND 12.0 I-WALL CONFIGURATION WITH REDUCED CHANNEL WIDTH	**$3,468,000**
ALTERNATIVE 7 EAST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 10.0 AND 14.0 I-WALL CONFIGURATION WITH LEIGHTWEIGHT FILL	**$3,654,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

ALTERNATIVE COST SUMMARY

ALTERNATIVE DESCRIPTION NORTH OF CLAIBORNE AVENUE	ESTIMATED COST
ALTERNATIVE 1 - RECOMMENDED PLAN WEST SIDE, NO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 15.0 I-WALL CONFIGURATION	**$1,944,000**
ALTERNATIVE 2 WEST SIDE, NO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 15.0	**$2,855,000**
ALTERNATIVE 3 WEST SIDE, NO. OF CLAIBORNE - LEVEE AT ELS. 12.0 AND 12.0 I-WALL CONFIGURATION	**$2,047,000**
ALTERNATIVE 1 - RECOMMENDED PLAN EAST SIDE, NO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 15.0 I-WALL CONFIGURATION	**$2,034,000**
ALTERNATIVE 2 EAST SIDE, NO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 13.0	**$4,083,000**
ALTERNATIVE 3 EAST SIDE, NO. OF CLAIBORNE - LEVEE AT ELS. 10.0 AND 14.0 I-WALL CONFIGURATION	**$2,424,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

ALTERNATIVE COST SUMMARY

ALTERNATIVE DESCRIPTION SOUTH OF CLAIBORNE AVENUE	ESTIMATED COST
ALTERNATIVE 1 - RECOMMENDED PLAN WEST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 15.0 I-WALL CONFIGURATION WITH LIGHTWEIGHT FILL	**$2,729,000**
ALTERNATIVE 2 WEST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 15.0	**$5,318,000**
ALTERNATIVE 3 WEST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 12.0 AND 12.0 I-WALL CONFIGURATION	**$3,133,000**
ALTERNATIVE 4 WEST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 13.0 AND 13.0 I-WALL CONFIGURATION WITH LIGHTWEIGHT FILL	**$2,612,000**
ALTERNATIVE 1 - RECOMMENDED PLAN EAST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 15.0 I-WALL CONFIGURATION	**$3,130,000**
ALTERNATIVE 2 EAST SIDE, SO. OF CLAIBORNE - LEVEE ATELS. 15.0 AND 15.0	**$5,567,000**
ALTERNATIVE 3 EAST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 12.0 AND 12.0 I-WALL CONFIGURATION	**$3,631,000**
ALTERNATIVE 4 EAST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 14.0 AND 13.0 I-WALL CONFIGURATION	**$2,964,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

ALTERNATIVE COST SUMMARY

ALTERNATIVE DESCRIPTION NORTH OF CLAIBORNE AVENUE	ESTIMATED COST
ALTERNATIVE 1 - RECOMMENDED PLAN WEST SIDE, NO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 15.0 I-WALL CONFIGURATION	**$1,892,000**
ALTERNATIVE 2 WEST SIDE, NO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 15.0	**$2,539,000**
ALTERNATIVE 3 WEST SIDE, NO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 15.0 I-WALL CONFIGURATION	**$2,332,000**
ALTERNATIVE 4 WEST SIDE, NO. OF CLAIBORNE - LEVEE AT ELS. 12.0 AND 12.0 I-WALL CONFIGURATION	**$1,752,000**
ALTERNATIVE 1 - RECOMMENDED PLAN EAST SIDE, NO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 15.0 I-WALL CONFIGURATION	**$1,760,000**
ALTERNATIVE 2 EAST SIDE, NO. OF CLAIBORNE - LEVEE ATELS. 15.0 AND 10.0	**$3,934,000**

6. RECOMMENDATIONS

A. GENERAL

A recommended general plan was developed for ship lock and barge lock configurations based on the results of the Alternative Study. These configurations were chosen considering allowable embankment elevations, number and length of foundation piling required, risk of vessel impacts and overall plan costs. In some instances, such as the west levee south of Claiborne Avenue, the stability analyses indicate that the embankment elevation may be raised somewhat from that presented herein.

In the reach North of Claiborne Avenue, the study clearly indicates that I-wall flood protection is more than adequate and provides the most cost effective solutions. On the west side of the channel, a levee alignment immediately adjacent to the west right-of-way is recommended to provide ample distance from the centerline of the channel. Since the area on the west side of the channel will likely be used by vessels awaiting entry into the lock, an alignment which turns west immediately north of the Claiborne Avenue Bridge should be considered.

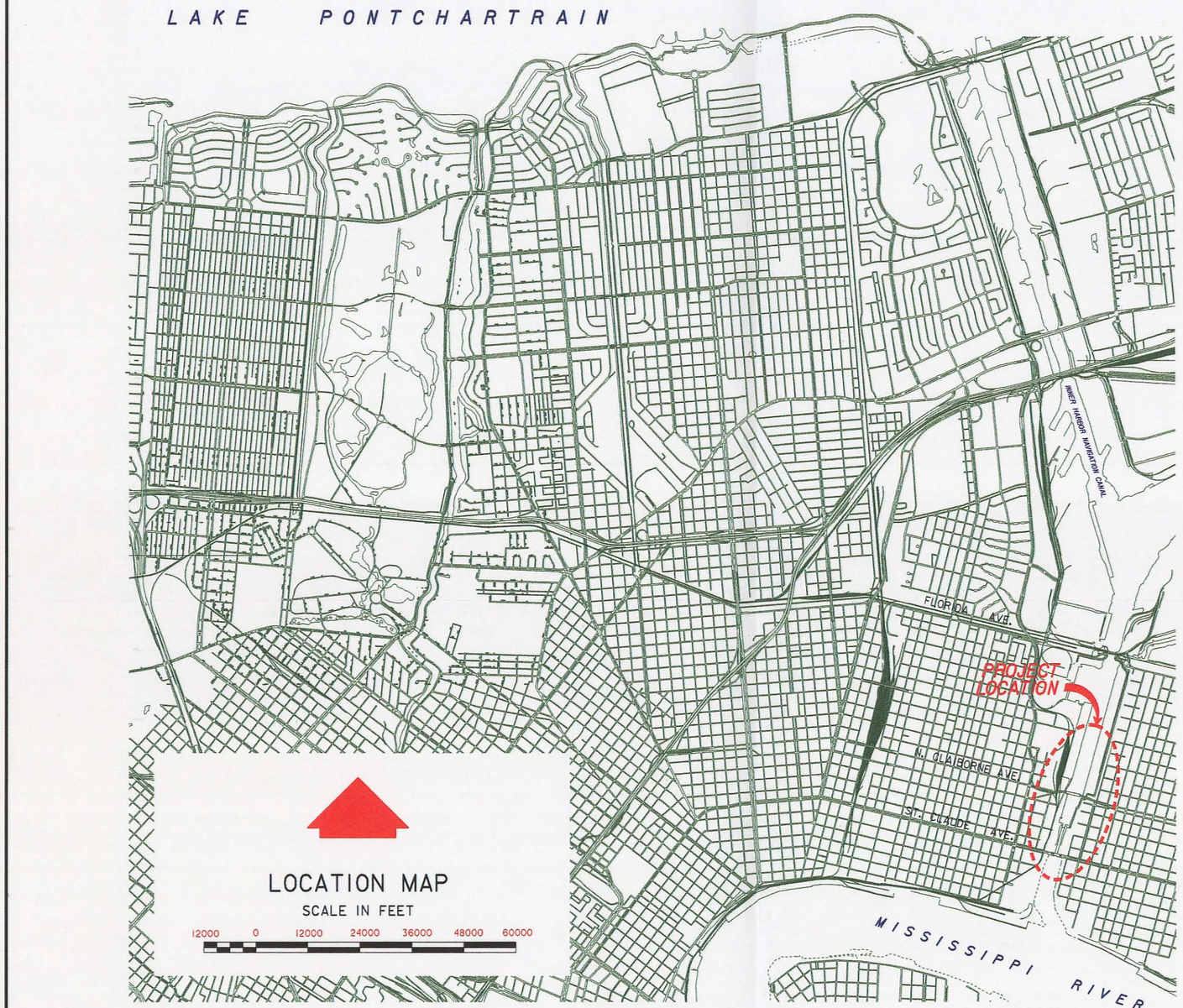
On the east side of the channel, review of the stability analyses indicates that filling the laying channel area will allow the levee alignment to be moved at least 100 feet toward the centerline of the channel. Sufficient fill material may be available from the required excavation near the existing lock to allow for cost effective implementation of this recommended alternative.

B. ADDITIONAL CONSIDERATIONS

1. Design Assumptions. The results of the stability analyses were influenced by the minimum channel water surface defined in the design requirements. The minimum channel stage of El. -2.0 N.G.V.D. is based on minimum canal stages presently experienced during hurricane conditions. This stage may be unusually low for this portion of the channel which will experience Mississippi River low water stages after construction. While minimum hurricane stage elevation may occur during construction, this extreme low water stage is unlikely to occur during project operation. Raising this low water stage to anticipated River levels and/or considering this extreme low water elevation as a "sudden drawdown" condition would likely allow for higher embankments for all alternatives and reduced sheet pile lengths for I-wall alternatives.

2. Deflection Criteria. As indicated previously, the sheet pile size required for I-wall sections was, in many cases, dictated by deflection considerations as opposed to predicted sheet pile stresses. Acceptable sheet pile deflections for this project have not been established. Additional discussion on I-wall, as well as T-wall, deflections is recommended. It may be appropriate to evaluate deflections based on the design flowline with minimal freeboard as opposed to a condition with water to the top of the wall (five feet freeboard). In addition, with due consideration of monolith joint design, wall deflection at the top of the earthen embankment may provide more

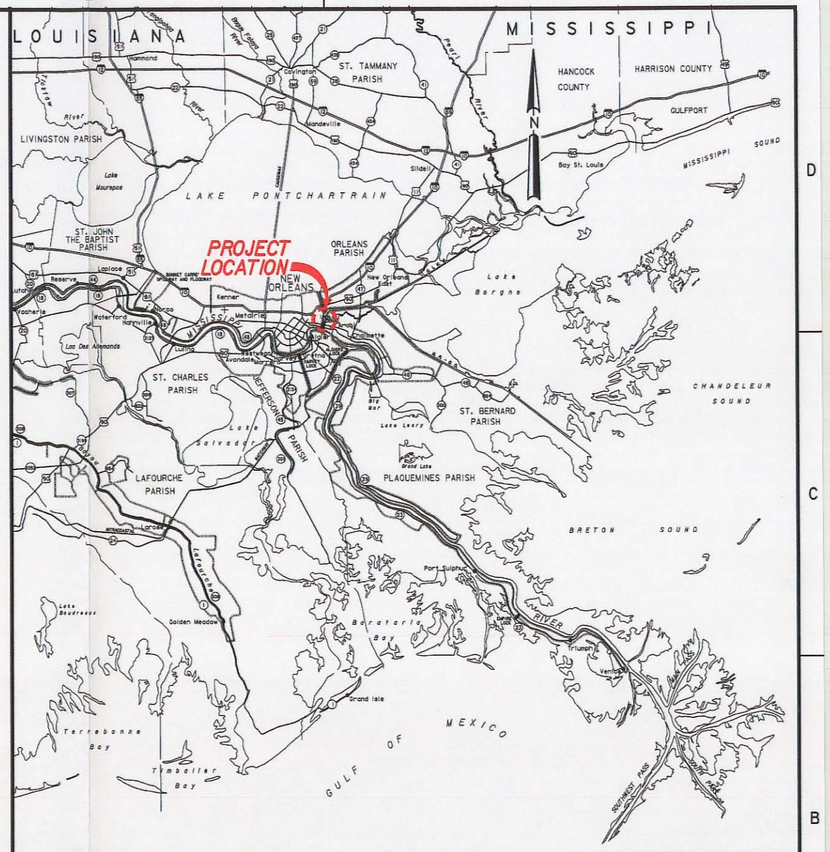
meaningful information with regard to deflection based on soil deflections and recovery.



LOCATION MAP

SCALE IN FEET

12000 0 12000 24000 36000 48000 60000



VICINITY MAP

SCALE IN MILES

10 0 10 20 30 40 50

Brown Cunningham Gannuch

ENGINEERS • ARCHITECTS • CONSULTANTS

2701 KINGMAN ST. METAIRIE, LOUISIANA

MISSISSIPPI RIVER - GULF OUTLET

LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DESIGN REPORT

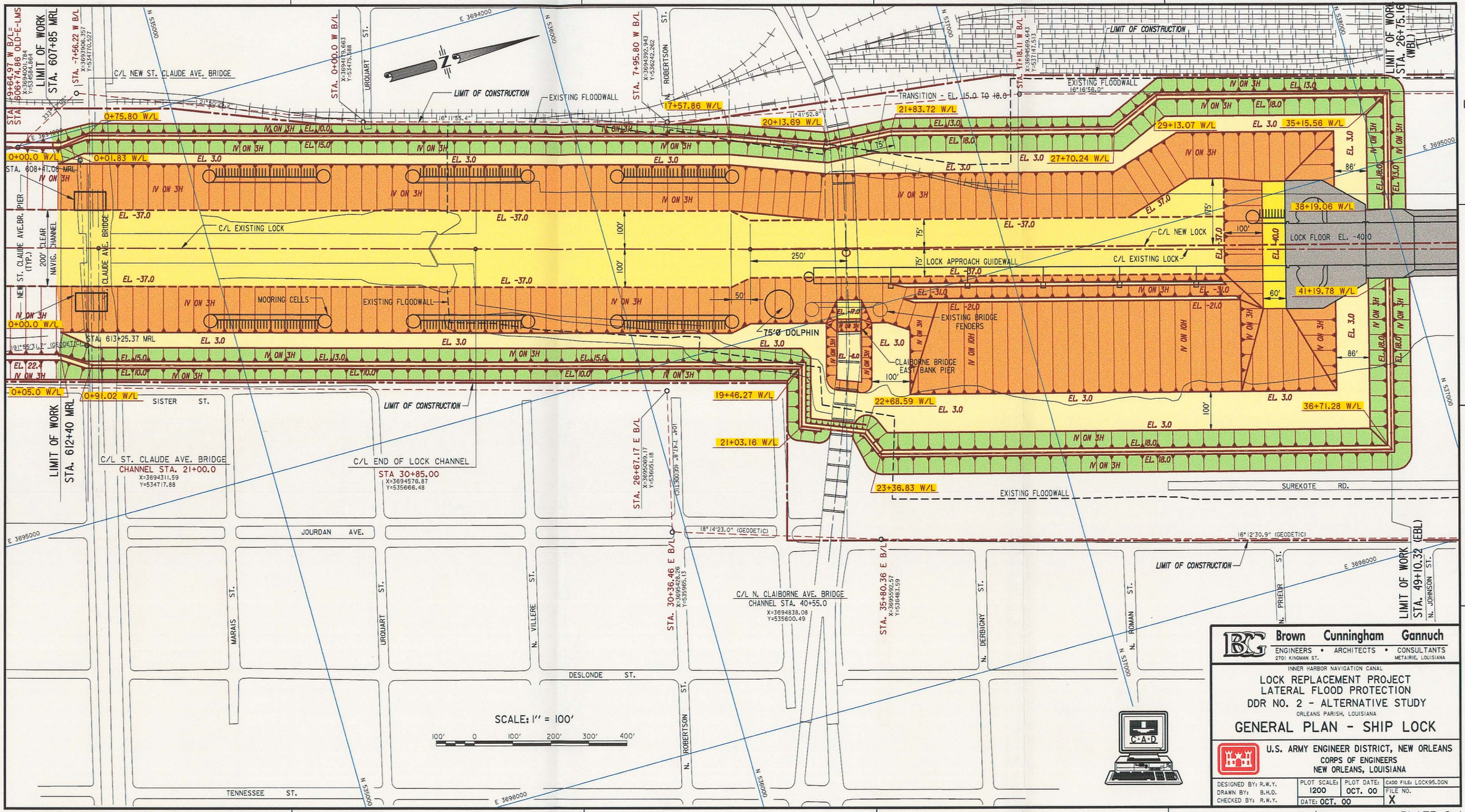
ORLEANS PARISH, LOUISIANA

LOCATION AND VICINITY MAP

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: R.W.Y.	PLOT SCALE: 1	PLOT DATE: OCT 2000	CADD FILE: INDEX.DGN
DRAWN BY: B.H.D.			FILE NO. X
CHECKED BY: R.W.Y.	DATE: OCT 2000		

PLATE I -1



Brown Cunningham Gannuch
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2701 KINGMAN ST. METAIRIE, LOUISIANA

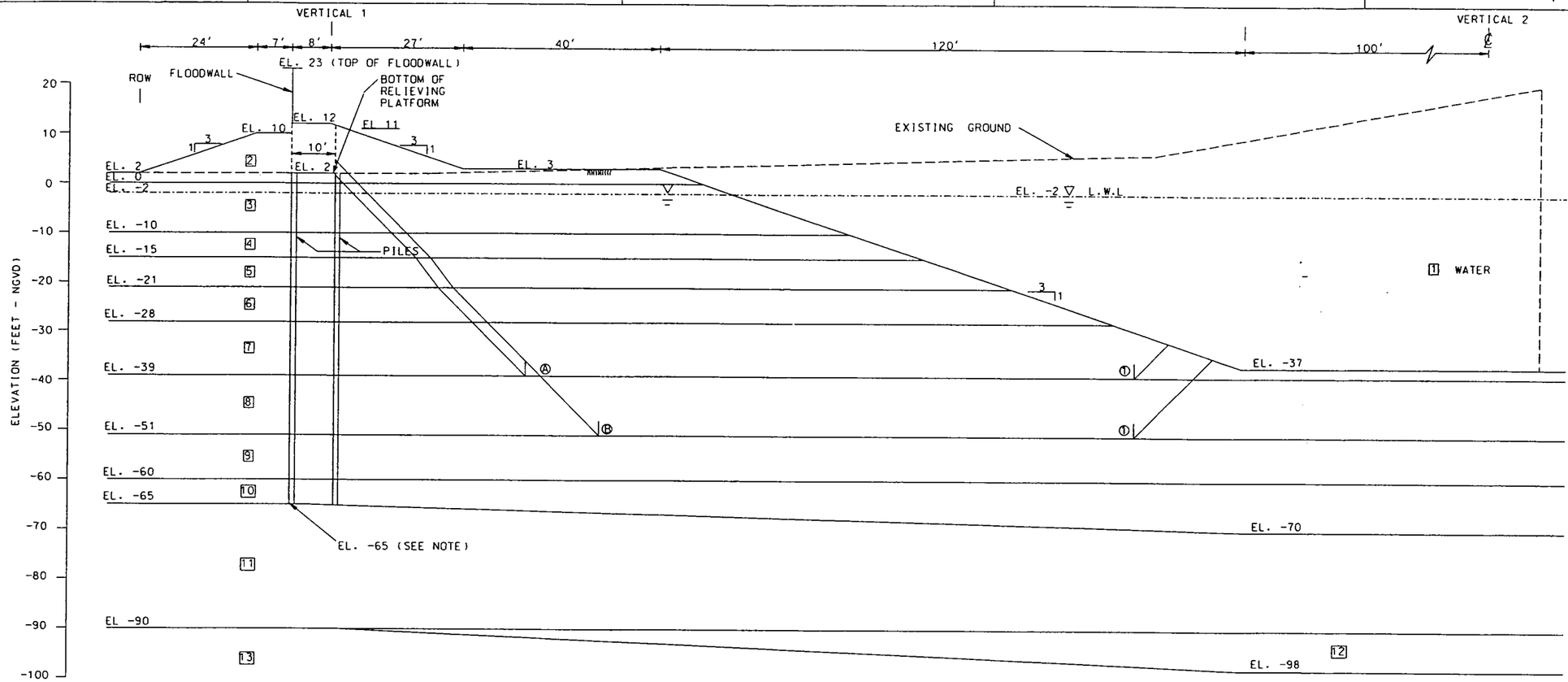
INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 - ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA

GENERAL PLAN - SHIP LOCK

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: R.W.Y.	PLOT SCALE: 1200	PLOT DATE: OCT. 00	CADD FILE: LOCK95.DGN
DRAWN BY: B.H.D.			FILE NO. X
CHECKED BY: R.W.Y.	DATE: OCT. 00		

PLATE S-1



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	104	0	320	320	110	0	300	300
4	94	0	320	320	94	0	320	320
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0
11	118	0	1400	1400	114	0	900	900
12	118	0	1400	1400	115	15	200	200
13	114	0	1400	1400	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	61.137	83.082	1.36
Ⓑ ①	84.216	115.735	1.37

NOTE: PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -65.0.

20' 0' 20'

C·A·D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28TH ST. METAIRIE, LOUISIANA

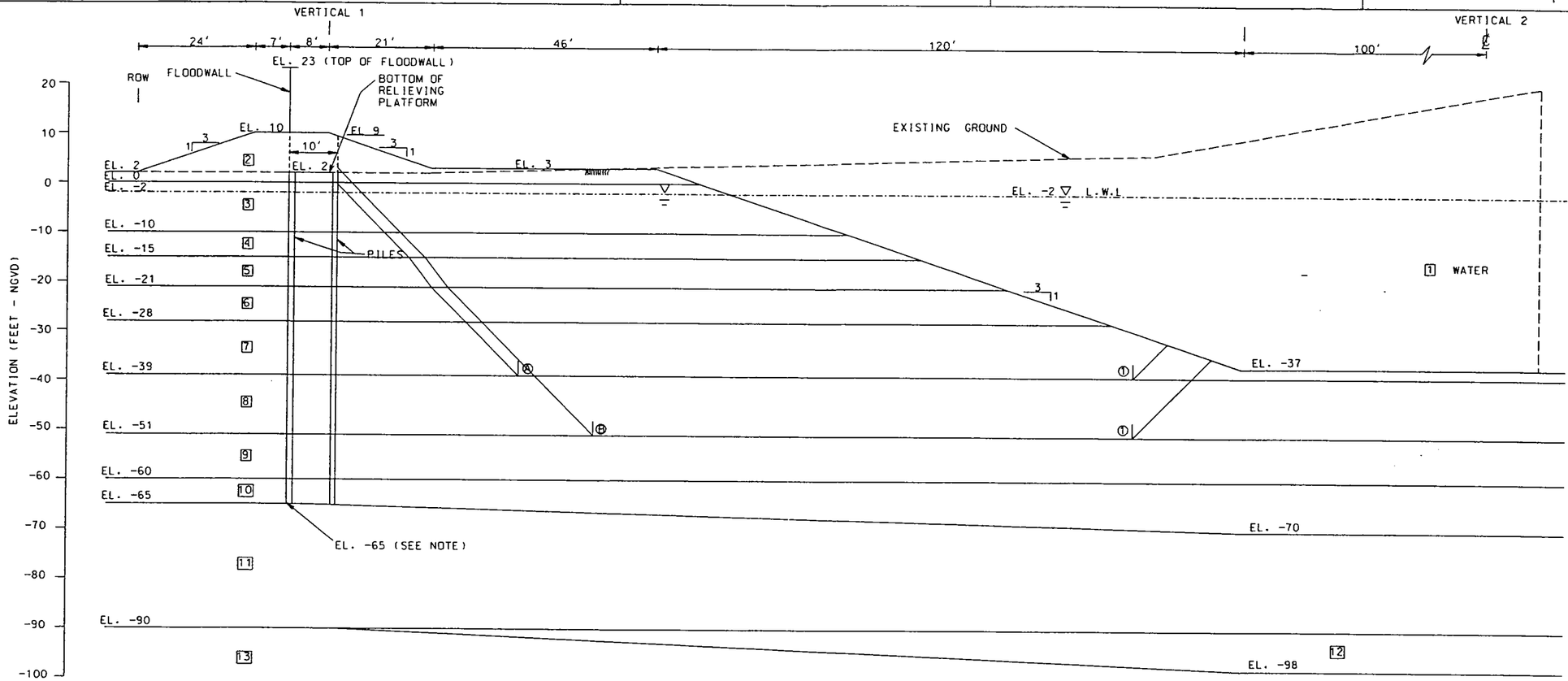
INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS ALT. I (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP	PLOT SCALE:	PLOT DATE:	CADD FILE:
DRAWN BY: DMK			FILE NO.
CHECKED BY: CMP	DATE:		

PLATE S-2 (REVISED)



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	104	0	320	320	110	0	300	300
4	94	0	320	320	94	0	320	320
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0
11	118	0	1400	1400	114	0	900	900
12	118	0	1400	1400	115	15	200	200
13	114	0	1400	1400	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT) DRIVING	SUMMATION OF FORCES (LB/FT) RESISTING	FACTOR OF SAFETY
Ⓐ ①	48.485	68.987	1.42
Ⓑ ①	71.494	103.720	1.45

NOTES: (1) PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -65.0.

(2) T-WALL AND PLATFORM REQUIRED DUE TO NO SOLUTION FOR I-WALL FLOODWALL WITH FILL TO EL. 10.0.

20' 0' 20'

C-A-D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3012 8TH ST. METAIRIE, LOUISIANA

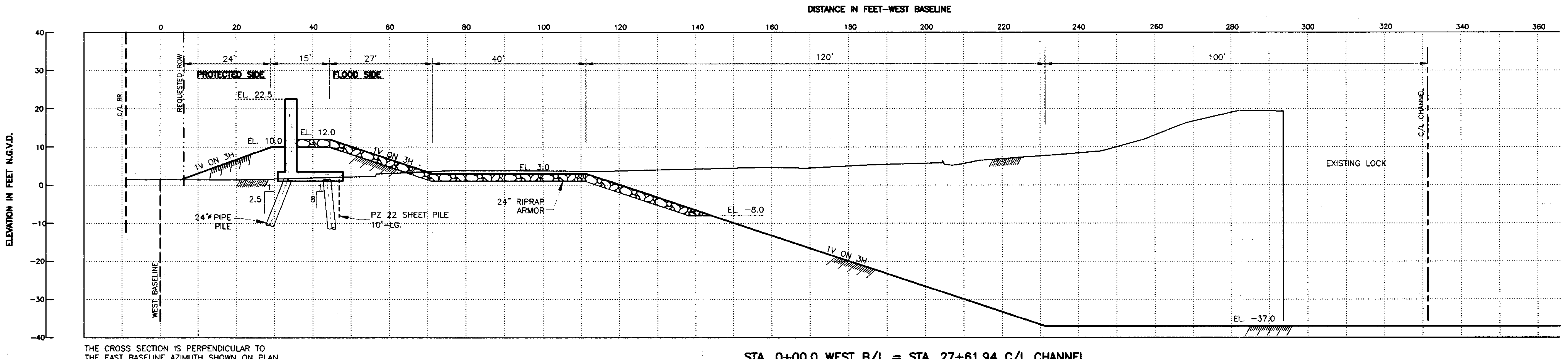
INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS ALT. 2 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

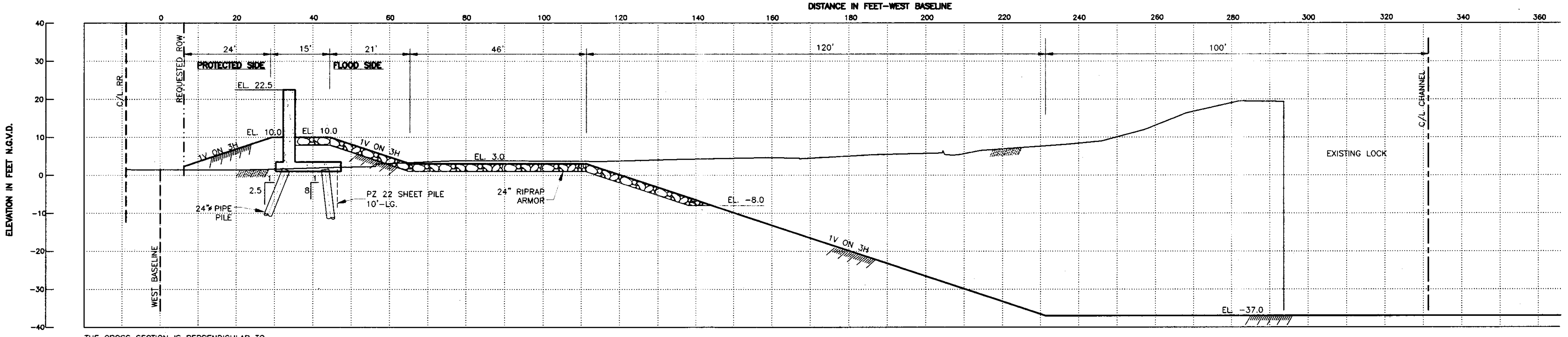
PLATE S-3 (REVISED)



THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL

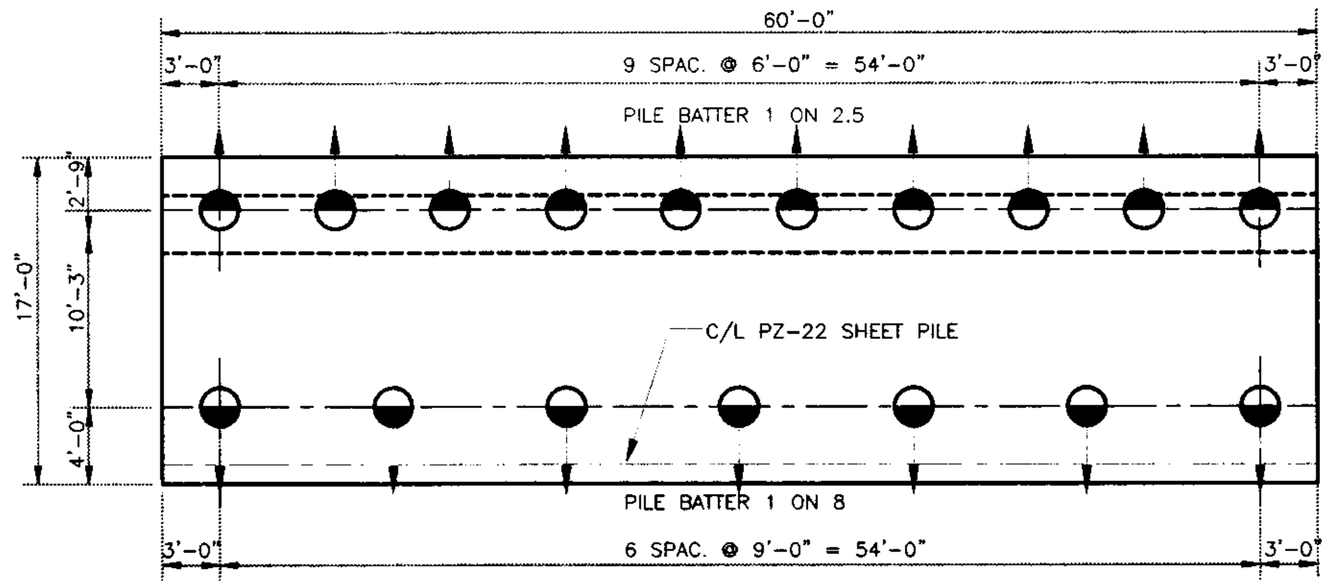
WEST SIDE LEVEE–ALTERNATIVE 1 (ELS. 12.0 AND 10.0)
RECOMMENDED ALTERNATIVE



THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

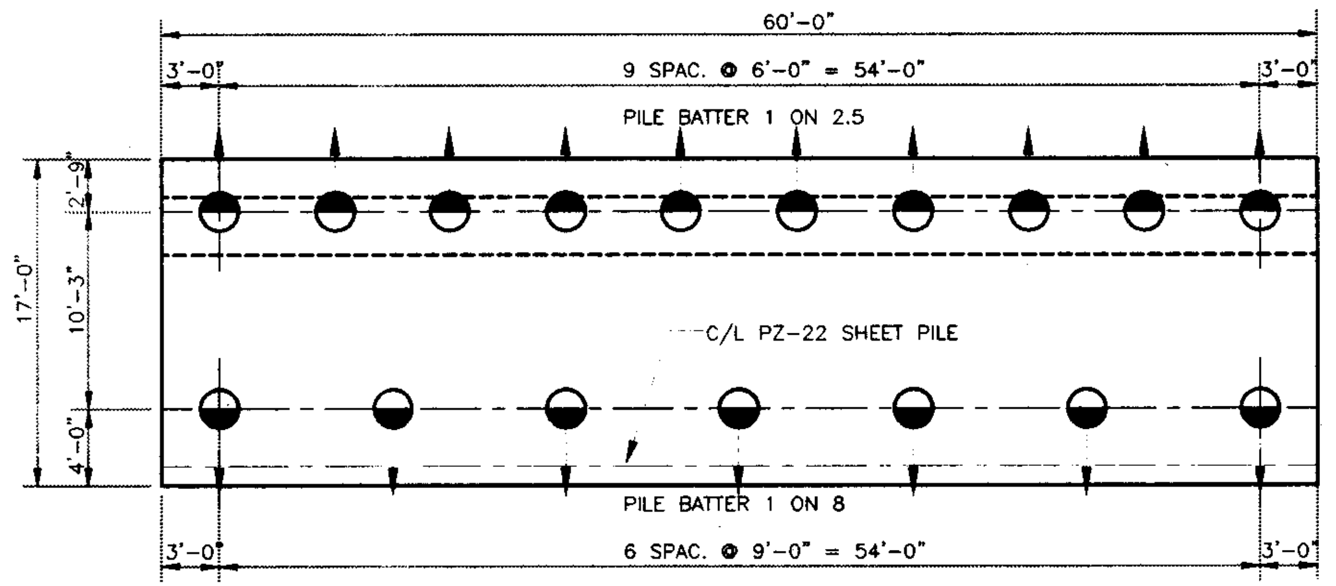
STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL

WEST SIDE LEVEE–ALTERNATE 2 (ELS. 10.0 AND 10.0)



PLAN – 17 PILE T-WALL MONOLITH

ALTERNATIVE 1
SCALE : 1"=5'-0"



PLAN – 17 PILE T-WALL MONOLITH

ALTERNATIVE 2
SCALE : 1"=5'-0"

SCALE: 1'' = 10'

SCALE: 1'' = 5'

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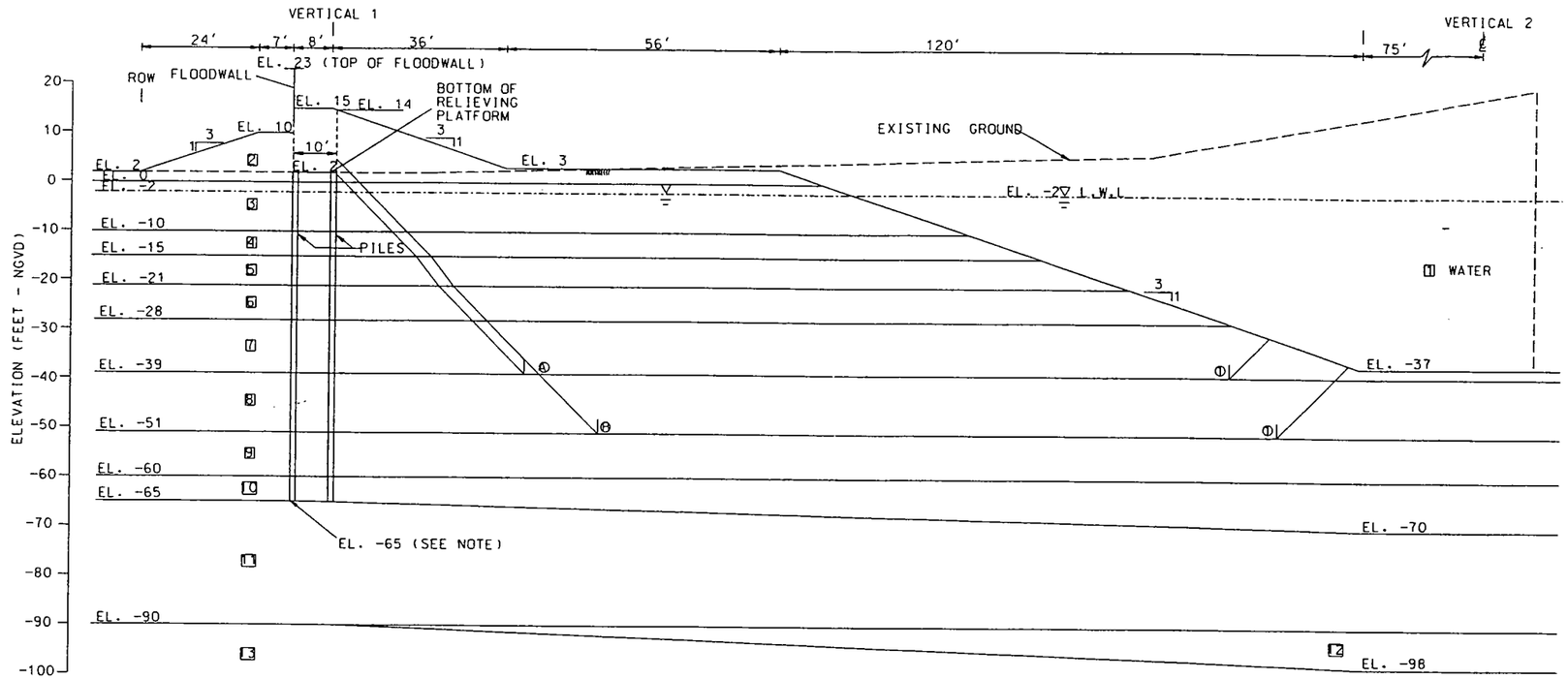
2701 KINGMAN ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 – ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA
SHIP LOCK PLAN–WEST SIDE
ALTERNATIVES 1 AND 2 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY DRAWN BY: JSB CHECKED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	CADD FILE: X FILE NO. X
	DATE: OCT., 2000		



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	104	0	320	320	110	0	300	300
4	94	0	320	320	94	0	320	320
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0
11	118	0	1400	1400	114	0	900	900
12	118	0	1400	1400	115	15	200	200
13	114	0	1400	1400	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	71.115	91.604	1.29
Ⓑ ①	95.816	129.531	1.35

NOTE: PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -65.0.

30' 0' 30'

C·A·D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3041 28TH ST. METAIRIE, LOUISIANA

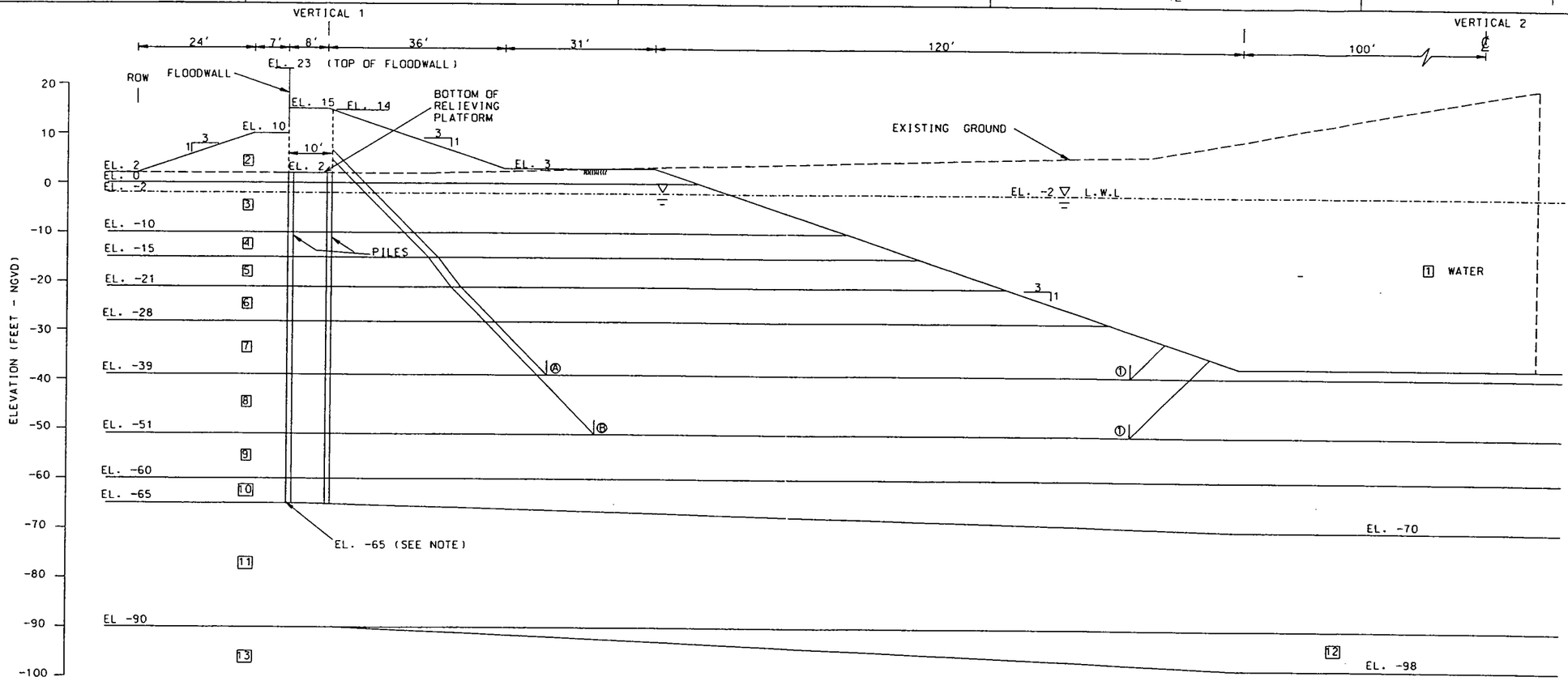
INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS ALT. 3 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP	PLOT SCALE:	PLOT DATE:	CADD FILE:
DRAWN BY: DMK			FILE NO.
CHECKED BY: CMP	DATE:		

PLATE S-5 (REVISED)



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	85	0	500	500	85	0	500	500
3	104	0	320	320	110	0	300	300
4	94	0	320	320	94	0	320	320
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0
11	118	0	1400	1400	114	0	900	900
12	118	0	1400	1400	115	15	200	200
13	114	0	1400	1400	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	63.831	83.228	1.30
Ⓑ ①	86.022	116.099	1.35

NOTE: PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -65.0.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
METAIRIE, LOUISIANA

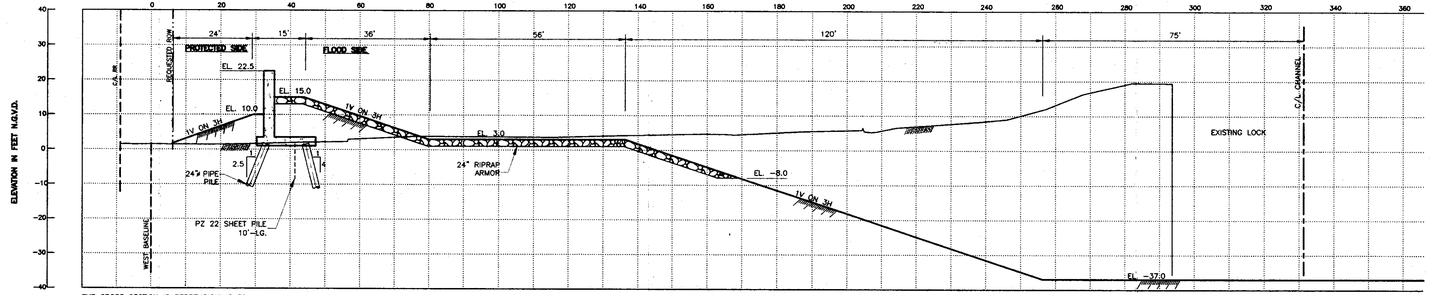
INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS ALT. 4 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

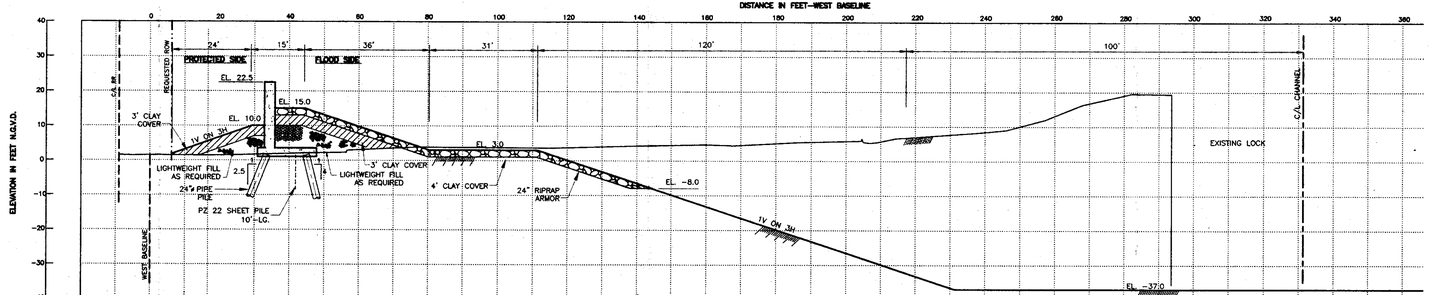
DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

PLATE S-6 (REVISED)



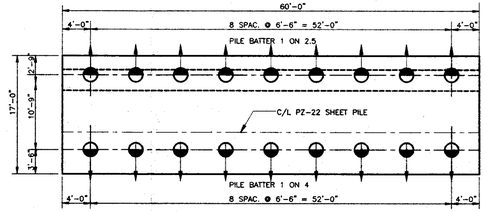
THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL
WEST SIDE LEVEE–ALTERNATIVE 3 (ELS. 15.0 AND 10.0)
REDUCED CHANNEL WIDTH

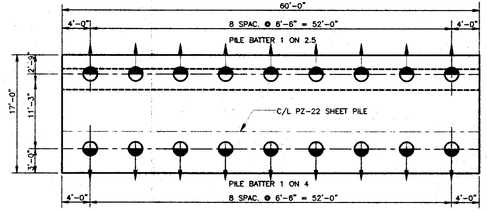


THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL
WEST SIDE LEVEE–ALTERNATIVE 4 (ELS. 15.0 AND 10.0)
LIGHTWEIGHT FILL



PLAN – 18 PILE T-WALL MONOLITH
ALTERNATIVE 3
REDUCED CHANNEL WIDTH
SCALE : 1"=5'-0"



PLAN – 18 PILE T-WALL MONOLITH
ALTERNATIVE 4
LIGHTWEIGHT FILL
SCALE : 1"=5'-0"

SCALE: 1'' = 10'

SCALE: 1'' = 5'

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3201 RANDOLPH ST. MICHIRE, LOUISIANA

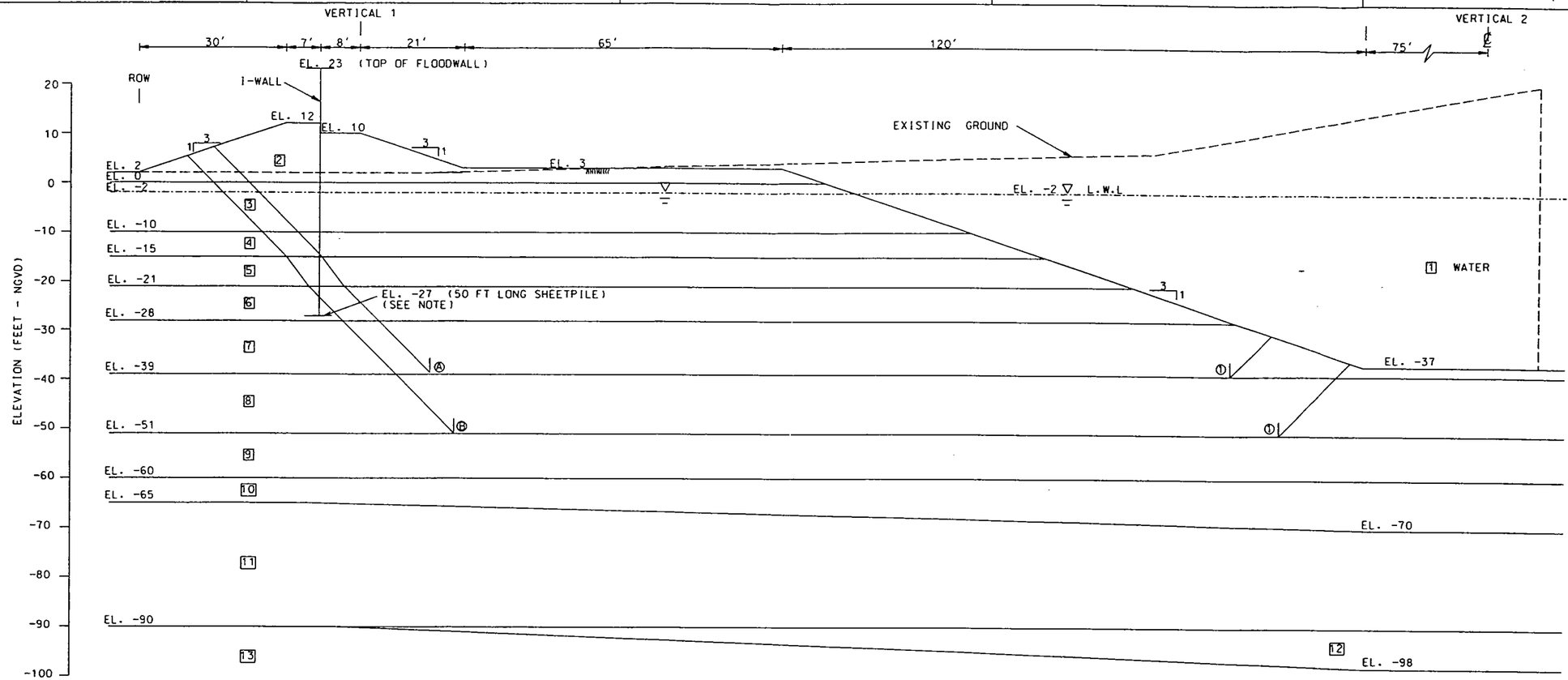
INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2, ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN–WEST SIDE
ALTERNATIVES 3 AND 4 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	CADD FILE X
DRAWN BY: RJB			FILE NO. X
CHECKED BY: RWY	DATE: OCT., 2000		

PLATE S-7



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	104	0	320	320	110	0	300	300
4	94	0	320	320	94	0	320	320
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0
11	118	0	1400	1400	114	0	900	900
12	118	0	1400	1400	115	15	200	200
13	114	0	1400	1400	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	81.594	105.266	1.29
Ⓑ ①	109.739	149.762	1.36

NOTE: SHEETPILE I-WALL GOVERNED BY O-CASE. FS = 1.25 SOIL PARAMETERS WITH WATER TO EL. 22.4 ON THE CANAL SIDE OF THE WALL
MAXIMUM MOMENT = 30.3 FT-KIPS/FT @ EL. 2.1

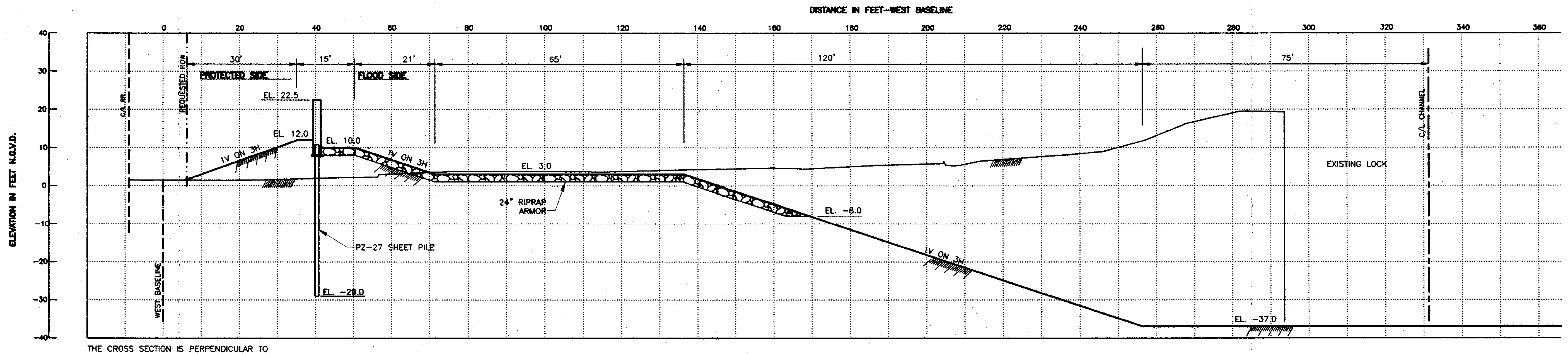
EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3012 18TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA
SHIP LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS ALT. 5 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DNK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

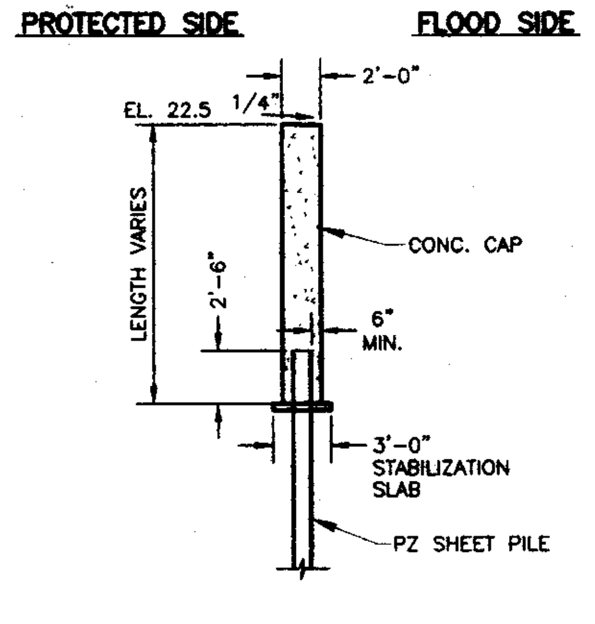
PLATE S-8 (REVISED)



THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL

WEST SIDE LEVEE-ALTERNATIVE 5 (ELS. 10.0 AND 12.0)
I-WALL WITH REDUCED CHANNEL WIDTH



TYPICAL I-WALL DETAIL

SCALE: 1"=5'-0"

SCALE: 1'' = 10'

SCALE: 1'' = 5'

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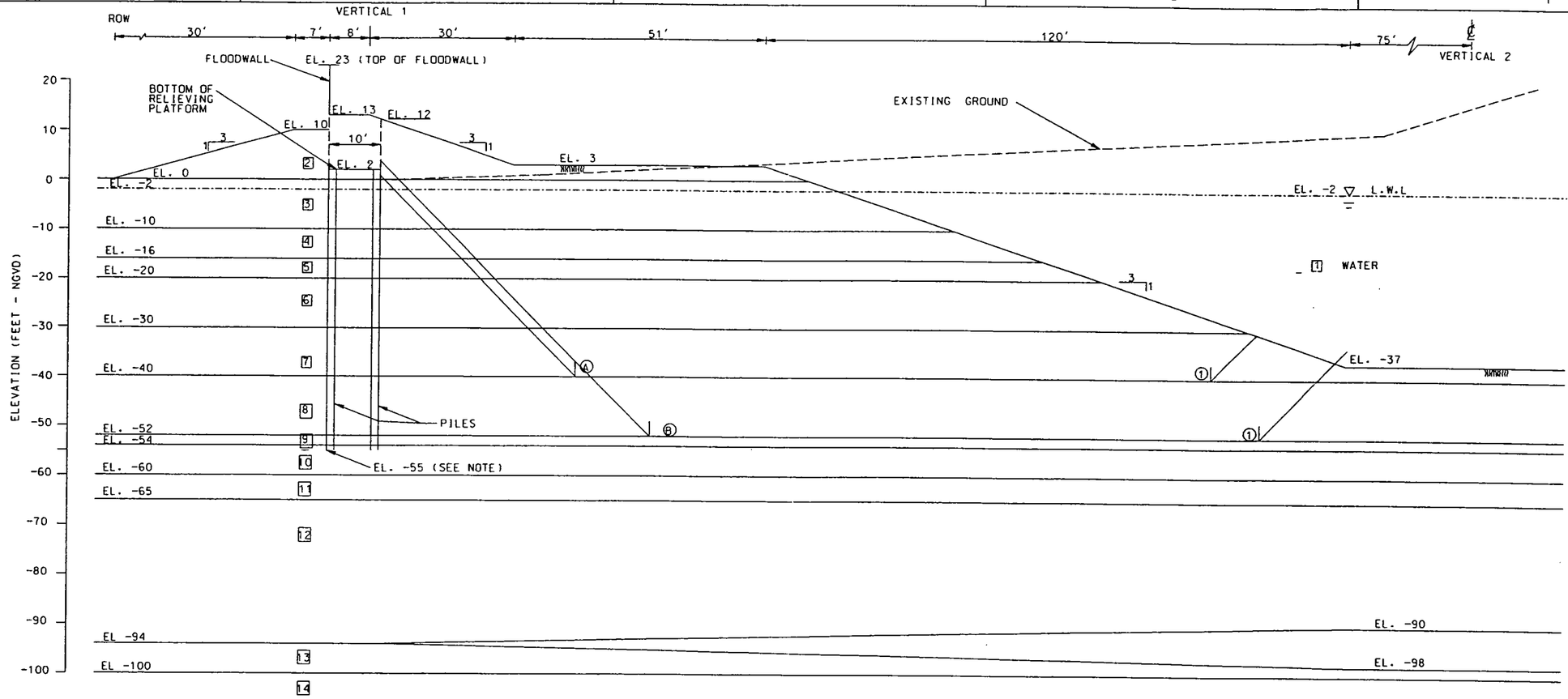
INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 – ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA
SHIP LOCK PLAN–WEST SIDE
ALTERNATIVE 5 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	CADD FILE: X
DRAWN BY: JSB			FILE NO. X
CHECKED BY: RWY	DATE: OCT., 2000		

PLATE S-9



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	102	0	260	260	102	0	260	260
4	98	0	400	400	110	0	300	300
5	115	15	200	200	115	15	200	200
6	104	0	400	400	110	0	300	300
7	98	0	400	400	104	0	300	300
8	104	0	600	600	100	0	420	420
9	120	30	0	0	120	30	0	0
10	109	0	1000	1000	104	0	500	500
11	120	30	0	0	120	30	0	0
12	115	0	1100	1100	114	0	900	900
13	115	15	200	200	115	15	200	200
14	115	0	1100	1100	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT) DRIVING	SUMMATION OF FORCES (LB/FT) RESISTING	FACTOR OF SAFETY
Ⓐ ①	64,203	85,695	1.33
Ⓑ ①	87,782	127,614	1.45

NOTE: PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -55.

20' 0' 20'

C•A•D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3018 28TH ST. METAIRIE, LOUISIANA

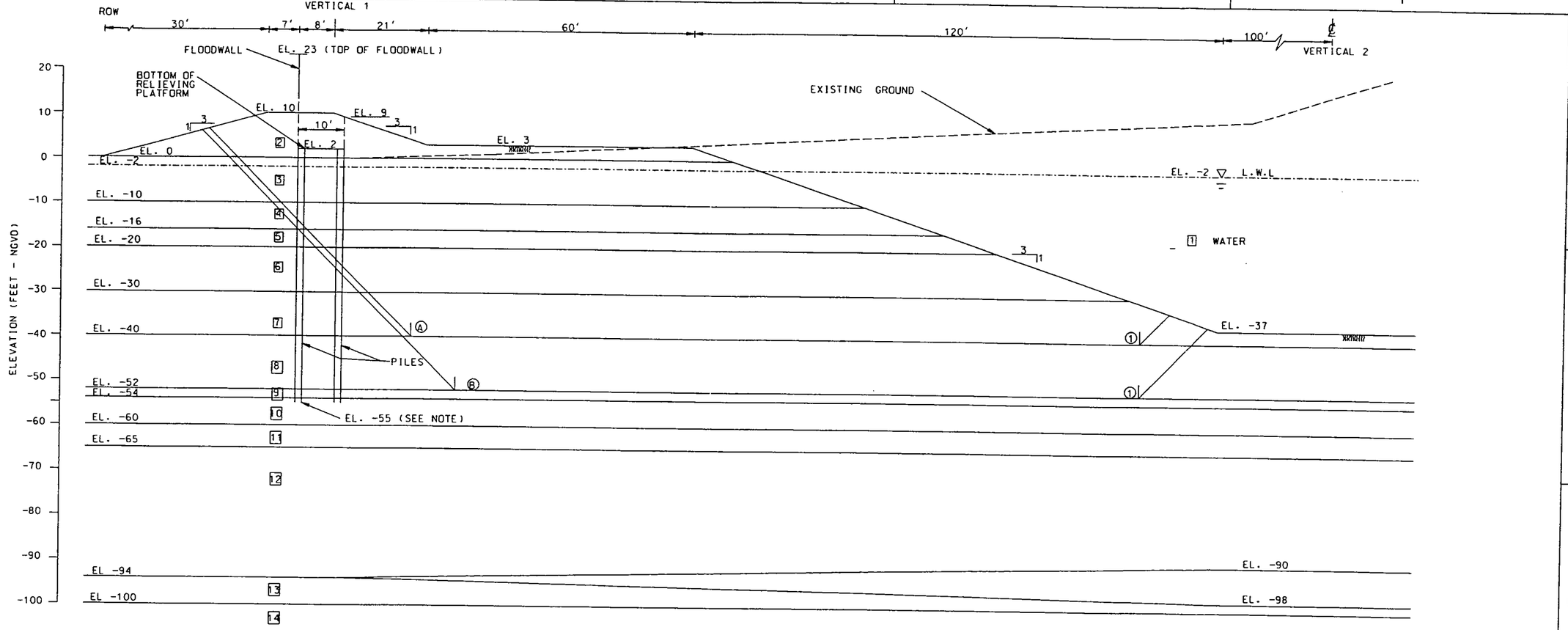
INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-EAST SIDE
SLOPE STABILITY ANALYSIS ALT. I(SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
DATE:
CADD FILE:
FILE NO.

PLATE S-10 (REVISED)



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	102	0	260	260	102	0	260	260
4	98	0	400	400	110	0	300	300
5	115	15	200	200	115	15	200	200
6	104	0	400	400	110	0	300	300
7	98	0	400	400	104	0	300	300
8	104	0	600	600	100	0	420	420
9	120	30	0	0	120	30	0	0
10	109	0	1000	1000	104	0	500	500
11	120	30	0	0	120	30	0	0
12	115	0	1100	1100	114	0	900	900
13	115	15	200	200	115	15	200	200
14	115	0	1100	1100	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	77,794	101,465	1.30
Ⓑ ①	101,120	147,386	1.46

NOTES: (1) PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -55.0.
(2) ANALYSES SHOWN ARE FOR SLOPE WITH NO PLATFORM. T-WALL AND PLATFORM ARE REQUIRED DUE TO NO SOLUTION FOR I-WALL FLOODWALL WITH FILL TO EL. 10.0. PLACEMENT OF PLATFORM WILL GREATLY INCREASE THE FACTORS OF SAFETY AGAINST A SLOPE FAILURE.

20' 0' 20'

C-A-D

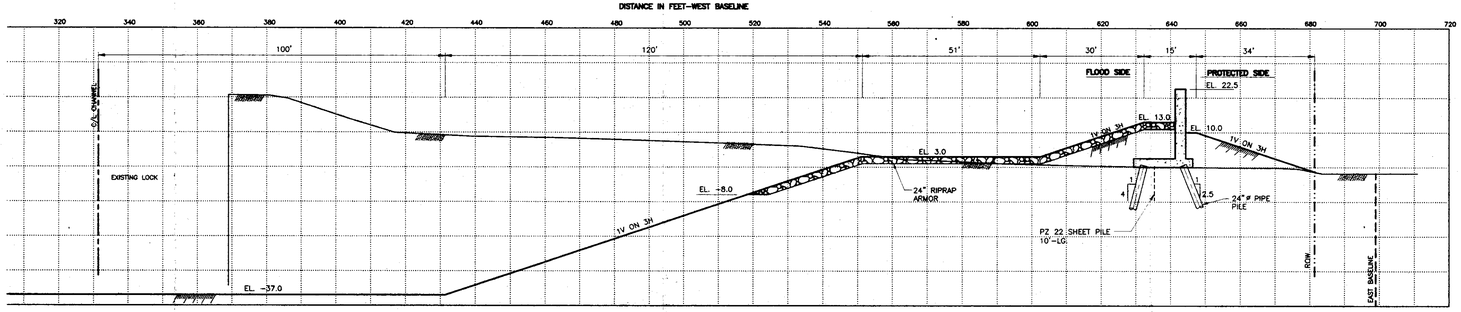
EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3081 28TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA
SHIP LOCK PLAN-EAST SIDE
SLOPE STABILITY ANALYSIS ALT. 2 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

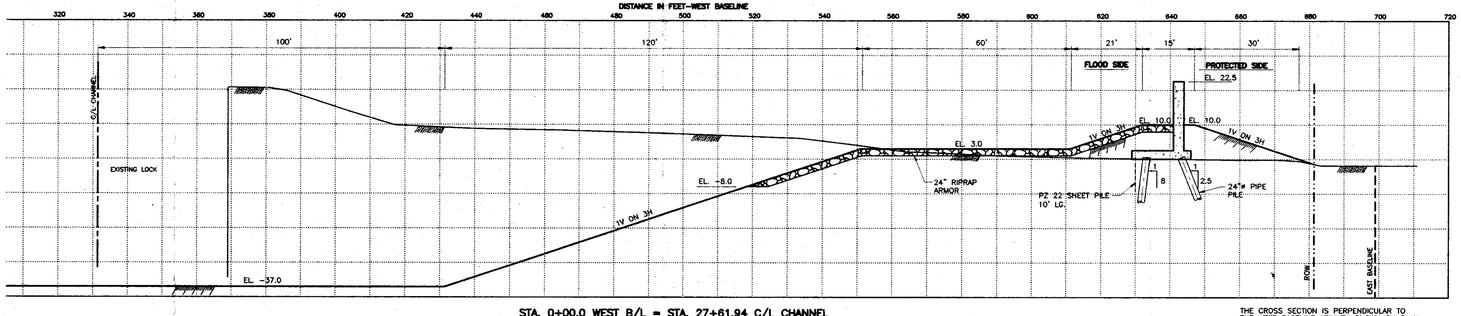
DESIGNED BY: CMP DRAWN BY: DMK CHECKED BY: CMP	PLOT SCALE:	CADD FILE:
	PLOT DATE:	FILE NO.
	DATE:	

PLATE S-11 (REVISED)



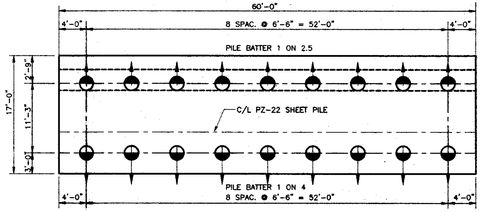
STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL
EAST SIDE LEVEE-ALTERNATIVE 1 (ELS. 13.0 AND 10.0)
RECOMMENDED PLAN

THE CROSS SECTION IS PERPENDICULAR TO THE WEST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

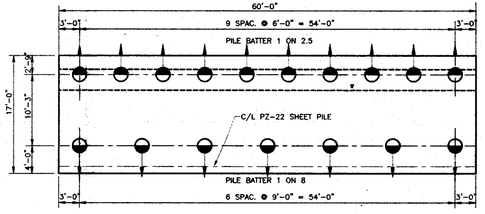


STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL
EAST SIDE LEVEE-ALTERNATIVE 2 (ELS. 10.0 AND 10.0)

THE CROSS SECTION IS PERPENDICULAR TO THE WEST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.



PLAN - 18 PILE T-WALL MONOLITH
ALTERNATIVE 1
SCALE : 1"=5'-0"



PLAN - 17 PILE T-WALL MONOLITH
ALTERNATIVE 2
SCALE : 1"=5'-0"

SCALE: 1" = 10'
10' 0 10' 20' 30' 40'

SCALE: 1" = 5'
5' 0 5' 10' 15'

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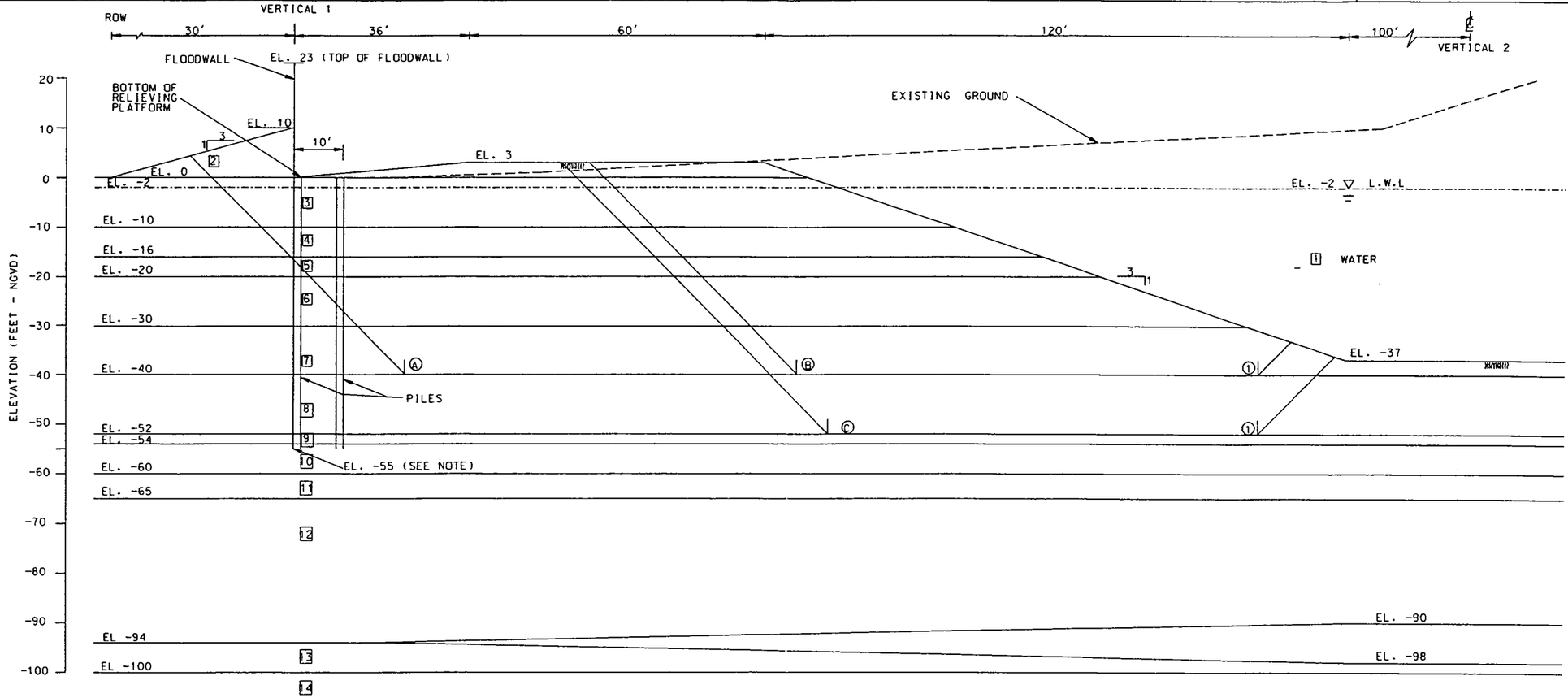
ENGINEERS • ARCHITECTS • CONSULTANTS
2701 RIDGELAKE DR. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 - ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA
SHIP LOCK PLAN-EAST SIDE
ALTERNATIVES 1 AND 2 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: XWY	PLOT SCALE: 10	PLOT DATE: X	CADD FILE: X
DRAWN BY: JSB			FILE NO. X
CHECKED BY: XWY	DATE: OCT, 2000		

PLATE S-12



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	102	0	260	260	102	0	260	260
4	98	0	400	400	110	0	300	300
5	115	15	200	200	115	15	200	200
6	104	0	400	400	110	0	300	300
7	98	0	400	400	104	0	300	300
8	104	0	600	600	100	0	420	420
9	120	30	0	0	120	30	0	0
10	109	0	1000	1000	104	0	500	500
11	120	30	0	0	120	30	0	0
12	115	0	1100	1100	114	0	900	900
13	115	15	200	200	115	15	200	200
14	115	0	1100	1100	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	54.485	100.969	1.85
Ⓑ ①	50.099	69.109	1.38
Ⓒ ①	71.220	104.712	1.47

NOTES: (1) PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -55.0.
(2) T-WALL AND PLATFORM REQUIRED DUE TO NO SOLUTION FOR I-WALL FLOODWALL.

20' 0' 20'

C•A•D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3064 28TH ST. METAIRIE, LOUISIANA

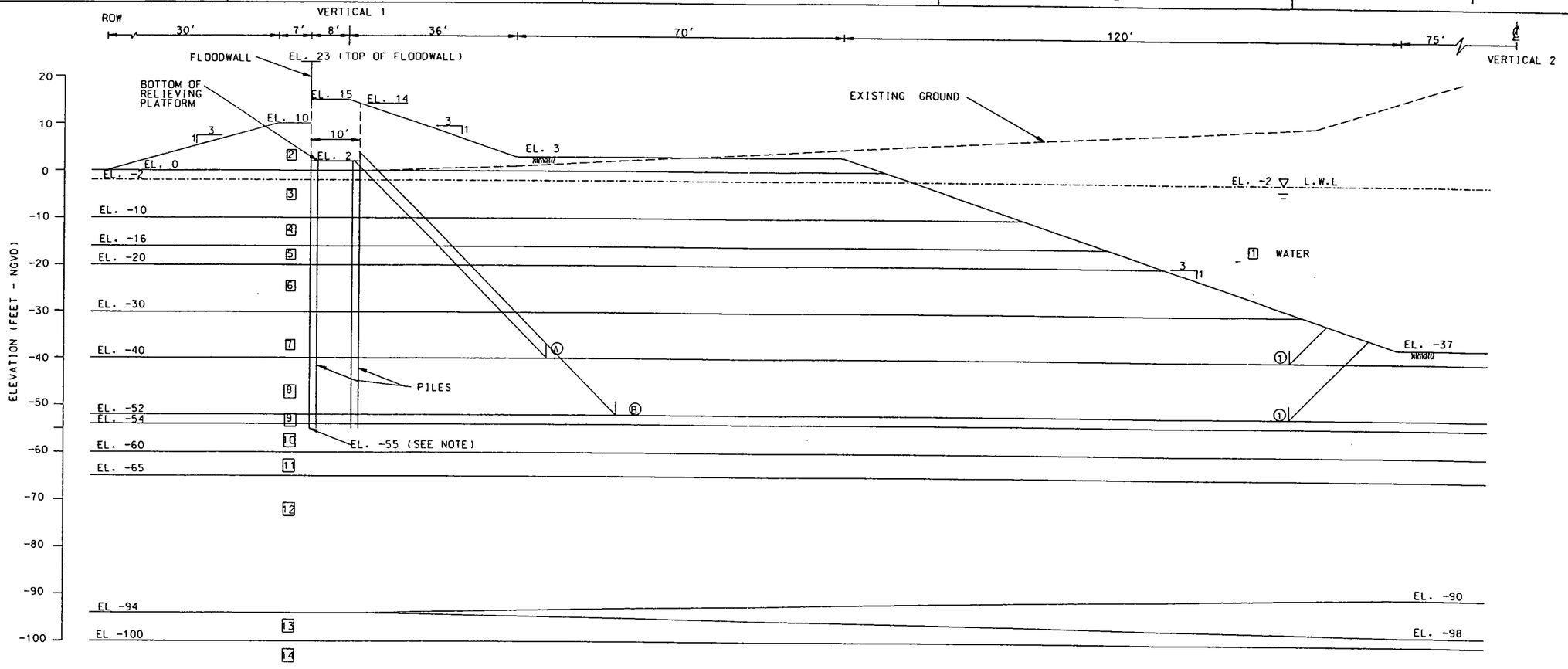
INDUSTRIAL CANAL LOCK REPLACEMENT
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-EAST SIDE
SLOPE STABILITY ANALYSIS ALT. 3 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP	PLOT SCALE:	PLOT DATE:	CADD FILE:
DRAWN BY: DMK			FILE NO.
CHECKED BY: CMP	DATE:		

PLATE S-13 (REVISED)



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	102	0	260	260	102	0	260	260
4	98	0	400	400	110	0	300	300
5	115	15	200	200	115	15	200	200
6	104	0	400	400	110	0	300	300
7	98	0	400	400	104	0	300	300
8	104	0	600	600	100	0	420	420
9	120	30	0	0	120	30	0	0
10	109	0	1000	1000	104	0	500	500
11	120	30	0	0	120	30	0	0
12	115	0	1100	1100	114	0	900	900
13	115	15	200	200	115	15	200	200
14	115	0	1100	1100	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	72.029	95.248	1.32
Ⓑ ①	93.892	138.027	1.47

NOTE: PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -55.0.

20' 0' 20'

C-A-D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3016 26TH ST. METAIRIE, LOUISIANA

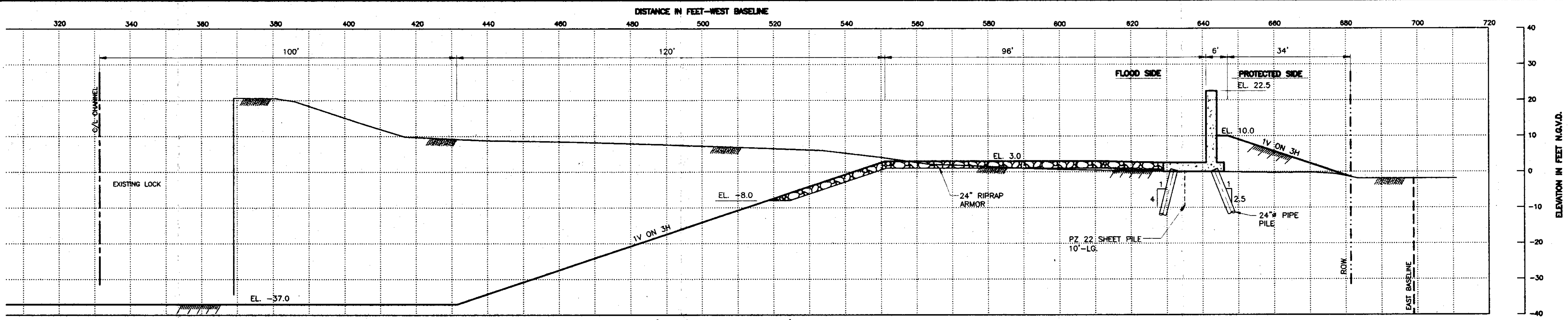
INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-EAST SIDE
SLOPE STABILITY ANALYSIS ALT. 4 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

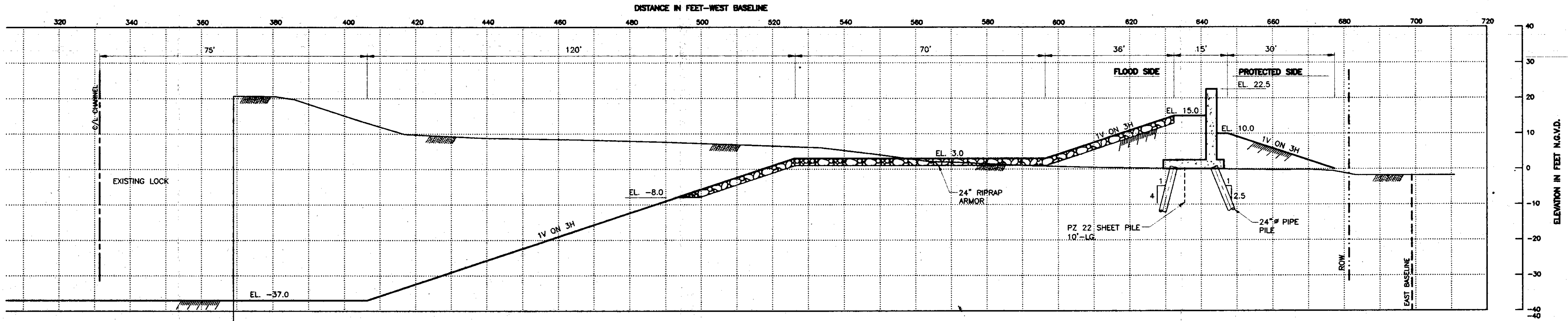
DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

PLATE S-14 (REVISED)



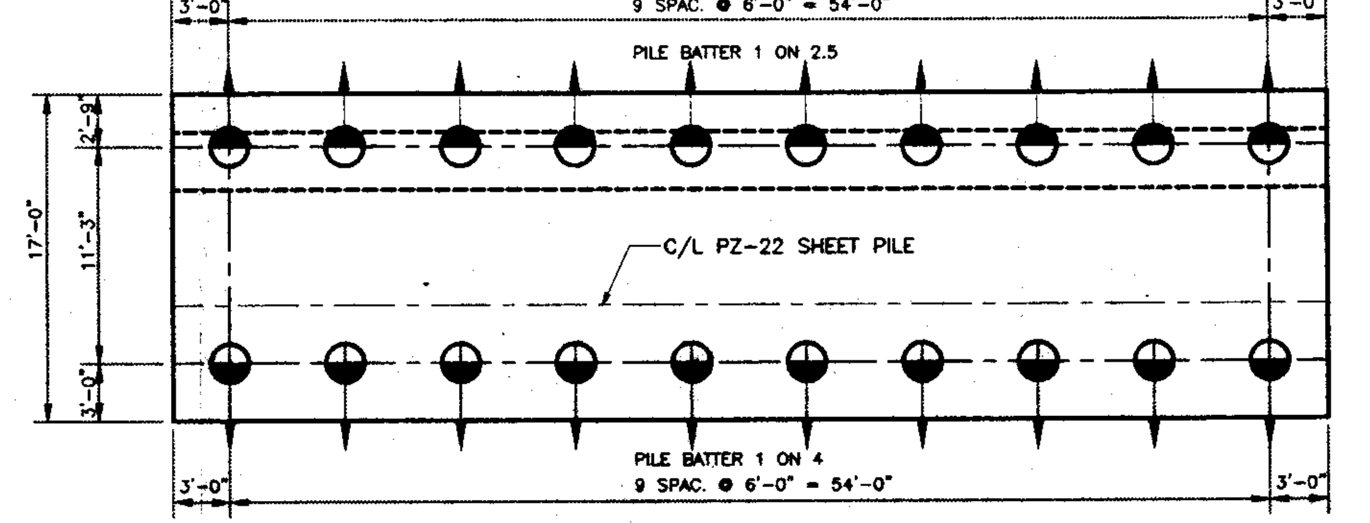
STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL
EAST SIDE LEVEE-ALTERNATIVE 3 (ELS. 3.0 AND 10.0)

THE CROSS SECTION IS PERPENDICULAR TO THE WEST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

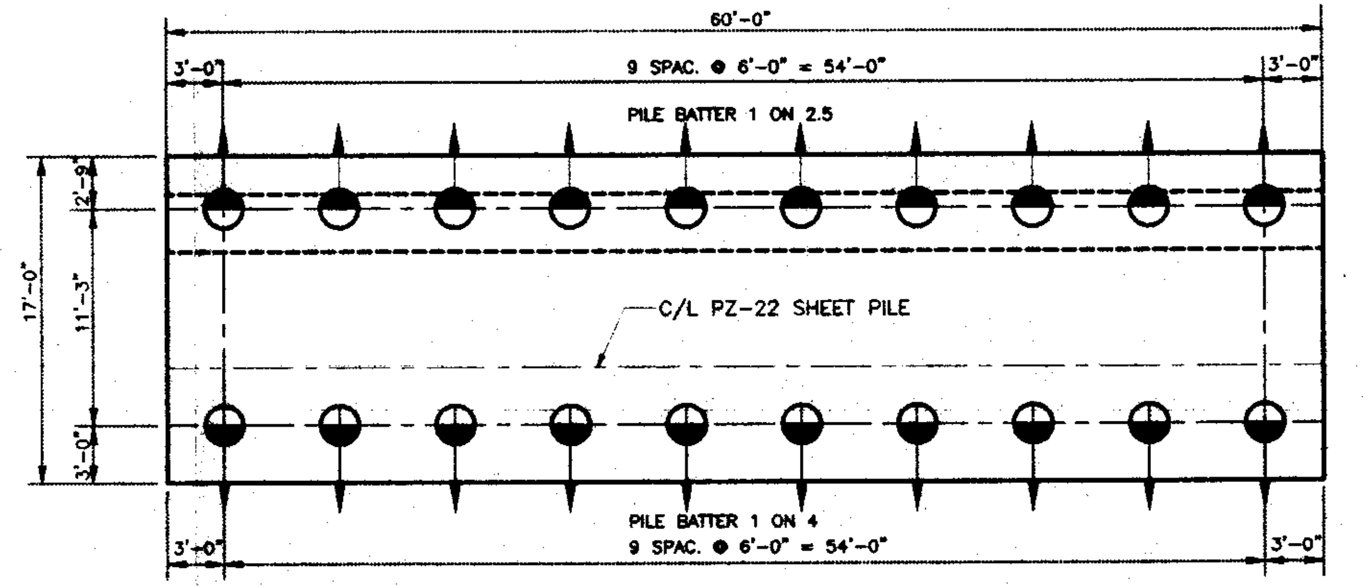


STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL
EAST SIDE LEVEE-ALTERNATIVE 4 (ELS. 15.0 AND 10.0)
REDUCED CHANNEL WIDTH

THE CROSS SECTION IS PERPENDICULAR TO THE WEST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.



PLAN - 20 PILE T-WALL MONOLITH
ALTERNATIVE 3
SCALE : 1"=5'-0"



PLAN - 20 PILE T-WALL MONOLITH
ALTERNATIVE 4
SCALE : 1"=5'-0"

SCALE: 1'' = 10'

SCALE: 1'' = 5'

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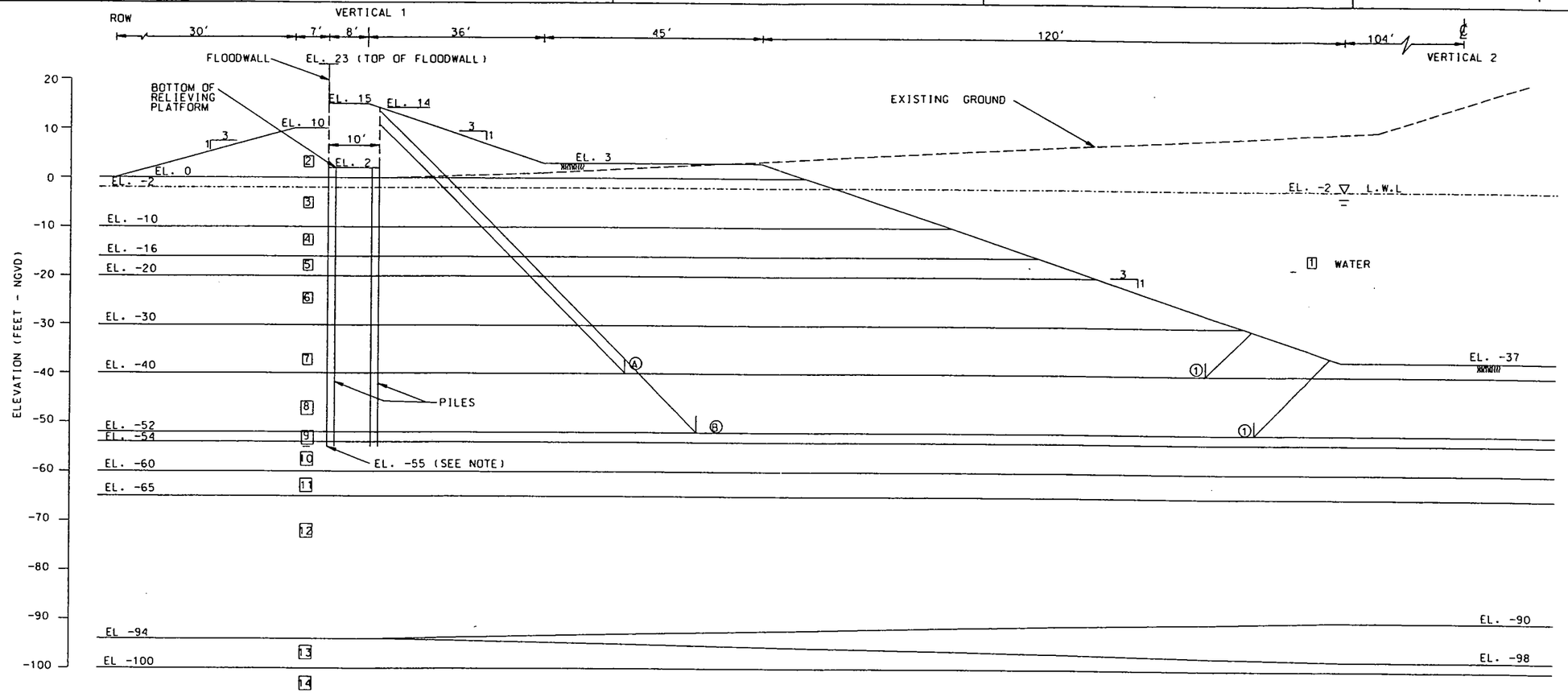
ENGINEERS • ARCHITECTS • CONSULTANTS
2701 KINGMAN ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 - ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-EAST SIDE ALTERNATIVES 3 AND 4 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	CADD FILE: X
DRAWN BY: JSB	DATE: OCT., 2000		FILE NO. X
CHECKED BY: RWY			



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	85	0	500	500	85	0	500	500
3	102	0	260	260	102	0	260	260
4	98	0	400	400	110	0	300	300
5	115	15	200	200	115	15	200	200
6	104	0	400	400	110	0	300	300
7	98	0	400	400	104	0	300	300
8	104	0	600	600	100	0	420	420
9	120	30	0	0	120	30	0	0
10	109	0	1000	1000	104	0	500	500
11	120	30	0	0	120	30	0	0
12	115	0	1100	1100	114	0	900	900
13	115	15	200	200	115	15	200	200
14	115	0	1100	1100	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	62.079	81.662	1.32
Ⓑ ①	84.722	121.674	1.44

NOTE: PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -55.0.

20' 0' 20'

C·A·D

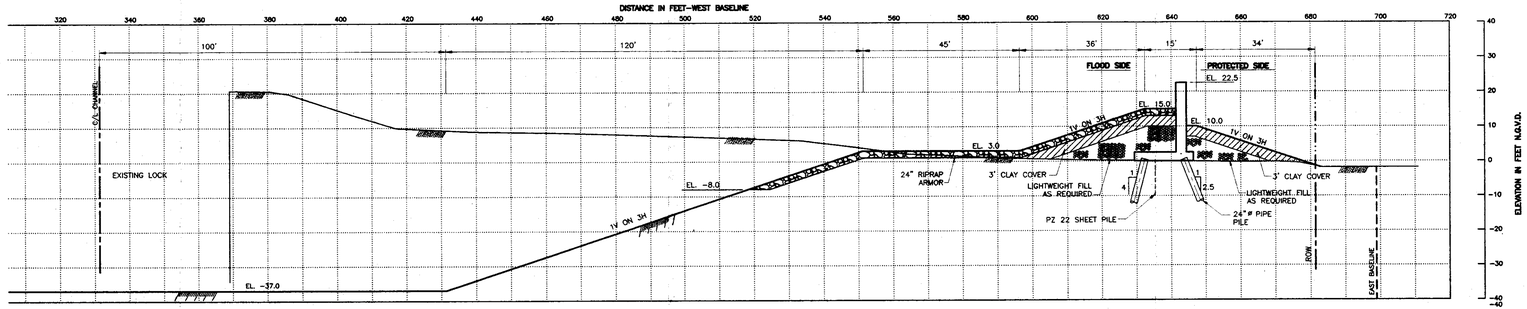
EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3012 8TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA
SHIP LOCK PLAN-EAST SIDE
SLOPE STABILITY ANALYSIS ALT. 5 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

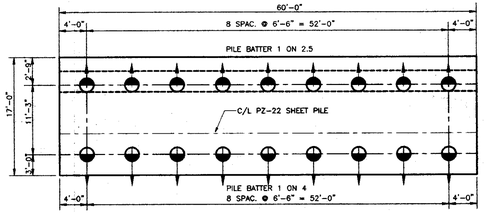
DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

PLATE S-16 (REVISED)

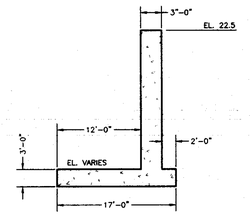


STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL
EAST SIDE LEVEE-ALTERNATIVE 5 (ELS. 15.0 AND 10.0)
LIGHTWEIGHT FILL

THE CROSS SECTION IS PERPENDICULAR TO THE WEST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.



PLAN - 18 PILE T-WALL MONOLITH
ALTERNATIVE 5
SCALE : 1"=5'-0"



TYPICAL T-WALL SECTION
SCALE : 1"=5'-0"

SCALE: 1" = 10'
10' 0 10' 20' 30' 40'

SCALE: 1" = 5'
5' 0 5' 10' 15'

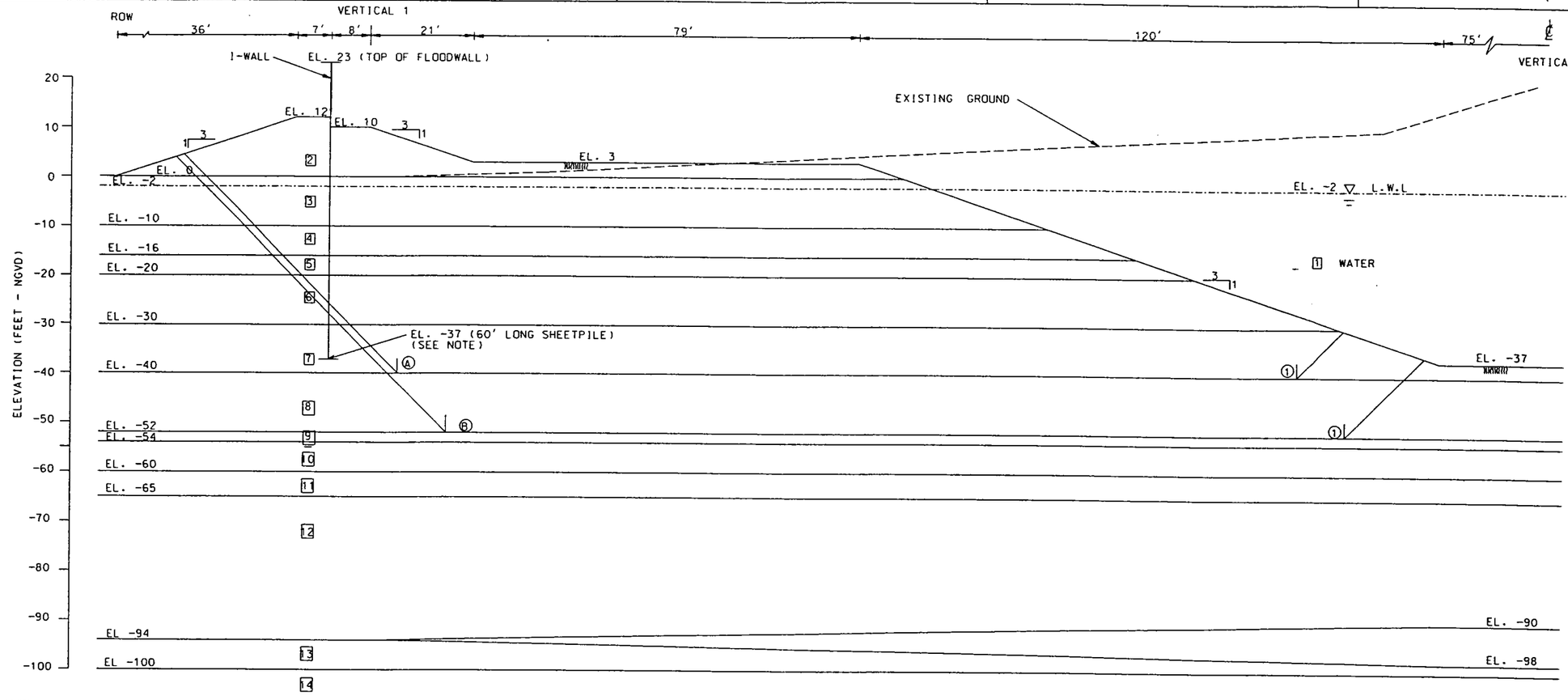
Brown Cunningham Gannuch
ENGINEERS • ARCHITECTS • CONSULTANTS
2701 Metairie Rd. METAIRIE, LOUISIANA

NEW LOCK AND CONNECTING CHANNELS
INDUSTRIAL CANAL LOCK REPLACEMENT
LATERAL FLOOD PROTECTION
DOR NO. 2 - ALTERNATIVE STUDY
CALCASIEU RIVER, LOUISIANA
SHIP LOCK PLAN-EAST SIDE
ALTERNATIVE 5 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	DWG FILE: X
DRAWN BY: JSB			FILE NO. X
CHECKED BY: RWY	DATE: OCT., 2000		

PLATE S-17



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	85	0	500	500	85	0	500	500
3	102	0	260	260	102	0	260	260
4	98	0	400	400	110	0	300	300
5	115	15	200	200	115	15	200	200
6	104	0	400	400	110	0	300	300
7	98	0	400	400	104	0	300	300
8	104	0	600	600	100	0	420	420
9	120	30	0	0	120	30	0	0
10	109	0	1000	1000	104	0	500	500
11	120	30	0	0	120	30	0	0
12	115	0	1100	1100	114	0	900	900
13	115	15	200	200	115	15	200	200
14	115	0	1100	1100	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	83.175	109.201	1.31
Ⓑ ①	109.360	161.014	1.42

NOTE: SHEETPILE I-WALL GOVERNED BY O-CASE. FS = 1.25 SOIL PARAMETERS WITH WATER TO EL. 22.4 ON THE CANAL SIDE OF THE WALL.
MAXIMUM MOMENT = 37.8 FT-KIPS/FT @ EL. -17.4

20' 0' 20'

C·A·D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3012 19TH ST. METAIRIE, LOUISIANA

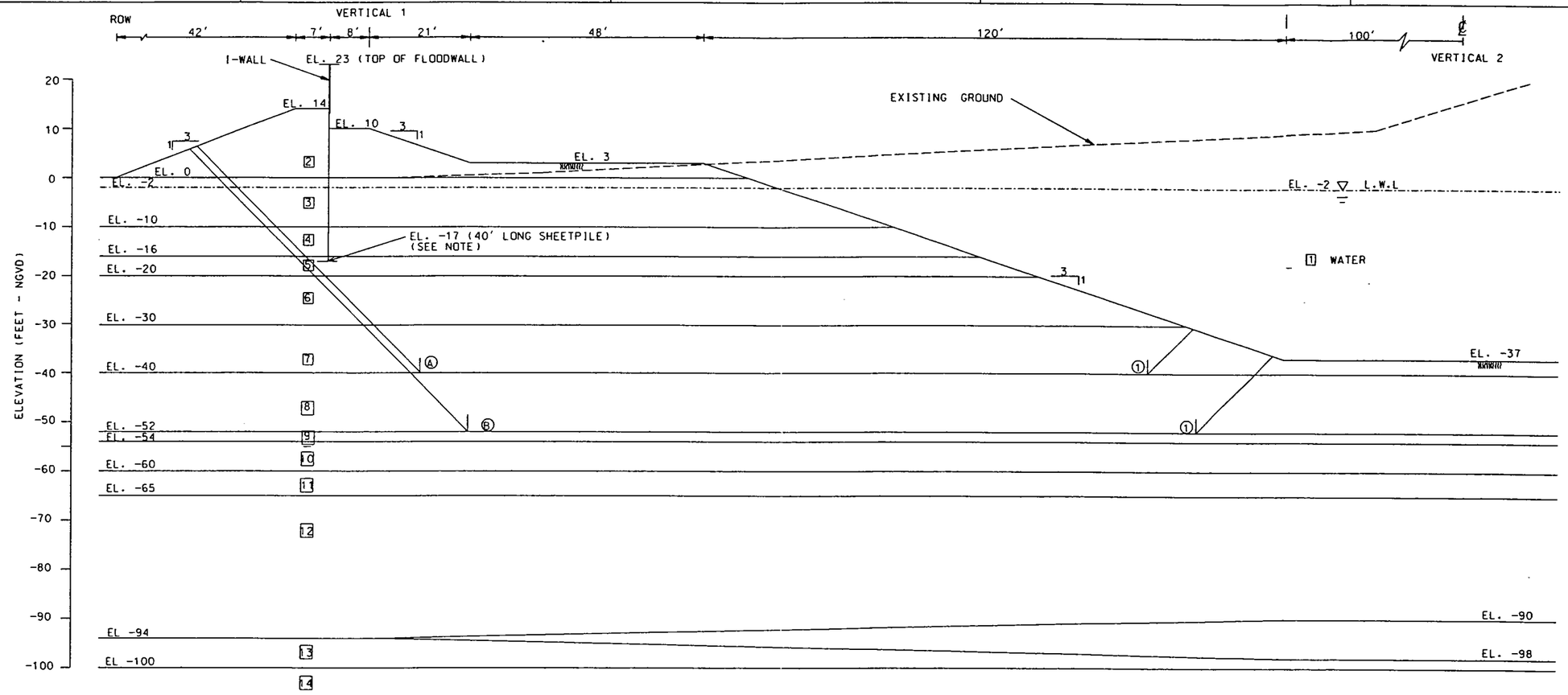
INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-EAST SIDE
SLOPE STABILITY ANALYSIS ALT. 6 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP	PLOT SCALE:	PLOT DATE:	CADD FILE:
DRAWN BY: DMK			FILE NO.
CHECKED BY: CMP	DATE:		

PLATE S-18 (REVISED)



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	85	0	500	500	85	0	500	500
3	102	0	260	260	102	0	260	260
4	98	0	400	400	110	0	300	300
5	115	15	200	200	115	15	200	200
6	104	0	400	400	110	0	300	300
7	98	0	400	400	104	0	300	300
8	104	0	600	600	100	0	420	420
9	120	30	0	0	120	30	0	0
10	109	0	1000	1000	104	0	500	500
11	120	30	0	0	120	30	0	0
12	115	0	1100	1100	114	0	900	900
13	115	15	200	200	115	15	200	200
14	115	0	1100	1100	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT) DRIVING	SUMMATION OF FORCES (LB/FT) RESISTING	FACTOR OF SAFETY
Ⓐ ①	74.770	99.085	1.33
Ⓑ ①	99.444	145.643	1.46

NOTE: SHEETPILE I-WALL GOVERNED BY S-CASE. FS = 1.0 SOIL PARAMETERS WITH WATER TO EL 22.4 ON THE CANAL SIDE OF THE WALL.
MAXIMUM MOMENT = 38.9 FT-KIPS/FT @ EL 0.0.

20' 0' 20'

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 19TH ST. METAIRIE, LOUISIANA

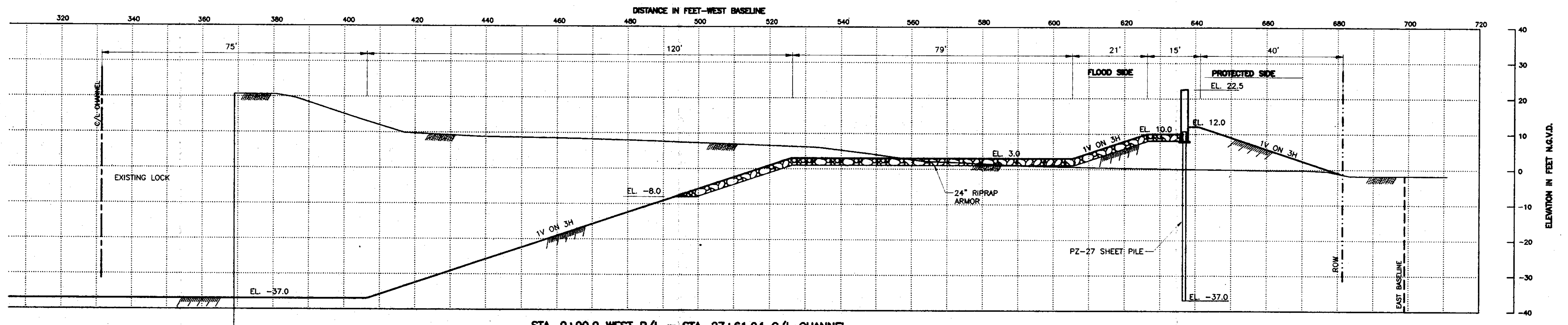
INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-EAST SIDE
SLOPE STABILITY ANALYSIS ALT. 7 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

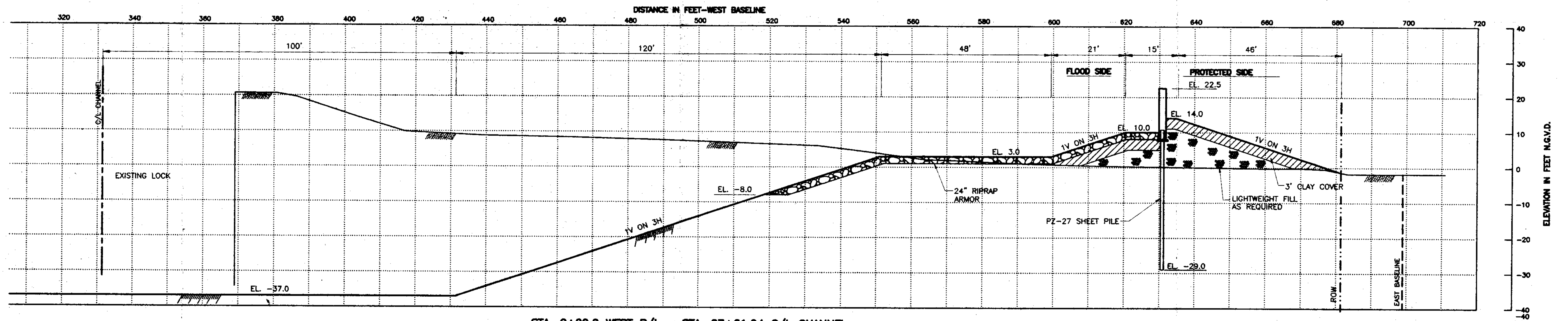
DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

PLATE S-19 (REVISED)



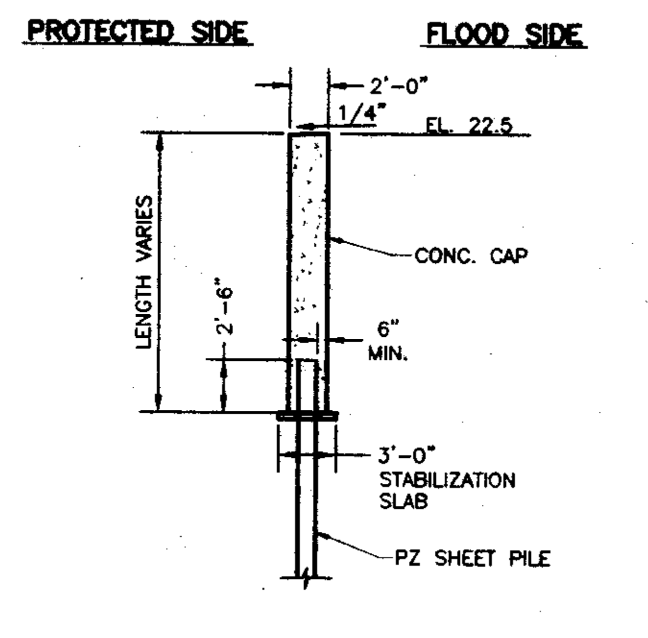
STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL
EAST SIDE LEVEE–ALTERNATIVE 6 (ELS. 10.0 AND 12.0)
REDUCED CHANNEL WIDTH

THE CROSS SECTION IS PERPENDICULAR TO THE WEST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.



STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL
EAST SIDE LEVEE–ALTERNATIVE 7 (ELS. 10.0 AND 14.0)
LIGHTWEIGHT FILL

THE CROSS SECTION IS PERPENDICULAR TO THE WEST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.



TYPICAL I-WALL DETAIL

SCALE: 1'' = 10'
10' 0 10' 20' 30' 40'

SCALE: 1'' = 5'
5' 0 5' 10' 15'

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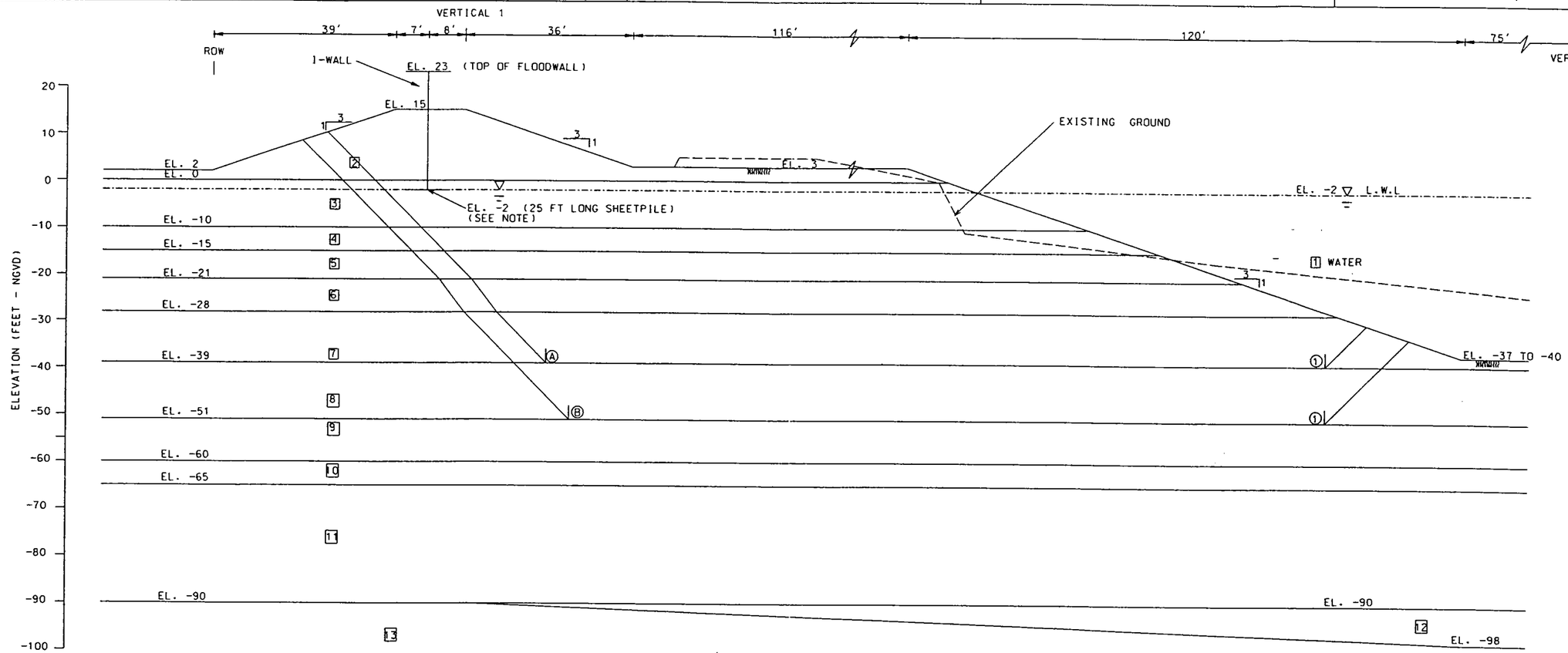
INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 – ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA
SHIP LOCK PLAN–EAST SIDE
ALTERNATIVES 6 AND 7 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	DWG FILE: X
DRAWN BY: JDB	DATE: OCT., 2000		FILE NO. X
CHECKED BY: RWY			

PLATE S-20



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	104	0	320	320	110	0	260	260
4	94	0	320	320	94	0	300	300
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	30	0	0
10	120	30	0	0	120	0	500	500
11	118	0	1400	1400	114	30	0	0
12	118	0	1400	1400	115	0	900	900
13	118	0	1400	1400	114	15	200	200

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	103.010	131.837	1.28
Ⓑ ①	133.133	180.946	1.36

NOTE: SHEETPILE I-WALL GOVERNED BY Q-CASE. FS = 1.25 SOIL PARAMETERS WITH WATER TO EL. 22.4 ON THE CANAL SIDE OF THE WALL.
MAXIMUM MOMENT = 18.2 FT-KIPS/FT @ EL. 6.6

20' 0' 20'

C·A·D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3028TH ST. METAIRIE, LOUISIANA

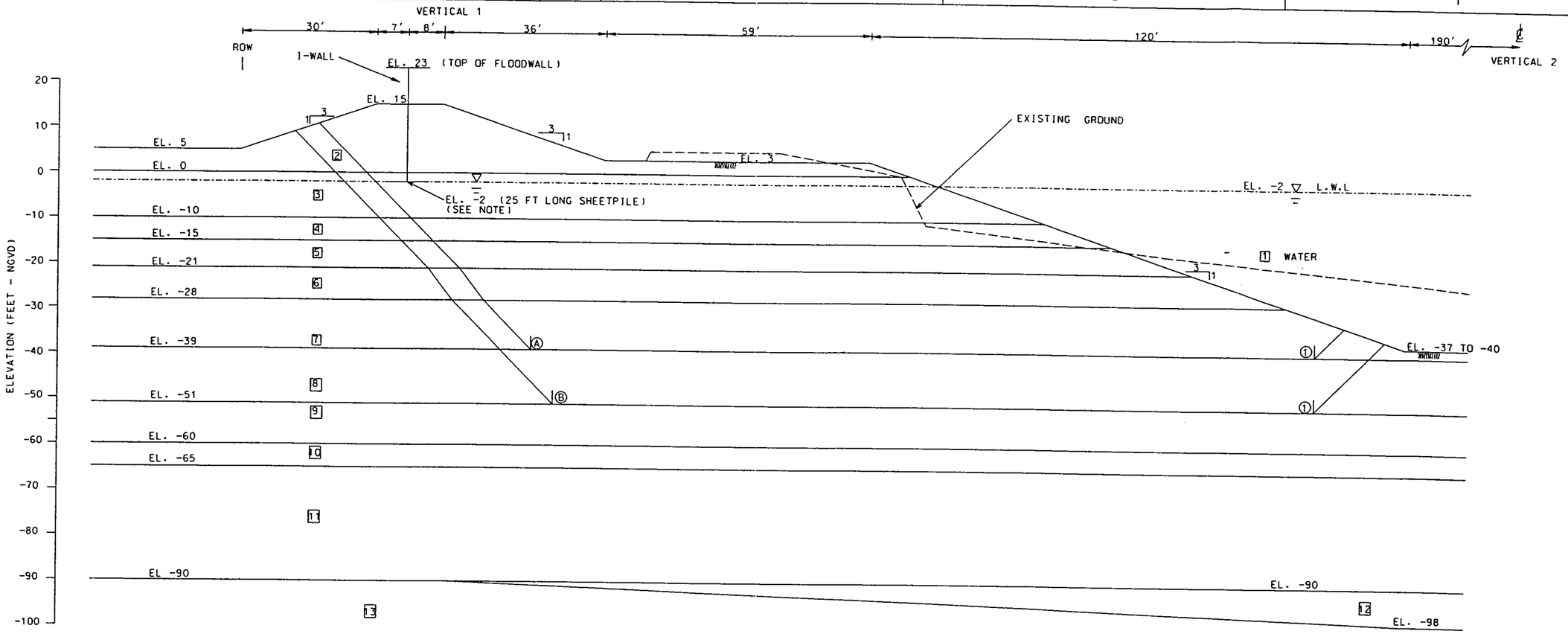
INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS ALT. I (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP	PLOT SCALE:	PLOT DATE:	CADD FILE:
DRAWN BY: DMK			FILE NO.
CHECKED BY: CMP	DATE:		

PLATE S-21 (REVISED)



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	85	0	500	500	85	0	500	500
3	104	0	320	320	110	0	260	260
4	94	0	320	320	94	0	300	300
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	30	0	0
10	120	30	0	0	120	0	500	500
11	118	0	1400	1400	114	30	0	0
12	118	0	1400	1400	115	0	900	900
13	118	0	1400	1400	114	15	200	200

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	85.763	114.062	1.33
Ⓑ ①	113.787	157.663	1.39

NOTE: SHEETPILE I-WALL GOVERNED BY Q-CASE. FS = 1.25 SOIL PARAMETERS WITH WATER TO EL. 22.4 ON THE CANAL SIDE OF THE WALL.
MAXIMUM MOMENT = 8.1 FT-KIPS/FT @ EL. 10.6

20' 0' 20'

C·A·D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3012TH ST. METAIRIE, LOUISIANA

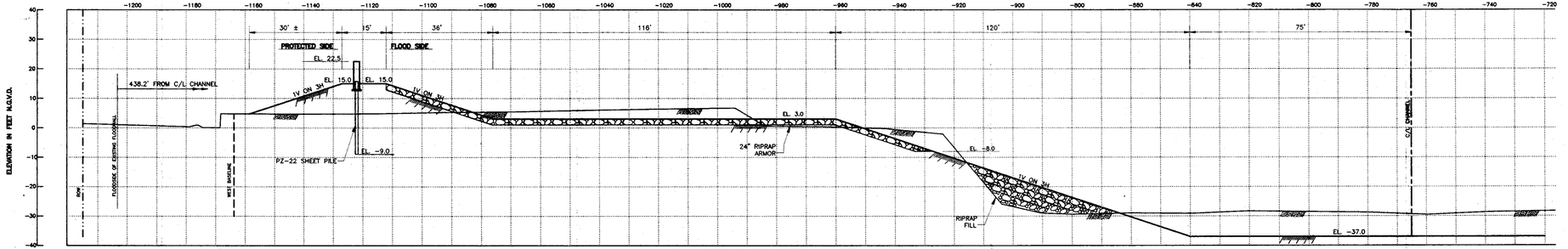
INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS ALT. I (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

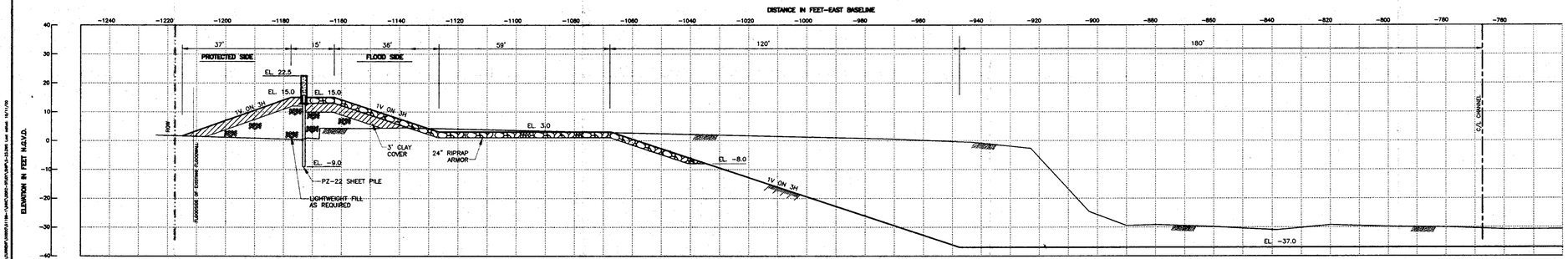
DESIGNED BY: CMP	PLOT SCALE:	PLOT DATE:	CADD FILE:
DRAWN BY: DMK			FILE NO.
CHECKED BY: CMP	DATE:		

PLATE S-22 (REVISED)



THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

STA. 18+00.0 WEST B/L = STA. 46+00.30 C/L CHANNEL
WEST SIDE LEVEE-ALTERNATIVE 1 (ELS. 15.0 AND 15.0)
RECOMMENDED PLAN - (I-WALL)



THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

STA. 22+00.0 WEST B/L = STA. 50+00.40 C/L CHANNEL
WEST SIDE LEVEE-ALTERNATIVE 1 (ELS. 15.0 AND 15.0)
RECOMMENDED PLAN - (I-WALL WITH LIGHTWEIGHT FILL)

SCALE: 1'' = 10'

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2701 DRUMMS RD.
METAIRIE, LOUISIANA

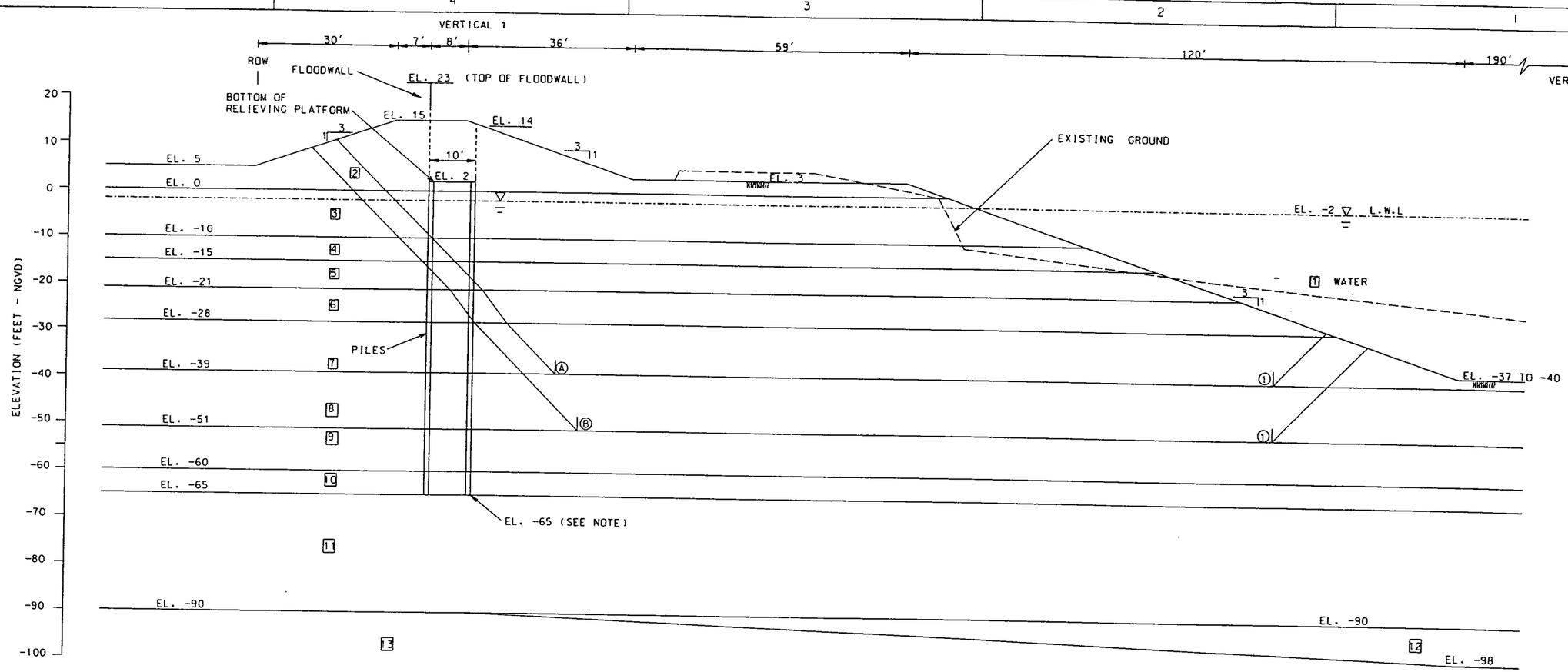
INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR MOD. 2 - ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE ALTERNATIVE 1 (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWP	PLOT SCALE: 10	PLOT DATE: X	GRID FILE: X
DRAWN BY: JGE			FILE NO. X
CHECKED BY: RWP	DATE: OCT., 2000		

PLATE S-23



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	104	0	320	320	110	0	260	260
4	94	0	320	320	94	0	300	300
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	30	0	0
10	120	30	0	0	120	0	500	500
11	118	0	1400	1400	114	30	0	0
12	118	0	1400	1400	115	0	900	900
13	118	0	1400	1400	114	15	200	200

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	83.212	107.976	1.30
Ⓑ ①	115.206	153.215	1.33

NOTE: PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -65.0.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28TH ST. METAIRIE, LOUISIANA

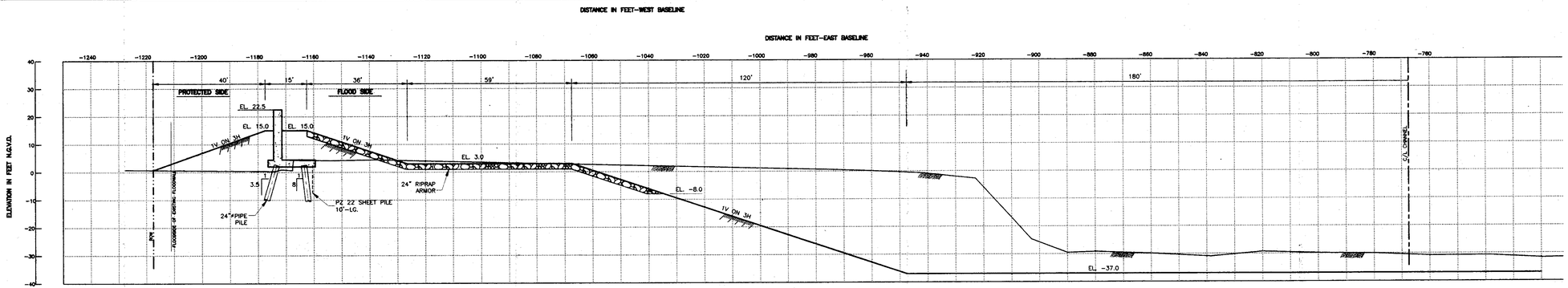
INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS ALT. 2 (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

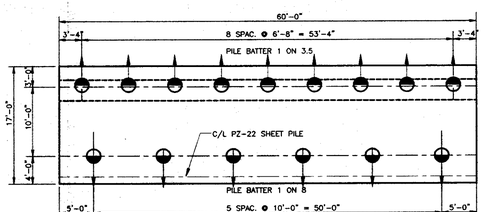
DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

PLATE S-24 (REVISED)



THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

STA. 22+00.0 WEST B/L = STA. 50+00.40 C/L CHANNEL
WEST SIDE LEVEE-ALTERNATIVE 2 (ELS. 15.0 AND 15.0)



PLAN - 15 PILE T-WALL MONOLITH
ALTERNATIVE 2
SCALE : 1"=5'-0"

SCALE: 1" = 10'
10' 0 10' 20' 30' 40'

SCALE: 1" = 5'
5' 0 5' 10' 15'

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METAIRIE, LOUISIANA

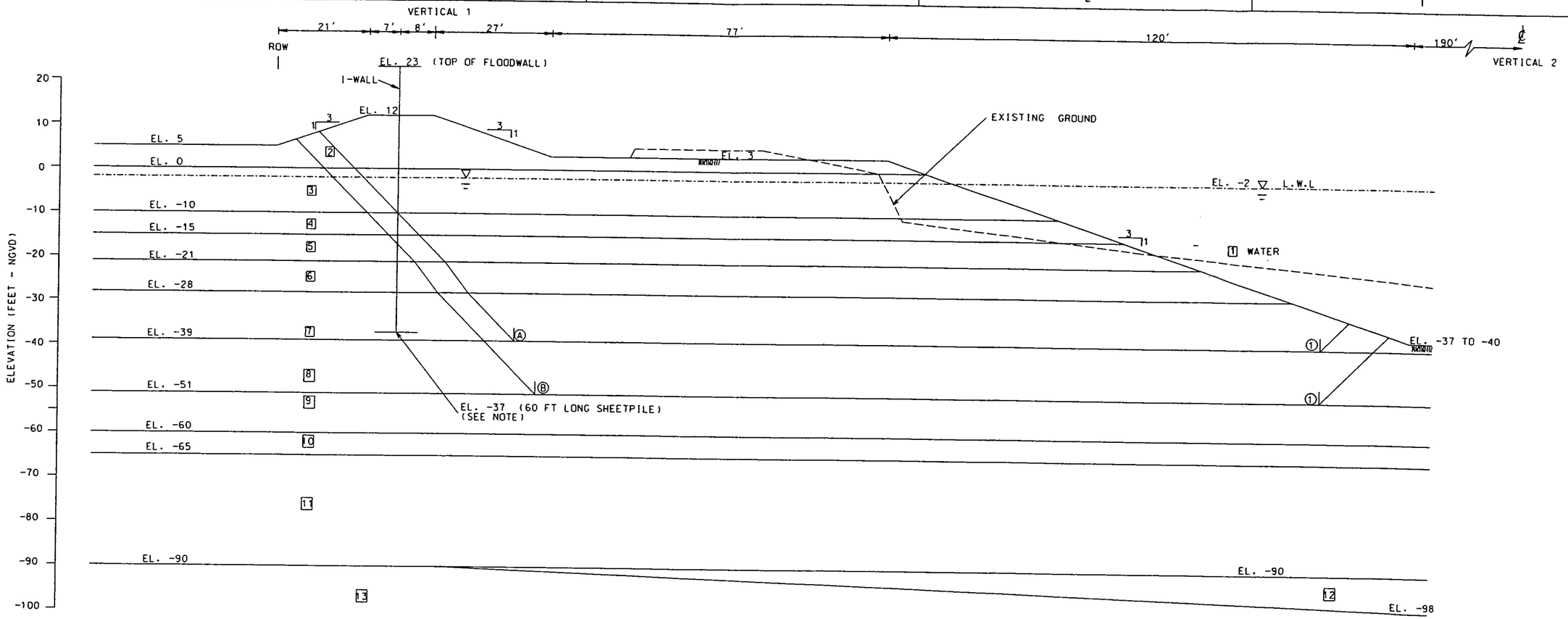
INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 - ALTERNATIVE STUDY
ST. BERNARD PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE
ALTERNATIVE 2 (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY	PLOT SCALE: 10	PLOT DATE: DATE: OCT., 2000	GRID PLO: X
DRAWN BY: JGS			FILE NO: X
CHECKED BY: RWY			

PLATE S-25



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	85	0	500	500	85	0	500	500
3	104	0	320	320	110	0	260	260
4	94	0	320	320	94	0	300	300
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	30	0	0
10	120	30	0	0	120	0	500	500
11	118	0	1400	1400	114	30	0	0
12	118	0	1400	1400	115	0	900	900
13	118	0	1400	1400	114	15	200	200

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT) DRIVING	SUMMATION OF FORCES (LB/FT) RESISTING	FACTOR OF SAFETY
Ⓐ ①	87.093	116.073	1.33
Ⓑ ①	114.725	161.187	1.40

NOTE: SHEETPILE I-WALL GOVERNED BY O-CASE. FS = 1.25 SOIL PARAMETERS WITH WATER TO EL. 22.4 ON THE CANAL SIDE OF THE WALL.
MAXIMUM MOMENT = 35.8 FT-KIPS/FT @ EL. -18.1

20' 0' 20'

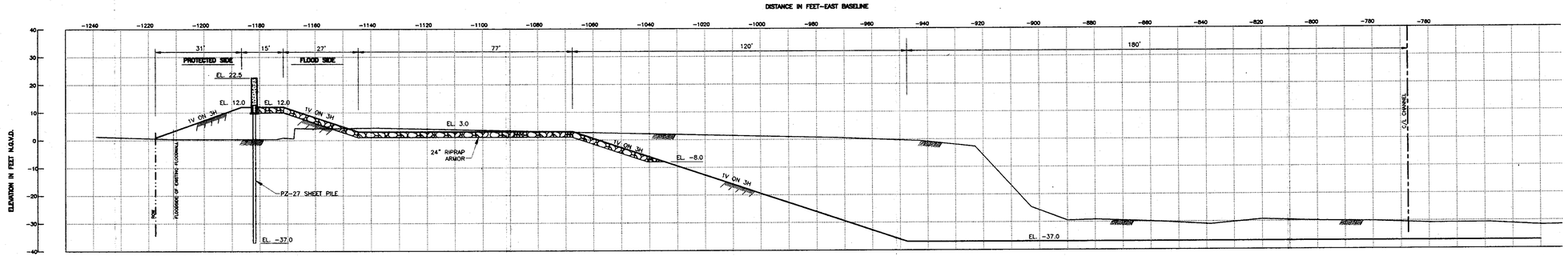
EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3012 9TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
DESIGN REPORT
SHIP LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS ALT. 3 (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

PLATE S-26 (REVISED)



THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

STA. 22+00.0 WEST B/L = STA. 50+00.40 C/L CHANNEL
WEST SIDE LEVEE-ALTERNATIVE 3 (ELS. 12.0 AND 12.0)

SCALE: 1'' = 10'

SCALE: 1'' = 5'

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ENGINEERS • ARCHITECTS • CONSULTANTS
METAIRIE, LOUISIANA

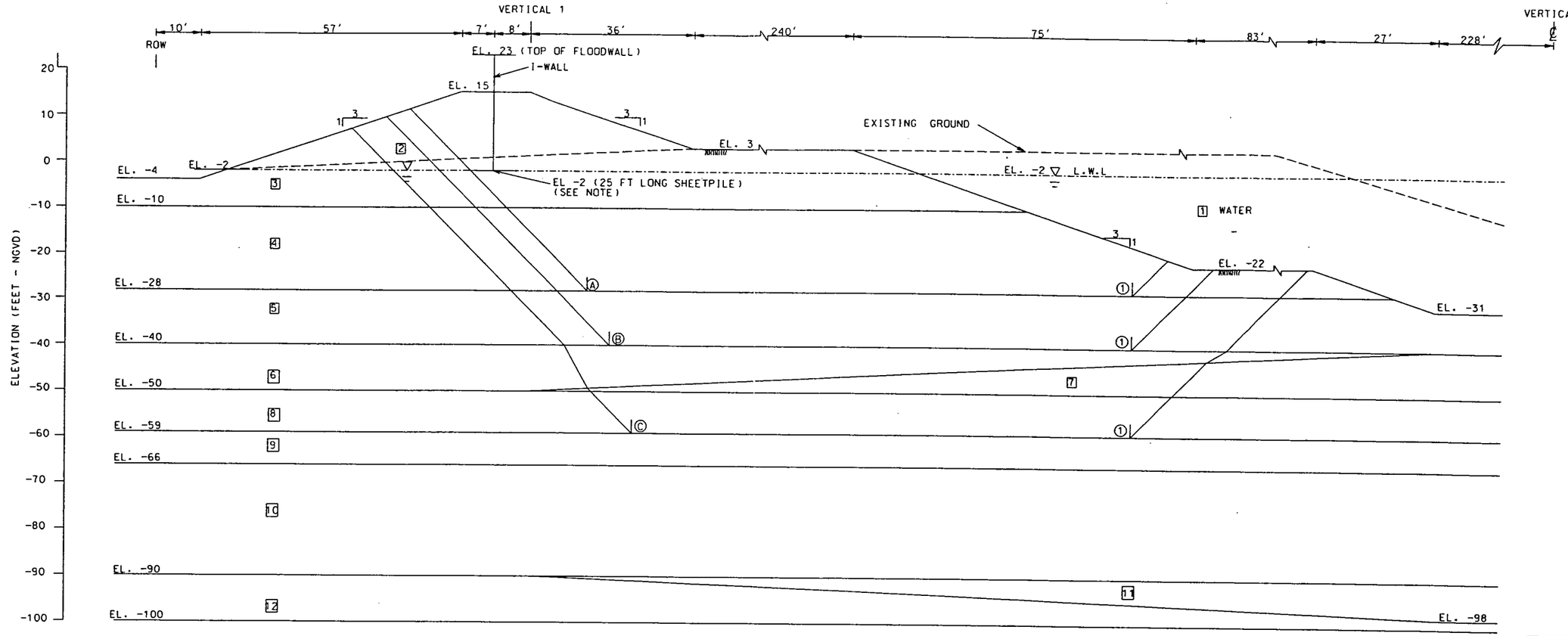
INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 - ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE
ALTERNATIVE 3 (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	DGN FILE: X
DRAWN BY: JGB			FILE NO. X
CHECKED BY: RWY	DATE: OCT., 2000		

PLATE S-27



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	99	0	200	200	99	0	200	200
4	95	0	200	200	110	0	300	300
5	100	0	380	380	104	0	300	300
6	120	30	0	0	120	30	0	0
7	100	0	420	420	100	0	420	420
8	110	0	380	380	104	0	500	500
9	120	30	0	0	120	30	0	0
10	112	0	1100	1100	114	0	900	900
11	115	15	200	200	115	15	200	200
12	112	0	1100	1100	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT) DRIVING	SUMMATION OF FORCES (LB/FT) RESISTING	FACTOR OF SAFETY
Ⓐ ①	72.186	92.953	1.29
Ⓑ ①	97.443	164.943	1.69
Ⓒ ①	135.641	213.710	1.58

NOTE: SHEETPILE I-WALL GOVERNED BY O-CASE. FS = 1.25 SOIL PARAMETERS WITH WATER TO EL. 22.4 ON THE CANAL SIDE OF THE WALL.
MAXIMUM MOMENT = 18.2 FT-KIPS/FT @ EL. 6.6

20' 0' 20'

C·A·D

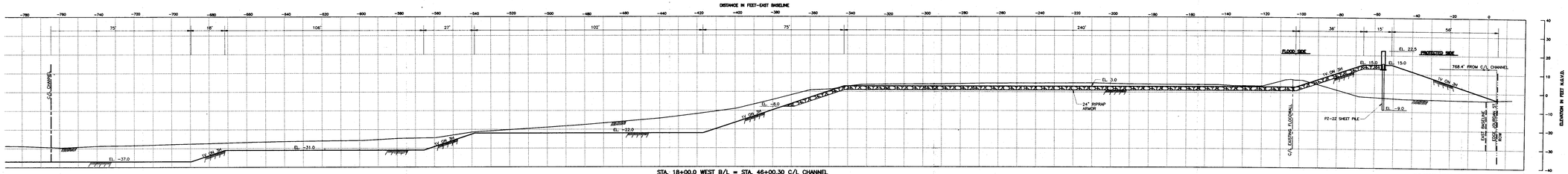
EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3081 28TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA
SHIP LOCK PLAN-EAST SIDE
SLOPE STABILITY ANALYSIS ALT. I (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP	PLOT SCALE:	PLOT DATE:	CADD FILE:
DRAWN BY: DMK			FILE NO.
CHECKED BY: CMP	DATE:		

PLATE S-28 (REVISED)



STA. 18+00.0 WEST B/L = STA. 46+00.30 C/L CHANNEL
EAST SIDE LEVEE--ALTERNATIVE 1 (ELS. 15.0 AND 15.0)
RECOMMENDED PLAN

NOTE: STABILITY ANALYSIS FOR THIS SECTION IS BASED ON ANALYSIS SHOWN ON PLATE B-23

THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

SCALE: 1" = 10'

Brown Cunningham Gannuch
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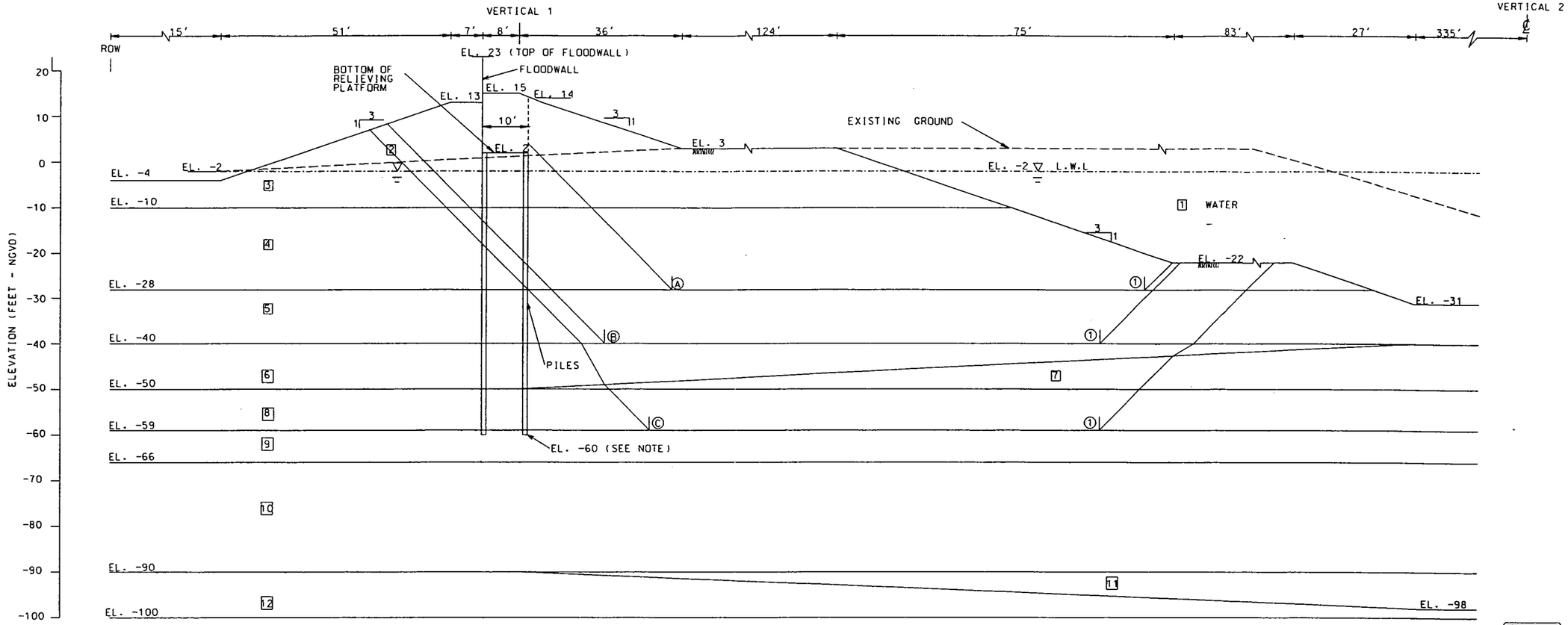
INNER HARBOR NAVIGATION CANAL
INDUSTRIAL CANAL LOCK REPLACEMENT
LATERAL FLOOD PROTECTION
DOR NO. 5 — ALTERNATIVE STUDY
SHIP LOCK PLAN-EAST SIDE
ALTERNATIVE 1 (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY	PLOT SCALE: 1	PLOT DATE: OCT. 2000	Corps FILE #: FILE NO. X
DRAWN BY: JCB			
CHECKED BY: RWY			

PLATE S-29



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	99	0	200	200	99	0	200	200
4	95	0	200	200	110	0	300	300
5	100	0	380	380	104	0	300	300
6	120	30	0	0	120	30	0	0
7	100	0	420	420	100	0	420	420
8	110	0	380	380	104	0	500	500
9	120	30	0	0	120	30	0	0
10	112	0	1100	1100	114	0	900	900
11	115	15	200	200	115	15	200	200
12	112	0	1100	1100	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	47.002	60.948	1.30
Ⓑ ①	73.067	113.196	1.54
Ⓒ ①	106.377	160.975	1.51

NOTE: PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -60.0.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3012 8TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA
SHIP LOCK PLAN-EAST SIDE
SLOPE STABILITY ANALYSIS ALT. 2 (NORTH)

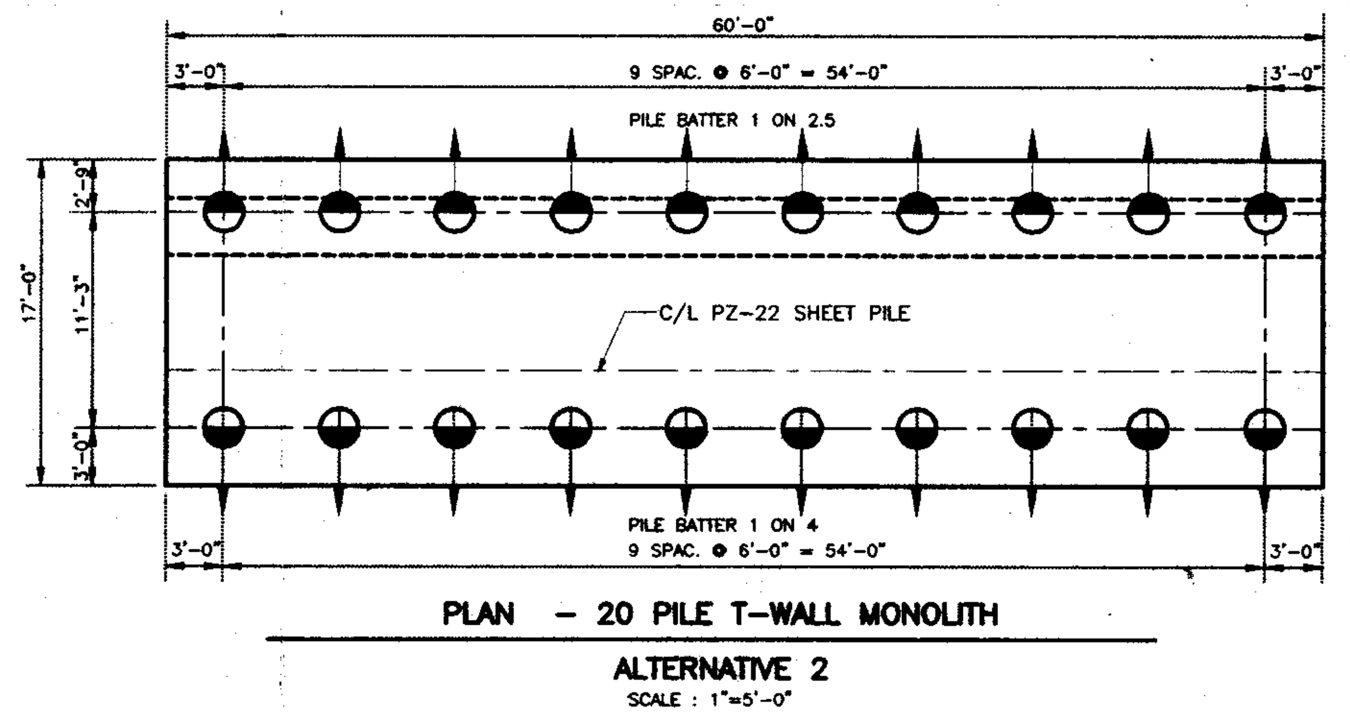
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

PLATE S-30 (REVISED)

STA. 18+00.0 WEST B/L = STA. 46+00.30 C/L CHANNEL
EAST SIDE LEVEE-ALTERNATIVE 2 (ELS. 15.0 AND 13.0)

THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.



PLAN - 20 PILE T-WALL MONOLITH

ALTERNATIVE 2
SCALE : 1"=5'-0"

SCALE: 1'' = 10'

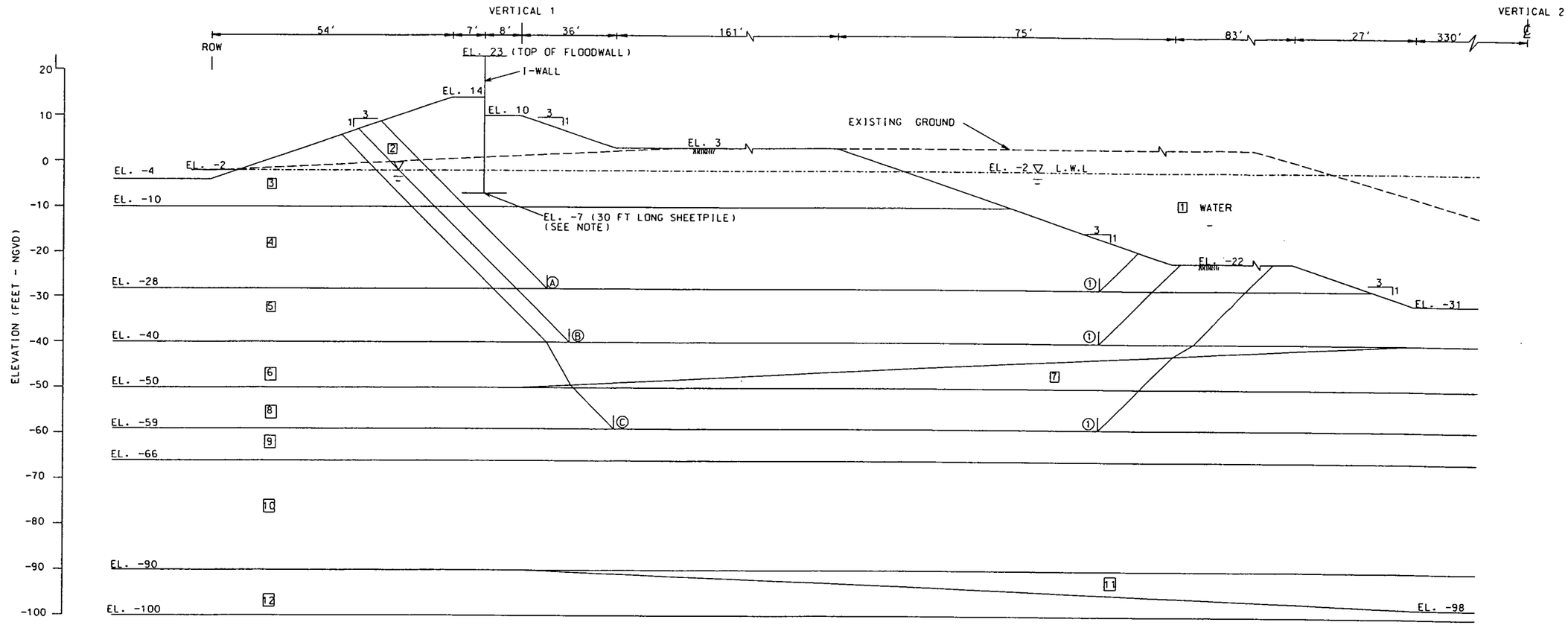
SCALE: 1'' = 5'

Brown Cunningham Gannuch
ENGINEERS • ARCHITECTS • CONSULTANTS
2701 KINGMAN ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 - ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA
SHIP LOCK PLAN-EAST SIDE
ALTERNATIVE 2 (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY DRAWN BY: JSB CHECKED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	CADD FILE: X
	DATE: OCT., 2000		FILE NO. X



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	99	0	200	200	99	0	200	200
4	95	0	200	200	110	0	300	300
5	100	0	380	380	104	0	300	300
6	120	30	0	0	120	30	0	0
7	100	0	420	420	100	0	420	420
8	110	0	380	380	104	0	500	500
9	120	30	0	0	120	30	0	0
10	112	0	1100	1100	114	0	900	900
11	115	15	200	200	115	15	200	200
12	112	0	1100	1100	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	57,801	75,603	1.31
Ⓑ ①	77,818	122,929	1.58
Ⓒ ①	105,690	175,920	1.66

NOTE: SHEETPILE I-WALL GOVERNED BY S-CASE, FS = 1.0 SOIL PARAMETERS WITH WATER TO EL. 22.4 ON THE CANAL SIDE OF THE WALL.
MAXIMUM MOMENT = 24.7 FT-KIPS/FT @ EL. 5.1

20' 0' 20'

C-A-D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-EAST SIDE
SLOPE STABILITY ANALYSIS ALT. 2 (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DMR
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
DATE:
CADD FILE:
FILE NO.

PLATE S-32 (REVISED)

STA. 18+00.0 WEST B/L = STA. 46+00.30 C/L CHANNEL
EAST SIDE LEVEE-ALTERNATIVE 3 (ELS. 10.0 AND 14.0)

THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

SCALE: 1'' = 10'

10' 0 10' 20' 30' 40'

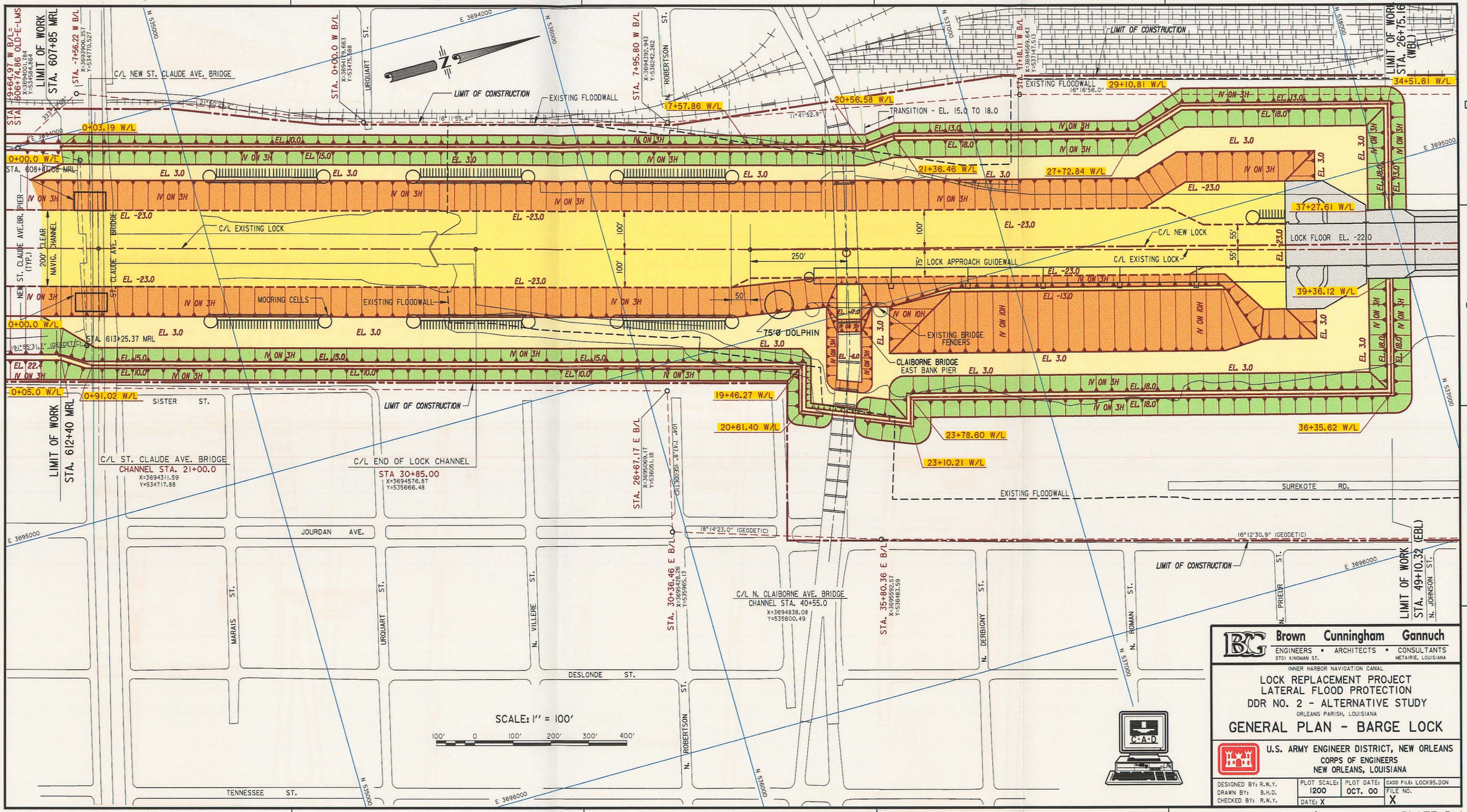
Brown Cunningham Gannuch
ENGINEERS • ARCHITECTS • CONSULTANTS
2701 KINGMAN ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 – ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA
SHIP LOCK PLAN–EAST SIDE
ALTERNATIVE 3 (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY DRAWN BY: JSB CHECKED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	CADD FILE: X
	DATE: OCT., 2000		FILE NO. X

PLATE S–33



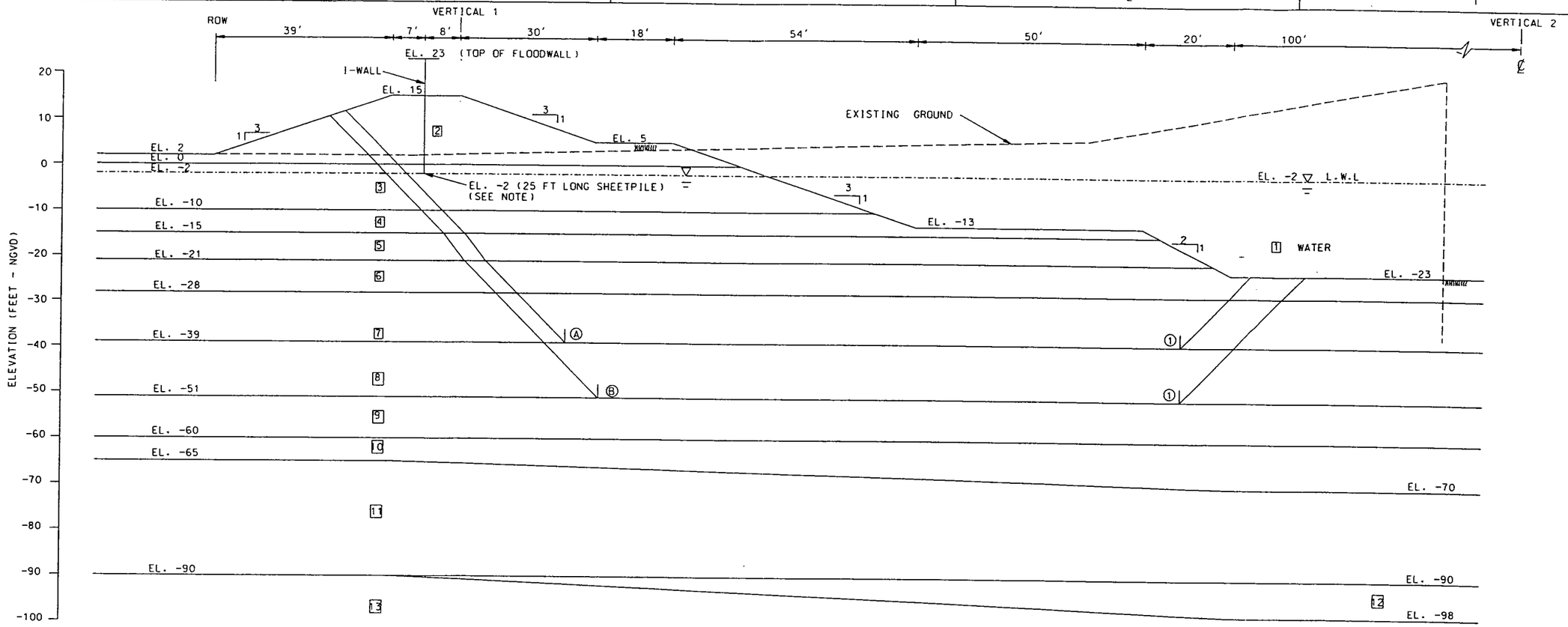
Brown Cunningham Gannuch
ENGINEERS • ARCHITECTS • CONSULTANTS
2701 KINGMAN ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 - ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA

GENERAL PLAN - BARGE LOCK

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: R.W.Y.	PLOT SCALE: 1200	PLOT DATE: OCT. 00	CADD FILE: LOCK95.DGN
DRAWN BY: B.H.D.			FILE NO. X
CHECKED BY: R.W.Y.	DATE: X		



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	85	0	500	500	85	0	500	500
3	99	0	320	320	110	0	300	300
4	95	0	320	320	94	0	320	320
5	100	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0
11	118	0	1400	1400	114	0	900	900
12	118	0	1400	1400	115	15	200	200
13	114	0	1400	1400	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	78,344	103,887	1.33
Ⓑ ①	100,668	143,236	1.42

NOTE: SHEETPILE I-WALL GOVERNED BY O-CASE, FS=1.25
SOIL PARAMETERS WITH WATER TO EL. 22.4 ON THE
CANAL SIDE OF THE WALL. MAXIMUM MOMENT = 8.1 FT-KIPS/FT
AT EL. 10.6

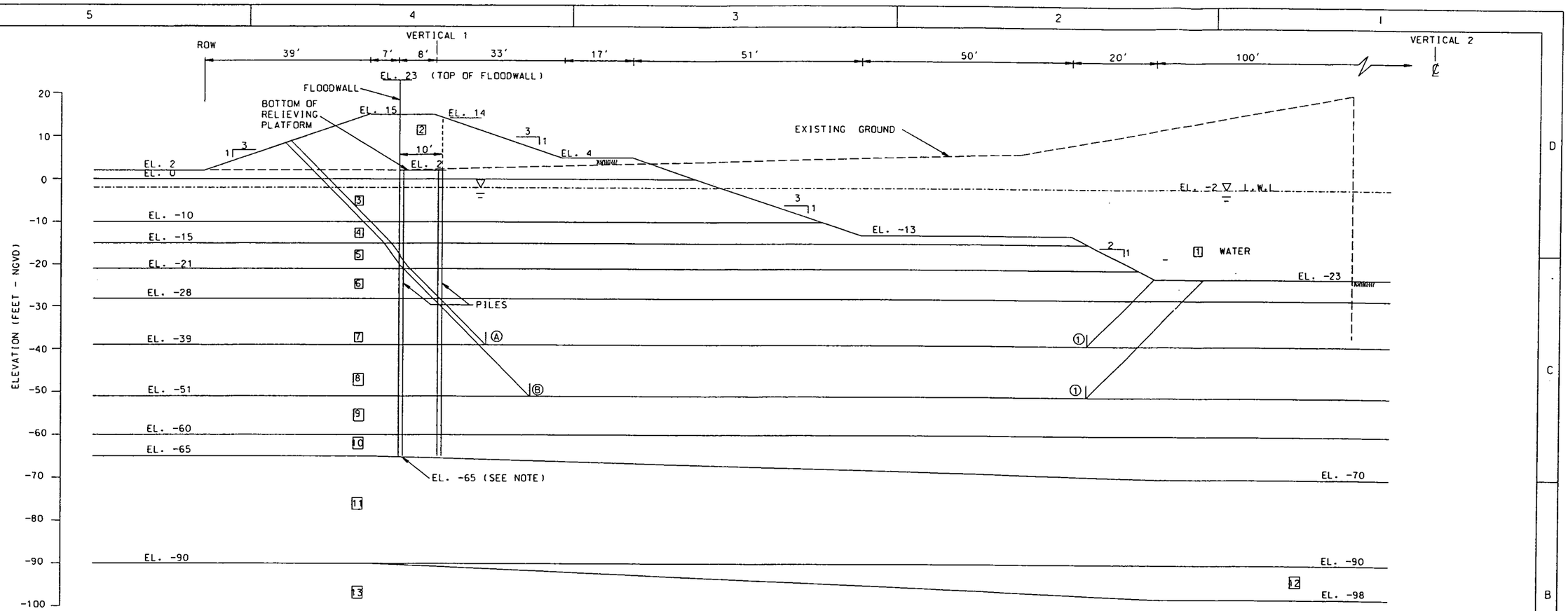
EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 26TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA
BARGE LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS ALT. I (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP	PLOT SCALE:	PLOT DATE:	CADD FILE:
DRAWN BY: DMK			FILE NO.
CHECKED BY: CMP	DATE:		

PLATE B-2 (REVISED)



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	99	0	320	320	110	0	300	300
4	95	0	320	320	94	0	320	320
5	100	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0
11	118	0	1400	1400	114	0	900	900
12	118	0	1400	1400	115	15	200	200
13	114	0	1400	1400	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	77.496	100.984	1.30
Ⓑ ①	101.965	139.391	1.37

NOTE: PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -60.0.

20' 0' 20'

C-A-D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
308 29TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

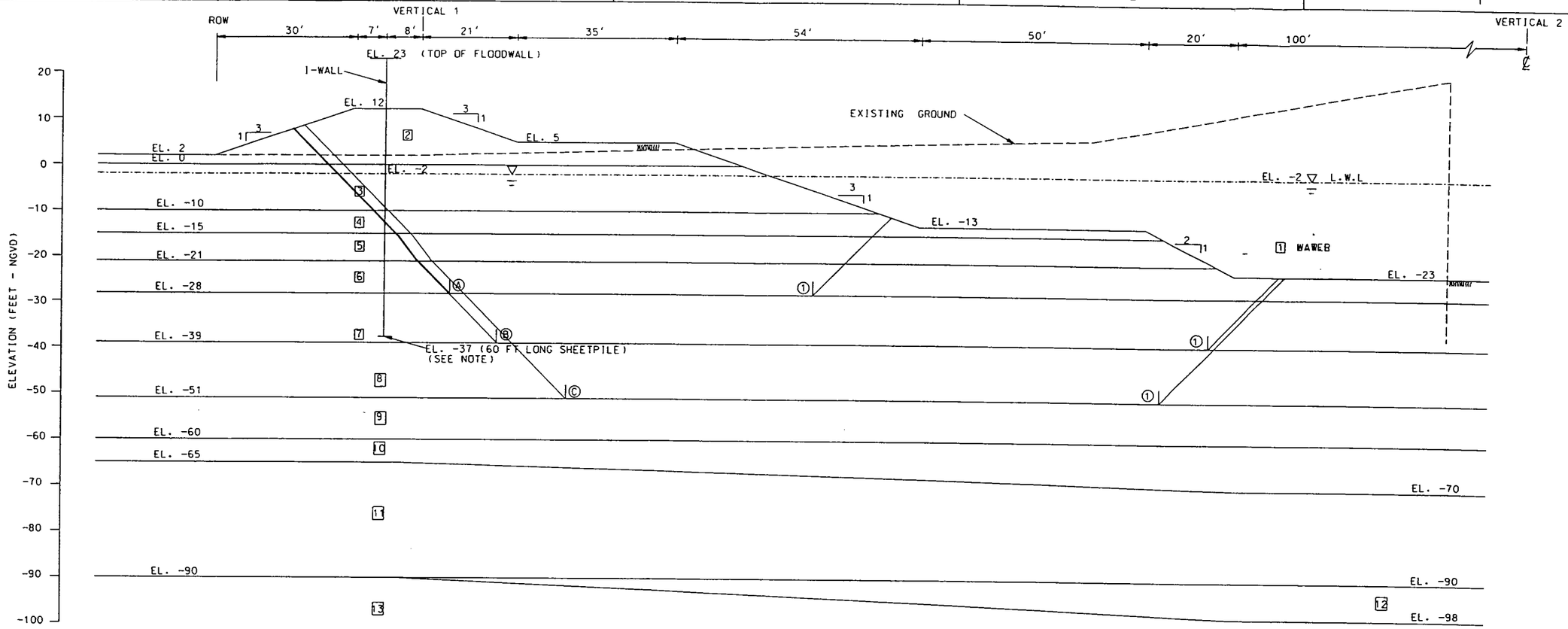
BARGE LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS ALT. 2 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

PLATE B-3 (REVISED)


DISTANCE IN FEET-WEST BASELINE
ELEVATION IN FEET N.G.V.D.
PROTECTED SIDE
FLOOD SIDE
EL. 22.5
EL. 15.0
EL. 15.0
1V ON 3H
EL. 5.0
3' CLAY COVER
24" RIPRAP ARMOR
LIGHTWEIGHT FILL AS REQUIRED
EL. -9.0
EL. -8.0
EL. -13.0
1V ON 2H
EL. -23.0
PZ-22 SHEET PILE
EXISTING LOCK
C/L CHANNEL
WEST BASELINE
REQUESTED ROW
THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.
STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL
WEST SIDE LEVEE-ALTERNATIVE 1 (ELS. 15.0 AND 15.0)
RECOMMENDED PLAN (I-WALL WITH LIGHTWEIGHT FILL)
EL. 4.0
24" PIPE PILE
STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL
WEST SIDE LEVEE-ALTERNATIVE 2 (ELS. 15.0 AND 15.0)
60'-0"
8 SPAC. @ 6'-8" = 53'-4"
PILE BATTER 1 ON 3.5
C/L PZ-22 SHEET PILE
PILE BATTER 1 ON 8
5 SPAC. @ 10'-0" = 50'-0"
PLAN - 15 PILE T-WALL MONOLITH
ALTERNATIVE 2
SCALE : 1"=5'-0"
SCALE: 1'' = 10'
SCALE: 1'' = 5'
Brown Cunningham Gannuch
ENGINEERS ARCHITECTS CONSULTANTS
2701 KINGMAN ST. METAIRIE, LOUISIANA
INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 - ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA
BARGE LOCK PLAN-WEST SIDE
ALTERNATIVES 1 AND 2 (SOUTH)
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA
DESIGNED BY: RWY
DRAWN BY: JSB
CHECKED BY: RWY
PLOT SCALE: 10
PLOT DATE: X
DATE: OCT., 2000
CADD FILE: X
FILE NO. X
PLATE B-4



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	99	0	320	320	110	0	300	300
4	95	0	320	320	94	0	320	320
5	100	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0
11	118	0	1400	1400	114	0	900	900
12	118	0	1400	1400	115	15	200	200
13	114	0	1400	1400	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	32.505	48.776	1.50
Ⓑ ①	82.127	106.106	1.29
Ⓒ ①	99.350	141.041	1.41

NOTE: SHEETPILE I-WALL GOVERNED BY O-CASE. FS=1.25
SOIL PARAMETERS WITH WATER TO EL. 22.4 ON THE
CANAL SIDE OF THE WALL. MAXIMUM MOMENT = 35.8 FT-KIPS/FT
AT EL. -18.1

20' 0' 20'

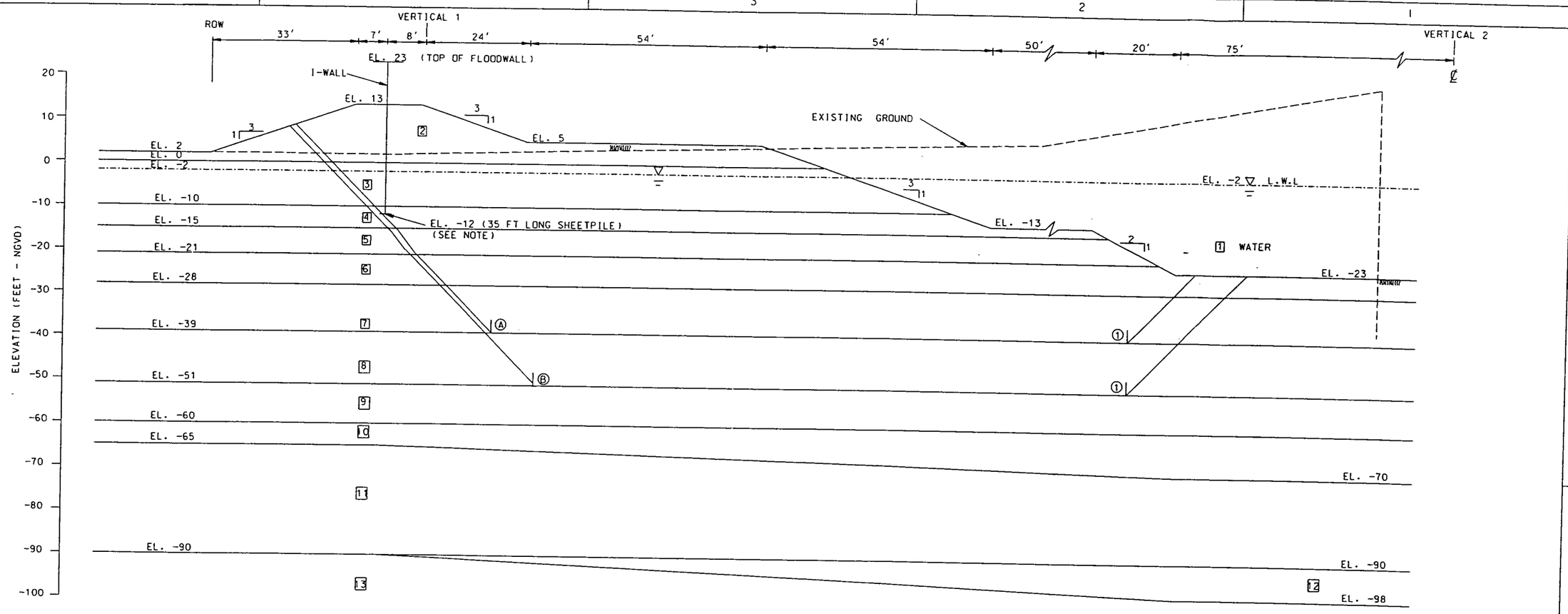
EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA
BARGE LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS ALT. 3 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

PLATE B-5 (REVISED)



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	99	0	320	320	110	0	300	300
4	95	0	320	320	94	0	320	320
5	100	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0
11	118	0	1400	1400	114	0	900	900
12	118	0	1400	1400	115	15	200	200
13	114	0	1400	1400	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	86.502	111.580	1.29
Ⓑ ①	108.328	154.208	1.42

NOTE: SHEETPILE I-WALL GOVERNED BY S-CASE, FS=1.0
SOIL PARAMETERS WITH WATER TO EL. 22.4 ON THE
CANAL SIDE OF THE WALL. MAXIMUM MOMENT = 39.2 FT-KIPS/FT
AT EL. 1.6

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3017 8TH ST. METAIRIE, LOUISIANA

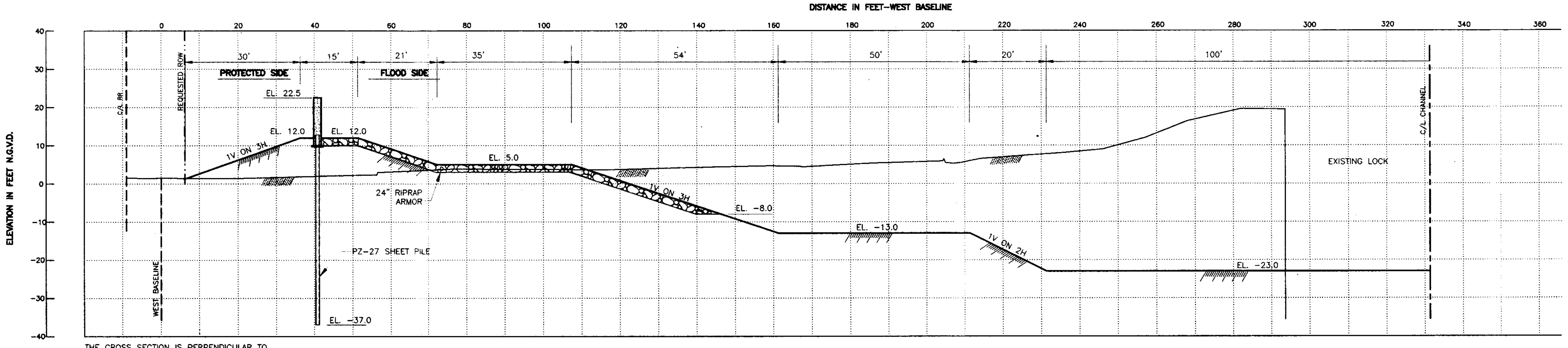
INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH LOUISIANA

BARGE LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS ALT. 4 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
F.E. NO.
DATE:

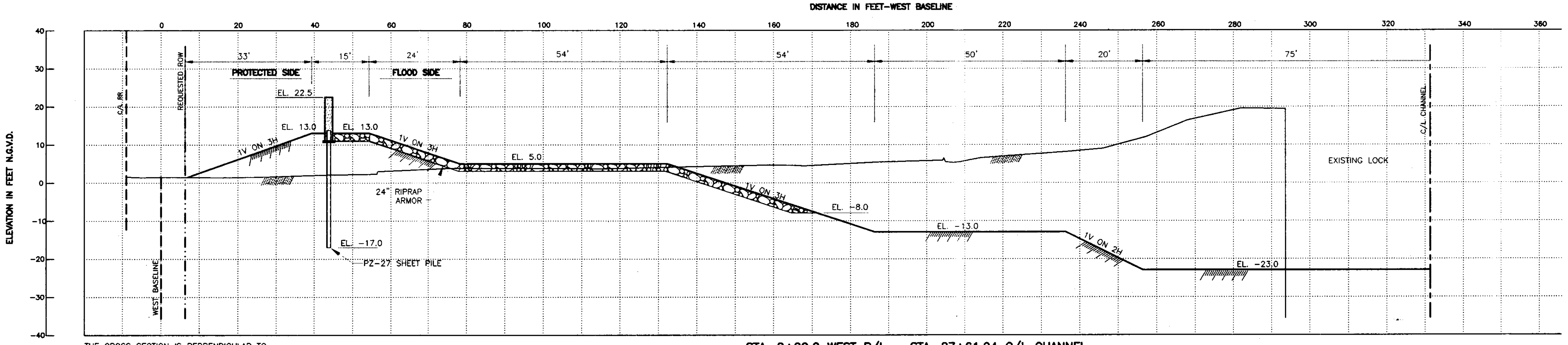
PLATE B-6 (REVISED)



THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL

WEST SIDE LEVEE-ALTERNATIVE 3 (ELS. 12.0 AND 12.0)



THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL

WEST SIDE LEVEE-ALTERNATIVE 4 (ELS. 13.0 AND 13.0)
REDUCED CHANNEL WIDTH

SCALE: 1'' = 10'

10' 0 10' 20' 30' 40'

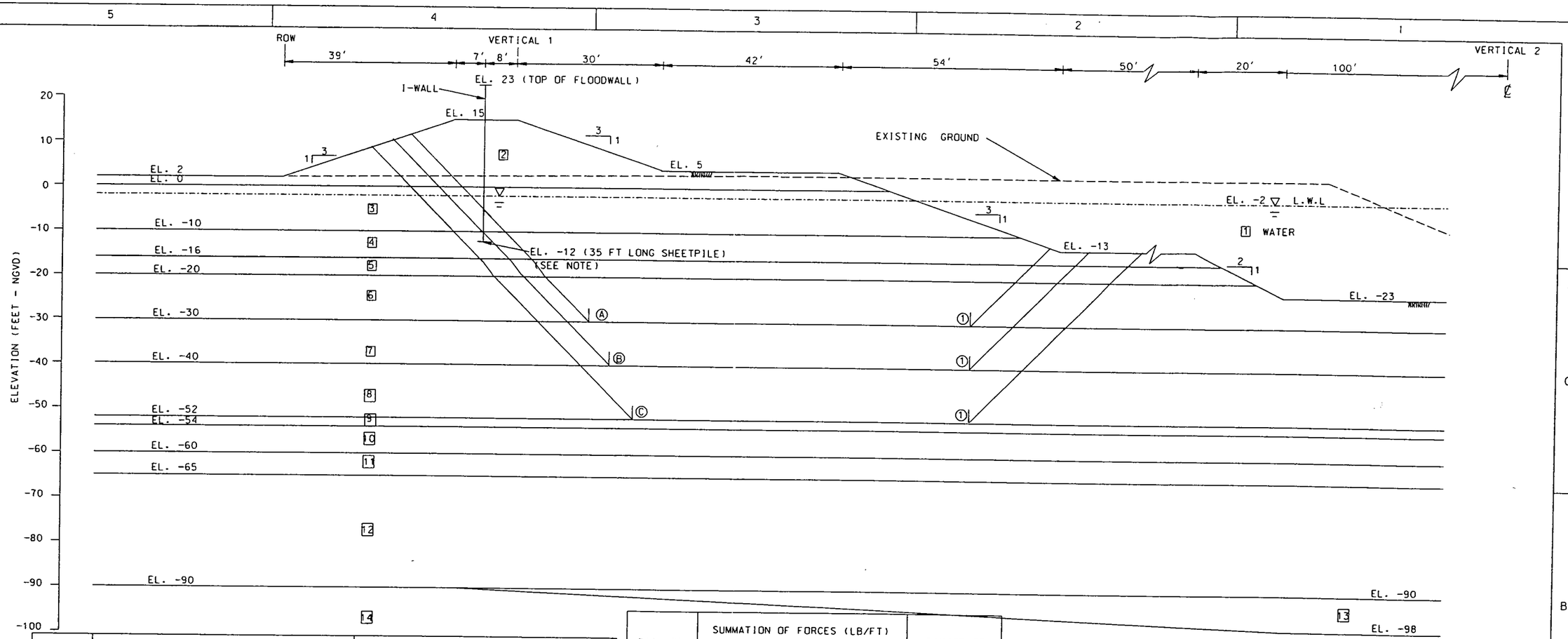
Brown Cunningham Gannuch
ENGINEERS ◦ ARCHITECTS ◦ CONSULTANTS
2701 KINGMAN ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 – ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA
BARGE LOCK PLAN–WEST SIDE
ALTERNATIVES 3 AND 4 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY DRAWN BY: JSB CHECKED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	CADD FILE: X
	DATE: OCT., 2000		FILE NO. X

PLATE B-7



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	85	0	500	500	85	0	500	500
3	102	0	260	260	102	0	260	260
4	98	0	400	400	110	0	300	300
5	115	15	200	200	115	15	200	200
6	104	0	400	400	110	0	300	300
7	98	0	400	400	104	0	300	300
8	104	0	600	600	100	0	420	420
9	120	30	0	0	120	30	0	0
10	109	0	1000	1000	104	0	500	500
11	120	30	0	0	120	30	0	0
12	115	0	1100	1100	114	0	900	900
13	115	15	200	200	115	15	200	200
14	115	0	1100	1100	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT) DRIVING	SUMMATION OF FORCES (LB/FT) RESISTING	FACTOR OF SAFETY
Ⓐ ①	54.936	80.857	1.47
Ⓑ ①	69.235	92.310	1.33
Ⓒ ①	84.932	129.817	1.53

NOTE: SHEETPILE I-WALL GOVERNED BY S-CASE, FS=1.0
SOIL PARAMETERS WITH WATER TO EL. 22.4 ON THE CANAL SIDE OF THE WALL. MAXIMUM MOMENT = 27.4 FT-KIPS/FT AT EL. 2.5

SCALE 1" = 20'
20' 0' 20'

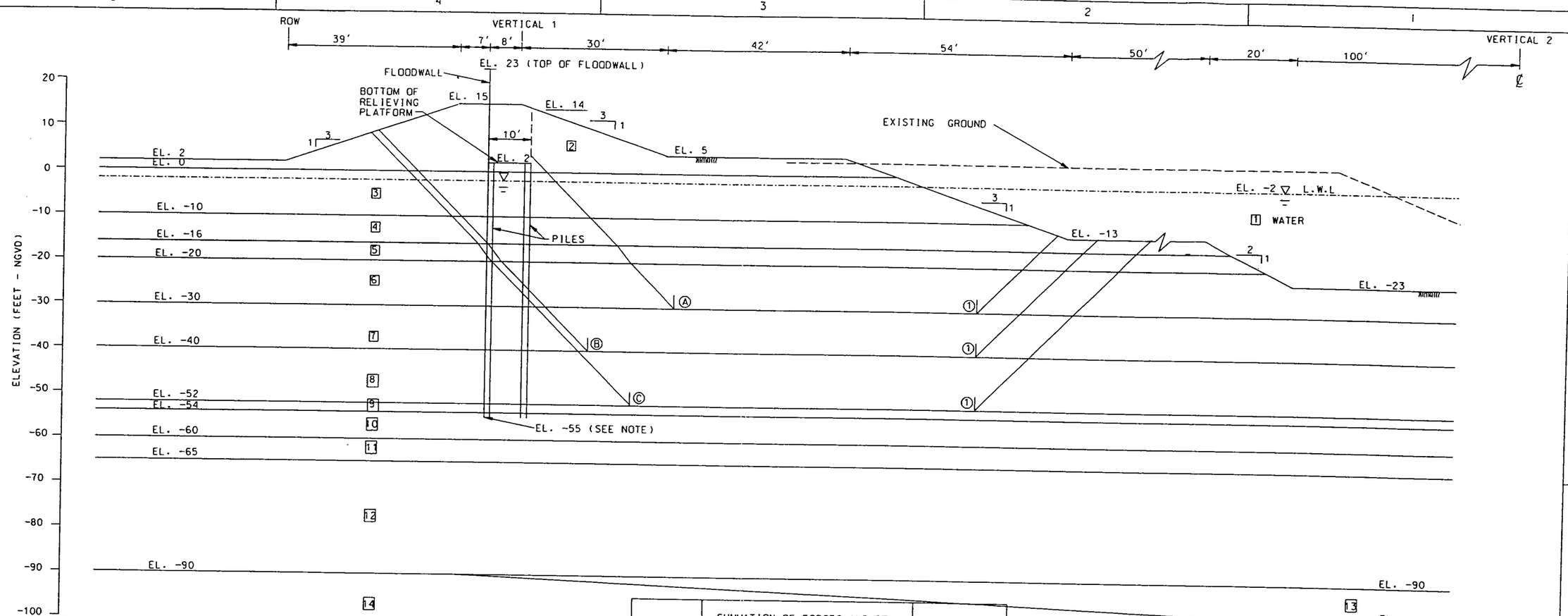
EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
METAIRIE, LOUISIANA

INNER HARBOR LOCK REPLACEMENT
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA
BARGE LOCK PLAN-EAST SIDE
SLOPE STABILITY ANALYSIS ALT. I(SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

PLATE B-8 (REVISED)



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	102	0	260	260	102	0	260	260
4	98	0	400	400	110	0	300	300
5	115	15	200	200	115	15	200	200
6	104	0	400	400	110	0	300	300
7	98	0	400	400	104	0	300	300
8	104	0	600	600	100	0	420	420
9	120	30	0	0	120	30	0	0
10	109	0	1000	1000	104	0	500	500
11	120	30	0	0	120	30	0	0
12	115	0	1100	1100	114	0	900	900
13	115	15	200	200	115	15	200	200
14	115	0	1100	1100	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	46.142	65.427	1.42
Ⓑ ①	70.999	91.378	1.29
Ⓒ ①	89.595	128.918	1.44

NOTE: PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT EL. -55.0.

SCALE 1" = 20'

20' 0' 20'

C·A·D

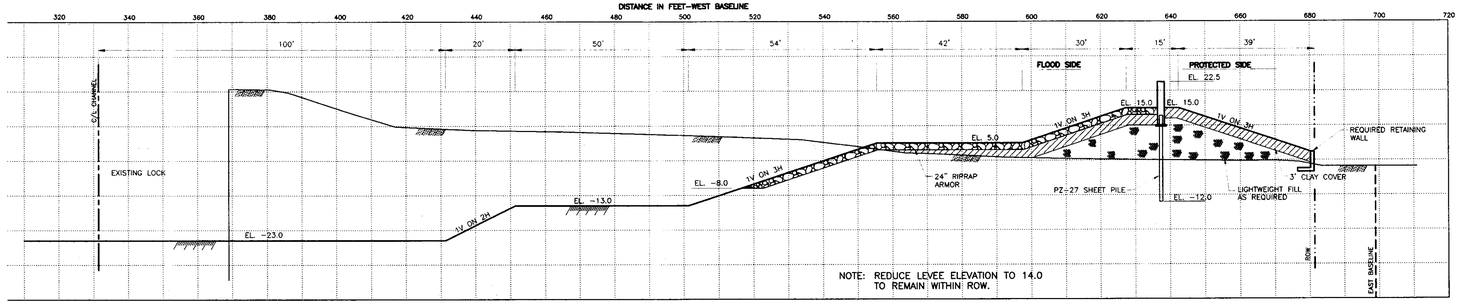
EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 20TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA
BARGE LOCK PLAN-EAST SIDE
SLOPE STABILITY ANALYSIS ALT. 2 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

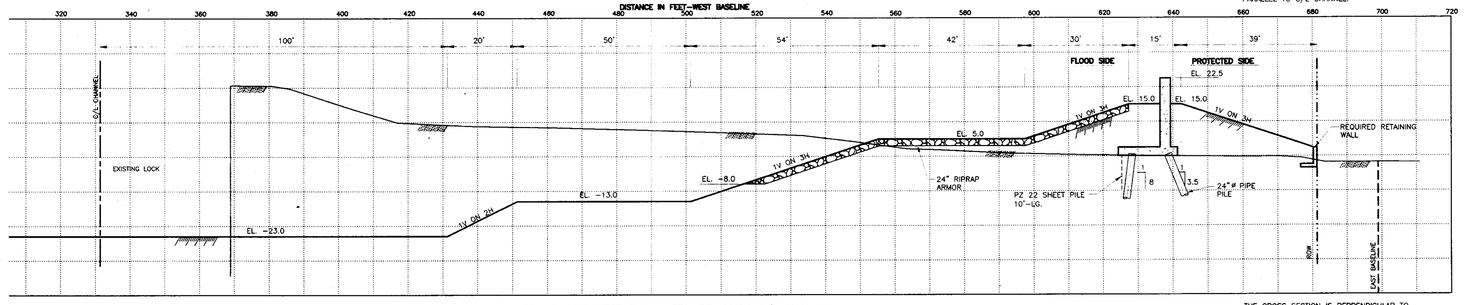
PLATE B-9 (REVISED)



NOTE: REDUCE LEVEE ELEVATION TO 14.0 TO REMAIN WITHIN ROW.

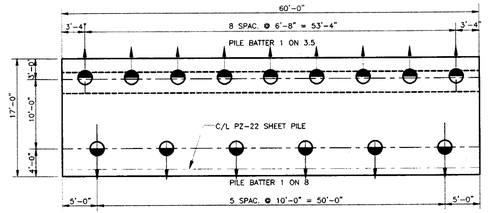
STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL
EAST SIDE LEVEE- ALTERNATIVE 1 (ELS. 15.0 AND 15.0)
RECOMMENDED PLAN (I-WALL WITH LIGHTWEIGHT FILL)

THE CROSS SECTION IS PERPENDICULAR TO THE WEST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.



STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL
EAST SIDE LEVEE-ALTERNATIVE 2 (ELS. 15.0 AND 15.0)

THE CROSS SECTION IS PERPENDICULAR TO THE WEST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.



PLAN – 15 PILE T-WALL MONOLITH
ALTERNATIVE 2
SCALE : 1"=5'-0"

NOTE: IN FINAL CONFIGURATION CROSS-SECTION TO BE SHIFTED TO ELMINATE RETAINING WALL.

SCALE: 1'' = 10'

SCALE: 1'' = 5'

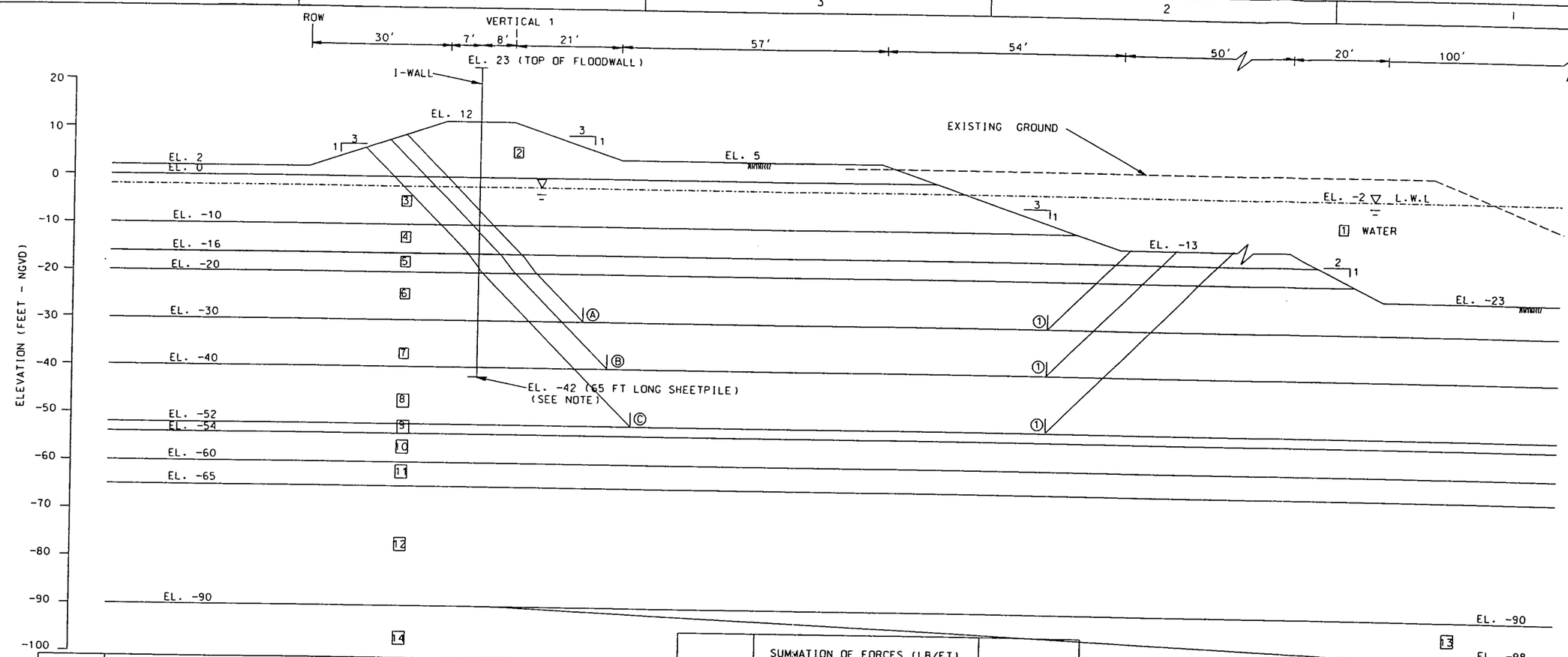
Brown Cunningham Gannuch
ENGINEERS * ARCHITECTS * CONSULTANTS
3701 KNOMAN ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 ALTERNATIVE STUDY
BARGE LOCK PLAN-EAST SIDE
ALTERNATIVES 1 AND 2 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	CADD FILE X
DRAWN BY: JSR			FILE NO. X
CHECKED BY: RWY	DATE: OCT., 2000		

PLATE B-10



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	102	0	260	260	102	0	260	260
4	98	0	400	400	110	0	300	300
5	115	15	200	200	115	15	200	200
6	104	0	400	400	110	0	300	300
7	98	0	400	400	104	0	300	300
8	104	0	600	600	100	0	420	420
9	120	30	0	0	120	30	0	0
10	109	0	1000	1000	104	0	500	500
11	120	30	0	0	120	30	0	0
12	115	0	1100	1100	114	0	900	900
13	115	15	200	200	115	15	200	200
14	115	0	1100	1100	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	-
Ⓐ ①	56,690	82,193	1.45
Ⓑ ①	71,395	93,607	1.31
Ⓒ ①	86,168	130,990	1.52

NOTE: SHEETPILE I-WALL GOVERNED BY O-CASE, FS=1.25
SOIL PARAMETERS WITH WATER TO EL. 22.4 ON THE CANAL SIDE OF THE WALL. MAXIMUM MOMENT = 53.7FT-KIPS/FT AT EL. -23

SCALE 1" = 20'
20' 0' 20'

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3081 29TH ST. METAIRIE, LOUISIANA

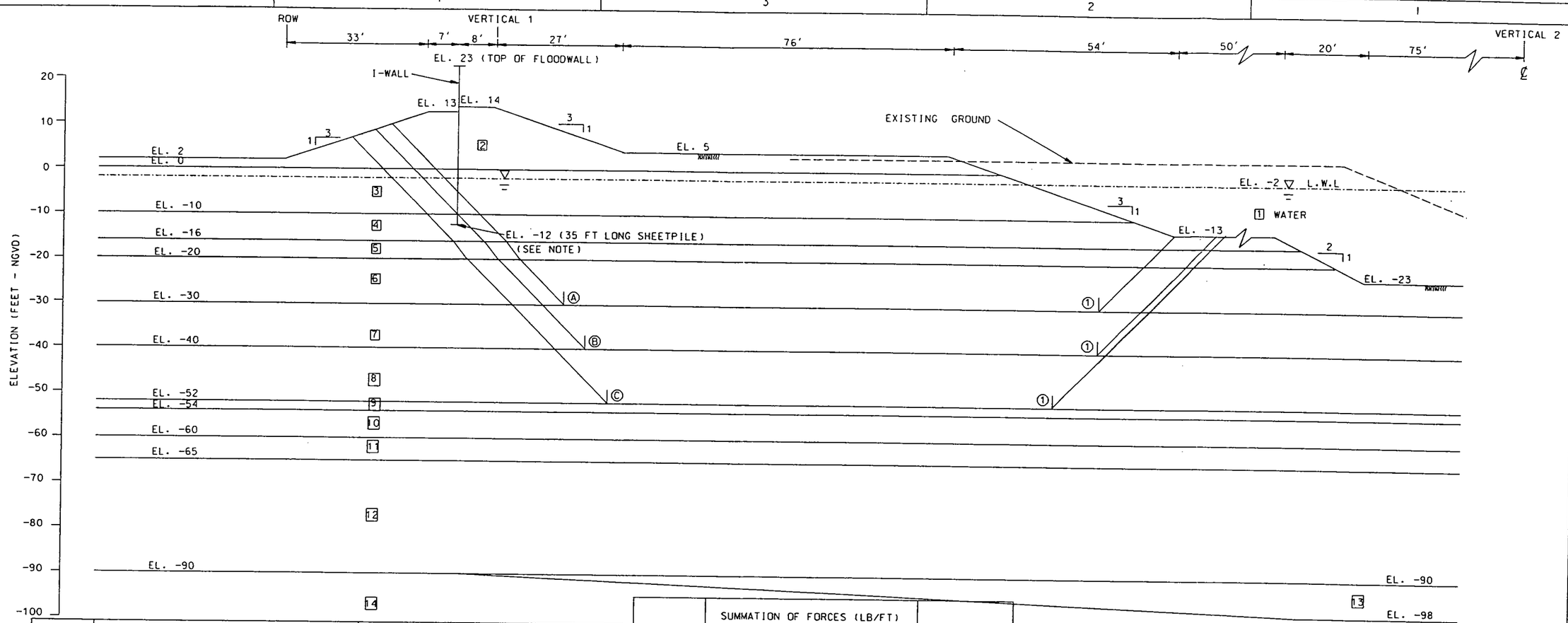
INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

BARGE LOCK PLAN-EAST SIDE
SLOPE STABILITY ANALYSIS ALT. 3 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
DATE:
FILE NO.

PLATE B-II (REVISED)



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	102	0	260	260	102	0	260	260
4	98	0	400	400	110	0	300	300
5	115	15	200	200	115	15	200	200
6	104	0	400	400	110	0	300	300
7	98	0	400	400	104	0	300	300
8	104	0	600	600	100	0	420	420
9	120	30	0	0	120	30	0	0
10	109	0	1000	1000	104	0	500	500
11	120	30	0	0	120	30	0	0
12	115	0	1100	1100	114	0	900	900
13	115	15	200	200	115	15	200	200
14	115	0	1100	1100	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT) DRIVING	SUMMATION OF FORCES (LB/FT) RESISTING	FACTOR OF SAFETY
Ⓐ ①	63,993	92,035	1.44
Ⓑ ①	79,803	103,906	1.30
Ⓒ ①	94,097	142,127	1.51

NOTE: SHEETPILE I-WALL GOVERNED BY S-CASE, FS=1.0 SOIL PARAMETERS WITH WATER TO EL. 22.4 ON THE CANAL SIDE OF THE WALL. MAXIMUM MOMENT = 40.9 FT-KIPS/FT AT EL. 1.0

SCALE 1" = 20'

20' 0' 20'

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

BARGE LOCK PLAN-EAST SIDE
SLOPE STABILITY ANALYSIS ALT. 4 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
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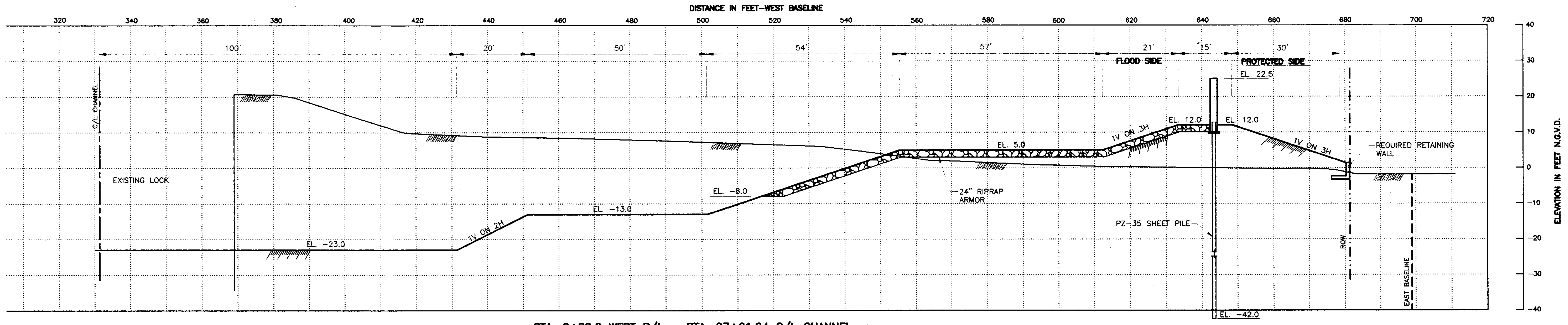
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

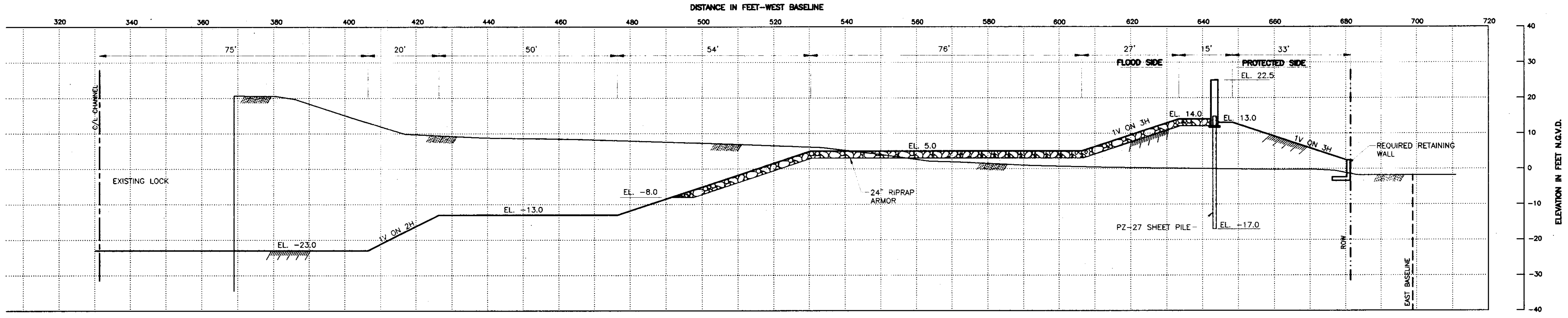
PLATE B-12 (REVISED)



STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL
EAST SIDE LEVEE-ALTERNATIVE 3 (ELS. 12.0 AND 12.0)

THE CROSS SECTION IS PERPENDICULAR TO THE WEST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

NOTE: IN FINAL CONFIGURATION CROSS-SECTION TO BE SHIFTED TO ELIMINATE RETAINING WALL.



STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL
EAST SIDE LEVEE-ALTERNATIVE 4 (ELS. 14.0 AND 13.0)
REDUCED CHANNEL WIDTH

THE CROSS SECTION IS PERPENDICULAR TO THE WEST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

SCALE: 1'' = 10'

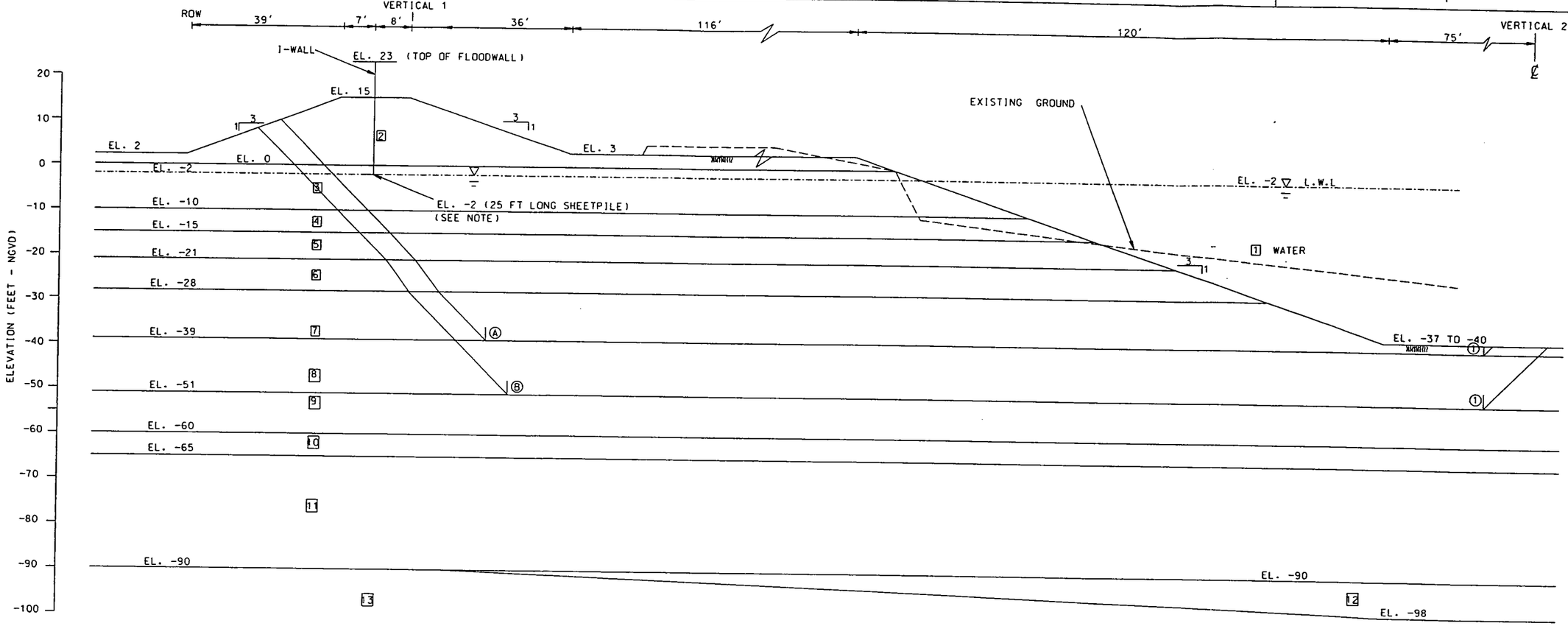
Brown Cunningham Gannuch
ENGINEERS ◦ ARCHITECTS ◦ CONSULTANTS
2701 KINGMAN ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 – ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA
BARGE LOCK PLAN–EAST SIDE
ALTERNATIVES 3 AND 4 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	CADD FILE: X
DRAWN BY: JSB	DATE: MAY, 2000		FILE NO. X
CHECKED BY: RWY			

PLATE B-13



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	104	0	320	320	110	0	260	260
4	94	0	320	320	94	0	300	300
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	30	0	0
10	120	30	0	0	120	0	500	500
11	118	0	1400	1400	114	30	0	0
12	118	0	1400	1400	115	0	900	900
13	118	0	1400	1400	114	15	200	200

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	103.010	131.837	1.28
Ⓑ ①	133.133	180.946	1.36

NOTE: SHEETPILE I-WALL GOVERNED BY S-CASE. FS=1.0
SOIL PARAMETERS WITH WATER TO EL. 22.4 ON THE
CANAL SIDE OF THE WALL. MAXIMUM MOMENT = 18.2 FT-KIPS/FT
AT EL. 6.6

20' 0' 20'

C-A-D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3028TH ST. METAIRIE, LOUISIANA

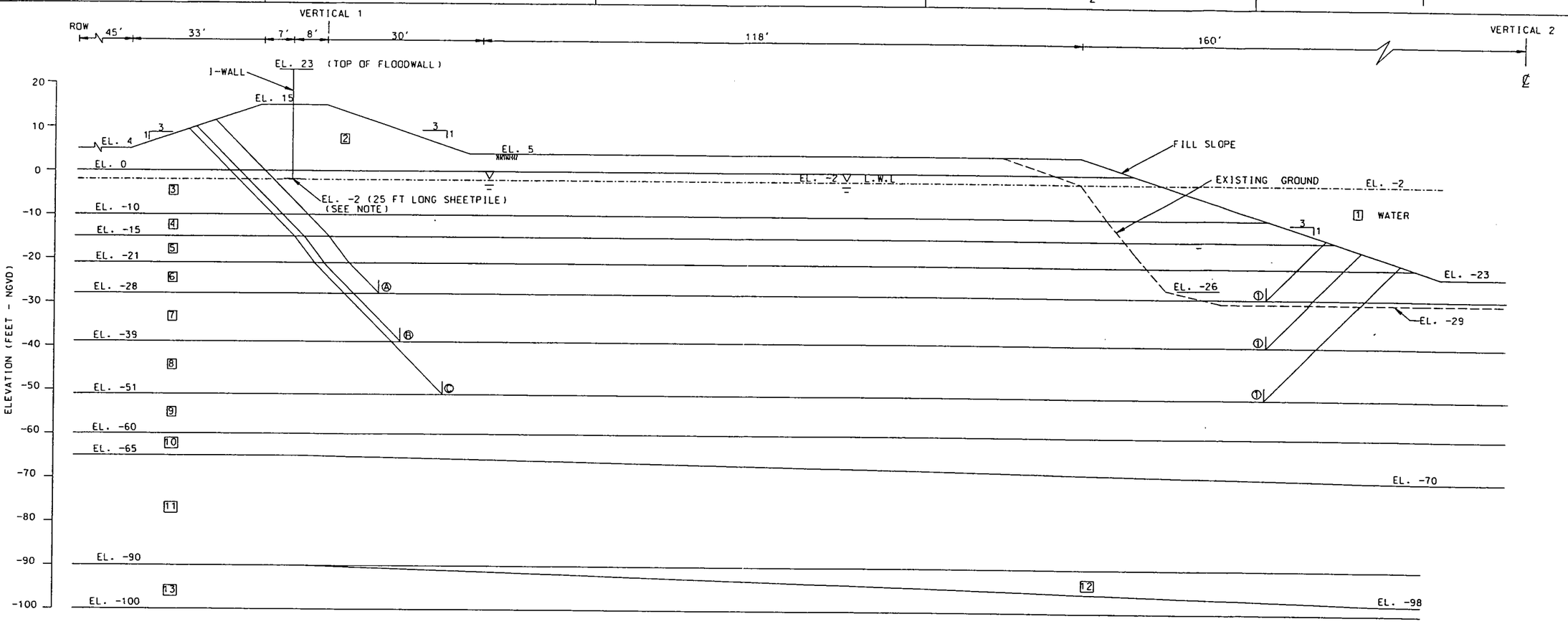
INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

BARGE LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS ALT. I (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

PLATE B-14 (REVISED)



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	104	0	320	320	110	0	300	300
4	94	0	320	320	94	0	320	320
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0
11	118	0	1400	1400	114	0	900	900
12	118	0	1400	1400	115	15	200	200
13	114	0	1400	1400	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	73,081	107,596	1.47
Ⓑ ①	97,775	126,677	1.30
Ⓒ ①	122,172	172,527	1.41

NOTE: SHEETPILE I-WALL GOVERNED BY S-CASE. FS=1.0
SOIL PARAMETERS WITH WATER TO EL. 22.4 ON THE CANAL SIDE OF THE WALL. MAXIMUM MOMENT = 18.2 FT-KIPS/FT AT EL. 6.6. THESE ANALYSES ALSO USED FOR ALTERNATIVE 3. SEE PLATE B-19.

20' 0' 20'

C-A-D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

BARGE LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS ALT. I (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

PLATE B-15 (REVISED)

THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

STA. 18+00.0 WEST B/L = STA. 46+00.30 C/L CHANNEL

WEST SIDE LEVEE–ALTERNATIVE 1 (EL. 15.0 AND 15.0)
RECOMMENDED PLAN

THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

STA. 22+00.0 WEST B/L = STA. 50+00.40 C/L CHANNEL

WEST SIDE LEVEE–ALTERNATIVE 1 (ELS. 15.0 AND 15.0)
RECOMMENDED PLAN – (I-WALL WITH LIGHTWEIGHT FILL)

SCALE: 1'' = 10'

10' 0 10' 20' 30' 40'

Brown Cunningham Gannuch
ENGINEERS ◦ ARCHITECTS ◦ CONSULTANTS
2701 KINGMAN ST. METAIRIE, LOUISIANA

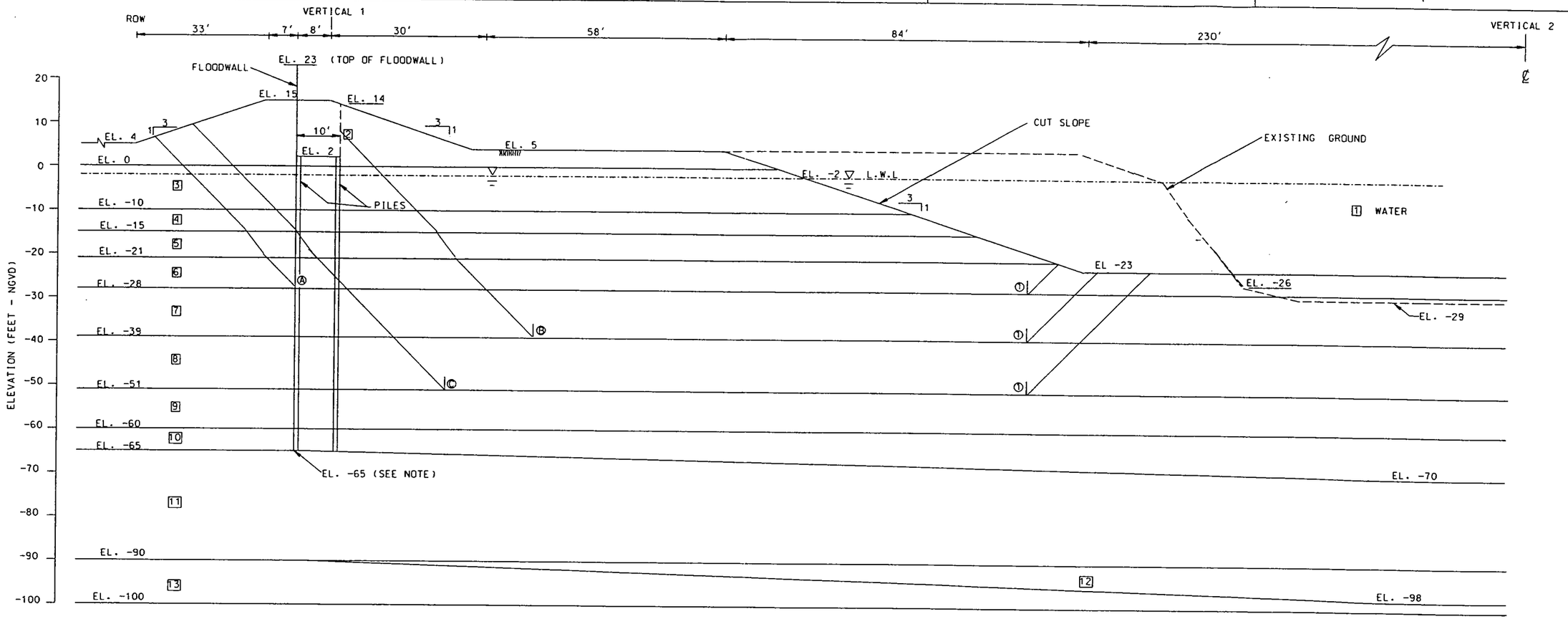
INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 – ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA

BARGE LOCK PLAN–WEST SIDE
ALTERNATIVE 1 (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY DRAWN BY: JSB CHECKED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	CADD FILE: X
	DATE: OCT., 2000		FILE NO. X

PLATE B-16



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	104	0	320	320	110	0	300	300
4	94	0	320	320	94	0	320	320
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0
11	118	0	1400	1400	114	0	900	900
12	118	0	1400	1400	115	15	200	200
13	114	0	1400	1400	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	57.763	87.398	1.51
Ⓑ ①	68.734	88.623	1.29
Ⓒ ①	101.737	139.823	1.37

NOTE: PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL -65.0.

20' 0' 20'

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3012 8TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

BARGE LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS ALT. 2 (NORTH)

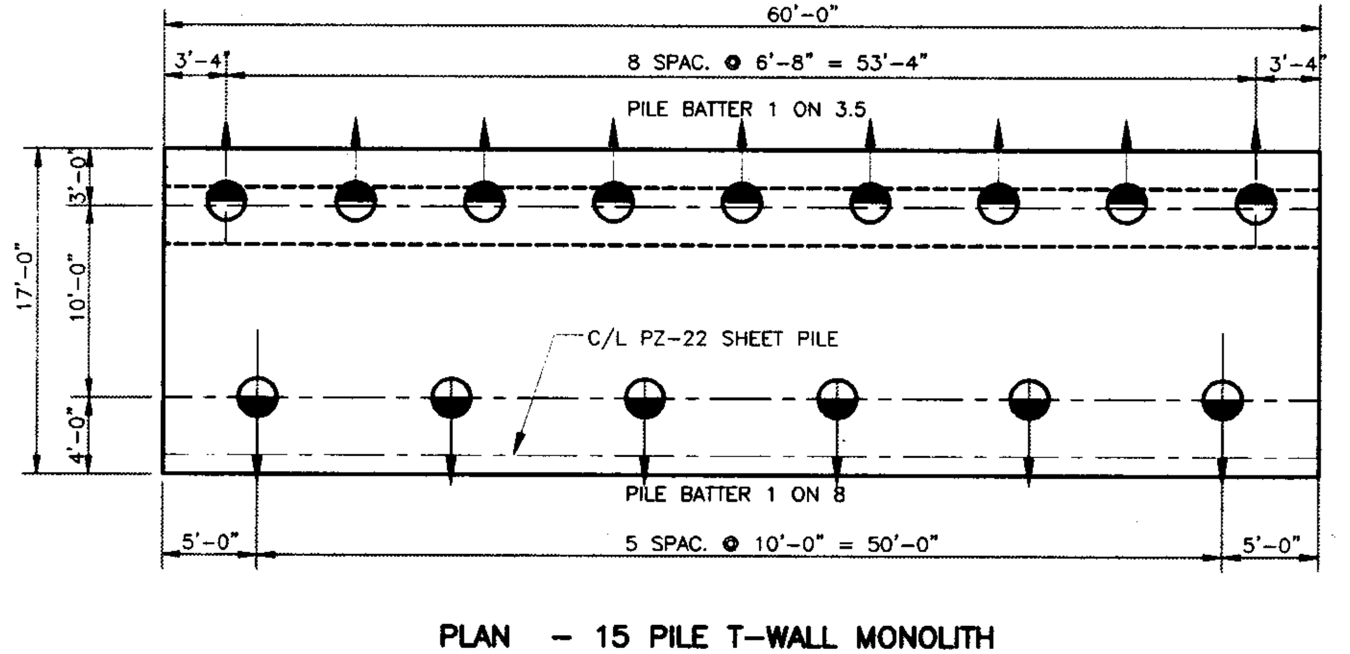
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

PLATE B-17 (REVISED)

THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

STA. 22+00.0 WEST B/L = STA. 50+00.40 C/L CHANNEL
WEST SIDE LEVEE-ALTERNATIVE 2 (ELS. 15.0 AND 15.0)



PLAN - 15 PILE T-WALL MONOLITH
ALTERNATIVE 2
SCALE : 1"=5'-0"

SCALE: 1'' = 10'

SCALE: 1'' = 5'

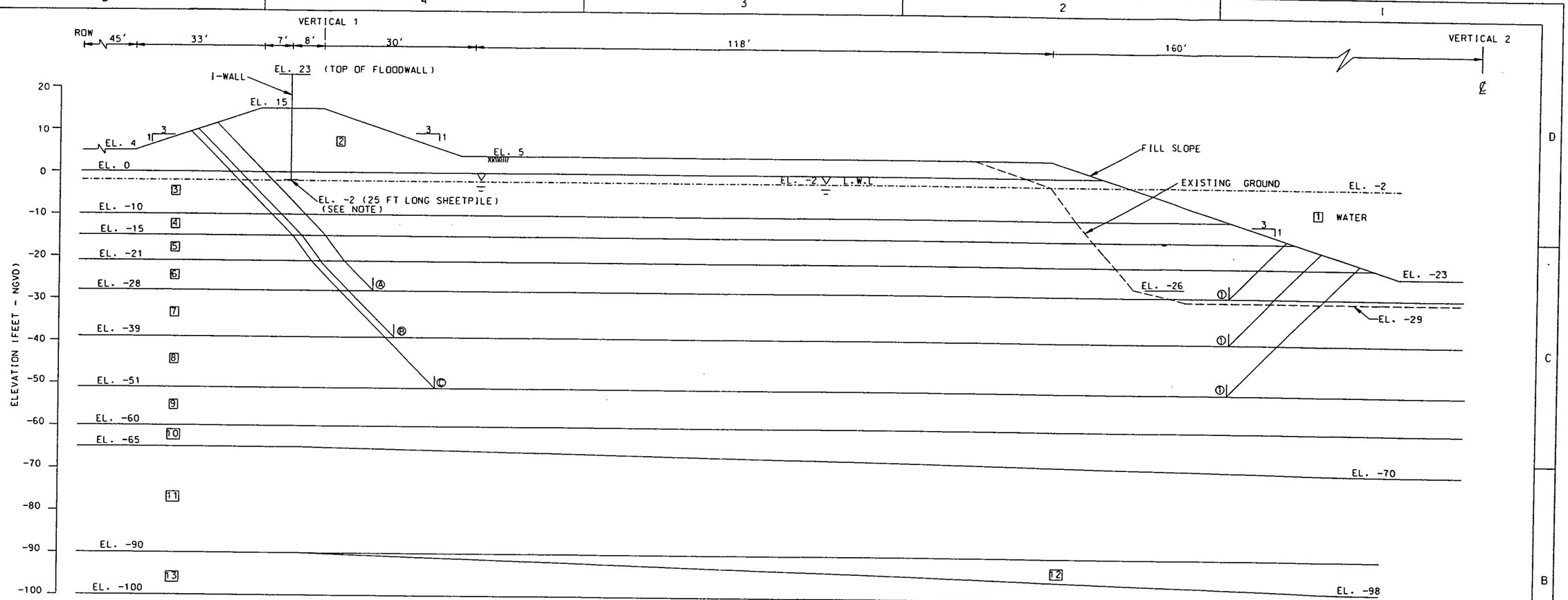
Brown Cunningham Gannuch
ENGINEERS ARCHITECTS CONSULTANTS
2701 KINGMAN ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 - ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA
BARGE LOCK PLAN-WEST SIDE
ALTERNATIVE 2 (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY DRAWN BY: JSB CHECKED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	CADD FILE: X
	DATE: OCT., 2000		FILE NO. X

PLATE B-18



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	104	0	320	320	110	0	300	300
4	94	0	320	320	94	0	320	320
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0
11	118	0	1400	1400	114	0	900	900
12	118	0	1400	1400	115	15	200	200
13	114	0	1400	1400	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT) DRIVING	SUMMATION OF FORCES (LB/FT) RESISTING	FACTOR OF SAFETY
Ⓐ ①	73,081	107,596	1.47
Ⓑ ①	97,775	126,677	1.30
Ⓒ ①	122,172	172,527	1.41

NOTE: SHEETPILE I-WALL GOVERNED BY S-CASE. FS=1.0 SOIL PARAMETERS WITH WATER TO EL. 22.4 ON THE CANAL SIDE OF THE WALL. MAXIMUM MOMENT = 18.2 FT-KIPS/FT AT EL. 6.6. THESE ANALYSES ALSO USED FOR ALTERNATIVE 1. SEE PLATE B-15.

20' 0' 20'

C • A • D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA
BARGE LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS ALT. 3 (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

PLATE B-19 (REVISED)

THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

STA. 18+00.0 WEST B/L = STA. 46+00.30 C/L CHANNEL

WEST SIDE LEVEE–ALTERNATIVE 3 (EL. 15.0 AND 15.0)

SCALE: 1'' = 10'

10' 0 10' 20' 30' 40'

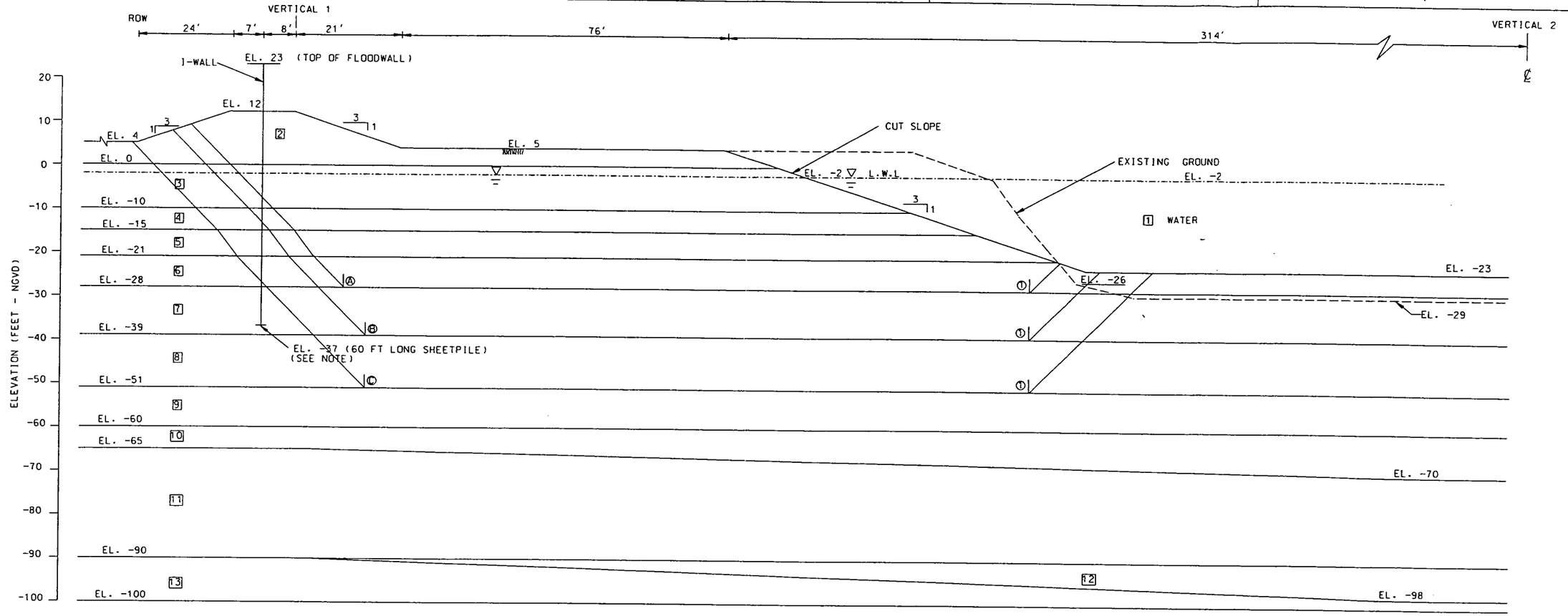
Brown Cunningham Gannuch
ENGINEERS ◦ ARCHITECTS ◦ CONSULTANTS
2701 KINGMAN ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT CANAL
LATERAL FLOOD PROTECTION
DDR NO. 2 – ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA

BARGE LOCK PLAN–WEST SIDE
ALTERNATIVE 3 (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY DRAWN BY: JSB CHECKED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	CADD FILE: X
	DATE: OCT., 2000		FILE NO. X



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	104	0	320	320	110	0	300	300
4	94	0	320	320	94	0	320	320
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0
11	118	0	1400	1400	114	0	900	900
12	118	0	1400	1400	115	15	200	200
13	114	0	1400	1400	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	60,623	90,004	1.48
Ⓑ ①	82,481	110,083	1.33
Ⓒ ①	101,178	146,517	1.45

NOTE: SHEETPILE I-WALL GOVERNED BY O-CASE, FS=1.25
SOIL PARAMETERS WITH WATER TO EL. 22.4 ON THE CANAL SIDE OF THE WALL. MAXIMUM MOMENT = 35.8 FT-KIPS/FT AT EL. -18.1

20' 0' 20'

C-A-D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONA CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

BARGE LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS ALT. 4 (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

PLATE B-21(REVISED)

THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

STA. 22+00.0 WEST B/L = STA. 50+00.40 C/L CHANNEL
WEST SIDE – ALTERNATIVE 4 (ELS. 12.0 AND 12.0)

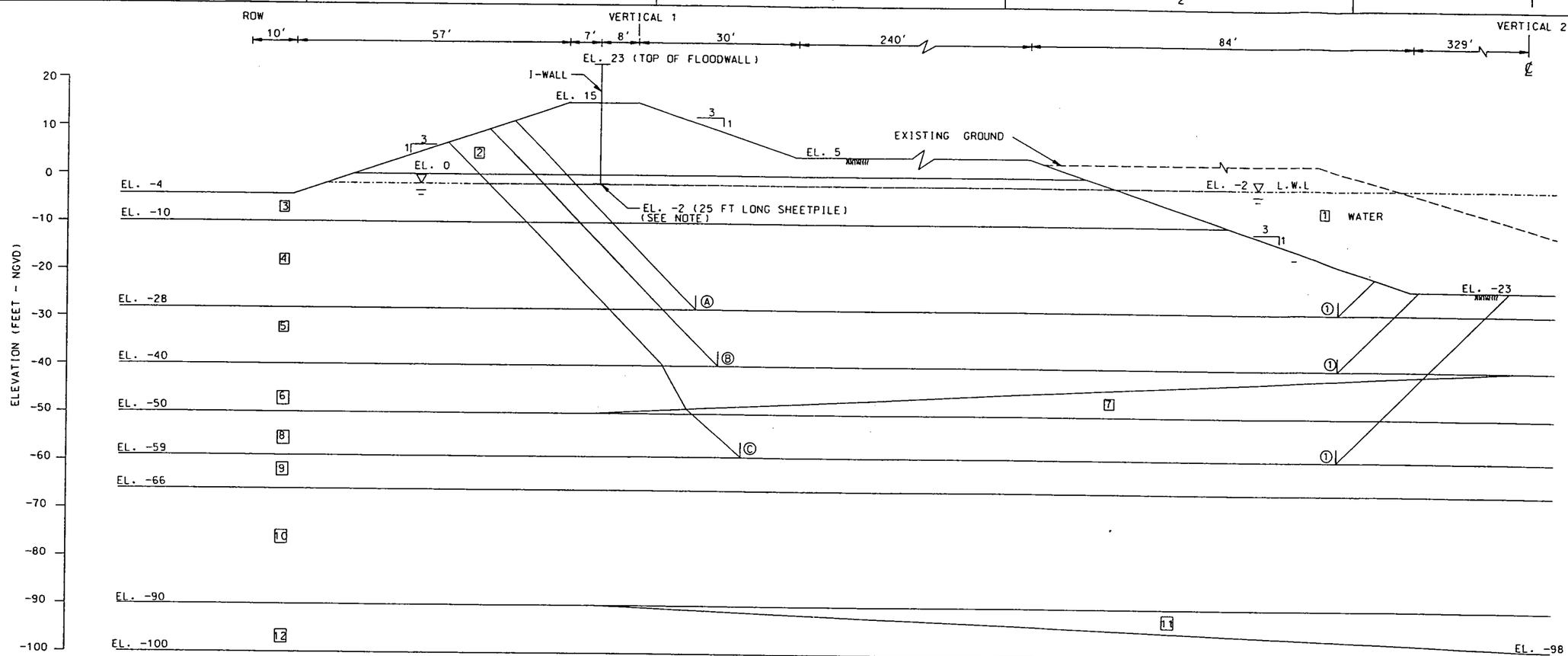
SCALE: 1'' = 10'

Brown Cunningham Gannuch
ENGINEERS · ARCHITECTS · CONSULTANTS
2701 KINGMAN ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 – ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA
BARGE LOCK PLAN–WEST SIDE
ALTERNATIVE 4 (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY DRAWN BY: JSB CHECKED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	CADD FILE: X
	DATE: OCT., 2000		FILE NO. X



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	99	0	200	200	99	0	200	200
4	95	0	200	200	110	0	300	300
5	100	0	380	380	104	0	300	300
6	120	30	0	0	120	30	0	0
7	100	0	420	420	100	0	420	420
8	110	0	380	380	104	0	500	500
9	120	30	0	0	120	30	0	0
10	112	0	1100	1100	114	0	900	900
11	115	15	200	200	115	15	200	200
12	112	0	1100	1100	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	72.186	92.953	1.29
Ⓑ ①	97.443	164.943	1.69
Ⓒ ①	135.641	213.710	1.58

NOTE: SHEETPILE I-WALL GOVERNED BY S-CASE. FS=1.0
SOIL PARAMETERS WITH WATER TO EL. 22.4 ON THE CANAL SIDE OF THE WALL. MAXIMUM MOMENT = 18.2 FT-KIPS/FT AT EL. 6.6

SCALE 1" = 20'
20' 0' 20'

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA
BARGE LOCK PLAN-EAST SIDE
SLOPE STABILITY ANALYSIS ALT. I (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

PLATE B-23 (REVISED)

STA. 18+00.0 WEST B/L = STA. 46+00.30 C/L CHANNEL
EAST SIDE LEVEE-ALTERNATIVE 1 (ELS. 15.0 AND 15.0)
RECOMMENDED PLAN

THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

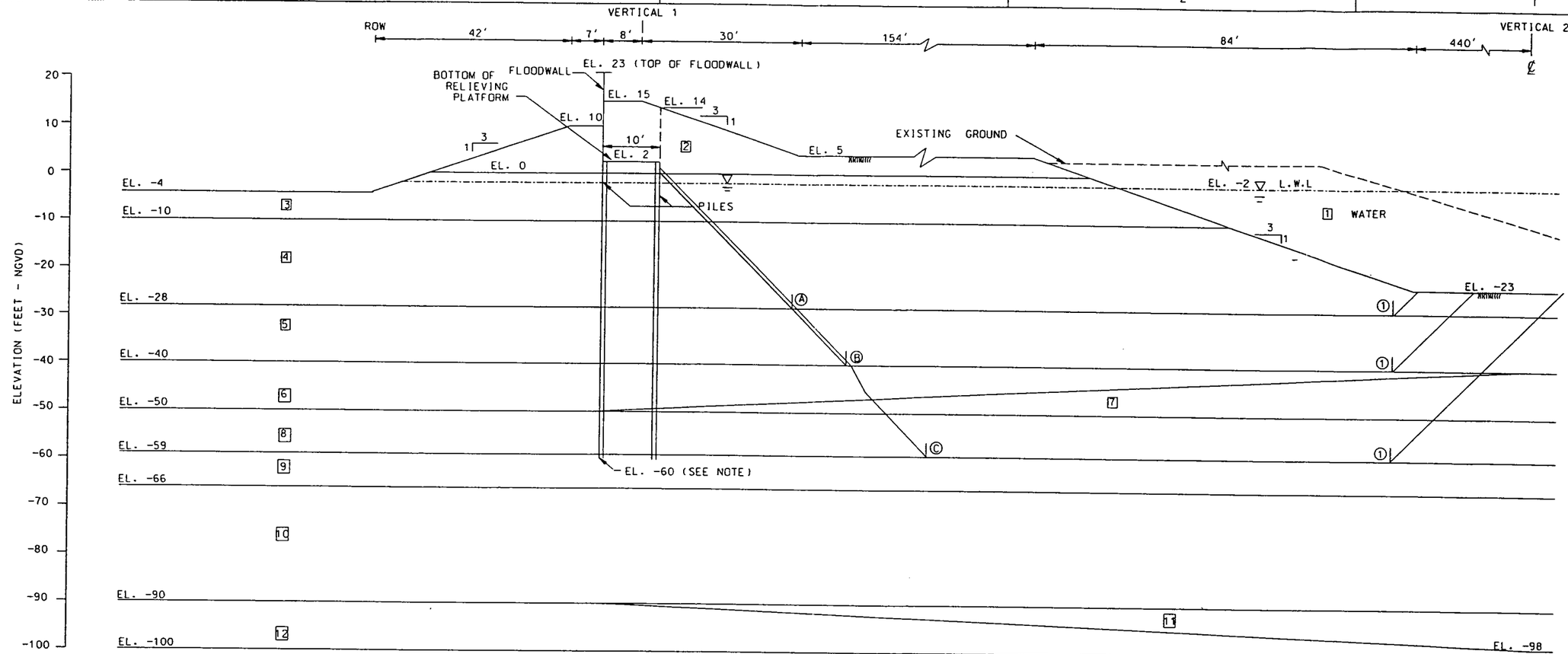
SCALE: 1'' = 10'

Brown Cunningham Gannuch
ENGINEERS ◦ ARCHITECTS ◦ CONSULTANTS
2701 KINGMAN ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 – ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA
BARGE LOCK PLAN – EAST SIDE
ALTERNATIVE 1 (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	CADD FILE: X
DRAWN BY: JSB			FILE NO. X
CHECKED BY: RWY	DATE: OCT., 2000		



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	99	0	200	200	99	0	200	200
4	95	0	200	200	110	0	300	300
5	100	0	380	380	104	0	300	300
6	120	30	0	0	120	30	0	0
7	100	0	420	420	100	0	420	420
8	110	0	380	380	104	0	500	500
9	120	30	0	0	120	30	0	0
10	112	0	1100	1100	114	0	900	900
11	115	15	200	200	115	15	200	200
12	112	0	1100	1100	114	0	900	900

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	49,292	63,675	1.29
Ⓑ ①	67,063	116,518	1.74
Ⓒ ①	96,717	159,045	1.64

NOTE: PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -60.0.

SCALE 1" = 20'

20' 0' 20'

C·A·D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3421 28TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA
BARGE LOCK PLAN-EAST SIDE
SLOPE STABILITY ANALYSIS ALT. 2 (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

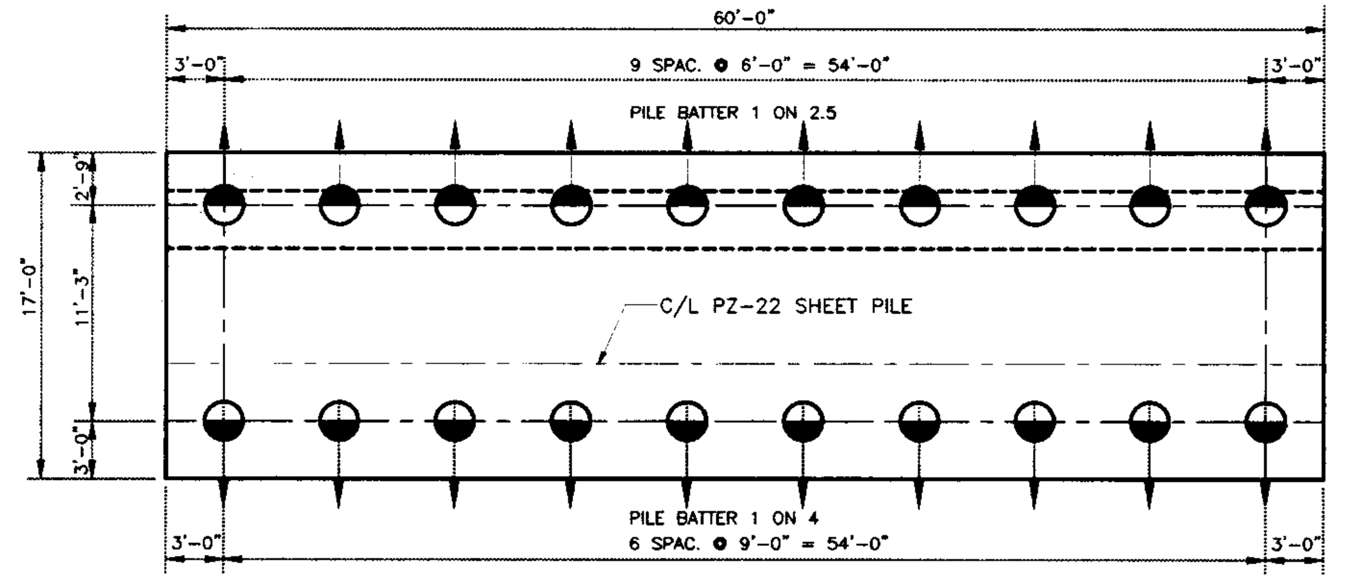
DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
DATE:
CADD FILE:
FILE NO.

PLATE B-25 (REVISED)

STA. 18+00.0 WEST B/L = STA. 46+00.30 C/L CHANNEL

EAST SIDE LEVEE–ALTERNATIVE 2 (ELS. 15.0 AND 10.0)

THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.



PLAN – 20 PILE T-WALL MONOLITH

ALTERNATIVE 2

SCALE: 1"=5'–0"

SCALE: 1'' = 10'

SCALE: 1'' = 5'

Brown Cunningham Gannuch
ENGINEERS • ARCHITECTS • CONSULTANTS
2701 KINGMAN ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 – ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA

BARGE LOCK PLAN–EAST SIDE ALTERNATIVE 2 (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	CADD FILE: X
DRAWN BY: JSB			FILE NO. X
CHECKED BY: RWY	DATE: OCT., 2000		

Appendix A

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT. CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

REPLY TO
ATTENTION OF:

February 23, 2000

Contracting Division
Technical Services Branch

SUBJECT: Request for Proposal for Professional Services Contract for Preparation of a Design Report for the Industrial Canal Lock Replacement Lateral Flood Protection Contract DACW29-99-D-0022, Modification (Task Order 1)

Mr. Rodney J. Gannuch
Brown, Cunningham and Gannuch
2701 Kingman Street
Metairie, Louisiana 70006

Dear Mr. Gannuch:

You are requested to furnish a cost proposal for the subject project to be performed by modification to task order 1 under your contract. Your proposal shall be prepared in accordance with the contract and the attached Scope of Work.

Please submit your proposal to Contracting Division only by close of business Friday , February 25, 2000. The Contracting Division FAX number is 504-862-2889. Please follow any Faxed proposal with a hard copy in the mail.

If you have any questions, please contact Cathy Torlage, Contract Specialist, at 504-862-2874.

Sincerely,

Elois Evans

Elois Evans
Chief, Technical Svcs Br.

Enclosures
As stated

Request for Modification of Professional Services Contract for Preparation of a Design Report for the Industrial Canal Lock Replacement Lateral Flood Protection
Contract No. DACW29-99-D-0022 (Brown, Cunningham and Gannuch)
TASK ORDER 01

3. The Changes:

A. Add the paragraph d to the Scope of Work, on page 3 in the original contract:

d. ADDITIONAL DESIGN ALTERNATIVES. Investigate the following alternatives to the 50% design level. The design effort shall be sufficient to determine the feasibility of using an I-Wall or pile founded T-Wall structure. All designs shall be adequate to determine unit cost comparison. For all alternatives investigated provide one (1) cross-section sheet that depicts the final design section, the required floodwall configuration and foundation piling requirements. For the area north of Claiborne Avenue, provide one (1) plan sheet that depicts the final floodwall alignments. For all alternatives investigated provide one (1) geotechnical stability sheet that depicts the final design section and computed factors safety. One conference shall be added to present the findings. The alternatives are as follows:

SHIP LOCK ALTERNATIVES

1. North of Claiborne Avenue:

West Side - Decrease fill to El. 15.0 Floodside and review stability analysis using an I-wall for the required flood protection.

East Side - Determine the fill requirements in the area east of the guidewall (laying channel area) to allow for I-wall flood protection. Using the two backfill configurations (Els. 15.0 and 10.0, Els. 15.0 and 13.0) raise the fill as necessary to establish the minimum stability line required to create a "green area" on the protected side of the wall. (Two analyses.)

2. South of Claiborne Avenue: (All alternatives consider use of steel pipe piles)

BASE

A. Provide stability analysis and floodwall requirements assuming El. 10.0 as the fill elevation on both sides of the wall. (East and West Side).

B. Provide stability analysis and floodwall requirements assuming El. 10.0 as the elevation on both sides of the wall. (East and West Side).

ADDED

A. Provide stability analysis and floodwall requirements using the channel geometry presented in the 50% DDR submittal except revise the berms in the channel slopes as necessary and provide an alternative slope, if beneficial. Fill elevations shall remain at El. 15.0 on the Floodside and El. 10.0 on the Protected Side. Determine allowable fill elevation on the Floodside assuming minimal support from the T-wall monolith. (Use 10 feet maximum.)

B. Provide stability analysis and floodwall requirements using the channel geometry presented in the 50% DDR submittal except reduce the bottom width from 200 feet to 150 feet. Fill elevations shall remain at El. 10.0 on the Protected Side. Revise the berms in the channel slopes as necessary and provide an alternative slope, if beneficial. Fill elevations shall remain at El. 15.0 on the Floodside and El. 10.0 on the Protected Side. Determine allowable fill elevation on the Floodside assuming minimal support from the T-wall monolith. (Use 10 feet maximum.)

C. Provide stability analysis and floodwall requirements assuming fill elevations at El. 15.0 on the Floodside and El. 10.0 on the Protected Side. Use lightweight materials for the required fills to minimize foundation requirements. (East Side)

D. Based on the results of the analyses of the three Added Alternatives (above) on the East Side, combine the alternatives and review stability analysis using an I-wall for the required flood protection. (Determine if an I-wall solution will work for any combination)

E. Based on the results of the analyses of the three Added Alternatives (above) on the East Side, provide stability analysis and floodwall requirements for the West Side using the best alternative.

BARGE LOCK ALTERNATIVES

A. Provide stability analysis and floodwall requirements for the Barge Lock configuration using the alternative described above.

B. Based on the results of the analyses of all alternatives on the East Side, provide stability analysis and floodwall requirements for the best alternative and consider that the existing channel is filled as necessary to achieve the required bottom elevation.

Tobb

E. PROJECT SCHEDULE. Work described above.

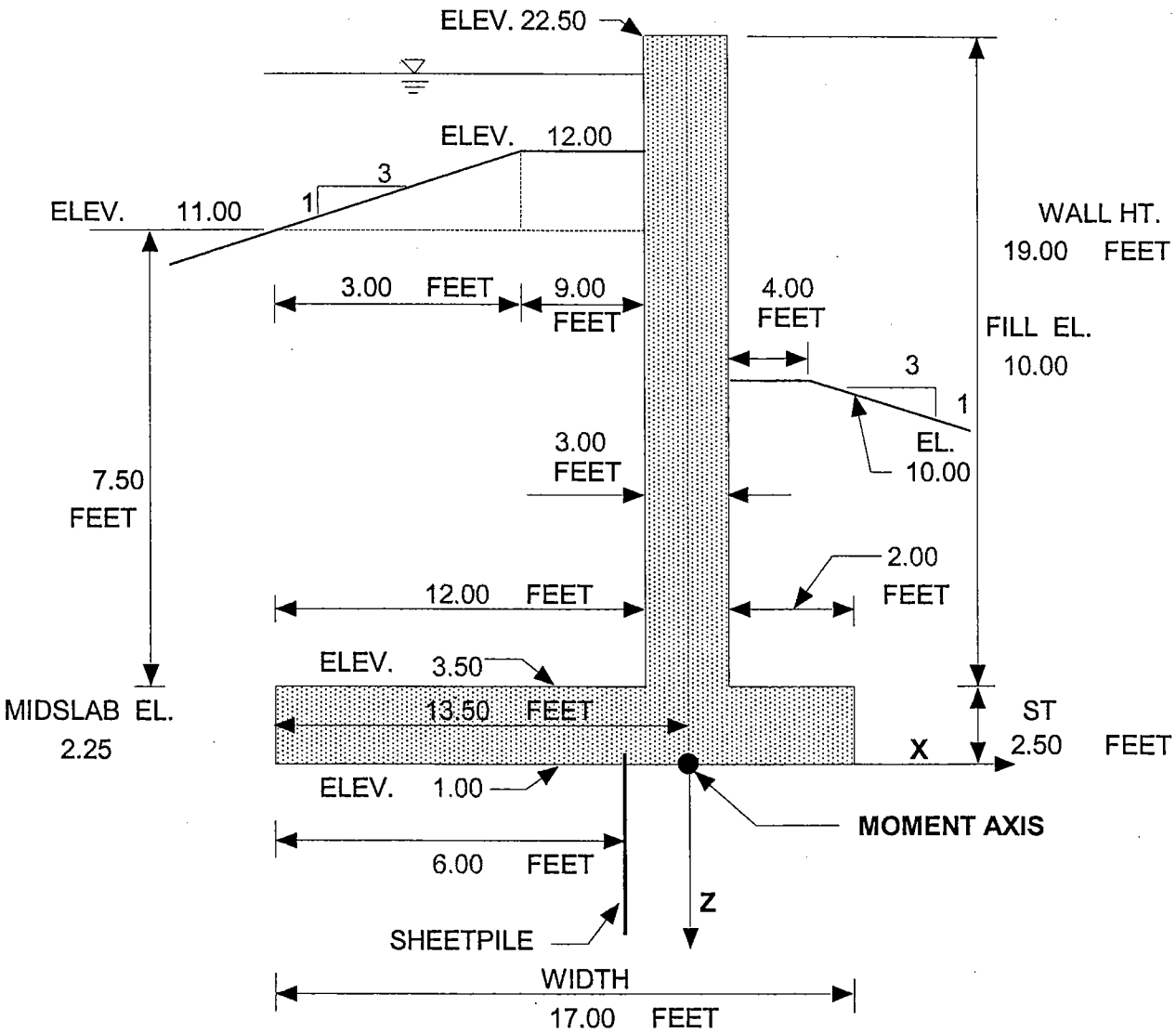
Work Item	Time Interval For Work Item in Calendar Days	Time in Calendar Days From Date of Acknowledge of Receipt of Notice to Proceed
Notice to Proceed		0
Pre-work Conference	5	5
Submit DDR for 50% Review	90	95
End of 50% Review	30	165
**Additional Alternatives	40	135
Review Conference	3	168
Resolution of 50% Review Comments	7	175
Submit DDR for 95% Local Review (LR)	50	225
End of LR	20	245
Resolution of LR comments	14	259
Submit Final DDR	15	274

**** The time interval starts after NTP.**

Appendix B

IHNC SHIP LOCK
WEST SIDE - S. OF CLAIBORNE - LEVEE AT 12.0 - 10.0
BASIC T-WALL GEOMETRY

CONCRETE STRENGTH	**4,000**	
REINFORCING STRENGTH	**60,000**	
WALL INTERVAL	1.33	
SLAB INTERVAL	2	
MONOLITH LENGTH	60	
BACKFILL WEIGHT	122.5	**PCF**
Ko	0.8	

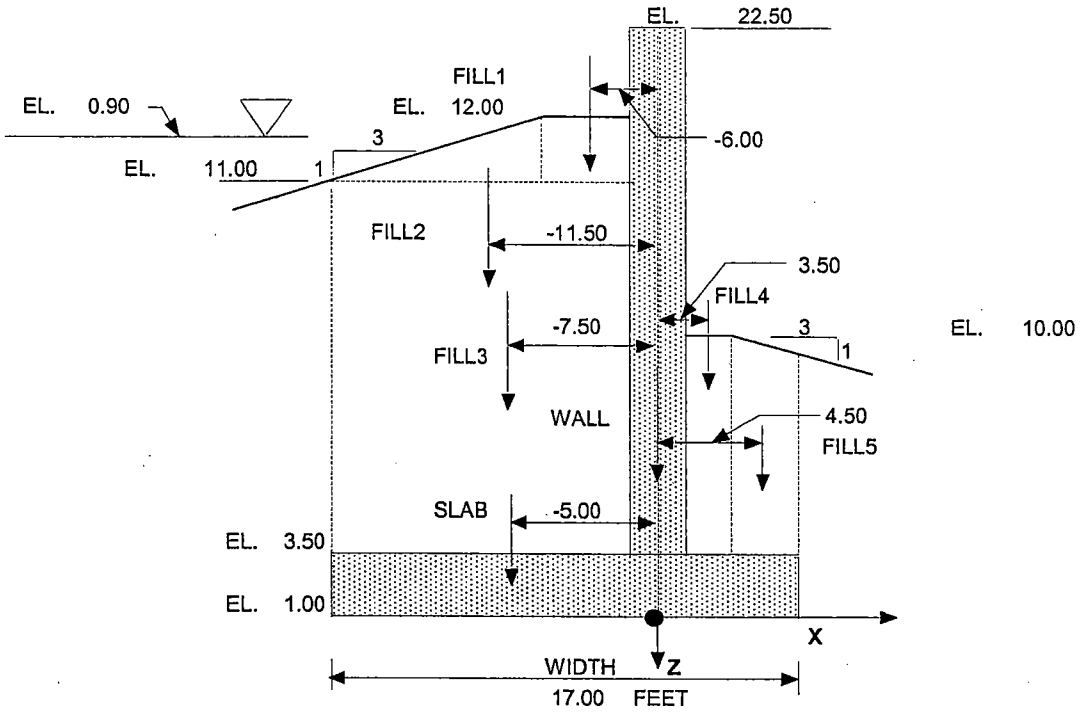


IHNC SHIP LOCK

WEST SIDE - S. OF CLAIBORNE - LEVEE AT 12.0 - 10.0

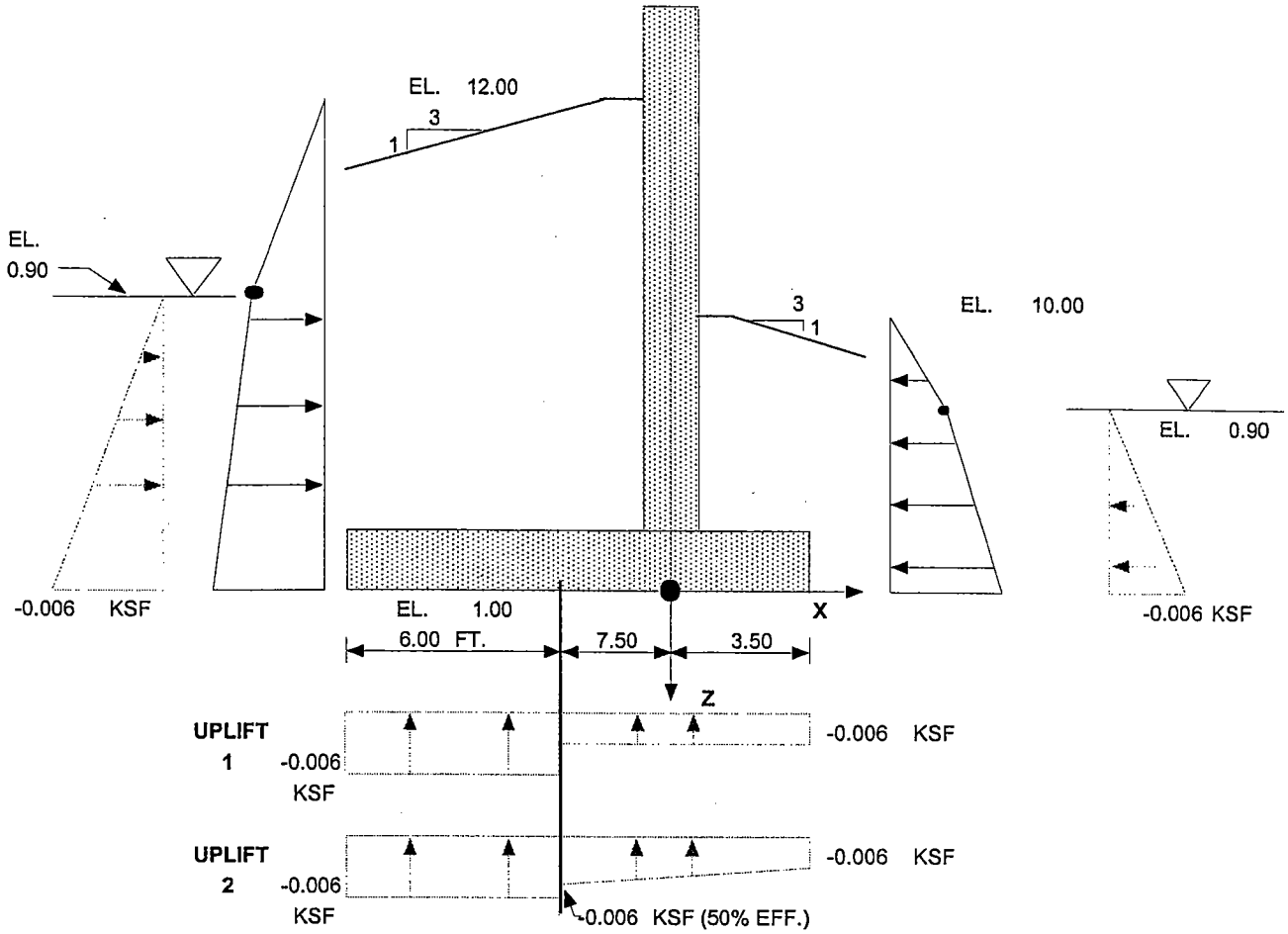
CASE 1 - CONSTRUCTION

FLOODSIDE WATER ELEV.	0.90
UPLIFT - PROT. SIDE	0.90
ALLOWABLE OVERSTRESS	16.66 %



ITEM	FORCE Z (WEIGHT)	X CENT. FEET	Y CENT. FEET	Myy FT.-K	Mzz FT.-K
CONCRETE SLAB	6.38	-5.00	0.00	32	0
CONCRETE WALL	8.55	0.00	0.00	0	0
FLOODSIDE FILL1	1.10	-6.00	0.00	7	0
FLOODSIDE FILL2	0.18	-11.50	0.00	2	0
FLOODSIDE FILL3	11.03	-7.50	0.00	83	0
PROTECTED SIDE FILL4	3.19	3.50	0.00	-11	0
PROTECTED SIDE FILL5	-1.59	4.50	0.00	7	0
FLOODSIDE WATER	0.00	-26.97	0.00	0	0
FLOODSIDE WATER	0.00	0.00	0.00	0	0
TOTALS	**28.83**	-4.14		**119.31**	**0**
CONCRETE	**14.93**	-2.14		**31.88**	**0**
FILL 1-3	**12.31**	-7.43		**91.42**	**0**
FILL 4-5	**1.59**	2.50		**-3.98**	**0**
FS WATER	**0.00**	-		**0.00**	**0**
	KIPS			FT.-K	FT.-K

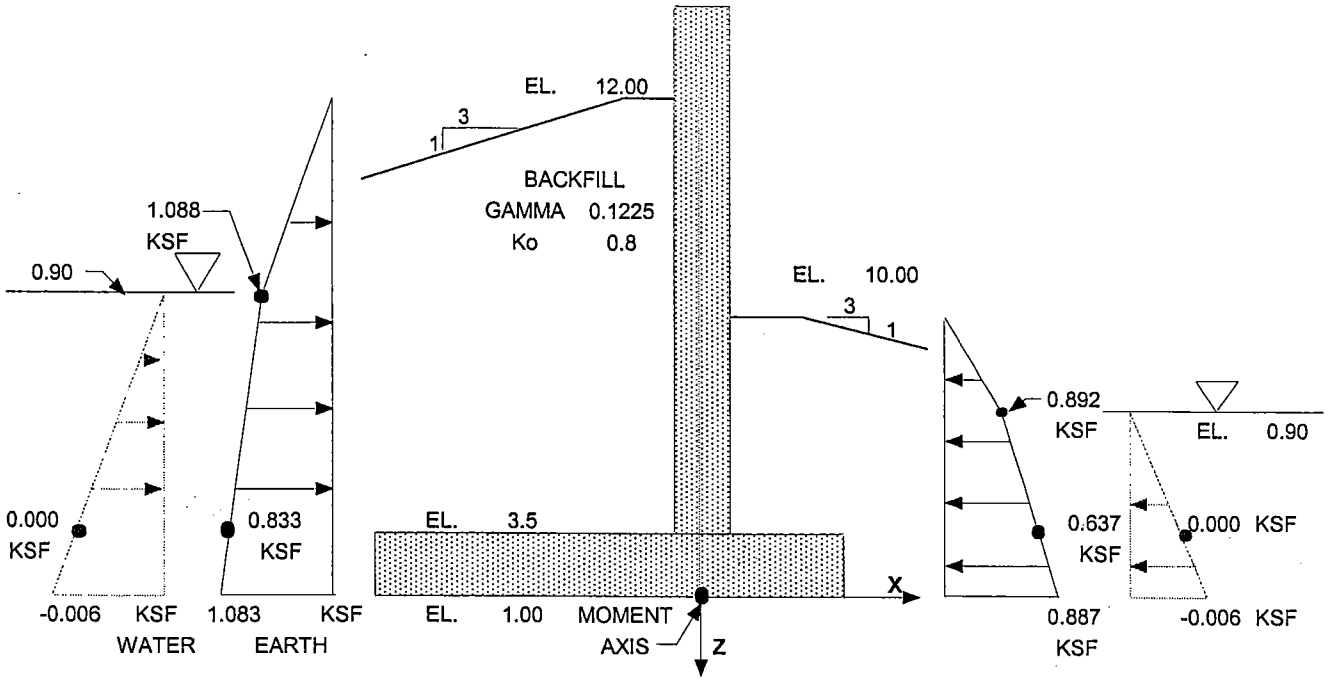
IHNC SHIP LOCK
WEST SIDE - S. OF CLAIBORNE - LEVEE AT 12.0 - 10.0
CASE 1 - CONSTRUCTION



ITEM	WIDTH	PRESS	FORCE Z	X CENT. FEET	Y CENT. FEET	Myy FT.-K	Mzz FT.-K
	FLOODSIDE:						
UPLIFT 1	6.00	-0.01	0.04	-10.50	0.00	0	0
	PROTECTED SIDE:						
UPLIFT 1	11.00	-0.01	0.07	-2.00	0.00	0	0
TOTALS			**0.11**	-5.00		**1**	**0**
FLD.SIDE			**0.04**	-10.50		**0.39**	**0**
PROT. SIDE			**0.07**	-2.00		**0.14**	**0**
			KIPS			FT.-K	FT.-K

ITEM	WIDTH	PRESS	FORCE Z	X CENT. FEET	Y CENT. FEET	Myy FT.-K	Mzz FT.-K
	FLOODSIDE:						
UPLIFT 2	6.00	-0.01	0.04	-10.50	0.00	0	0
	PROTECTED SIDE:						
UPLIFT 2	11.00	-0.01	0.07	-2.00	0.00	0	0
UPLIFT 2	11.00	0.00	0.00	-3.83	0.00	0	0
TOTALS			**0.11**	-5.00		**1**	**0**
FLD.SIDE			**0.04**	-10.50		**0**	**0**
PROT. SIDE			**0.07**	-2.00		**0**	**0**
			KIPS			FT.-K	FT.-K

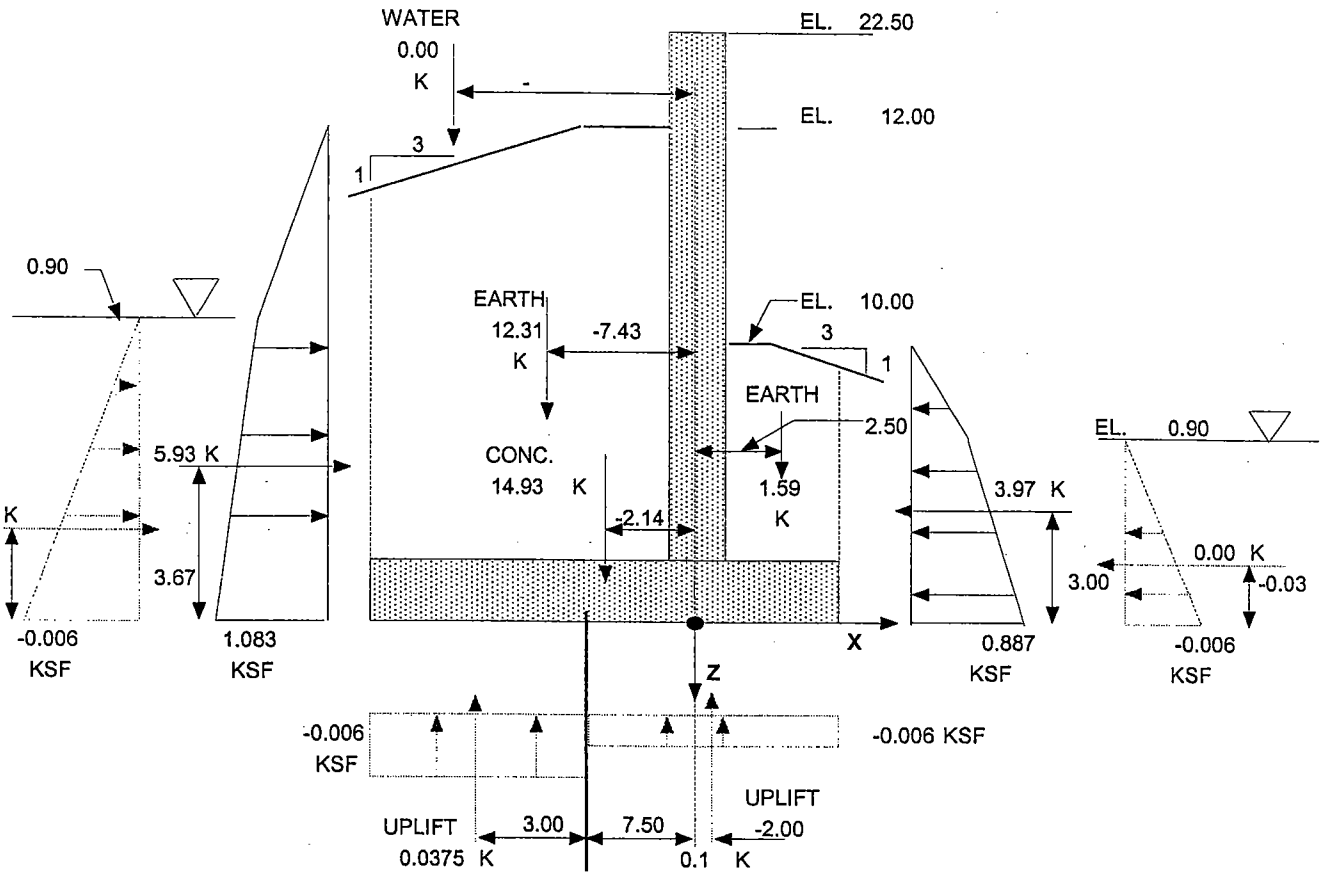
IHNC SHIP LOCK
WEST SIDE - S. OF CLAIBORNE - LEVEE AT 12.0 - 10.0
CASE 1 - CONSTRUCTION



ITEM	HEIGHT	PRESS	FORCE X		Y CENT. FEET	Z CENT. FEET	Mzz FT-K/FT	Myy FT-K/FT
	FLOODSIDE:							
EARTH 1	11.10	1.088	6.04	k/ft	0.00	-3.60	0	-21.7
EARTH 2	-0.10	1.088	-0.11	k/ft	0.00	0.05	0	-0.0
EARTH 3	-0.10	-0.005	0.00	k/ft	0.00	0.03	0	0.0
GRND WATER	-0.10	-0.006	0.00	k/ft	0.00	0.03	0	0.0
	PROTECTED:			k/ft				
EARTH 4	9.10	0.892	-4.06	k/ft	0.00	-2.93	0	11.9
EARTH 5	-0.10	0.892	0.09	k/ft	0.00	0.05	0	0.0
EARTH 6	-0.10	0.887	-0.00	k/ft	0.00	0.03	0	-0.0
GRND WATER	-0.10	-0.006	-0.00	k/ft	0.00	0.03	0	-0.0

	FORCE X		Y CENT. FEET	Z CENT. FEET	Mzz FT-K/FT.	Myy FT-K/FT.
FLOODSIDE EARTH FORCE	5.93		0.00	-3.67		-21.74
FLOODSIDE WATER FORCE	0.00		0.00	0.03		0.00001
TOTAL FLOODSIDE FORCE	5.93	k/ft	0.00	-3.67	0.0	-21.7
PROT. SIDE EARTH FORCE	-3.97		0.00	-3.00		11.9
PROT. SIDE WATER FORCE	-0.00		0.00	0.03		-0.0
TOTAL PROT. SIDE FORCE	-3.97	k/ft	0.00	-3.00	0.0	11.9
TOTAL NET HORIZ. FORCE	1.96	k/ft	0.00	-5.02	0.0	-9.8

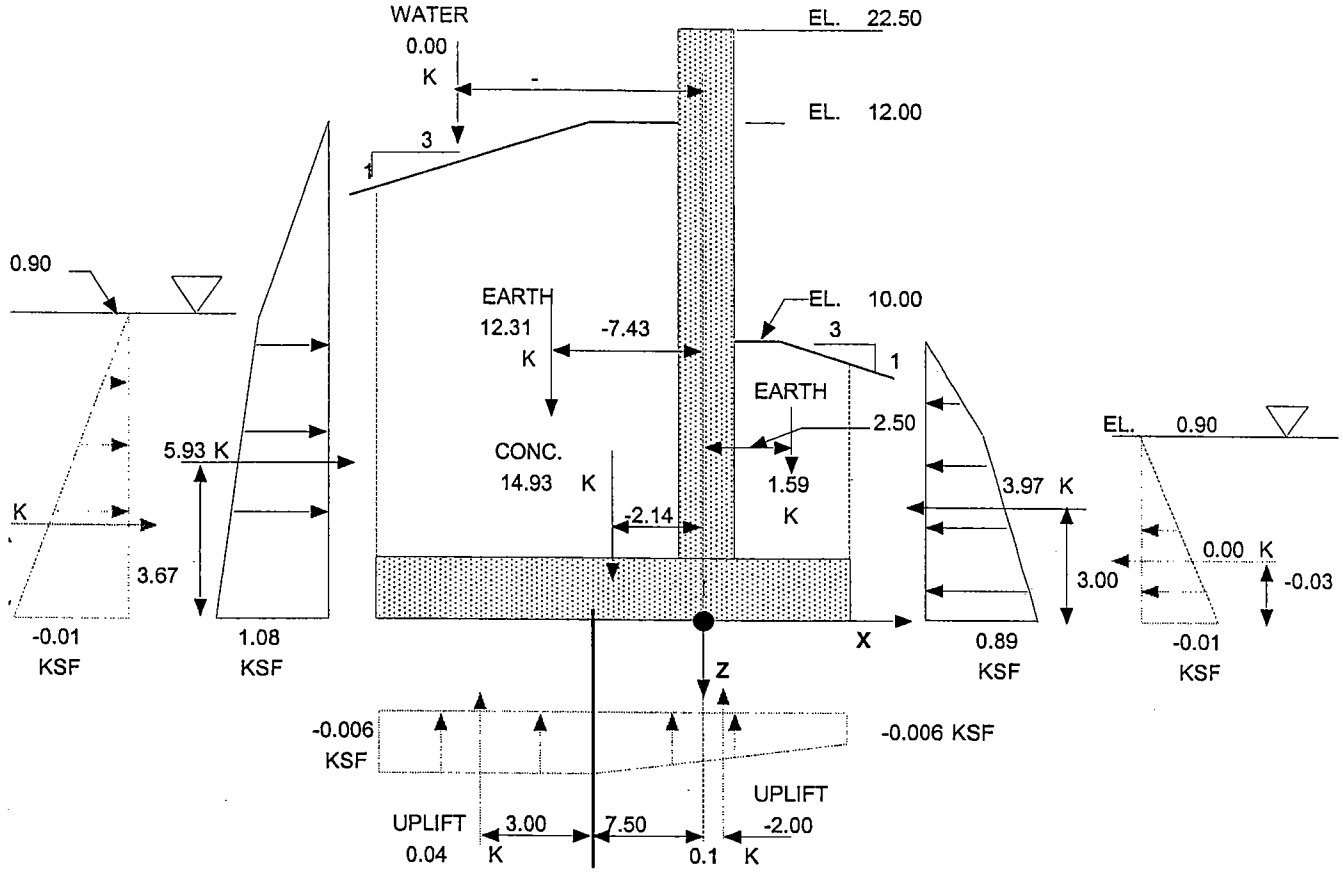
IHNC SHIP LOCK
WEST SIDE - S. OF CLAIBORNE - LEVEE AT 12.0 - 10.0
CASE 1 - CONSTRUCTION



ITEM	FORCE X	FORCE Y	FORCE Z		X CENT. FEET	Z CENT. FEET	Myy FT-K/FT	Mzz FT-K/FT
CONCRETE	0.0	0.0	14.9	k/ft	-2.14	0.0	32	0
FLDSIDE FILL	0.0	0.0	12.3	k/ft	-7.43	0.0	91	0
PROTSIDE FILL	0.0	0.0	1.6	k/ft	2.50	0.0	-4	0
F. SIDE UPLIFT	0.0	0.0	0.0	k/ft	-10.50	0.0	0	0
P. SIDE UPLIFT	0.0	0.0	0.1	k/ft	-2.00	0.0	0	0
F. S. EARTH Pr.	5.9	0.0	0.0	k/ft	-	-3.67	-22	0
P. S. EARTH Pr.	-4.0	0.0	0.0	k/ft	-	-3.00	12	0
F. S. WATER Pr.	0.0	0.0	0.0	k/ft	-	0.03	0	0
P. S. WATER Pr.	-0.0	0.0	0.0	k/ft	-	0.03	-0	0

	X	Y	Z	Mxx	Myy	Mzz
TOTALS	2.0	0.0	28.9	0	110	0
MONO. TOTAL	117.6	0.0	1736.1	0	6600	0

IHNC SHIP LOCK
WEST SIDE - S. OF CLAIBORNE - LEVEE AT 12.0 - 10.0
CASE 1 - CONSTRUCTION

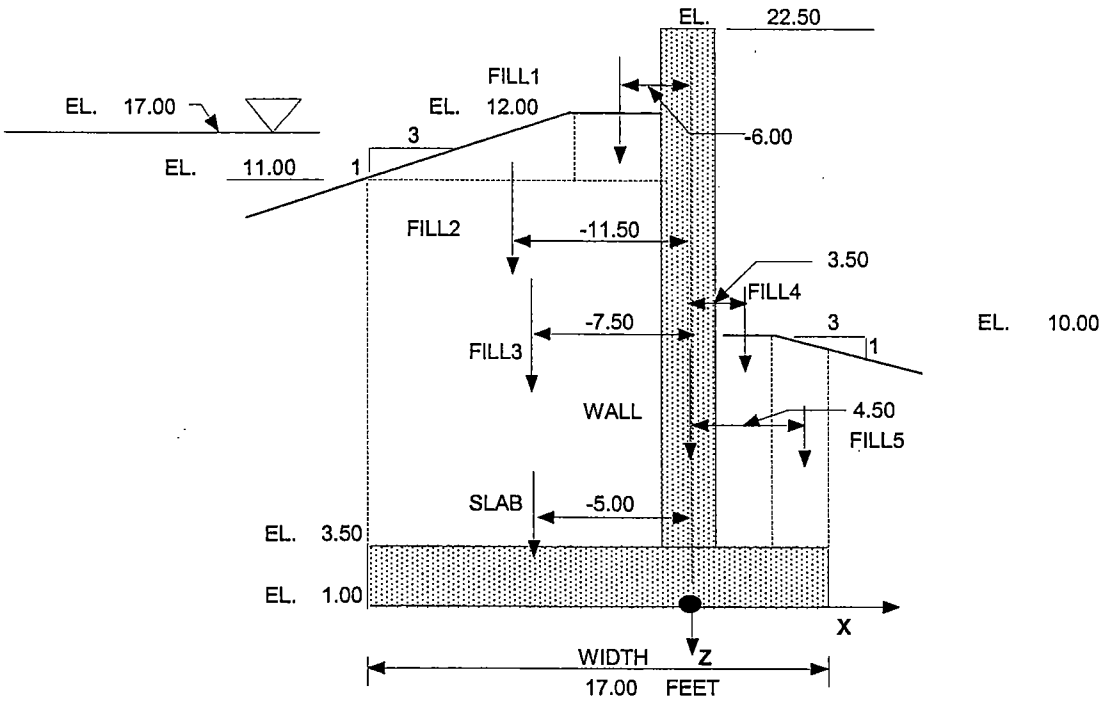


ITEM	FORCE X	FORCE Y	FORCE Z		X CENT. FEET	Z CENT. FEET	Myy FT-K/FT	Mzz FT-K/FT
CONCRETE	0.0	0.0	14.9	k/ft	-2.14	0.00	32	0
FLDSIDE FILL	0.0	0.0	12.3	k/ft	-7.43	0.00	91	0
PROTSIDE FILL	0.0	0.0	1.6	k/ft	2.50	0.00	-4	0
F. SIDE UPLIFT	0.0	0.0	0.0	k/ft	-10.50	0.00	0	0
P. SIDE UPLIFT	0.0	0.0	0.1	k/ft	-2.00	0.00	0	0
F. S. EARTH Pr.	5.9	0.0	0.0	k/ft	-	-3.67	-22	0
P. S. EARTH Pr.	-4.0	0.0	0.0	k/ft	-	-3.00	12	0
F. S. WATER Pr.	0.0	0.0	0.0	k/ft	-	0.03	0	0
P. S. WATER Pr.	-0.0	0.0	0.0	k/ft	-	0.03	-0	0

	X	Y	Z		Mxx	Myy	Mzz
TOTALS	2.0	0.0	28.9		0	110	0
MONO. TOTAL	117.6	0.0	1736.1		0	6600	0
					X	Y	Z
VERTICAL			1736		-4.14		
HORIZ			118				-5.02

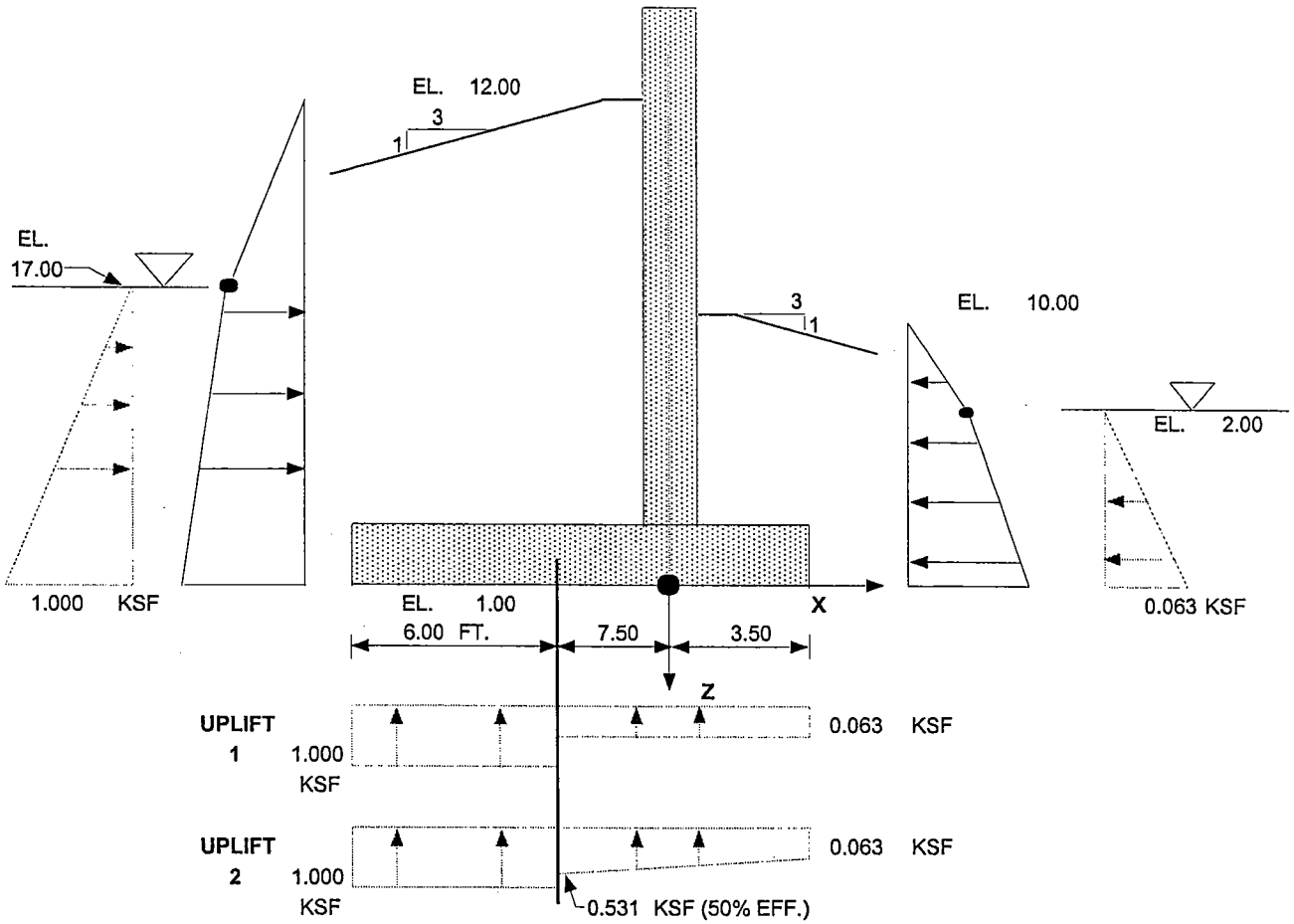
IHNC SHIP LOCK
WEST SIDE - S. OF CLAIBORNE - LEVEE AT 12.0 - 10.0
CASE 2 - RIVER FLOWLINE

FLOODSIDE WATER ELEV.	17.00
UPLIFT - PROT. SIDE	2.00
ALLOWABLE OVERSTRESS	NONE



ITEM	FORCE Z (WEIGHT)	X CENT. FEET	Y CENT. FEET	Myy FT.-K	Mzz FT.-K
CONCRETE SLAB	6.38	-5.00	0.00	32	0
CONCRETE WALL	8.55	0.00	0.00	0	0
FLOODSIDE FILL1	1.10	-6.00	0.00	7	0
FLOODSIDE FILL2	0.18	-11.50	0.00	2	0
FLOODSIDE FILL3	11.03	-7.50	0.00	83	0
PROTECTED SIDE FILL4	3.19	3.50	0.00	-11	0
PROTECTED SIDE FILL5	-1.59	4.50	0.00	7	0
FLOODSIDE WATER	0.09	-12.50	0.00	1	0
FLOODSIDE WATER	3.75	-7.50	0.00	28	0
TOTALS	**32.67**	-4.55		**148.61**	**0**
CONCRETE	**14.93**	-2.14		**31.88**	**0**
FILL 1-3	**12.31**	-7.43		**91.42**	**0**
FILL 4-5	**1.59**	2.50		**-3.98**	**0**
FS WATER	**3.84**	-7.62		**29.30**	**0**
	KIPS			FT.-K	FT.-K

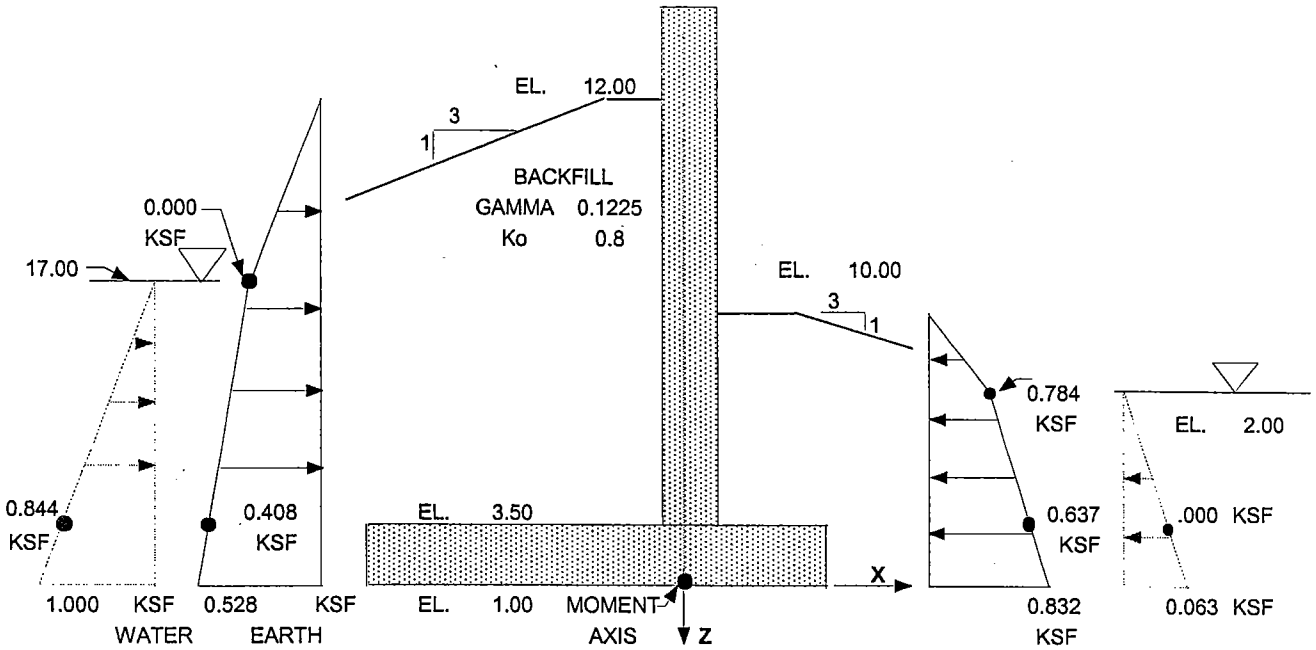
IHNC SHIP LOCK
WEST SIDE - S. OF CLAIBORNE - LEVEE AT 12.0 - 10.0
CASE 2 - RIVER FLOWLINE



ITEM	WIDTH	PRESS	FORCE Z	X CENT. FEET	Y CENT. FEET	Myy FT.-K	Mzz FT.-K
	FLOODSIDE:						
UPLIFT 1	6.00	1.00	-6.00	-10.50	0.00	-63	0
	PROTECTED SIDE:						
UPLIFT 1	11.00	0.06	-0.69	-2.00	0.00	-1	0
TOTALS			**-6.69**	-9.63		**-64**	**0**
FLD.SIDE			**-6.00**	-10.50		**-63.00**	**0**
PROT. SIDE			**-0.69**	-2.00		**-1.38**	**0**
			KIPS			FT.-K	FT.-K

ITEM	WIDTH	PRESS	FORCE Z	X CENT. FEET	Y CENT. FEET	Myy FT.-K	Mzz FT.-K
	FLOODSIDE:						
UPLIFT 2	6.00	1.00	-6.00	-10.50	0.00	-63	0
	PROTECTED SIDE:						
UPLIFT 2	11.00	0.06	-0.69	-2.00	0.00	-1	0
UPLIFT 2	11.00	0.47	-2.58	-3.83	0.00	-10	0
TOTALS			**-9.27**	-8.01		**-74**	**0**
FLD.SIDE			**-6.00**	-10.50		**-63**	**0**
PROT. SIDE			**-3.27**	-3.45		**-11**	**0**
			KIPS			FT.-K	FT.-K

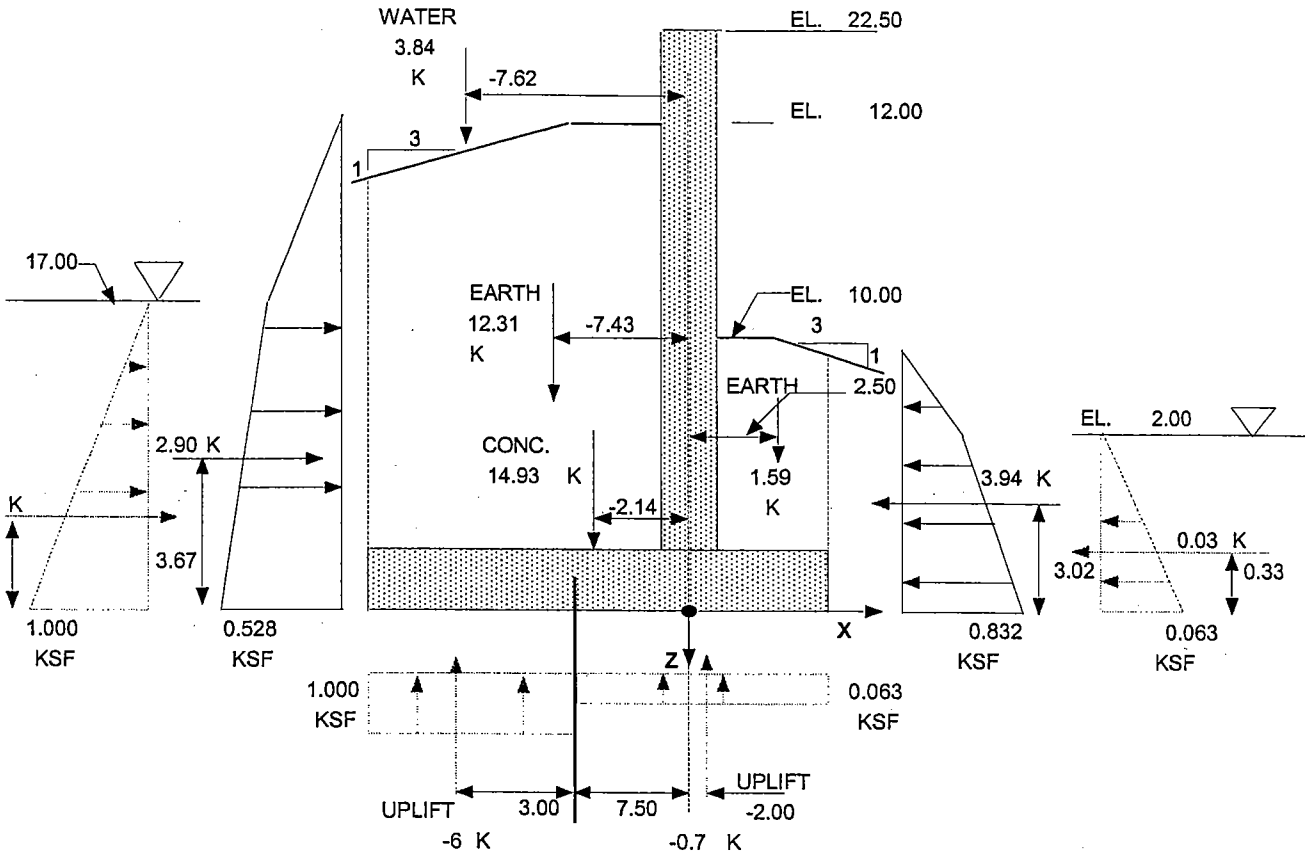
IHNC SHIP LOCK
WEST SIDE - S. OF CLAIBORNE - LEVEE AT 12.0 - 10.0
CASE 2 - RIVER FLOWLINE



ITEM	HEIGHT	PRESS	FORCE X		Y CENT. FEET	Z CENT. FEET	Mzz FT-K/FT	Myy FT-K/FT
	FLOODSIDE:							
EARTH 1	0.00	0.000	0.00	k/ft	0.00	0.00	0	0.0
EARTH 2	11.00	0.000	0.00	k/ft	0.00	0.00	0	0.0
EARTH 3	11.00	0.528	2.90	k/ft	0.00	-3.67	0	-10.6
GRND WATER	16.00	1.000	8.00	k/ft	0.00	-5.33	0	-42.7
	PROTECTED:			k/ft				
EARTH 4	8.00	0.784	-3.14	k/ft	0.00	-3.67	0	11.5
EARTH 5	1.00	0.784	-0.78	k/ft	0.00	-0.50	0	0.4
EARTH 6	1.00	0.832	-0.02	k/ft	0.00	-0.33	0	0.0
GRND WATER	1.00	0.063	-0.03	k/ft	0.00	-0.33	0	0.0

	FORCE X		Y CENT. FEET	Z CENT. FEET	Mzz FT-K/FT.	Myy FT-K/FT.
FLOODSIDE EARTH FORCE	2.90		0.00	-3.67		-10.648
FLOODSIDE WATER FORCE	8.00		0.00	-5.33		-42.667
TOTAL FLOODSIDE FORCE	10.90	k/ft	0.00	-4.89	0.0	-53.3
PROT. SIDE EARTH FORCE	-3.94		0.00	-3.02		11.9
PROT. SIDE WATER FORCE	-0.03		0.00	-0.33		0.0
TOTAL PROT. SIDE FORCE	-3.98	k/ft	0.00	-3.00	0.0	11.9
TOTAL NET HORIZ. FORCE	6.93	k/ft	0.00	-5.98	0.0	-41.4

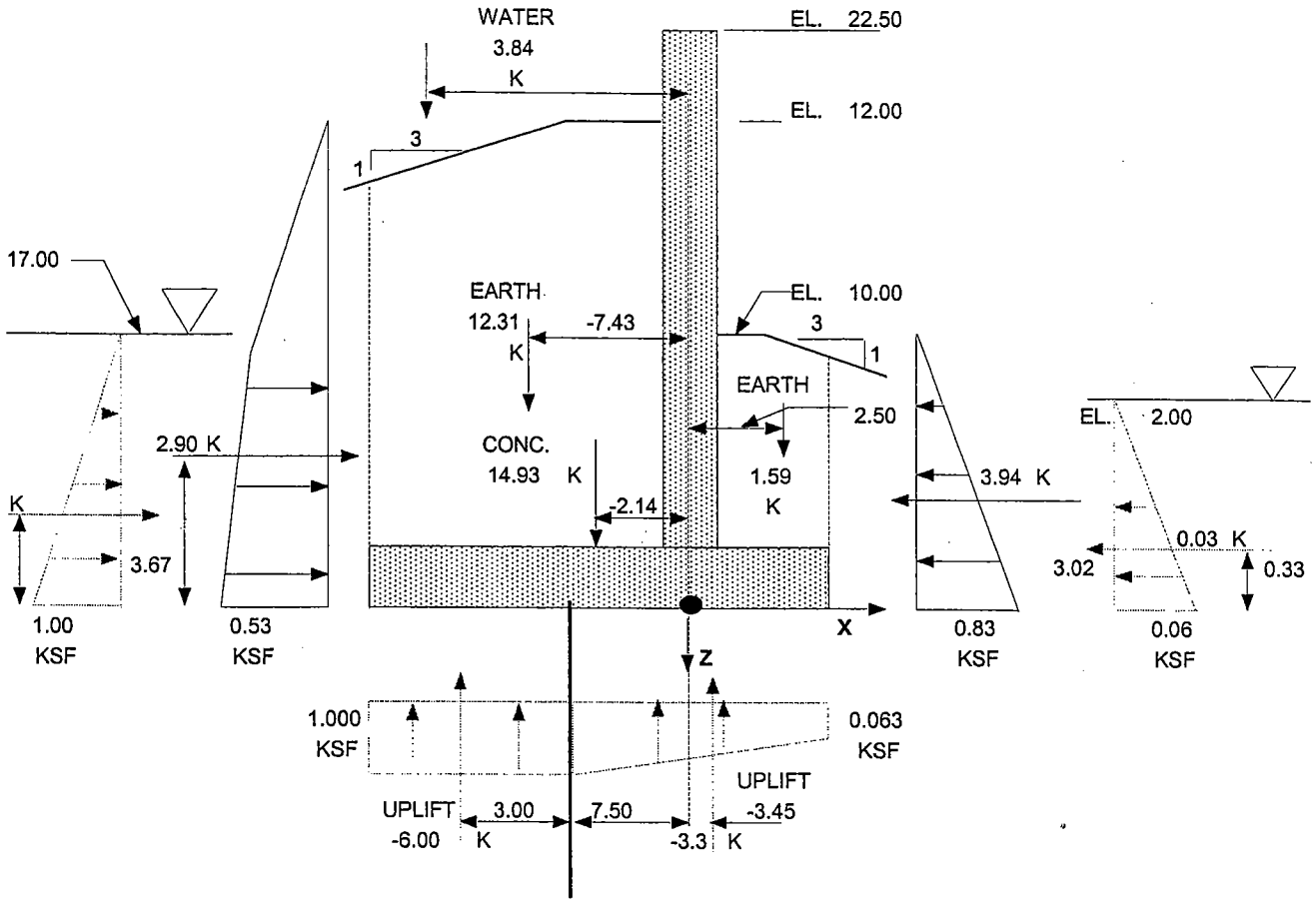
IHNC SHIP LOCK
WEST SIDE - S. OF CLAIBORNE - LEVEE AT 12.0 - 10.0
CASE 2 - RIVER FLOWLINE



ITEM	FORCE X	FORCE Y	FORCE Z		X CENT. FEET	Z CENT. FEET	Myy FT-K/FT	Mzz FT-K/FT
CONCRETE	0.0	0.0	14.9	k/ft	-2.14	0.0	32	0
FLDSIDE FILL	0.0	0.0	12.3	k/ft	-7.43	0.0	91	0
PROTSIDE FILL	0.0	0.0	1.6	k/ft	2.50	0.0	-4	0
F. SIDE UPLIFT	0.0	0.0	-6.0	k/ft	-10.50	0.0	-63	0
P. SIDE UPLIFT	0.0	0.0	-0.7	k/ft	-2.00	0.0	-1	0
F. S. EARTH Pr.	2.9	0.0	0.0	k/ft	-	-3.67	-11	0
P. S. EARTH Pr.	-3.9	0.0	0.0	k/ft	-	-3.02	12	0
F. S. WATER Pr.	8.0	0.0	0.0	k/ft	-	-5.33	-43	0
P. S. WATER Pr.	-0.0	0.0	0.0	k/ft	-	-0.33	0	0

	X	Y	Z	Mxx	Myy	Mzz
TOTALS	6.9	0.0	22.1	0	14	0
MONO. TOTAL	415.7	0.0	1328.5	0	812	0

IHNC SHIP LOCK
WEST SIDE - S. OF CLAIBORNE - LEVEE AT 12.0 - 10.0
CASE 2 - RIVER FLOWLINE

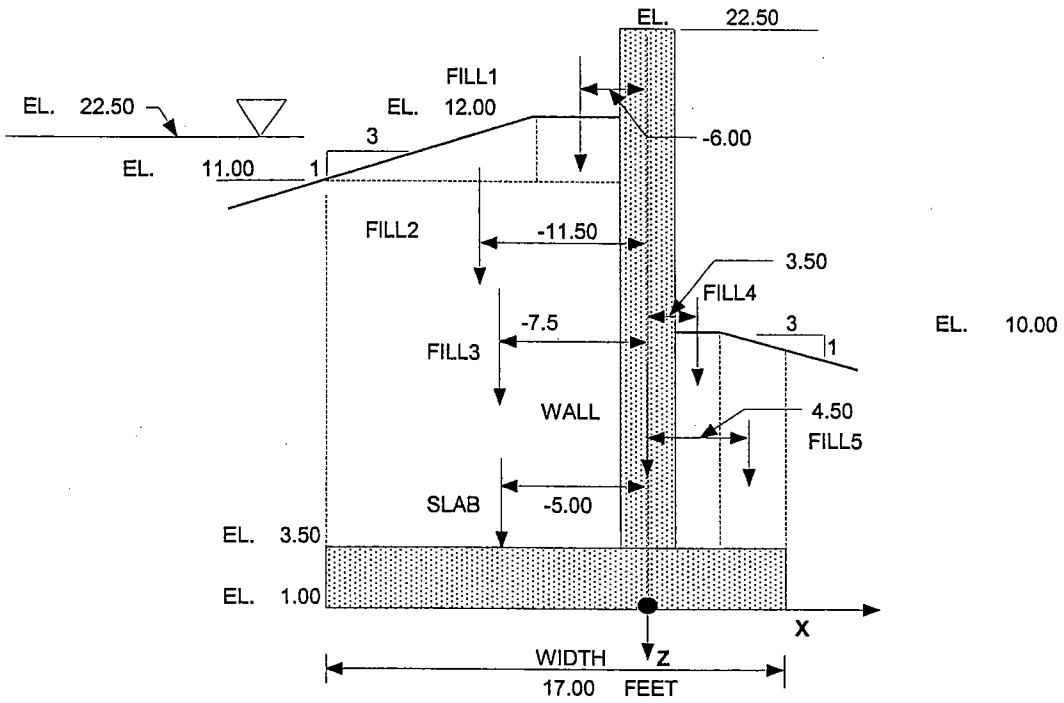


ITEM	FORCE X	FORCE Y	FORCE Z		X CENT. FEET	Z CENT. FEET	Myy FT-K/FT	Mzz FT-K/FT
CONCRETE	0.0	0.0	14.9	k/ft	-2.14	0.00	32	0
FLDSIDE FILL	0.0	0.0	12.3	k/ft	-7.43	0.00	91	0
PROTSIDE FILL	0.0	0.0	1.6	k/ft	2.50	0.00	-4	0
F. SIDE UPLIFT	0.0	0.0	-6.0	k/ft	-10.50	0.00	-63	0
P. SIDE UPLIFT	0.0	0.0	-3.3	k/ft	-3.45	0.00	-11	0
F. S. EARTH Pr.	2.9	0.0	0.0	k/ft	-	-3.67	-11	0
P. S. EARTH Pr.	-3.9	0.0	0.0	k/ft	-	-3.02	12	0
F. S. WATER Pr.	8.0	0.0	0.0	k/ft	-	-5.33	-43	0
P. S. WATER Pr.	-0.0	0.0	0.0	k/ft	-	-0.33	0	0

	X	Y	Z	Mxx	Myy	Mzz
TOTALS	6.9	0.0	19.6	0	4	0
MONO. TOTAL	415.7	0.0	1173.8	0	219	0
VERTICAL			1174	-2.30		
HORIZ			416			-5.98

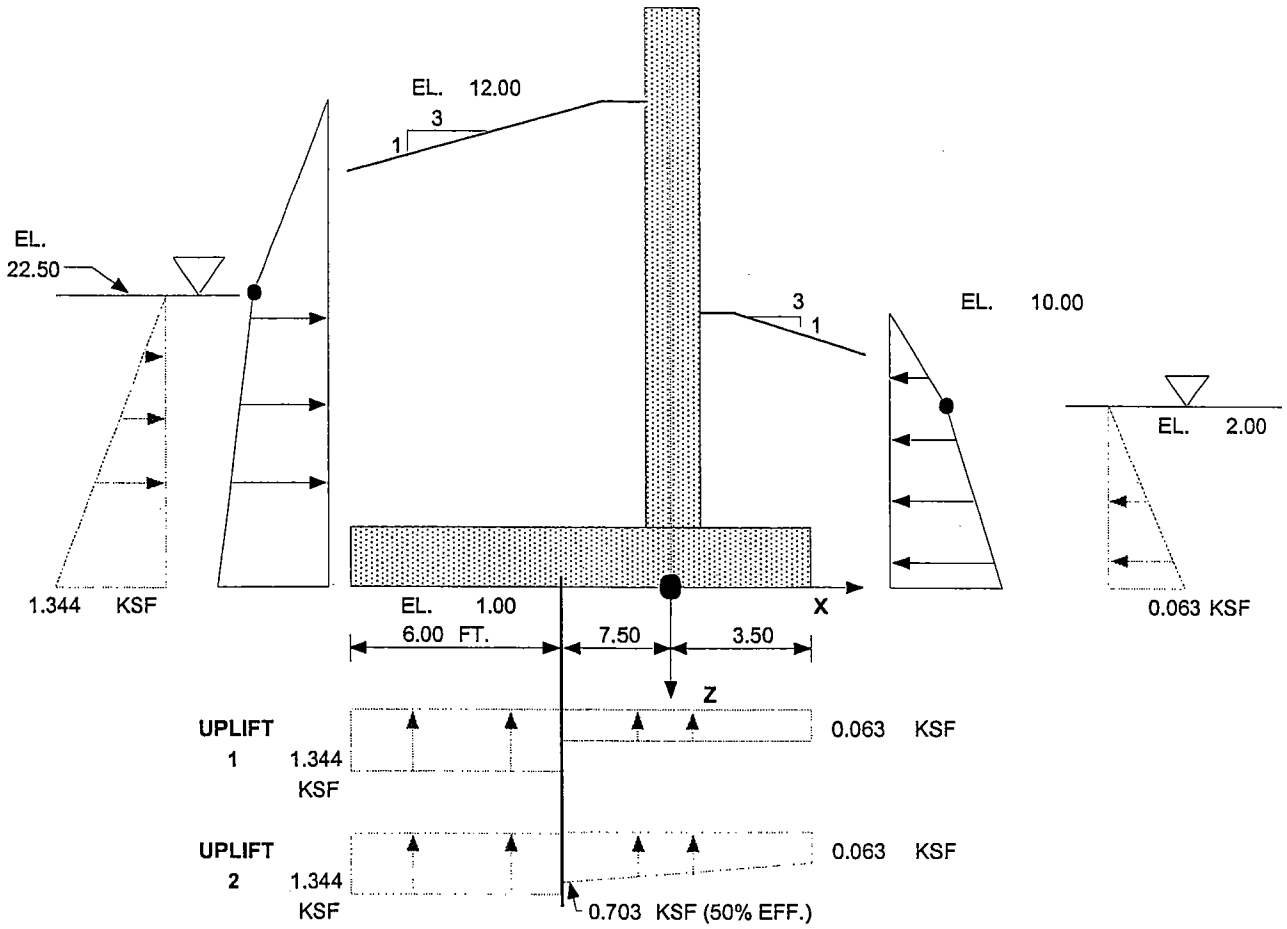
IHNC SHIP LOCK
WEST SIDE - S. OF CLAIBORNE - LEVEE AT 12.0 - 10.0
CASE 3 - RIVER FLOWLINE PLUS FREEBOARD

FLOODSIDE WATER ELEV.	22.50
UPLIFT - PROT. SIDE	2.00
ALLOWABLE OVERSTRESS	NONE



ITEM	FORCE Z (WEIGHT)	X CENT. FEET	Y CENT. FEET	Myy FT.-K	Mzz FT.-K
CONCRETE SLAB	6.38	-5.00	0.00	32	0
CONCRETE WALL	8.55	0.00	0.00	0	0
FLOODSIDE FILL1	1.10	-6.00	0.00	7	0
FLOODSIDE FILL2	0.18	-11.50	0.00	2	0
FLOODSIDE FILL3	11.03	-7.50	0.00	83	0
PROTECTED SIDE FILL4	3.19	3.50	0.00	-11	0
PROTECTED SIDE FILL5	-1.59	4.50	0.00	7	0
FLOODSIDE WATER	0.09	-12.50	0.00	1	0
FLOODSIDE WATER	7.88	-7.50	0.00	59	0
TOTALS	**36.80**	-4.88		**179.54**	**0**
CONCRETE	**14.93**	-2.14		**31.88**	**0**
FILL 1-3	**12.31**	-7.43		**91.42**	**0**
FILL 4-5	**1.59**	2.50		**-3.98**	**0**
FS WATER	**7.97**	-7.56		**60.23**	**0**
	KIPS			FT.-K	FT.-K

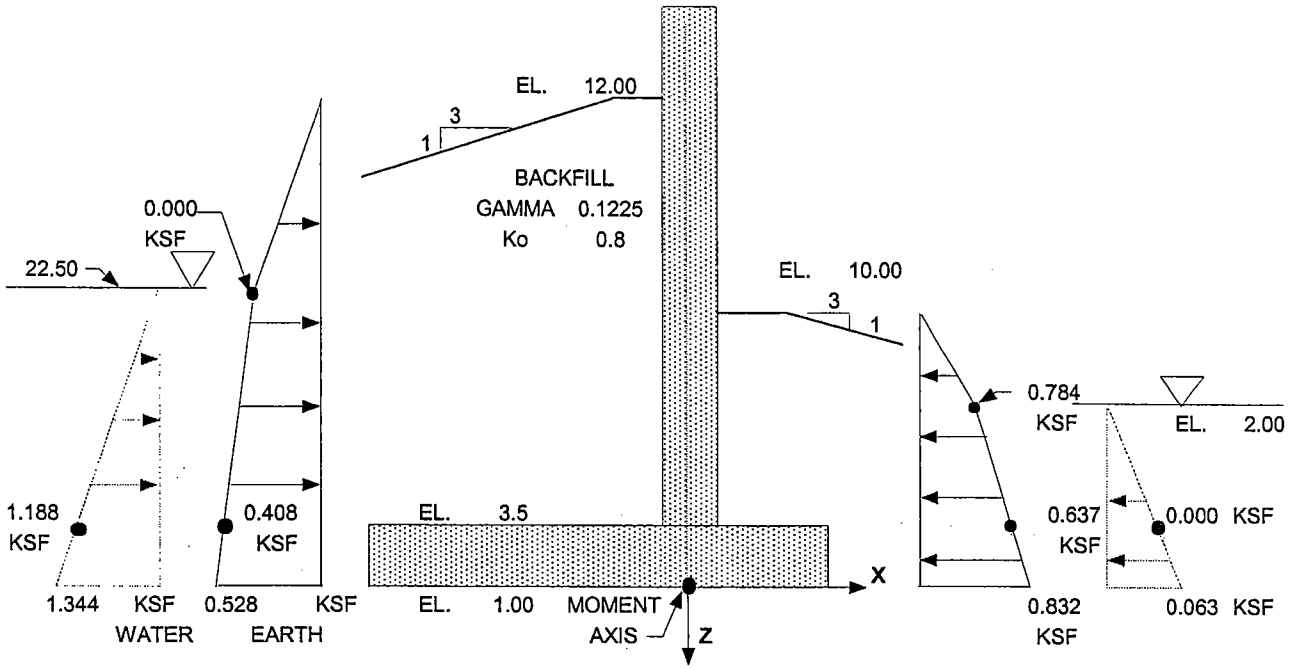
IHNC SHIP LOCK
WEST SIDE - S. OF CLAIBORNE - LEVEE AT 12.0 - 10.0
CASE 3 - RIVER FLOWLINE PLUS FREEBOARD



ITEM	WIDTH	PRESS	FORCE X	X CENT. FEET	Y CENT. FEET	Myy FT.-K	Mzz FT.-K
	FLOODSIDE:						
UPLIFT 1	6.00	1.34	-8.06	-10.50	0.00	-85	0
	PROTECTED SIDE:						
UPLIFT 1	11.00	0.06	-0.69	-2.00	0.00	-1	0
TOTALS			**-8.75**	-9.83		**-86**	**0**
FLD.SIDE			**-8.06**	-10.50		**-84.66**	**0**
PROT. SIDE			**-0.69**	-2.00		**-1.38**	**0**
			KIPS			FT.-K	FT.-K

ITEM	WIDTH	PRESS	FORCE Z	X CENT. FEET	Y CENT. FEET	Myy FT.-K	Mzz FT.-K
	FLOODSIDE:						
UPLIFT 2	6.00	1.34	-8.06	-10.50	0.00	-85	0
	PROTECTED SIDE:						
UPLIFT 2	11.00	0.06	-0.69	-2.00	0.00	-1	0
UPLIFT 2	11.00	0.64	-3.52	-3.83	0.00	-14	0
TOTALS			**-12.27**	-8.11		**-100**	**0**
FLD.SIDE			**-8.06**	-10.50		**-85**	**0**
PROT. SIDE			**-4.21**	-3.53		**-15**	**0**
			KIPS			FT.-K	FT.-K

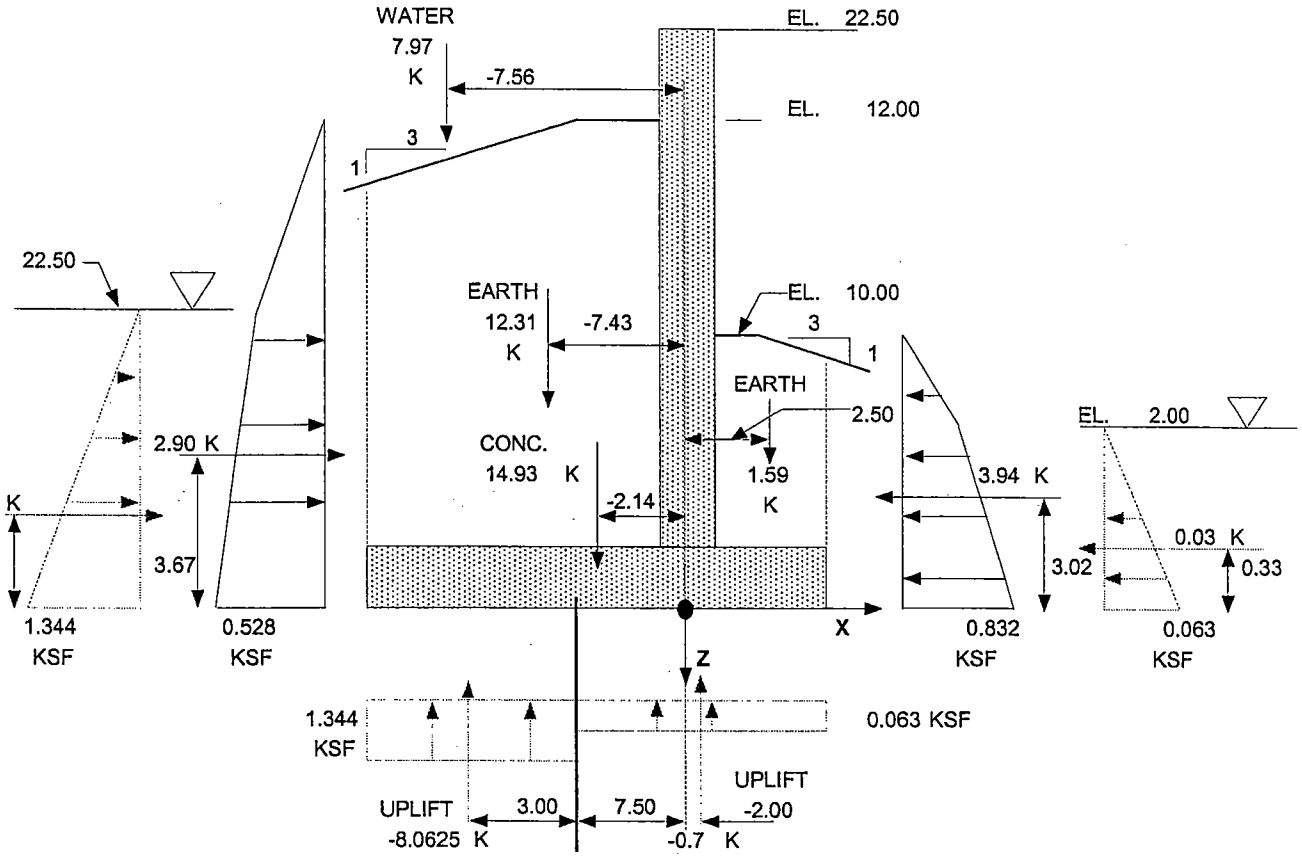
IHNC SHIP LOCK
WEST SIDE - S. OF CLAIBORNE - LEVEE AT 12.0 - 10.0
CASE 3 - RIVER FLOWLINE PLUS FREEBOARD



ITEM	HEIGHT	PRESS	FORCE X		Y CENT. FEET	Z CENT. FEET	Mzz FT-K/FT	Myy FT-K/FT
	FLOODSIDE:							
EARTH 1	0.00	0.000	0.00	k/ft	0.00	0.00	0	0.0
EARTH 2	11.00	0.000	0.00	k/ft	0.00	0.00	0	0.0
EARTH 3	11.00	0.528	2.90	k/ft	0.00	-3.67	0	-10.6
GRND WATER	21.50	1.344	14.45	k/ft	0.00	-7.17	0	-103.5
	PROTECTED:			k/ft				
EARTH 4	8.00	0.784	-3.14	k/ft	0.00	-3.67	0	11.5
EARTH 5	1.00	0.784	-0.78	k/ft	0.00	-0.50	0	0.4
EARTH 6	1.00	0.832	-0.02	k/ft	0.00	-0.33	0	0.0
GRND WATER	1.00	0.063	-0.03	k/ft	0.00	-0.33	0	0.0

	FORCE X		Y CENT. FEET	Z CENT. FEET	Mzz FT-K/FT.	Myy FT-K/FT.
FLOODSIDE EARTH FORCE	**2.90**		0.00	-3.67		**-10.648**
FLOODSIDE WATER FORCE	**14.45**		0.00	-7.17		**-103.52**
TOTAL FLOODSIDE FORCE	**17.35**	k/ft	0.00	-6.58	**0.0**	**-114.2**
PROT. SIDE EARTH FORCE	**-3.94**		0.00	-3.02		**11.9**
PROT. SIDE WATER FORCE	**-0.03**		0.00	-0.33		**0.0**
TOTAL PROT. SIDE FORCE	**-3.98**	k/ft	0.00	-3.00	**0.0**	**11.9**
TOTAL NET HORIZ. FORCE	**13.37**	k/ft	0.00	-7.65	**0.0**	**-102.3**

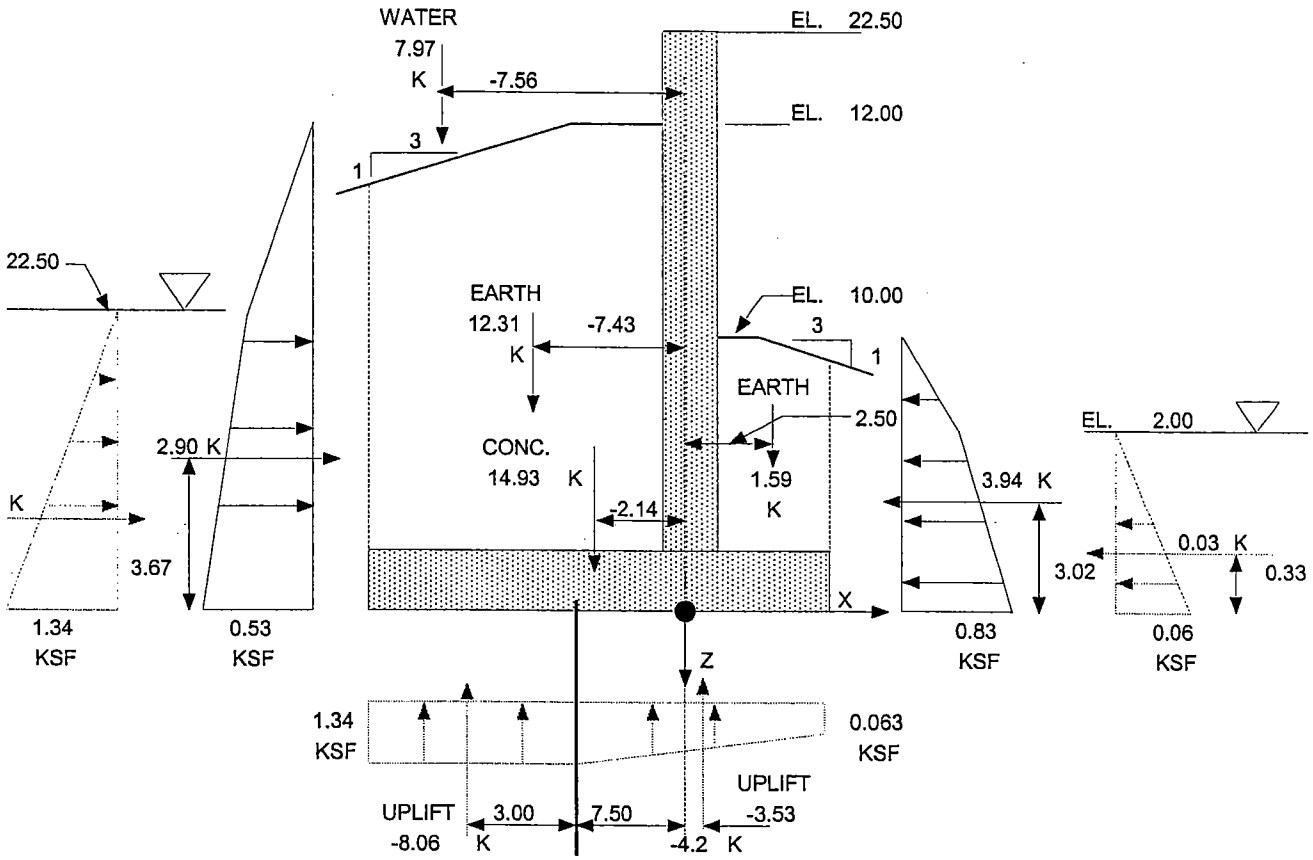
IHNC SHIP LOCK
WEST SIDE - S. OF CLAIBORNE - LEVEE AT 12.0 - 10.0
CASE 3 - RIVER FLOWLINE PLUS FREEBOARD



ITEM	FORCE X	FORCE Y	FORCE Z		X CENT. FEET	Z CENT. FEET	Myy FT-K/FT	Mzz FT-K/FT
CONCRETE	0.0	0.0	14.9	k/ft	-2.14	0.0	32	0
FLDSIDE FILL	0.0	0.0	12.3	k/ft	-7.43	0.0	91	0
PROTSIDE FILL	0.0	0.0	1.6	k/ft	2.50	0.0	-4	0
F. SIDE UPLIFT	0.0	0.0	-8.1	k/ft	-10.50	0.0	-85	0
P. SIDE UPLIFT	0.0	0.0	-0.7	k/ft	-2.00	0.0	-1	0
F. S. EARTH Pr.	2.9	0.0	0.0	k/ft	-	-3.67	-11	0
P. S. EARTH Pr.	-3.9	0.0	0.0	k/ft	-	-3.02	12	0
F. S. WATER Pr.	14.4	0.0	0.0	k/ft	-	-7.17	-104	0
P. S. WATER Pr.	-0.0	0.0	0.0	k/ft	-	-0.33	0	0

	X	Y	Z	Mxx	Myy	Mzz
TOTALS	13.4	0.0	20.1	0	-69	0
MONO. TOTAL	802.4	0.0	1204.7	0	-4139	0

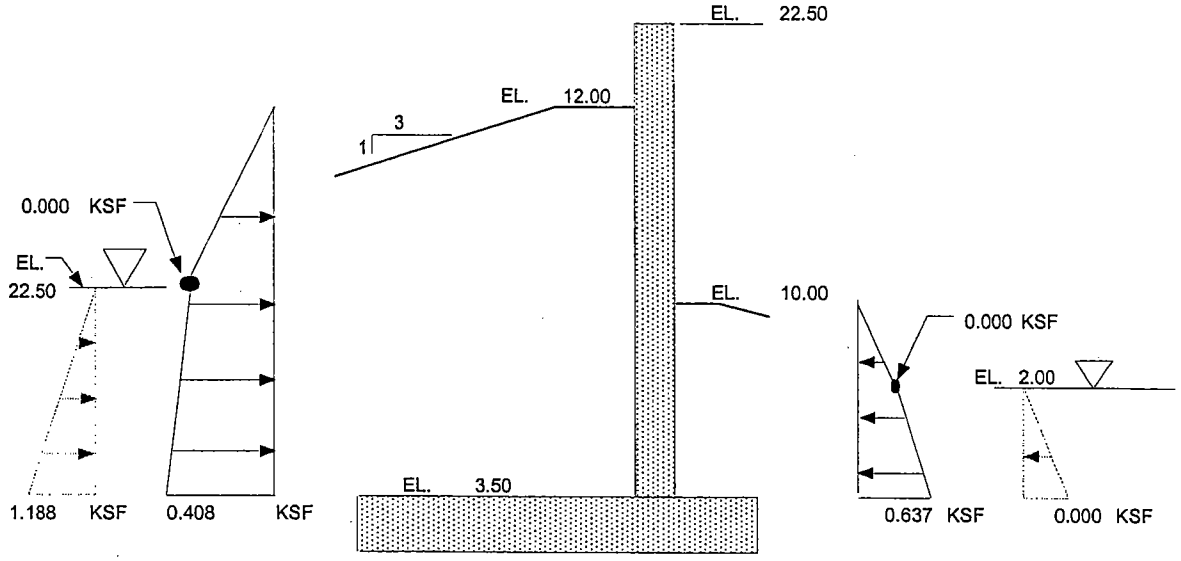
IHNC SHIP LOCK
WEST SIDE - S. OF CLAIBORNE - LEVEE AT 12.0 - 10.0
CASE 3 - RIVER FLOWLINE PLUS FREEBOARD



ITEM	FORCE X	FORCE Y	FORCE Z		X CENT. FEET	Z CENT. FEET	Myy FT-K/FT	Mzz FT-K/FT
CONCRETE	0.0	0.0	14.9	k/ft	-2.14	0.00	32	0
FLDSIDE FILL	0.0	0.0	12.3	k/ft	-7.43	0.00	91	0
PROTSIDE FILL	0.0	0.0	1.6	k/ft	2.50	0.00	-4	0
F. SIDE UPLIFT	0.0	0.0	-8.1	k/ft	-10.50	0.00	-85	0
P. SIDE UPLIFT	0.0	0.0	-4.2	k/ft	-3.53	0.00	-15	0
F. S. EARTH Pr.	2.9	0.0	0.0	k/ft	-	-3.67	-11	0
P. S. EARTH Pr.	-3.9	0.0	0.0	k/ft	-	-3.02	12	0
F. S. WATER Pr.	14.4	0.0	0.0	k/ft	-	-7.17	-104	0
P. S. WATER Pr.	-0.0	0.0	0.0	k/ft	-	-0.33	0	0

	X	Y	Z	Mxx	Myy	Mzz
TOTALS	13.4	0.0	16.6	0	-82	0
MONO. TOTAL	802.4	0.0	993.3	0	-4950	0
VERTICAL			993	-1.19		
HORIZ			802			-7.65

IHNC SHIP LOCK
WEST SIDE - S. OF CLAIBORNE - LEVEE AT 12.0 - 10.0
CASE 3 - RIVER FLOWLINE PLUS FREEBOARD



WALL ELEV.	LATERAL WALL SHEAR INFORMATION							WALL SHEAR CAPACITY REVIEW				
	EARTH SHEARS			WATER SHEARS				TOTAL SHEAR (KIPS)	FACT'D SHEAR	"d"	SHEAR CAPAC.	SHEAR OK?
	FLOOD SIDE	PROTECT SIDE	NET SHEAR	FLOOD SIDE	PROTECT SIDE	NET SHEAR						
22.5	0	0	0	0	0	0		0.0	0.0	32.5	41.9	YES
21.2	0	0	0	55	0	55		0.1	0.1	32.5	41.9	YES
19.8	0	0	0	221	0	221		0.2	0.5	32.5	41.9	YES
18.5	0	0	0	498	0	498		0.5	1.1	32.5	41.9	YES
17.2	0	0	0	884	0	884		0.9	2.0	32.5	41.9	YES
15.9	0	0	0	1,382	0	1,382		1.4	3.1	32.5	41.9	YES
14.5	0	0	0	1,990	0	1,990		2.0	4.4	32.5	41.9	YES
13.2	0	0	0	2,709	0	2,709		2.7	6.0	32.5	41.9	YES
11.9	0	0	0	3,538	0	3,538		3.5	7.8	32.5	41.9	YES
10.5	52	0	52	4,478	0	4,478		4.5	10.0	32.5	41.9	YES
9.2	188	31	157	5,528	0	5,528		5.7	12.6	32.5	41.9	YES
7.9	409	222	187	6,689	0	6,689		6.9	15.2	32.5	41.9	YES
6.5	715	587	129	7,960	0	7,960		8.1	17.9	32.5	41.9	YES
5.2	1,106	1,124	(18)	9,342	0	9,342		9.3	20.6	32.5	41.9	YES
3.9	1,582	1,835	(253)	10,835	0	10,835		10.6	23.4	32.5	41.9	YES

WALL ELEV.	LATERAL WALL MOMENT INFORMATION								WALL CONCRETE SECTION DESIGN				
	EARTH MOMENTS			WATER MOMENTS				TOTAL M	Mn W/OS FT-K	d MIN W / OS	"d"	Mn As	As REQ'D
	FLOOD SIDE	PROTECT SIDE	NET MOMENT	FLOOD SIDE	PROTECT SIDE	NET MOMENT							
22.5	0	0	0	0	0	0		0	0.0	0.0	32.5	0.00	0.60
21.2	0	0	0	24	0	24		24	0.1	0.4	32.5	0.00	0.60
19.8	0	0	0	196	0	196		196	0.5	1.1	32.5	0.00	0.60
18.5	0	0	0	661	0	661		661	1.6	2.0	32.5	0.01	0.60
17.2	0	0	0	1,567	0	1,567		1,567	3.8	3.1	32.5	0.02	0.60
15.9	0	0	0	3,060	0	3,060		3,060	7.5	4.3	32.5	0.05	0.60
14.5	0	0	0	5,288	0	5,288		5,288	13.0	5.7	32.5	0.08	0.60
13.2	0	0	0	8,397	0	8,397		8,397	20.6	7.2	32.5	0.13	0.60
11.9	0	0	0	12,535	0	12,535		12,535	30.8	8.8	32.5	0.19	0.60
10.5	25	0	25	17,847	0	17,847		17,873	43.9	10.5	32.5	0.27	0.60
9.2	175	8	167	24,482	0	24,482		24,649	60.5	12.3	32.5	0.38	0.60
7.9	563	158	405	32,586	0	32,586		32,991	81.0	14.2	32.5	0.50	0.67
6.5	1,301	676	625	42,305	0	42,305		42,930	105.4	16.2	32.5	0.66	0.88
5.2	2,502	1,793	709	53,787	0	53,787		54,496	133.8	18.3	32.5	0.84	1.12
3.9	4,279	3,740	539	67,179	0	67,179		67,718	166.3	20.4	32.5	1.05	1.29

```
1000 IHNC FLOODWALL ALT. STUDY WEST SIDE-
1005 LEVEE AT ELS. 12 AND 10
1030 PROP 29000 2550 2550 36.9 1.0 0 ALL
1040 SOIL ES 0.142 L 78 0 1 TO 10
1045 SOIL ES 0.142 L 62 0 11 TO 17
1050 PIN ALL
1060 ALLOW R 170 75 646 646 4131 4131 ALL
1100 PILE 1 0.75 -27.0 0.0
1110 ROW Y 10 1 9 AT 6.0
1111 PILE 11 -9.5 -27.0 0.0
1112 ROW Y 7 11 6 AT 9.0
1150 BATTER 2.5 1 TO 10
1160 BATTER 10.0 11 TO 17
1180 ANG 0 1 TO 10
1190 ANG 180 11 TO 17
1230 LOA 1 118.0 0.0 1794.0 0.0 6887.0 0.0
1235 LOA 2 416.0 0.0 1582.0 0.0 3280.0 0.0
1240 LOA 3 416.0 0.0 1364.0 0.0 1790.0 0.0
1245 LOA 4 803.0 0.0 1551.0 0.0 -766.0 0.0
1250 LOA 5 803.0 0.0 1253.0 0.0 -2802.0 0.0
1300 TOUT 1 2 4 5
1310 FOUT 1 2 4 5 I1210W17.OUT
1320 PFO ALL
```

```
 ********************************
 * CORPS PROGRAM  #  X0080       *  CPGA - CASE PILE GROUP ANALYSIS PROGRAM
 * VERSION NUMBER # 1993/03/29   *  RUN DATE 05-MAY-1989   RUN TIME 15.09.56
 ********************************

 IHNC FLOODWALL ALT. STUDY WEST SIDE

 LEVEE AT ELS. 12 AND 10


 THERE ARE   17 PILES AND
              5 LOAD CASES IN THIS RUN.

 ALL PILE COORDINATES ARE CONTAINED WITHIN A BOX
                                        X          Y          Z
                                      -----      -----      -----
 WITH DIAGONAL COORDINATES = (      -9.50 ,    -27.00 ,       .00 )
                             (        .75 ,     27.00 ,       .00 )

 ************************************************************************
**************

          PILE PROPERTIES AS INPUT

       E            I1            I2             A            C33
    B66
      KSI          IN**4         IN**4          IN**2
   .29000E+05   .25500E+04   .25500E+04   .36900E+02   .10000E+01
  .00000E+00

 THESE PILE PROPERTIES APPLY TO THE FOLLOWING PILES -

     ALL


 ************************************************************************
**************

          SOIL DESCRIPTIONS AS INPUT

    ES      ESOIL       LENGTH        L             LU
```

	K/IN**2		FT	FT
	.14200E+00	L	.78000E+02	.00000E+00

THIS SOIL DESCRIPTION APPLIES TO THE FOLLOWING PILES -

1 2 3 4 5 6 7 8 9 10

ES	ESOIL	LENGTH	L	LU
	K/IN**2		FT	FT
	.14200E+00	L	.62000E+02	.00000E+00

THIS SOIL DESCRIPTION APPLIES TO THE FOLLOWING PILES -

11 12 13 14 15 16 17

****

PILE GEOMETRY AS INPUT AND/OR GENERATED

NUM	X	Y	Z	BATTER	ANGLE	LENGTH	FIXITY
	FT	FT	FT			FT	
1	.75	-27.00	.00	2.50	.00	78.00	P
2	.75	-21.00	.00	2.50	.00	78.00	P
3	.75	-15.00	.00	2.50	.00	78.00	P
4	.75	-9.00	.00	2.50	.00	78.00	P
5	.75	-3.00	.00	2.50	.00	78.00	P
6	.75	3.00	.00	2.50	.00	78.00	P
7	.75	9.00	.00	2.50	.00	78.00	P
8	.75	15.00	.00	2.50	.00	78.00	P

9	.75	21.00	.00	2.50	.00	78.00
P						
10	.75	27.00	.00	2.50	.00	78.00
P						
11	-9.50	-27.00	.00	10.00	180.00	62.00
P						
12	-9.50	-18.00	.00	10.00	180.00	62.00
P						
13	-9.50	-9.00	.00	10.00	180.00	62.00
P						
14	-9.50	.00	.00	10.00	180.00	62.00
P						
15	-9.50	9.00	.00	10.00	180.00	62.00
P						
16	-9.50	18.00	.00	10.00	180.00	62.00
P						
17	-9.50	27.00	.00	10.00	180.00	62.00
P						

						1214.00

****

APPLIED LOADS

LOAD CASE	PX K	PY K	PZ K	MX FT-K	MY FT-K	MZ FT-K
1	118.0	.0	1794.0	.0	6887.0	.0
2	416.0	.0	1582.0	.0	3280.0	.0
3	416.0	.0	1364.0	.0	1790.0	.0
4	803.0	.0	1551.0	.0	-766.0	.0
5	803.0	.0	1253.0	.0	-2802.0	.0

LOAD CASE 1. NUMBER OF FAILURES = 0. NUMBER OF PILES IN TENSION = 0.

LOAD CASE 2. NUMBER OF FAILURES = 0. NUMBER OF PILES IN TENSION = 0.

LOAD CASE 3. NUMBER OF FAILURES = 0. NUMBER OF PILES IN TENSION = 0.

LOAD CASE 4. NUMBER OF FAILURES = 0. NUMBER OF PILES IN TENSION = 0.

LOAD CASE 5. NUMBER OF FAILURES = 0. NUMBER OF PILES IN TENSION = 7.

****

PILE CAP DISPLACEMENTS

LOAD CASE	DX	DY	DZ	RX	RY	RZ
	IN	IN	IN	RAD	RAD	RAD
1	-.6817E+00	.2687E-07	.3428E+00	-.1023E-11	-.2892E-02	-.7545E-11
2	.2707E-01	.1444E-07	.1011E+00	-.5498E-12	-.4797E-03	-.4054E-11
3	.4958E-01	.9081E-08	.8652E-01	-.3458E-12	-.4745E-03	-.2550E-11
4	.7469E+00	.1022E-08	-.1250E+00	-.3892E-13	.1779E-02	-.2870E-12
5	.7778E+00	-.6297E-08	-.1450E+00	.2398E-12	.1787E-02	.1768E-11

****

PILE FORCES IN LOCAL GEOMETRY

M1 & M2 NOT AT PILE HEAD FOR PINNED PILES
* INDICATES PILE FAILURE
# INDICATES CBF BASED ON MOMENTS DUE TO
(F3*EMIN) FOR CONCRETE PILES
B INDICATES BUCKLING CONTROLS

LOAD CASE - 1

PILE	F1	F2	F3	M1	M2	M3	ALF	C BF
	K	K	K	IN-K	IN-K	IN-K		
1	-11.7	.0	102.0	.0	803.3	.0	.60	. 35
2	-11.7	.0	102.0	.0	803.3	.0	.60	. 35
3	-11.7	.0	102.0	.0	803.3	.0	.60	. 35
4	-11.7	.0	102.0	.0	803.3	.0	.60	. 35
5	-11.7	.0	102.0	.0	803.3	.0	.60	. 35
6	-11.7	.0	102.0	.0	803.3	.0	.60	. 35
7	-11.7	.0	102.0	.0	803.3	.0	.60	. 35
8	-11.7	.0	102.0	.0	803.3	.0	.60	. 35
9	-11.7	.0	102.0	.0	803.3	.0	.60	. 35
10	-11.7	.0	102.0	.0	803.3	.0	.60	. 35
11	10.3	.0	116.3	.0	-706.4	.0	.68	. 35
12	10.3	.0	116.3	.0	-706.4	.0	.68	. 35
13	10.3	.0	116.3	.0	-706.4	.0	.68	. 35
14	10.3	.0	116.3	.0	-706.4	.0	.68	. 35
15	10.3	.0	116.3	.0	-706.4	.0	.68	. 35
16	10.3	.0	116.3	.0	-706.4	.0	.68	. 35
17	10.3	.0	116.3	.0	-706.4	.0	.68	.

35

LOAD CASE - 2

PILE	F1	F2	F3	M1	M2	M3	ALF	CBF
	K	K	K	IN-K	IN-K	IN-K		
1	-.2	.0	123.4	.0	14.6	.0	.73	.19
2	-.2	.0	123.4	.0	14.6	.0	.73	.19
3	-.2	.0	123.4	.0	14.6	.0	.73	.19
4	-.2	.0	123.4	.0	14.6	.0	.73	.19
5	-.2	.0	123.4	.0	14.6	.0	.73	.19
6	-.2	.0	123.4	.0	14.6	.0	.73	.19
7	-.2	.0	123.4	.0	14.6	.0	.73	.19
8	-.2	.0	123.4	.0	14.6	.0	.73	.19
9	-.2	.0	123.4	.0	14.6	.0	.73	.19
10	-.2	.0	123.4	.0	14.6	.0	.73	.19
11	-.5	.0	62.5	.0	32.9	.0	.37	.10
12	-.5	.0	62.5	.0	32.9	.0	.37	.10

13	-.5	.0	62.5	.0	32.9	.0	.37	. 10
14	-.5	.0	62.5	.0	32.9	.0	.37	. 10
15	-.5	.0	62.5	.0	32.9	.0	.37	. 10
16	-.5	.0	62.5	.0	32.9	.0	.37	. 10
17	-.5	.0	62.5	.0	32.9	.0	.37	. 10

LOAD CASE - 3

PILE	F1	F2	F3	M1	M2	M3	ALF	C BF
	K	K	K	IN-K	IN-K	IN-K		
1	.2	.0	117.4	.0	-12.8	.0	.69	. 18
2	.2	.0	117.4	.0	-12.8	.0	.69	. 18
3	.2	.0	117.4	.0	-12.8	.0	.69	. 18
4	.2	.0	117.4	.0	-12.8	.0	.69	. 18
5	.2	.0	117.4	.0	-12.8	.0	.69	. 18
6	.2	.0	117.4	.0	-12.8	.0	.69	. 18
7	.2	.0	117.4	.0	-12.8	.0	.69	. 18
8	.2	.0	117.4	.0	-12.8	.0	.69	. 18
9	.2	.0	117.4	.0	-12.8	.0	.69	. 18
10	.2	.0	117.4	.0	-12.8	.0	.69	. 18
11	-.8	.0	39.3	.0	54.8	.0	.23	. 07
12	-.8	.0	39.3	.0	54.8	.0	.23	. 07
13	-.8	.0	39.3	.0	54.8	.0	.23	. 07
14	-.8	.0	39.3	.0	54.8	.0	.23	. 07
15	-.8	.0	39.3	.0	54.8	.0	.23	. 07

16	-.8	.0	39.3	.0	54.8	.0	.23	. 07
17	-.8	.0	39.3	.0	54.8	.0	.23	. 07

LOAD CASE - 4

PILE	F1	F2	F3	M1	M2	M3	ALF	C BF
	K	K	K	IN-K	IN-K	IN-K		
1	11.3	.0	167.4	.0	-778.3	.0	.98	. 45
2	11.3	.0	167.4	.0	-778.3	.0	.98	. 45
3	11.3	.0	167.4	.0	-778.3	.0	.98	. 45
4	11.3	.0	167.4	.0	-778.3	.0	.98	. 45
5	11.3	.0	167.4	.0	-778.3	.0	.98	. 45
6	11.3	.0	167.4	.0	-778.3	.0	.98	. 45
7	11.3	.0	167.4	.0	-778.3	.0	.98	. 45
8	11.3	.0	167.4	.0	-778.3	.0	.98	. 45
9	11.3	.0	167.4	.0	-778.3	.0	.98	. 45
10	11.3	.0	167.4	.0	-778.3	.0	.98	.

45								
	11	-11.4	.0	4.4	.0	783.5	.0	.03 .
20								
	12	-11.4	.0	4.4	.0	783.5	.0	.03 .
20								
	13	-11.4	.0	4.4	.0	783.5	.0	.03 .
20								
	14	-11.4	.0	4.4	.0	783.5	.0	.03 .
20								
	15	-11.4	.0	4.4	.0	783.5	.0	.03 .
20								
	16	-11.4	.0	4.4	.0	783.5	.0	.03 .
20								
	17	-11.4	.0	4.4	.0	783.5	.0	.03 .
20								

LOAD CASE - 5

PILE	F1	F2	F3	M1	M2	M3	ALF	C
BF								
	K	K	K	IN-K	IN-K	IN-K		
1	11.9	.0	159.3	.0	-816.0	.0	.94	.
44								
2	11.9	.0	159.3	.0	-816.0	.0	.94	.
44								
3	11.9	.0	159.3	.0	-816.0	.0	.94	.
44								
4	11.9	.0	159.3	.0	-816.0	.0	.94	.
44								
5	11.9	.0	159.3	.0	-816.0	.0	.94	.
44								
6	11.9	.0	159.3	.0	-816.0	.0	.94	.
44								
7	11.9	.0	159.3	.0	-816.0	.0	.94	.
44								
8	11.9	.0	159.3	.0	-816.0	.0	.94	.
44								
9	11.9	.0	159.3	.0	-816.0	.0	.94	.
44								
10	11.9	.0	159.3	.0	-816.0	.0	.94	.
44								
11	-11.8	.0	-27.3	.0	813.7	.0	.36	.
24								
12	-11.8	.0	-27.3	.0	813.7	.0	.36	.
24								
13	-11.8	.0	-27.3	.0	813.7	.0	.36	.

```
24
    14    -11.8        .0    -27.3        .0      813.7        .0   .36   .
24
    15    -11.8        .0    -27.3        .0      813.7        .0   .36   .
24
    16    -11.8        .0    -27.3        .0      813.7        .0   .36   .
24
    17    -11.8        .0    -27.3        .0      813.7        .0   .36   .
24
```

Revised Study

ALTERNATIVE STUDY REVISIONS

A. PURPOSE

These alternative study revisions present the results of additional study analyses and alternatives which were evaluated to determine the effects of both revisions to the design criteria and view comments made on the original alternative study. In general, the additional analyses reflect the following changes to the information presented in the original study:

1.) **Study Soil Strengths.** The study stability assumptions, which used channel strength parameters at the centerline of the channel, were less conservative than typical levee/embankment design assumptions and should not be used for stability analyses on Mississippi River levees. Review of the boring data determined that the upper bank strength parameters could be used closer to the channel than previously assumed, however the use of channel strengths at the channel edge was most appropriate and typical of past design criteria.

2.) **I-Wall Configurations.** The design criteria for I-wall designs was changed to require a minimum embankment crown elevation of El. 18.0 on both sides of the wall.

3.) **Deep Seated Failure Analyses.** The effects of unbalanced loads due to deep seated failure potential on final study T-wall designs were not considered in the original study and should be documented prior to proceeding with final designs.

4.) **Green Space Alternatives.** The effects of filling the lock laying channel on the east side of the canal, north of Claiborne Avenue on the required floodwall alignment were not addressed in the original study. Analyses to determine the extent of the "green space" that can be created of the protected side of the walls and the costs associated with channel fills required to create this space are provided herein.

5.) **Levee Crown Configuration.** The levee crown width was changed from 15 feet to 18 feet to provide for an inspection lane on the flood side of the floodwalls and for a bike path on the protected side.

B. SCOPE

The scope of the study revisions was limited to a detailed reanalysis of the original study alternatives presented for the ship lock plan on the west side of the canal. An alternative analysis to determine the impacts of filling the laying channel on the east side of the canal, north of Claiborne

Avenue is also included. These additional analyses considered the design criteria changes and/or loading additions described above. The results of these revised analyses were extrapolated to all of the original study alternatives. Design plates which depict the geotechnical analyses and resulting typical cross-sections for the study revisions are contained herein. Comparative cost estimates for all original study alternatives, as extrapolated from the revised analyses, are also presented.

C. CHANGES IN STUDY DESIGN CRITERIA

In general, the detailed design criteria described in the original study text remains valid. Changes and clarification of the criteria utilized in the additional study analyses are described below.

1. Design of Pile Foundations.

a. Deflections. Lateral and vertical deflections of the T-wall foundation designs with water levels at flowline (El. 17.6) and any unbalanced loads on the sheet piling was limited to ½" in either direction.

b. Pile Capacity. The axial capacity of the piles in the original study was based only on available boring data. The axial pile capacity for the revised analyses consider the results of pile load tests conducted at the site. Pile capacities were computed for both S and Q cases using a F.S. = 2.0. Reduction in lateral soil resistance due to pile spacing was considered in accordance with EM 1110-2-2906 "Design of Pile Foundations."

c. Unbalanced Loads. The reaction force at the T-Wall base from unbalanced loads on the sheet piling was computed using a F.S. = 1.0 on the soil strengths. Soil capacity above the factored bank stability failure plane was neglected for design cases that considered unbalanced loads. The entire embedded length of pile was considered to be laterally braced for unbalanced load conditions.

2. Design of Sheet Piling. The required sheet pile tip elevation and unbalanced force was determined for the Q- case using a factor of safety equal to 1.50. Shears and moments, due to unbalanced forces, were also computed using a factor of safety equal to 1.50. The required sheet piling section to resist these shears and moments was determined considering an allowable stress in the steel sheet piling equal to 0.66 Fy.

COST ESTIMATES

A. GENERAL

Revised, comparative cost estimates prepared for the various alternatives studied for both the Ship Lock and Barge Lock plans are presented in this section. Whenever possible, historical pricing data was obtained from District personnel. Where specific cost information was not available, estimates were prepared using judgement and experience from previous work. The cost estimates contained herein are intended solely for relative cost comparisons of the various alternatives contained in the revised study.

B. COST ASSUMPTIONS

1. General. Detailed quantity computations were prepared for the ship lock plan, alternatives 1 through 4 on the west side of the canal and south of Claiborne Avenue. These were the only west side alternatives which met the revised design criteria described above. Revised study analyses using the new criteria determined that I-type walls would not provide acceptable designs on the west side of the canal nor in any reach south of Claiborne Avenue. Quantities were also computed for the "maximum green space" alternative on the east side of the canal and north of Claiborne Avenue. These detailed quantity computations were utilized as the basis for quantity estimates for the remaining viable design alternatives north of Claiborne Avenue as well as acceptable alternatives for the east side of the canal. Estimated costs were prepared for both Ship Lock and Barge Lock plans.

2. Basic Assumptions. The basic assumptions for the revised study costs were similar to those used during the preparation of the original study. Quantity computations for earthwork were performed using the required channel and embankment and the cross-section information provided by the District. For the revised study, only four cross-sections were used to determine estimated quantities for the various alternatives:

- Station 0+00 West B/L
- Station 5+00 West B/L
- Station 18+00 West B/L
- Station 22+00 West B/L

The estimated material quantities and costs did not consider the areas beneath and immediately adjacent to the Claiborne Ave. Bridge however, the required structures in this area will likely be similar to that shown in the 50% DDR submittal due to the geometry required to minimize adverse loadings on the exiting bridge footings and supports. The embankments in this area will be based on the alternatives selected for further design on the north and south sides of the bridge.

Costs for mobilization and demolition of the existing floodwalls were not considered in the revised study. Embankment fill costs consider use of excavated channel materials. Costs for steel pipe piling are based on delivery of full length piles approximately 60 feet long. Where longer lengths are required for geotechnical capacity, an allowance for one splice per long pile was included as a line item.

It should be noted that these estimates include the costs for excavation of the navigation and the laying channels required for construction. It is very likely that these excavations will be performed prior to construction of the lateral floodwalls and that the associated costs for excavation are included with other items. These excavation costs will be deleted, if appropriate, when the costs are prepared for the final DDR.

2. South of Claiborne Ave. This reach includes the existing lock where significant amounts of excavation are required. Quantities were computed using the cross-section at Sta. 0+00 from the St. Claude Ave. Bridge (Sta. -5+00) to the end of the existing lock at Sta. 3+85. Average end areas were used to develop the quantities to Sta. 5+00. The cross-section at Sta. 5+00 was used to develop the quantities to the end of the reach near Sta. 10+20. The total length of this reach for quantity estimates was 1620 feet.

3. North of Claiborne Ave. This reach extends from Sta. 15+00 to a point immediately south of the proposed lock. The total length of the reach for quantity estimates was 840 feet. The cross-section at Sta. 18+00 was utilized for the first 500 feet of the reach. The section at Sta. 22+00 was utilized for all estimates north of Sta. 20+00 because a different stability section is required from this location to the proposed lock.

C. COST ESTIMATES

Cost estimates and estimated quantities for the viable study alternatives, using the revised design criteria, are presented on the following pages.

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

WEST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 1 (ELS. 12.0 AND 10.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	Excavation	CY	292,700	$4.00	$1,170,800
2	Embankment Fill	CY	12,700	$3.50	$44,450
3	24-Inch Riprap	TON	17,800	$30.00	$534,000
4	3-Inch Crushed Limestone Surface	TON	700	$30.00	$21,000
5	24-Inch Dia. Steel Pipe Piling	LF	41,100	$60.00	$2,466,000
6	Pipe Pile Splices	EA	490	$500.00	$245,000
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	87,500	$15.00	$1,312,500
8	Stabilization Concrete	CY	630	$100.00	$63,000
9	Reinforced Concrete in Floodwall Base	CY	4,410	$200.00	$882,000
10	Reinforced Concrete Walls	CY	3,060	$350.00	$1,071,000
11	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
12	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$7,809,750
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$7,810,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

WEST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 2 (ELS. 10.0 AND 10.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	306,100	$4.00	$1,224,400
2	Embankment Fill	CY	10,000	$3.50	$35,000
3	24-Inch Riprap	TON	18,100	$30.00	$543,000
4	3-Inch Crushed Limestone Surface	TON	700	$30.00	$21,000
5	24-Inch Dia. Steel Pipe Piling	LF	40,000	$60.00	$2,400,000
6	Pipe Pile Splices	EA	490	$500.00	$245,000
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	81,000	$15.00	$1,215,000
8	Stabilization Concrete	CY	630	$100.00	$63,000
9	Reinforced Concrete in Floodwall Base	CY	4,410	$200.00	$882,000
10	Reinforced Concrete Walls	CY	3,060	$350.00	$1,071,000
11	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
12	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$7,699,400
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$7,699,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

WEST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 3 (ELS. 15.0 & 10.0 RCW)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	243,500	$4.00	$974,000
2	Embankment Fill	CY	17,200	$3.50	$60,200
3	24-Inch Riprap	TON	24,300	$30.00	$729,000
4	3-Inch Crushed Limestone Surface	TON	700	$30.00	$21,000
5	24-Inch Dia. Steel Pipe Piling	LF	39,800	$60.00	$2,388,000
6	Pipe Pile Splices	EA	510	$500.00	$255,000
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	92,300	$15.00	$1,384,500
8	Stabilization Concrete	CY	630	$100.00	$63,000
9	Reinforced Concrete in Floodwall Base	CY	4,410	$200.00	$882,000
10	Reinforced Concrete Walls	CY	3,060	$350.00	$1,071,000
11	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
12	I-Wall Concrete	CY	0	$250.00	$0

SUBTOTAL	$7,827,700
CONTINGENCIES (0%)	$0
ALTERNATIVE COST	**$7,828,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

WEST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 4 (ELS. 15.0 & 10.0 LWF)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	266,500	$4.00	$1,066,000
2	Embankment Fill	CY	9,000	$3.50	$31,500
3	24-Inch Riprap	TON	19,900	$30.00	$597,000
4	3-Inch Crushed Limestone Surface	TON	700	$30.00	$21,000
5	24-Inch Dia. Steel Pipe Piling	LF	39,800	$60.00	$2,388,000
6	Pipe Pile Splices	EA	510	$500.00	$255,000
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	92,300	$15.00	$1,384,500
8	Stabilization Concrete	CY	630	$100.00	$63,000
9	Reinforced Concrete in Floodwall Base	CY	4,410	$200.00	$882,000
10	Reinforced Concrete Walls	CY	3,060	$350.00	$1,071,000
11	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
12	I-Wall Concrete	CY	0	$250.00	$0
13	Lightweight Fill	TON	8,700	$30.00	$261,000

SUBTOTAL	$8,020,000
CONTINGENCIES (0%)	$0
ALTERNATIVE COST	**$8,020,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN
WEST SIDE LEVEE, SO. OF CLAIBORNE - (ELS. 15.0 AND 10.0)
SELECTED ALTERNATIVE

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	Excavation	CY	266,500	$4.00	$1,066,000
2	Embankment Fill	CY	19,300	$3.50	$67,550
3	24-Inch Riprap	TON	17,100	$30.00	$513,000
4	3-Inch Crushed Limestone Surface	TON	700	$30.00	$21,000
5	24-Inch Dia. Steel Pipe Piling	LF	39,800	$60.00	$2,388,000
6	Pipe Pile Splices	EA	510	$500.00	$255,000
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	92,300	$15.00	$1,384,500
8	Stabilization Concrete	CY	630	$100.00	$63,000
9	Reinforced Concrete in Floodwall Base	CY	4,410	$200.00	$882,000
10	Reinforced Concrete Walls	CY	3,060	$350.00	$1,071,000
11	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
12	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$7,711,050
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$7,711,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

EAST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 1 (ELS. 13.0 AND 10.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	277,100	$4.00	$1,108,400
2	Embankment Fill	CY	25,000	$3.50	$87,500
3	24-Inch Riprap	TON	20,700	$30.00	$621,000
4	3-Inch Crushed Limestone Surface	TON	700	$30.00	$21,000
5	24-Inch Dia. Steel Pipe Piling	LF	47,300	$60.00	$2,838,000
6	Pipe Pile Splices	EA	570	$500.00	$285,000
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	72,900	$15.00	$1,093,500
8	Stabilization Concrete	CY	630	$100.00	$63,000
9	Reinforced Concrete in Floodwall Base	CY	4,410	$200.00	$882,000
10	Reinforced Concrete Walls	CY	3,420	$350.00	$1,197,000
11	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
12	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$8,196,400
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$8,196,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

EAST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 2 (ELS. 10.0 AND 10.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	277,700	$4.00	$1,110,800
2	Embankment Fill	CY	19,000	$3.50	$66,500
3	24-Inch Riprap	TON	19,700	$30.00	$591,000
4	3-Inch Crushed Limestone Surface	TON	700	$30.00	$21,000
5	24-Inch Dia. Steel Pipe Piling	LF	42,400	$60.00	$2,544,000
6	Pipe Pile Splices	EA	490	$500.00	$245,000
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	64,800	$15.00	$972,000
8	Stabilization Concrete	CY	630	$100.00	$63,000
9	Reinforced Concrete in Floodwall Base	CY	4,410	$200.00	$882,000
10	Reinforced Concrete Walls	CY	3,420	$350.00	$1,197,000
11	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
12	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$7,692,300
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$7,692,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

EAST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 3 (ELS. 3.0 AND 10.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	277,600	$4.00	$1,110,400
2	Embankment Fill	CY	9,600	$3.50	$33,600
3	24-Inch Riprap	TON	17,400	$30.00	$522,000
4	3-Inch Crushed Limestone Surface	TON	700	$30.00	$21,000
5	24-Inch Dia. Steel Pipe Piling	LF	42,400	$60.00	$2,544,000
6	Pipe Pile Splices	EA	490	$500.00	$245,000
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	16,200	$15.00	$243,000
8	Stabilization Concrete	CY	630	$100.00	$63,000
9	Reinforced Concrete in Floodwall Base	CY	4,410	$200.00	$882,000
10	Reinforced Concrete Walls	CY	3,420	$350.00	$1,197,000
11	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
12	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$6,861,000
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$6,861,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

EAST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 4 (ELS. 15.0 AND 10.0 RCW)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	217,800	$4.00	$871,200
2	Embankment Fill	CY	31,100	$3.50	$108,850
3	24-Inch Riprap	TON	23,300	$30.00	$699,000
4	3-Inch Crushed Limestone Surface	TON	700	$30.00	$21,000
5	24-Inch Dia. Steel Pipe Piling	LF	47,300	$60.00	$2,838,000
6	Pipe Pile Splices	EA	570	$500.00	$285,000
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	76,100	$15.00	$1,141,500
8	Stabilization Concrete	CY	630	$100.00	$63,000
9	Reinforced Concrete in Floodwall Base	CY	4,410	$200.00	$882,000
10	Reinforced Concrete Walls	CY	3,420	$350.00	$1,197,000
11	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
12	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$8,106,550
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$8,107,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

EAST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 5 (ELS. 15.0 & 10.0 LWF)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	277,400	$4.00	$1,109,600
2	Embankment Fill	CY	13,400	$3.50	$46,900
3	24-Inch Riprap	TON	21,800	$30.00	$654,000
4	3-Inch Crushed Limestone Surface	TON	700	$30.00	$21,000
5	24-Inch Dia. Steel Pipe Piling	LF	47,300	$60.00	$2,838,000
6	Pipe Pile Splices	EA	570	$500.00	$285,000
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	76,100	$15.00	$1,141,500
8	Stabilization Concrete	CY	630	$100.00	$63,000
9	Reinforced Concrete in Floodwall Base	CY	4,410	$200.00	$882,000
10	Reinforced Concrete Walls	CY	3,420	$350.00	$1,197,000
11	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
12	I-Wall Concrete	CY	0	$250.00	$0
13	Lightweight Fill	TON	18,400	$30.00	$552,000
				SUBTOTAL	$8,790,000
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$8,790,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

EAST SIDE LEVEE, SO. OF CLAIBORNE - (ELS. 15.0 AND 10.0)

SELECTED ALTERNATIVE

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	Excavation	CY	277,400	$4.00	$1,109,600
2	Embankment Fill	CY	29,900	$3.50	$104,650
3	24-Inch Riprap	TON	19,700	$30.00	$591,000
4	3-Inch Crushed Limestone Surface	TON	700	$30.00	$21,000
5	24-Inch Dia. Steel Pipe Piling	LF	42,400	$60.00	$2,544,000
6	Pipe Pile Splices	EA	510	$500.00	$255,000
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	79,400	$15.00	$1,191,000
8	Stabilization Concrete	CY	630	$100.00	$63,000
9	Reinforced Concrete in Floodwall Base	CY	4,410	$200.00	$882,000
10	Reinforced Concrete Walls	CY	3,060	$350.00	$1,071,000
11	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
12	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$7,832,250
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$7,832,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

WEST SIDE LEVEE, NO. OF CLAIBORNE - ALT. 2 (ELS. 15.0 AND 15.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	Excavation	CY	160,700	$4.00	$642,800
2	Embankment Fill	CY	16,900	$3.50	$59,150
3	24-Inch Riprap	TON	14,600	$30.00	$438,000
4	3-Inch Crushed Limestone Surface	TON	300	$30.00	$9,000
5	24-Inch Dia. Steel Pipe Piling	LF	16,400	$60.00	$984,000
6	Pipe Pile Splices	EA	210	$500.00	$105,000
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	40,300	$15.00	$604,500
8	Stabilization Concrete	CY	260	$100.00	$26,000
9	Reinforced Concrete in Floodwall Base	CY	1,590	$200.00	$318,000
10	Reinforced Concrete Walls	CY	1,820	$350.00	$637,000
11	New I-Wall Steel Sheet Piling (PZ-22)	SF	0	$12.50	$0
12	I-Wall Concrete	CY	0	$250.00	$0
12	Lightweight Fill	TON	3,700	$30.00	$111,000
				SUBTOTAL	$3,934,450
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$3,934,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

EAST SIDE LEVEE, NO. OF CLAIBORNE - ALT. 1 (ELS. 15.0 AND 15.0 I-WALL)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	102,800	$4.00	$411,200
2	Embankment Fill	CY	27,800	$3.50	$97,300
3	24-Inch Riprap	TON	30,000	$30.00	$900,000
4	3-Inch Crushed Limestone Surface	TON	300	$30.00	$9,000
5	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
6	Pipe Pile Splices	EA	0	$500.00	$0
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	0	$15.00	$0
8	Stabilization Concrete	CY	110	$100.00	$11,000
9	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
10	Reinforced Concrete Walls	CY	0	$350.00	$0
11	New I-Wall Steel Sheet Piling (PZ-22)	SF	33,200	$12.50	$415,000
12	I-Wall Concrete	CY	570	$250.00	$142,500
				SUBTOTAL	$1,986,000
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$1,986,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

EAST SIDE LEVEE, NO. OF CLAIBORNE - ALT. 2 (ELS. 15.0 AND 13.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	209,600	$4.00	$838,400
2	Embankment Fill	CY	19,000	$3.50	$66,500
3	24-Inch Riprap	TON	16,500	$30.00	$495,000
4	3-Inch Crushed Limestone Surface	TON	300	$30.00	$9,000
5	24-Inch Dia. Steel Pipe Piling	LF	23,300	$60.00	$1,398,000
6	Pipe Pile Splices	EA	270	$500.00	$135,000
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	37,800	$15.00	$567,000
8	Stabilization Concrete	CY	330	$100.00	$33,000
9	Reinforced Concrete in Floodwall Base	CY	2,290	$200.00	$458,000
10	Reinforced Concrete Walls	CY	1,770	$350.00	$619,500
11	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
12	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$4,619,400
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$4,619,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

EAST SIDE LEVEE, NO. OF CLAIBORNE - ALT. 3 (ELS. 10.0 AND 14.0 I-WALL)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	209,500	$4.00	$838,000
2	Embankment Fill	CY	22,200	$3.50	$77,700
3	24-Inch Riprap	TON	23,200	$30.00	$696,000
4	3-Inch Crushed Limestone Surface	TON	300	$30.00	$9,000
5	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
6	Pipe Pile Splices	EA	0	$500.00	$0
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	0	$15.00	$0
8	Stabilization Concrete	CY	110	$100.00	$11,000
9	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
10	Reinforced Concrete Walls	CY	0	$350.00	$0
11	New I-Wall Steel Sheet Piling (PZ-27)	SF	32,300	$14.50	$468,350
12	I-Wall Concrete	CY	960	$250.00	$240,000
				SUBTOTAL	$2,340,050
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$2,340,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN
EAST SIDE LEVEE, NO. OF CLAIBORNE - (ELS. 18.0 AND 18.0 I-WALL)
SELECTED ALTERNATIVE

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	262,200	$4.00	$1,048,800
2	Embankment Fill	CY	26,200	$3.50	$91,700
3	Sand Fill	CY	197,300	$12.00	$2,367,600
4	Engineering Fabric	SY	103,900	$1.50	$155,850
5	3-Inch Crushed Limestone	TON	15,600	$30.00	$468,000
6	24-Inch Riprap	TON	23,200	$30.00	$696,000
7	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
8	Pipe Pile Splices	EA	0	$500.00	$0
9	Seepage Cutoff Sheet Piling (PZ-35)	SF	0	$15.00	$0
10	Stabilization Concrete	CY	110	$100.00	$11,000
11	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
12	Reinforced Concrete Walls	CY	0	$350.00	$0
13	New I-Wall Steel Sheet Piling (PZ-22)	SF	39,100	$12.00	$469,200
14	I-Wall Concrete	CY	840	$250.00	$210,000
				SUBTOTAL	$5,518,150
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$5,518,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

WEST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 2 (ELS. 15.0 AND 15.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	196,300	$4.00	$785,200
2	Embankment Fill	CY	27,300	$3.50	$95,550
3	24-Inch Riprap	TON	15,400	$30.00	$462,000
4	3-Inch Crushed Limestone Surface	TON	700	$30.00	$21,000
5	24-Inch Dia. Steel Pipe Piling	LF	31,600	$60.00	$1,896,000
6	Pipe Pile Splices	EA	410	$500.00	$205,000
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	81,000	$15.00	$1,215,000
8	Stabilization Concrete	CY	510	$100.00	$51,000
9	Reinforced Concrete in Floodwall Base	CY	3,060	$200.00	$612,000
10	Reinforced Concrete Walls	CY	3,150	$350.00	$1,102,500
11	New I-Wall Steel Sheet Piling (PZ-22)	SF	0	$12.50	$0
12	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$6,445,250
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$6,445,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

WEST SIDE LEVEE, SO. OF CLAIBORNE - (ELS. 15.0 AND 10.0)

SELECTED ALTERNATIVE

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	Excavation	CY	196,300	$4.00	$785,200
2	Embankment Fill	CY	13,700	$3.50	$47,950
3	24-Inch Riprap	TON	21,300	$30.00	$639,000
4	3-Inch Crushed Limestone Surface	TON	700	$30.00	$21,000
5	24-Inch Dia. Steel Pipe Piling	LF	44,400	$60.00	$2,664,000
6	Pipe Pile Splices	EA	570	$500.00	$285,000
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	87,500	$15.00	$1,312,500
8	Stabilization Concrete	CY	630	$100.00	$63,000
9	Reinforced Concrete in Floodwall Base	CY	4,410	$200.00	$882,000
10	Reinforced Concrete Walls	CY	3,060	$350.00	$1,071,000
11	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
12	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$7,770,650
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$7,771,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN
EAST SIDE LEVEE, SO. OF CLAIBORNE - ALT. 2 (ELS. 15.0 AND 15.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	189,300	$4.00	$757,200
2	Embankment Fill	CY	43,800	$3.50	$153,300
3	24-Inch Riprap	TON	20,100	$30.00	$603,000
4	3-Inch Crushed Limestone Surface	TON	700	$30.00	$21,000
5	24-Inch Dia. Steel Pipe Piling	LF	31,600	$60.00	$1,896,000
6	Pipe Pile Splices	EA	410	$500.00	$205,000
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	72,900	$15.00	$1,093,500
8	Stabilization Concrete	CY	510	$100.00	$51,000
9	Reinforced Concrete in Floodwall Base	CY	3,060	$200.00	$612,000
10	Reinforced Concrete Walls	CY	3,510	$350.00	$1,228,500
11	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
12	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$6,620,500
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$6,621,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN
EAST SIDE LEVEE, SO. OF CLAIBORNE - (ELS. 15.0 AND 10.0)
SELECTED ALTERNATIVE

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Unit Price	Amount
1	Excavation	CY	189,300	$4.00	$757,200
2	Embankment Fill	CY	30,200	$3.50	$105,700
3	24-Inch Riprap	TON	27,900	$30.00	$837,000
4	3-Inch Crushed Limestone Surface	TON	700	$30.00	$21,000
5	24-Inch Dia. Steel Pipe Piling	LF	47,300	$60.00	$2,838,000
6	Pipe Pile Splices	EA	570	$500.00	$285,000
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	79,400	$15.00	$1,191,000
8	Stabilization Concrete	CY	630	$100.00	$63,000
9	Reinforced Concrete in Floodwall Base	CY	4,410	$200.00	$882,000
10	Reinforced Concrete Walls	CY	3,060	$350.00	$1,071,000
11	New I-Wall Steel Sheet Piling (PZ-27)	SF	0	$12.50	$0
12	I-Wall Concrete	CY	0	$250.00	$0
				SUBTOTAL	$8,050,900
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$8,051,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

WEST SIDE LEVEE, NO. OF CLAIBORNE - ALT. 2 (ELS. 15.0 AND 15.0)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	82,300	$4.00	$329,200
2	Embankment Fill	CY	13,600	$3.50	$47,600
3	24-Inch Riprap	TON	15,000	$30.00	$450,000
4	3-Inch Crushed Limestone Surface	TON	300	$30.00	$9,000
5	24-Inch Dia. Steel Pipe Piling	LF	16,400	$60.00	$984,000
6	Pipe Pile Splices	EA	210	$500.00	$105,000
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	42,000	$15.00	$630,000
8	Stabilization Concrete	CY	260	$100.00	$26,000
9	Reinforced Concrete in Floodwall Base	CY	1,590	$200.00	$318,000
10	Reinforced Concrete Walls	CY	1,630	$350.00	$570,500
11	New I-Wall Steel Sheet Piling (PZ-22)	SF	0	$12.50	$0
12	I-Wall Concrete	CY	0	$250.00	$0
13	Lightweight Fill	TON	3,700	$30.00	$111,000
				SUBTOTAL	$3,580,300
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$3,580,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

EAST SIDE LEVEE, NO. OF CLAIBORNE - ALT. 1 (ELS. 15.0 AND 15.0 I-WALL)

COMPARATIVE COST ESTIMATE

Item No.	Item Description	Unit	Quantity	Price	Amount
1	Excavation	CY	24,700	$4.00	$98,800
2	Embankment Fill	CY	34,600	$3.50	$121,100
3	24-Inch Riprap	TON	31,400	$30.00	$942,000
4	3-Inch Crushed Limestone Surface	TON	300	$30.00	$9,000
5	24-Inch Dia. Steel Pipe Piling	LF	0	$60.00	$0
6	Pipe Pile Splices	EA	0	$500.00	$0
7	Seepage Cutoff Sheet Piling (PZ-35)	SF	0	$15.00	$0
8	Stabilization Concrete	CY	110	$100.00	$11,000
9	Reinforced Concrete in Floodwall Base	CY	0	$200.00	$0
10	Reinforced Concrete Walls	CY	0	$350.00	$0
11	New I-Wall Steel Sheet Piling (PZ-22)	SF	33,200	$12.50	$415,000
12	I-Wall Concrete	CY	570	$250.00	$142,500
				SUBTOTAL	$1,739,400
				CONTINGENCIES (0%)	$0
				ALTERNATIVE COST	**$1,739,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

ALTERNATIVE COST SUMMARY

ALTERNATIVE DESCRIPTION SOUTH OF CLAIBORNE AVENUE	ESTIMATED COST
ALTERNATIVE 1 - RECOMMENDED PLAN WEST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 12.0 AND 10.0	**$7,810,000**
ALTERNATIVE 2 WEST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 10.0 AND 10.0	**$7,699,000**
ALTERNATIVE 3 WEST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 10.0 REDUCED CHANNEL WIDTH	**$7,828,000**
ALTERNATIVE 4 WEST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 15.0 & 10.0 LIGHTWEIGHT FILL	**$8,020,000**
SELECTED ALTERNATIVE WEST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 15.0 & 10.0	**$7,711,000**
ALTERNATIVE 1 - RECOMMENDED PLAN EAST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 13.0 AND 10.0	**$8,196,000**
ALTERNATIVE 2 EAST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 10.0 AND 10.0	**$7,692,000**
ALTERNATIVE 3 EAST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 3.0 AND 10.0	**$6,861,000**
ALTERNATIVE 4 EAST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 10.0	**$8,107,000**
ALTERNATIVE 5 EAST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 15.0 & 10.0 LIGHTWEIGHT FILL	**$8,790,000**
SELECTED ALTERNATIVE EAST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 15.0 & 10.0	**$7,832,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - SHIP LOCK PLAN

ALTERNATIVE COST SUMMARY

ALTERNATIVE DESCRIPTION NORTH OF CLAIBORNE AVENUE	ESTIMATED COST
ALTERNATIVE 2 WEST SIDE, NO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 15.0 LIGHTWEIGHT FILL	**$3,934,000**
ALTERNATIVE 1 - RECOMMENDED PLAN EAST SIDE, NO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 15.0 I-WALL CONFIGURATION	**$1,986,000**
ALTERNATIVE 2 EAST SIDE, NO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 13.0	**$4,619,000**
ALTERNATIVE 3 EAST SIDE, NO. OF CLAIBORNE - LEVEE AT ELS. 10.0 AND 14.0 I-WALL CONFIGURATION	**$2,340,000**
SELECTED ALTERNATIVE EAST SIDE, NO. OF CLAIBORNE - LEVEE AT ELS. 18.0 AND 18.0 I-WALL CONFIGURATION WITH MAX. GREEN SPACE	**$5,518,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

ALTERNATIVE COST SUMMARY

ALTERNATIVE DESCRIPTION SOUTH OF CLAIBORNE AVENUE	ESTIMATED COST
ALTERNATIVE 2 WEST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 15.0	**$6,445,000**
SELECTED ALTERNATIVE WEST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 15.0 & 10.0	**$7,771,000**
ALTERNATIVE 2 EAST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 15.0	**$6,621,000**
SELECTED ALTERNATIVE EAST SIDE, SO. OF CLAIBORNE - LEVEE AT ELS. 15.0 & 10.0	**$8,051,000**

IHNC REPLACEMENT LOCK ALTERNATIVE STUDY

LATERAL FLOOD PROTECTION - BARGE LOCK PLAN

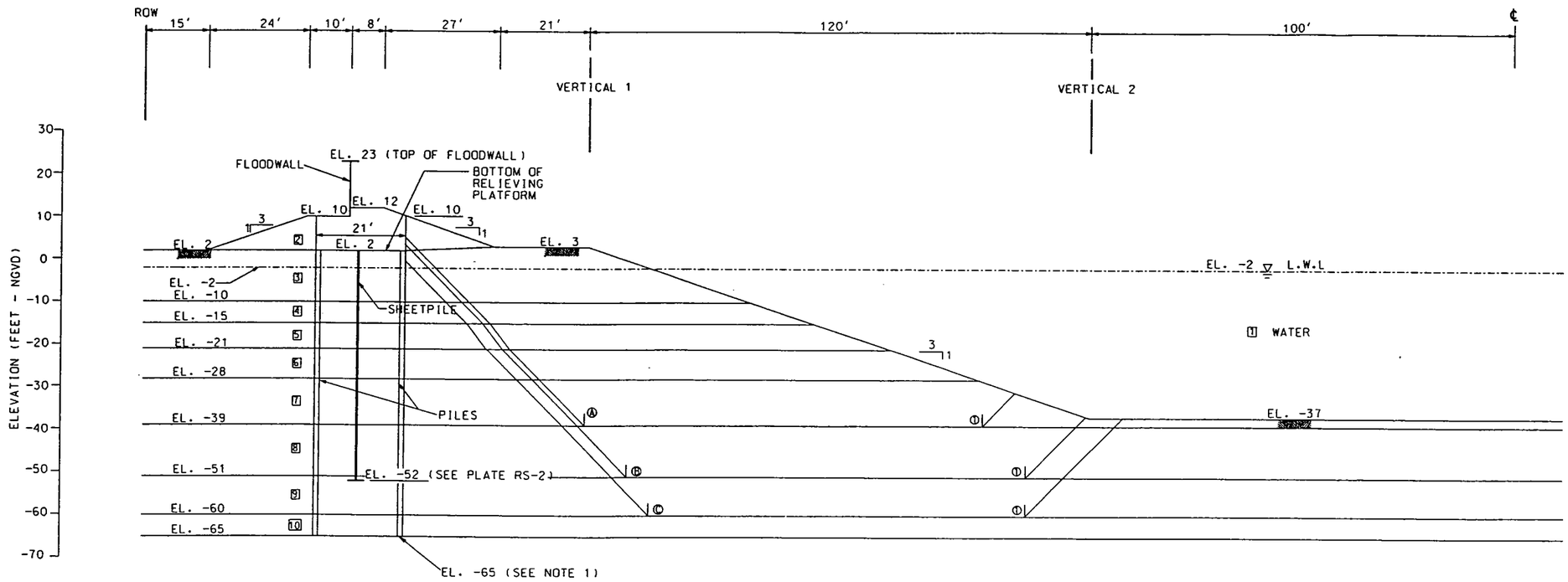
ALTERNATIVE COST SUMMARY

ALTERNATIVE DESCRIPTION NORTH OF CLAIBORNE AVENUE	ESTIMATED COST
ALTERNATIVE 2 WEST SIDE, NO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 15.0 LIGHTWEIGHT FILL	**$3,580,000**
ALTERNATIVE 1 - RECOMMENDED PLAN EAST SIDE, NO. OF CLAIBORNE - LEVEE AT ELS. 15.0 AND 15.0 I-WALL CONFIGURATION	**$1,739,000**

CONCLUSIONS

The revised study criteria and the analyses based on this new criteria indicates that there are no significant cost benefits associated with the use of smaller navigation channels nor with the use of lightweight fills. In addition, the relative costs associated with lowered embankment elevations was also found to be small. The analyses and cost data presented in this revised study indicates that reasonable designs can be provided using pile supported T-type walls with levee embankments at elevation 15.0 south of Claiborne Avenue and at elevation 18.0 north of Claiborne. In the reach North of Claiborne Avenue, the revised study clearly indicates that, on the east side of the canal, flood protection using combination levee/I-walls is more than adequate and that a large "green space" can be provided on the protected side of the wall if the laying channel required for construction is filled after the new lock is in position. These conclusions are valid for both Ship Lock and for Barge Lock plans. The costs associated with providing this added green space is estimated to be 2.5 to 3 million dollars.

These configurations were chosen for further development in the final design report for the lateral flood protection associated with the lock replacement.



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	104	0	320	320	110	0	300	300
4	94	0	320	320	94	0	320	320
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	55,944	72,443	1.29
Ⓑ ①	78,882	103,132	1.31
Ⓒ ①	95,567	141,413	1.48

NOTE: (1) PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -65.0.

(2) THE FAILURE WEDGES AND PLANES DISPLAYED WERE DETERMINED TO BE THE MOST CRITICAL AS VARIOUS OTHER STRATA AND FAILURE PLANES HAVE BEEN CHECKED.

(3) BASED ON LANE'S WEIGHTED CREEP ANALYSIS, A MINIMUM FACTOR OF SAFETY OF 3.0 AGAINST PIPING IS ACHIEVED FOR A SHEETPILE TIPPED AT EL. -16.0 FOR WATER AT EL. 22.0.

(4) ANALYSES ASSUME CHANNEL SLOPE IS FILLED WHERE REQUIRED TO CREATE A 1V ON 3H SLOPE.

30' 0' 30'

C·A·D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3012 28TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS (SOUTH, ALTERNATIVE 1)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

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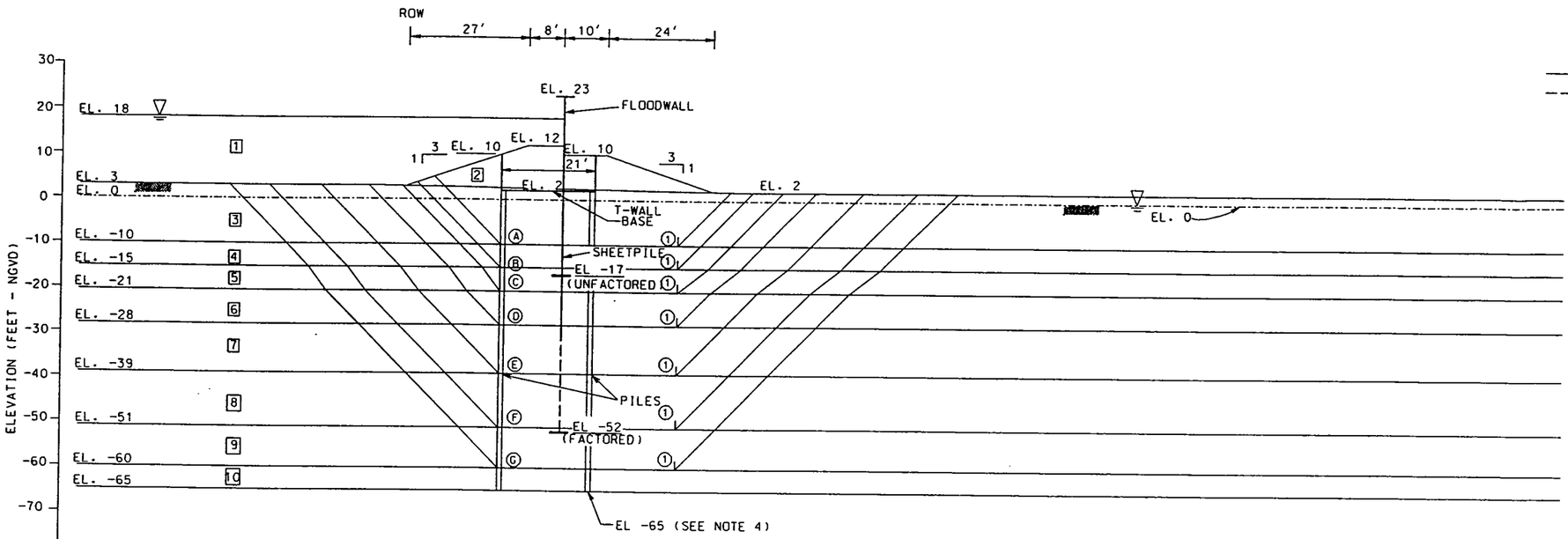
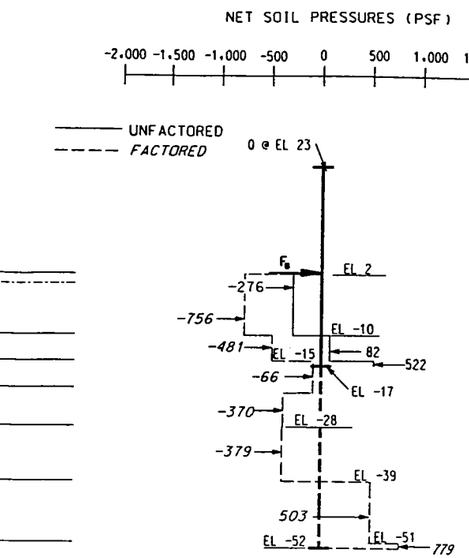
PLATE RS-1

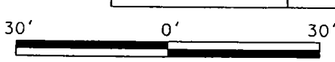




STRATUM NUMBER	SOIL PARAMETERS			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM
1	62.4	0	0	0
2	115	0	500	500
3	104	0	320	320
4	94	0	320	320
5	115	15	200	200
6	105	0	360	360
7	105	0	420	420
8	105	0	570	570
9	110	0	860	860
10	120	30	0	0

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY	UNFACTORED RESULTS			FACTORED RESULTS		
	DRIVING	RESISTING		NET FORCE (LB/FT)	CHANGE IN NET FORCE (LB/FT)	EQUIVALENT PRESSURE (PSF)	NET FORCE (LB/FT)	CHANGE IN NET FORCE (LB/FT)	EQUIVALENT PRESSURE (PSF)
Ⓐ ①	22.427	30.842	1.37	8.415	3.315	-276	-2.799	9.073	-756
Ⓑ ①	28.065	36.892	1.31	8.827	-412	82	-5.206	2.407	-481
Ⓒ ①	35.122	47.082	1.34	11.960	-3.133	522	-5.601	396	-66
Ⓓ ①	42.046	54.877	1.31	12.831	-871	124	-8.192	2.591	-370
Ⓔ ①	53.369	67.694	1.27	14.325	-1.494	136	-12.360	4.168	-379
Ⓕ ①	65.961	92.616	1.40	26.655	-12.330	1.028	-6.326	6.034	503
Ⓖ ①	75.422	113.816	1.51	38.394	-11.739	1.304	683	-7.009	779

SUMMARY OF ANALYSES		
ITEM	UNFACTORED	FACTORED
FORCE BELOW T-WALL BASE, F_B (KIPS/FT)	1.9	11.8
MAXIMUM MOMENT (FT-KIPS/FT)	6.8	95.6



NOTES: (1) BASED ON LANE'S WEIGHTED CREEP SEEPAGE ANALYSIS. THE T-WALL CUTOFF SHEETPILE MUST PENETRATE TO EL. -16.0 OR BELOW TO ACHIEVE A MINIMUM FACTOR OF SAFETY OF 3 AGAINST PIPING FOR WATER AT EL. 22.0.
(2) FACTORED SOIL PRESSURES CALCULATED BY MULTIPLYING THE DRIVING FORCES BY 1.50.
(3) THE HORIZONTAL COMPONENT OF THE LOAD ABOVE THE T-WALL BASE SHOULD BE ADDED TO THE LOAD PRESENTED ON THIS FIGURE TO CHECK THE OVERALL STABILITY OF THE SYSTEM.
(4) PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -65.0.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3012 16TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

WEST SIDE
T-WALL STABILITY ANALYSIS (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

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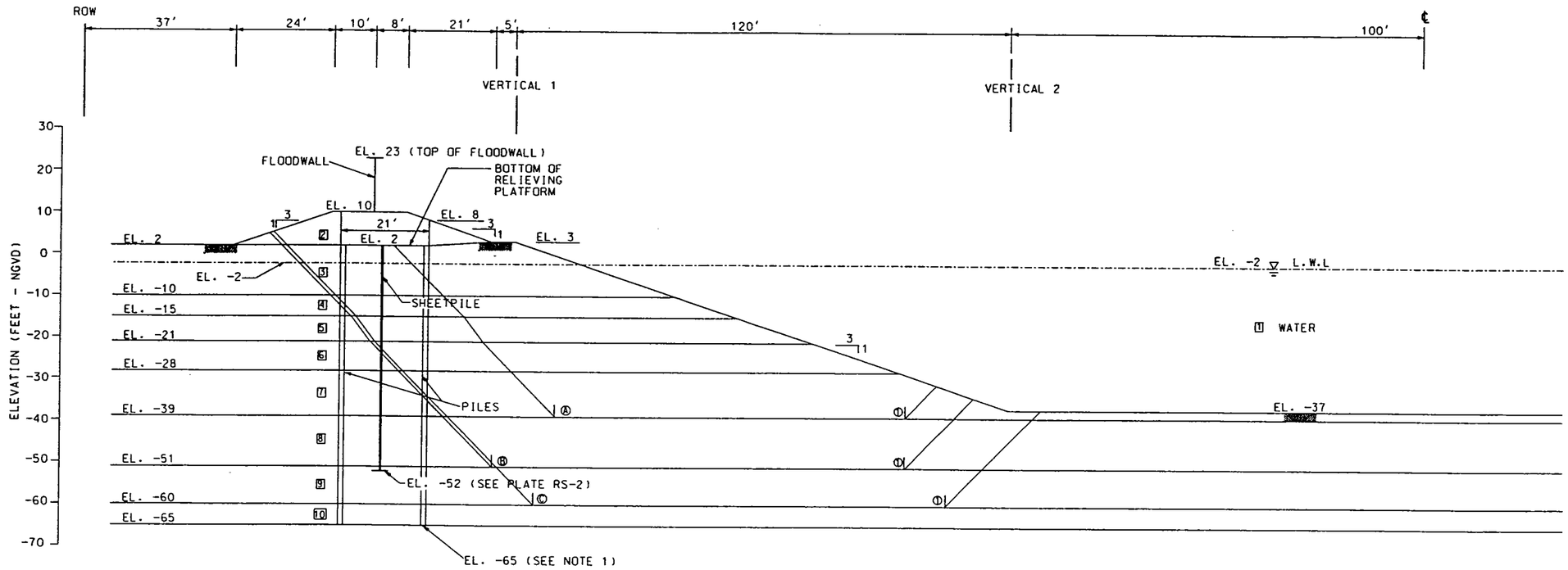

STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	104	0	320	320	110	0	300	300
4	94	0	320	320	94	0	320	320
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	49.963	66.795	1.34
Ⓑ ①	82.758	111.141	1.34
Ⓒ ①	100.244	147.791	1.47

NOTE: (1) PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -65.0.

(2) THE FAILURE WEDGES AND PLANES DISPLAYED WERE DETERMINED TO BE THE MOST CRITICAL AS VARIOUS OTHER STRATA AND FAILURE PLANES HAVE BEEN CHECKED.

(3) BASED ON LANE'S WEIGHTED CREEP ANALYSIS, A MINIMUM FACTOR OF SAFETY OF 3.0 AGAINST PIPING IS ACHIEVED FOR A SHEETPILE TIPPED AT EL. -16.0 FOR WATER AT EL. 22.0.

(4) ANALYSES ASSUME CHANNEL SLOPE IS FILLED WHERE REQUIRED TO CREATE A 1V ON 3H SLOPE.

30' 0' 30'

C•A•D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3012 8TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS (SOUTH, ALTERNATIVE 2)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

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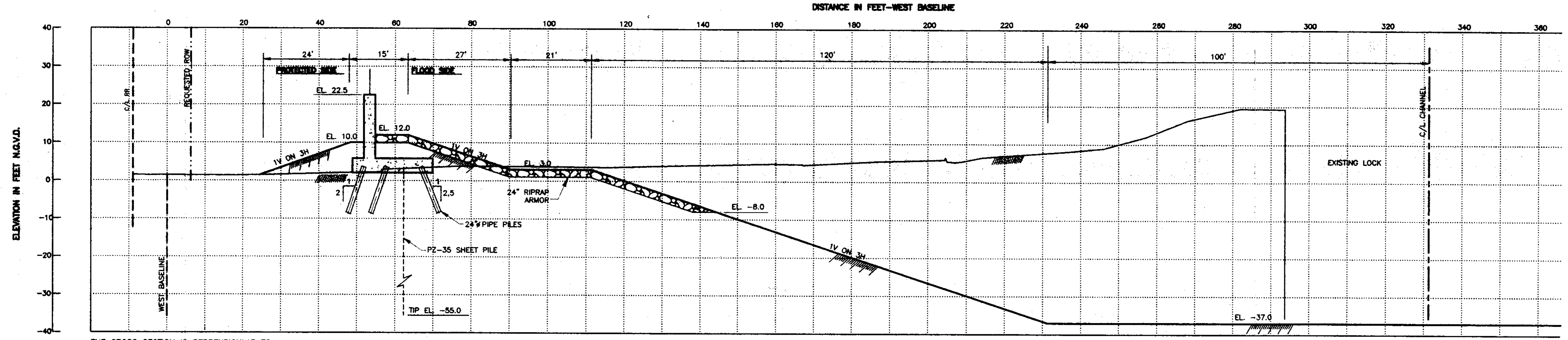
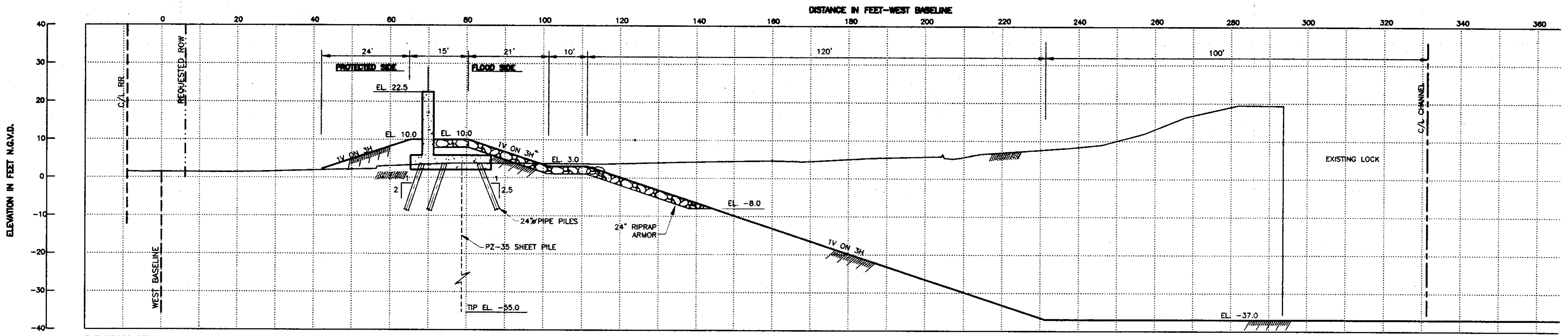
PLATE RS-4



THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL

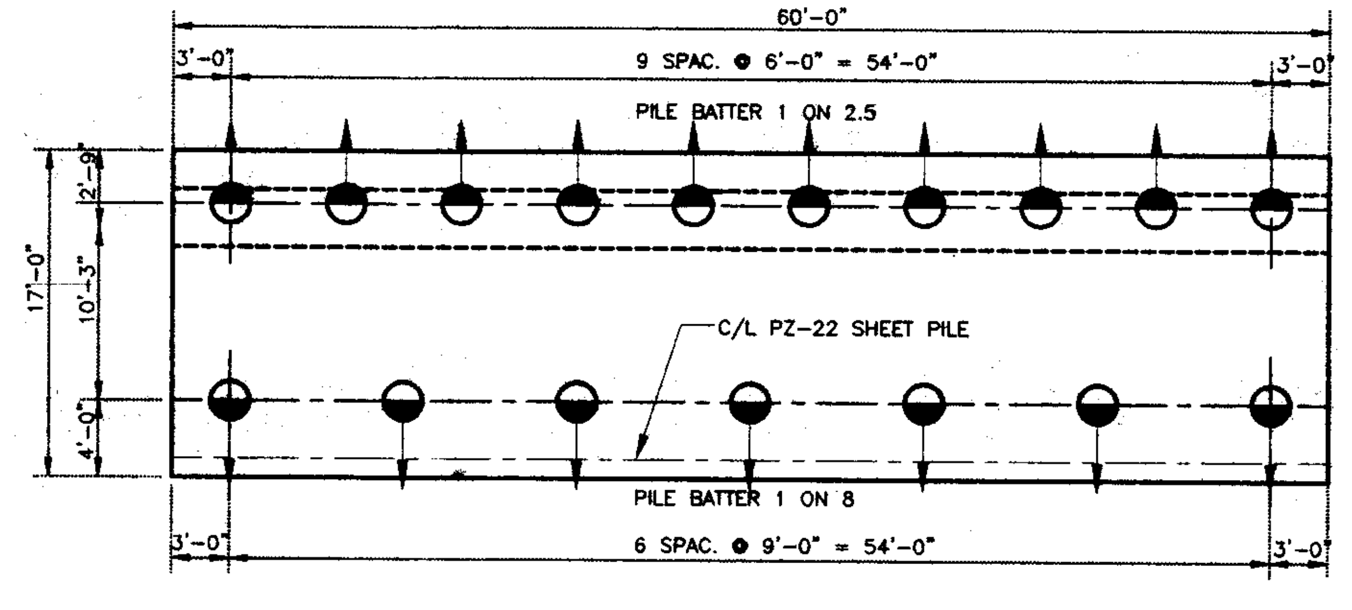
WEST SIDE LEVEE–ALTERNATIVE 1 (ELS. 12.0 AND 10.0)
RECOMMENDED ALTERNATIVE



THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

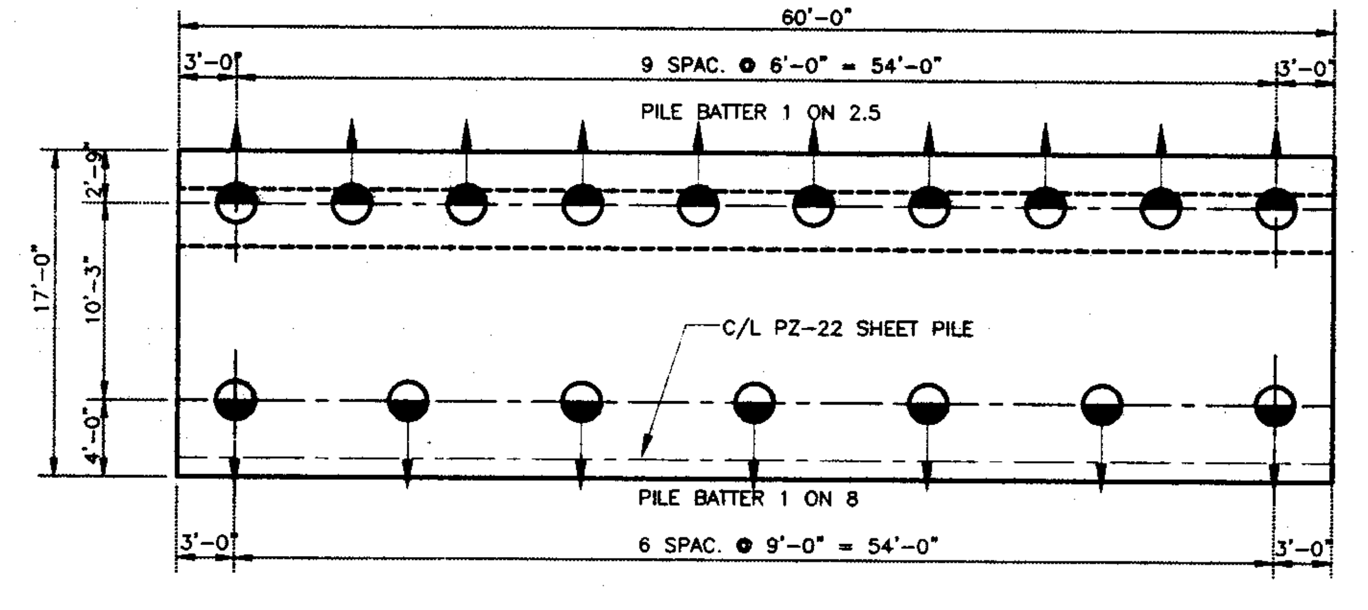
STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL

WEST SIDE LEVEE–ALTERNATE 2 (ELS. 10.0 AND 10.0)



PLAN – 17 PILE T-WALL MONOLITH

ALTERNATIVE 1
SCALE : 1"=5'-0"



PLAN – 17 PILE T-WALL MONOLITH

ALTERNATIVE 2
SCALE : 1"=5'-0"

SCALE: 1'' = 10'

SCALE: 1'' = 5'

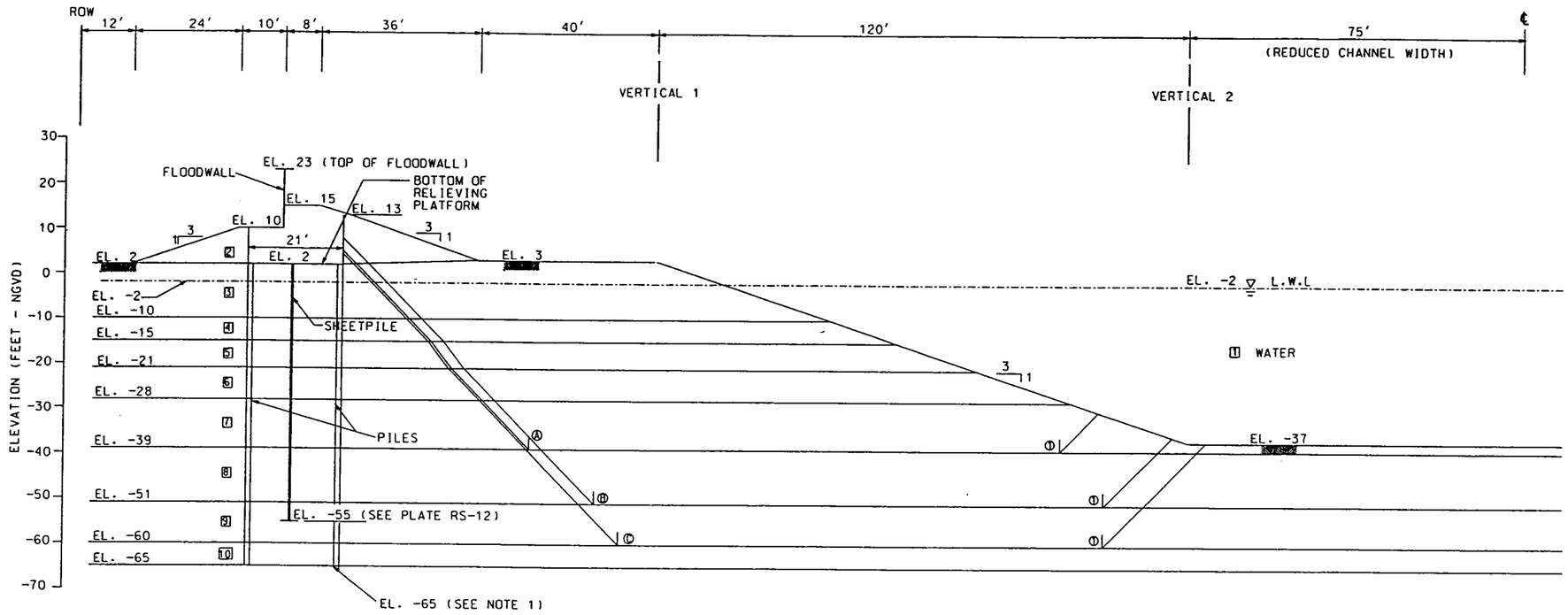
Brown Cunningham Gannuch
ENGINEERS • ARCHITECTS • CONSULTANTS
2701 KINGMAN ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 – ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN–WEST SIDE ALTERNATIVES 1 AND 2 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY DRAWN BY: JSB CHECKED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	CADD FILE: X
	DATE: OCT., 2000		FILE NO. X



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	104	0	320	320	110	0	300	300
4	94	0	320	320	94	0	320	320
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	64.940	84.037	1.29
Ⓑ ①	88.442	119.537	1.35
Ⓒ ①	107.629	161.909	1.50

NOTE: (1) PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -65.0.

(2) THE FAILURE WEDGES AND PLANES DISPLAYED WERE DETERMINED TO BE THE MOST CRITICAL AS VARIOUS OTHER STRATA AND FAILURE PLANES HAVE BEEN CHECKED.

(3) BASED ON LANE'S WEIGHTED CREEP ANALYSIS, A MINIMUM FACTOR OF SAFETY OF 3.0 AGAINST PIPING IS ACHIEVED FOR A SHEETPILE TIPPED AT EL. -16.0 FOR WATER AT EL. 22.0.

(4) ANALYSES ASSUME CHANNEL SLOPE IS FILLED WHERE REQUIRED TO CREATE A 1V ON 3H SLOPE.

30' 0' 30'

C·A·D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3012 18TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS (SOUTH, ALTERNATIVE 3)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

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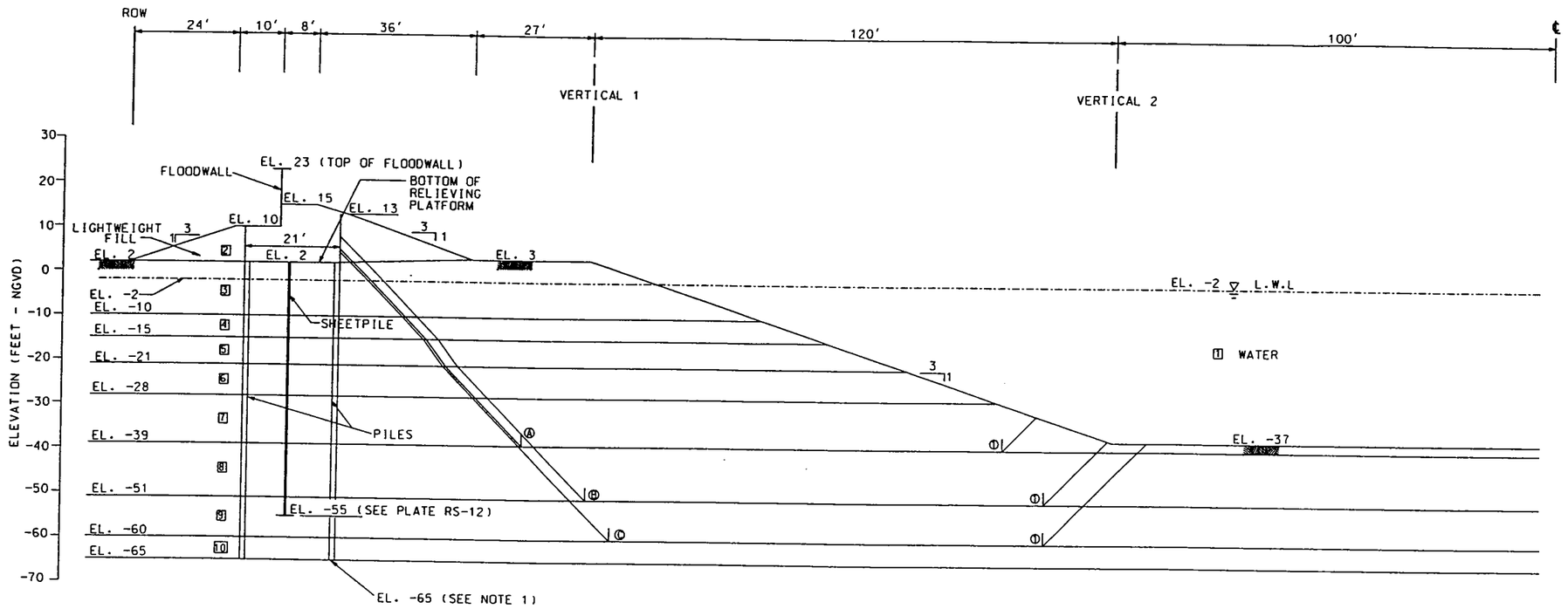
CHECKED BY: CWP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

PLATE RS-6

No Plate RS-7



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	85	30	0	0	85	30	0	0
3	104	0	320	320	110	0	300	300
4	94	0	320	320	94	0	320	320
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT) DRIVING	SUMMATION OF FORCES (LB/FT) RESISTING	FACTOR OF SAFETY
Ⓐ ①	61.341	79.067	1.29
Ⓑ ①	84.916	111.485	1.31
Ⓒ ①	103.987	151.250	1.45

NOTE: (1) PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -65.0.

(2) THE FAILURE WEDGES AND PLANES DISPLAYED WERE DETERMINED TO BE THE MOST CRITICAL AS VARIOUS OTHER STRATA AND FAILURE PLANES HAVE BEEN CHECKED.

(3) BASED ON LANE'S WEIGHTED CREEP ANALYSIS, A MINIMUM FACTOR OF SAFETY OF 3.0 AGAINST PIPING IS ACHIEVED FOR A SHEETPILE TIPPED AT EL. -16.0 FOR WATER AT EL. 22.0.

(4) ANALYSES ASSUME CHANNEL SLOPE IS FILLED WHERE REQUIRED TO CREATE A 1V ON 3H SLOPE.

30' 0' 30'

C•A•D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3012 28TH ST. METAIRIE, LOUISIANA

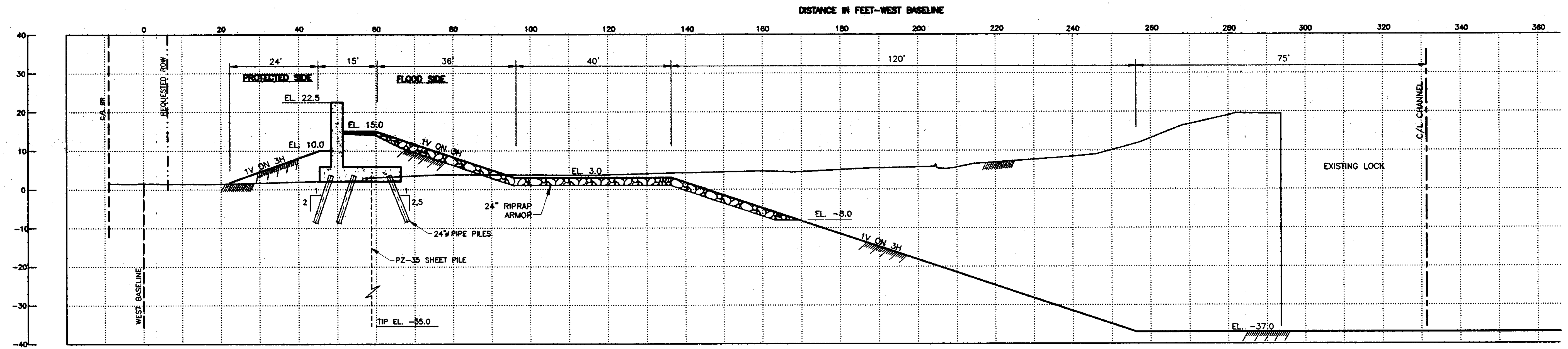
INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS (SOUTH, ALTERNATIVE4)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DMK
CHECKED BY: CMP
PLOT SCALE:
PLOT DATE:
CADD FILE:
FILE NO.
DATE:

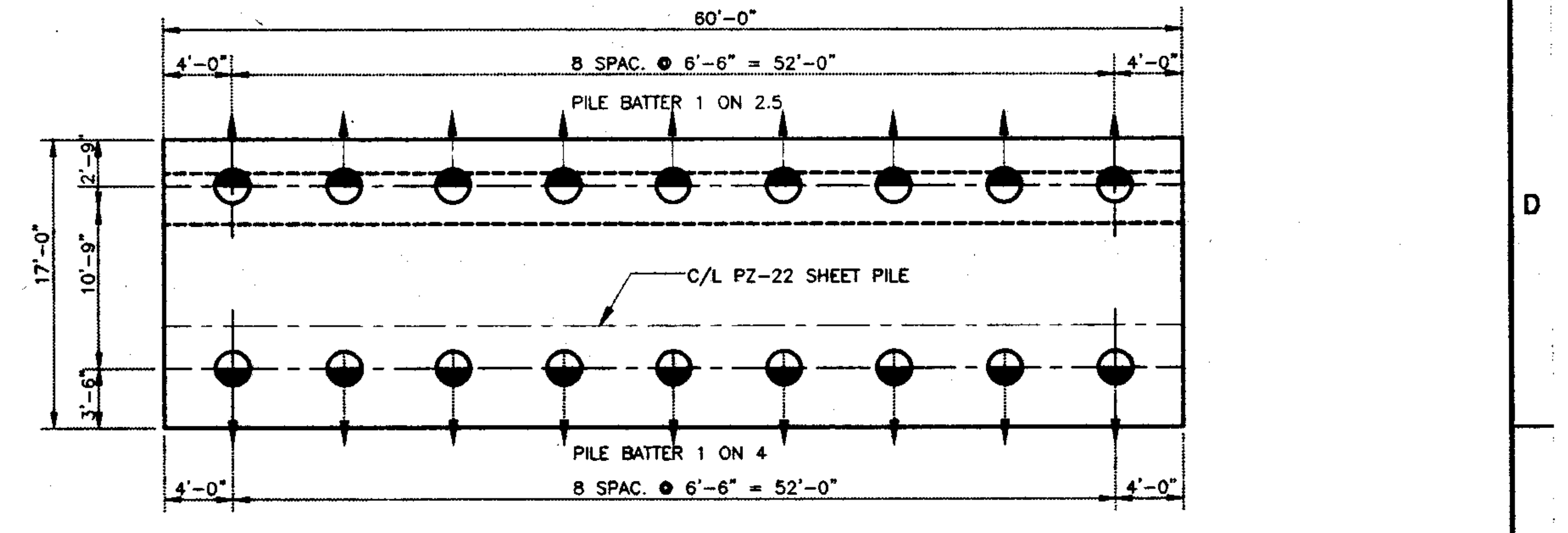
PLATE RS-8



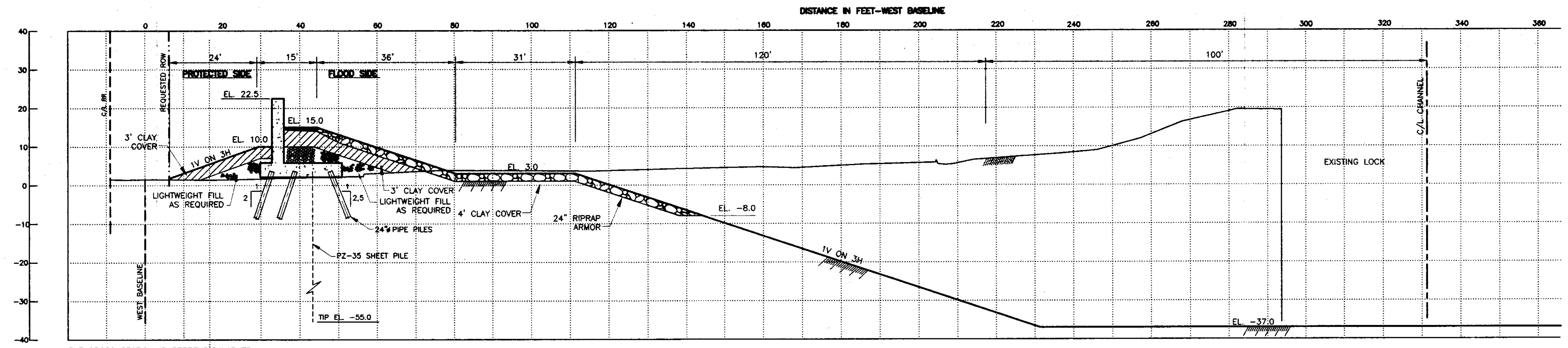
THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL

WEST SIDE LEVEE-ALTERNATIVE 3 (ELS. 15.0 AND 10.0)
REDUCED CHANNEL WIDTH



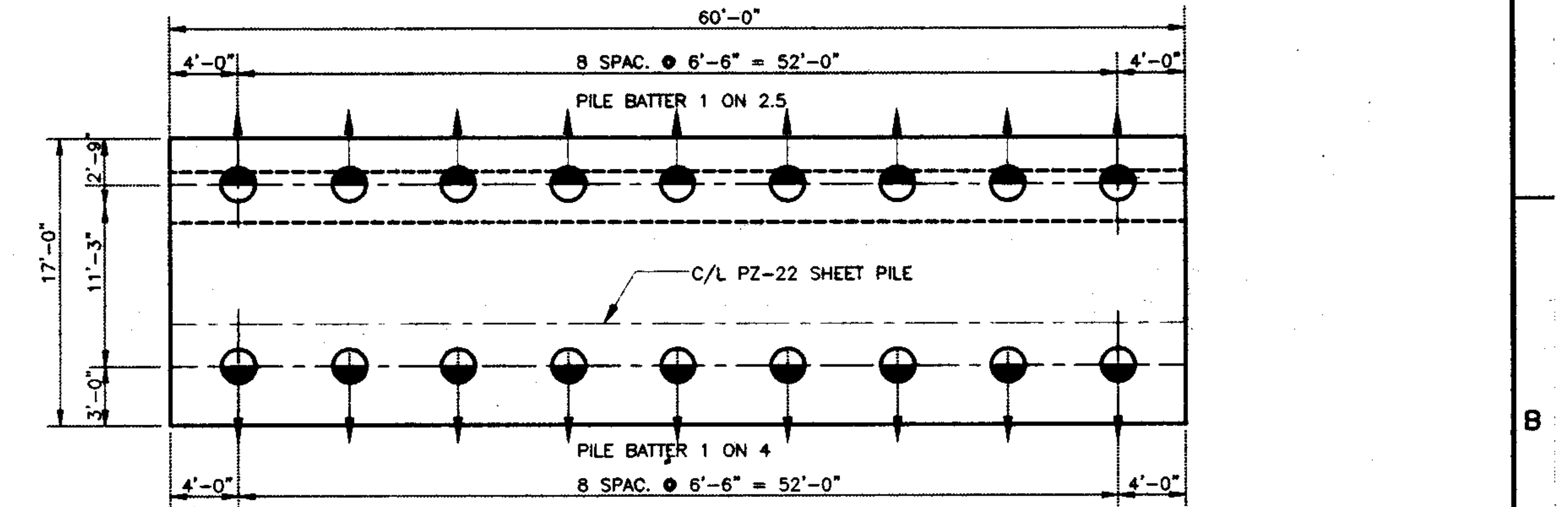
PLAN – 18 PILE T-WALL MONOLITH
ALTERNATIVE 3
REDUCED CHANNEL WIDTH
SCALE : 1"=5'-0"



THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

STA. 0+00.0 WEST B/L = STA. 27+61.94 C/L CHANNEL

WEST SIDE LEVEE-ALTERNATIVE 4 (ELS. 15.0 AND 10.0)
LIGHTWEIGHT FILL



PLAN – 18 PILE T-WALL MONOLITH
ALTERNATIVE 4
LIGHTWEIGHT FILL
SCALE : 1"=5'-0"

SCALE: 1'' = 10'

SCALE: 1'' = 5'

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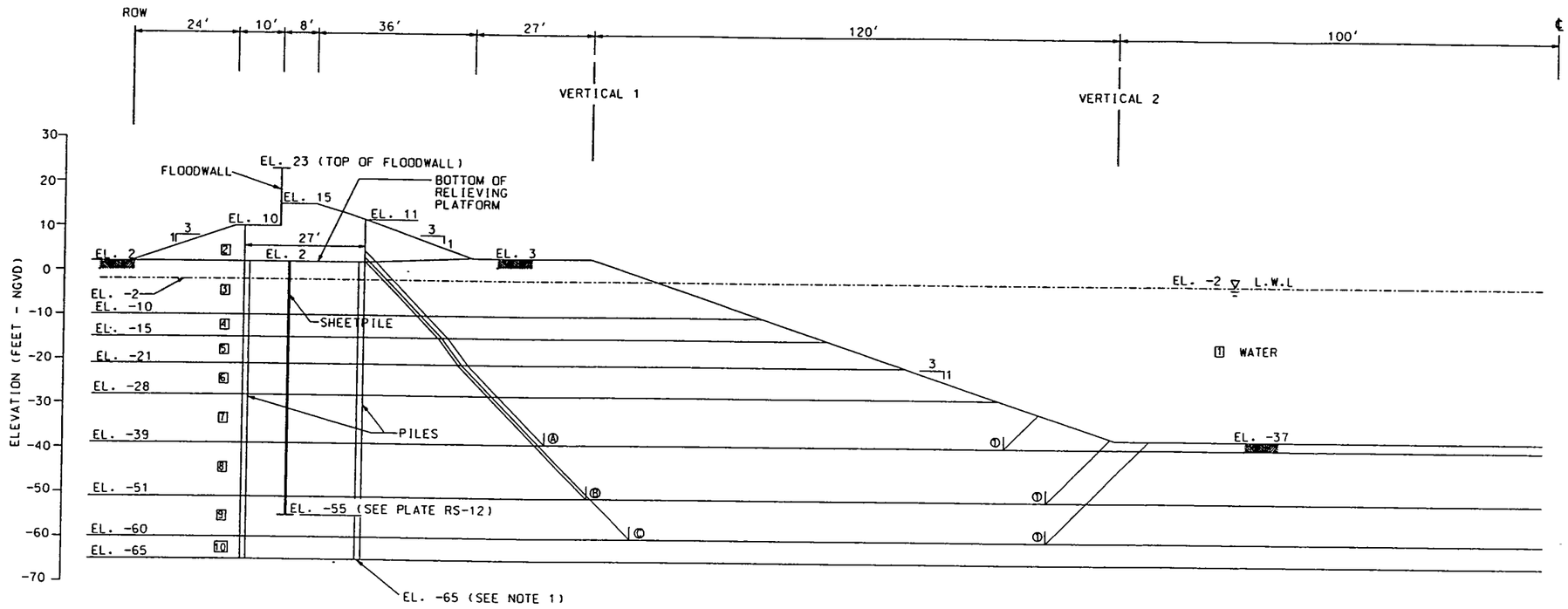
INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 – ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN–WEST SIDE
ALTERNATIVES 3 AND 4 (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY
DRAWN BY: JSB
CHECKED BY: RWY
PLOT SCALE: 10
PLOT DATE: X
FILE NO. X
DATE: OCT., 2000

PLATE RS-9



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	104	0	320	320	110	0	300	300
4	94	0	320	320	94	0	320	320
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	58.866	76.065	1.29
Ⓑ ①	83.435	109.317	1.31
Ⓒ ①	100.498	146.002	1.45

NOTE: (1) PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -65.0.

(2) THE FAILURE WEDGES AND PLANES DISPLAYED WERE DETERMINED TO BE THE MOST CRITICAL AS VARIOUS OTHER STRATA AND FAILURE PLANES HAVE BEEN CHECKED.

(3) BASED ON LANE'S WEIGHTED CREEP ANALYSIS. A MINIMUM FACTOR OF SAFETY OF 3.0 AGAINST PIPING IS ACHIEVED FOR A SHEETPILE TIPPED AT EL. -16.0 FOR WATER AT EL. 22.0.

(4) ANALYSES ASSUME CHANNEL SLOPE IS FILLED WHERE REQUIRED TO CREATE A 1V ON 3H SLOPE.

30' 0' 30'

C:A:D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3081 28TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS (SOUTH, WATER AT EL. -2)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

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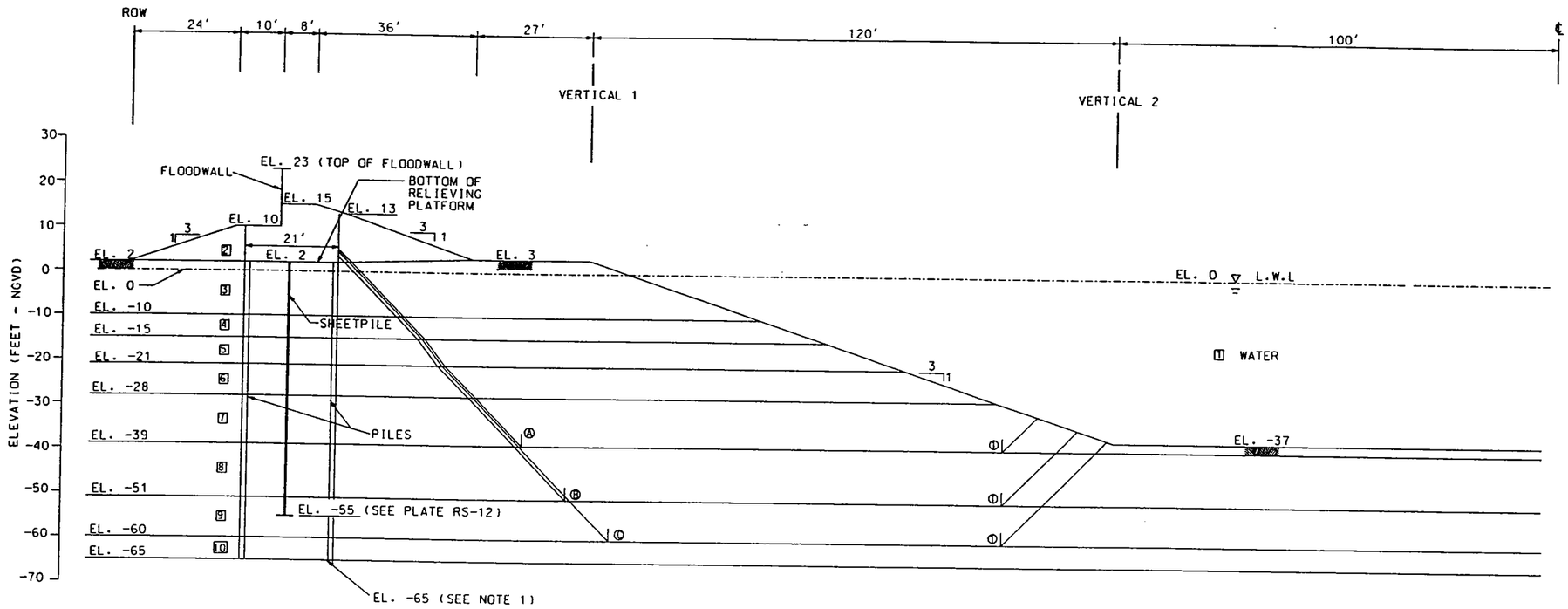
PLATE RS-10



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	104	0	320	320	110	0	300	300
4	94	0	320	320	94	0	320	320
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	60.550	79.387	1.31
Ⓑ ①	81.582	110.160	1.35
Ⓒ ①	98.106	146.873	1.50

NOTE: (1) PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -65.0.

(2) THE FAILURE WEDGES AND PLANES DISPLAYED WERE DETERMINED TO BE THE MOST CRITICAL AS VARIOUS OTHER STRATA AND FAILURE PLANES HAVE BEEN CHECKED.

(3) BASED ON LANE'S WEIGHTED CREEP ANALYSIS. A MINIMUM FACTOR OF SAFETY OF 3.0 AGAINST PIPING IS ACHIEVED FOR A SHEETPILE TIPPED AT EL. -16.0 FOR WATER AT EL. 22.0.

(4) ANALYSES ASSUME CHANNEL SLOPE IS FILLED WHERE REQUIRED TO CREATE A 1V ON 3H SLOPE.

30' 0' 30'

C·A·D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3012 28TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
DRAWN BY: DNK
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PLOT SCALE:
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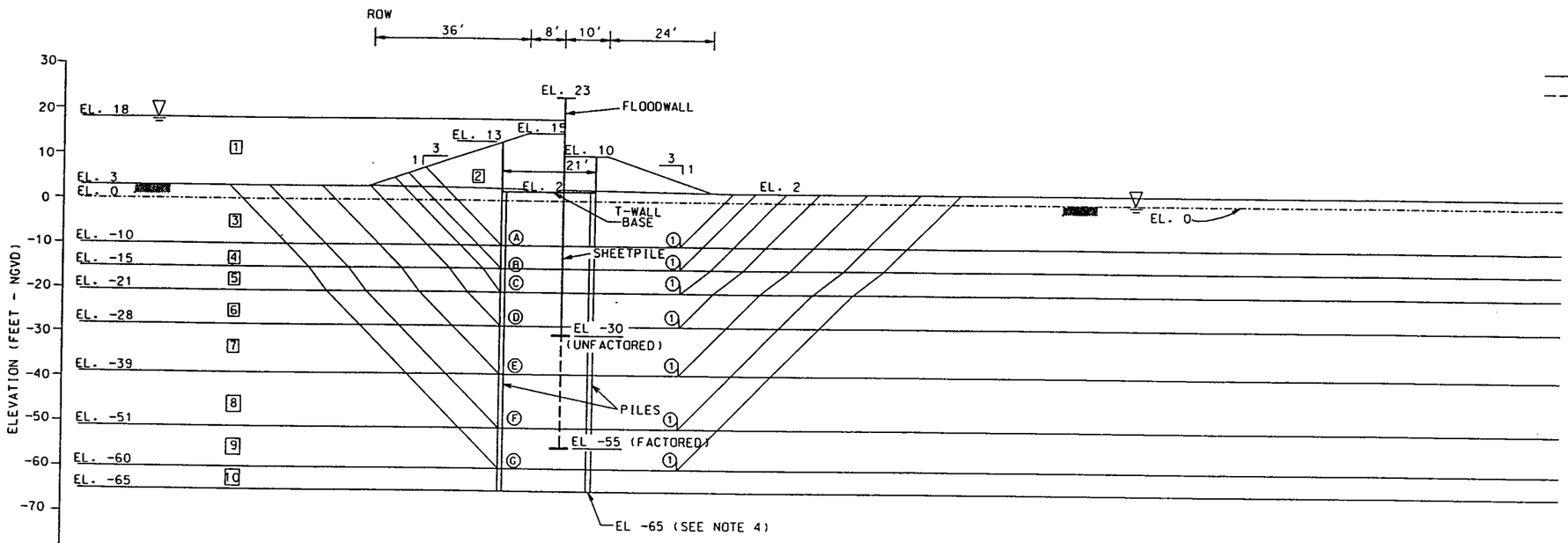
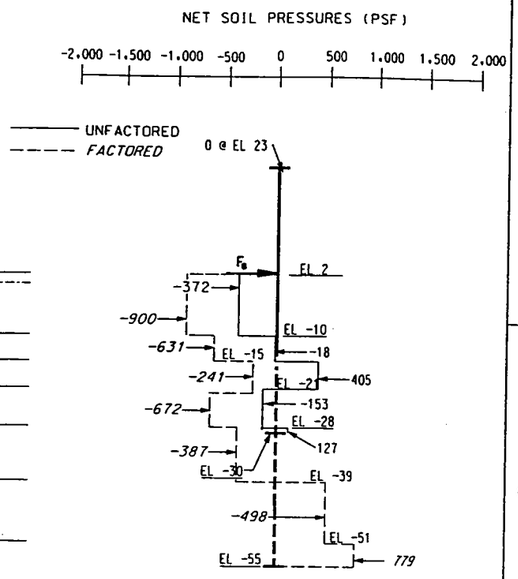
DATE:

PLATE RS-II





STRATUM NUMBER	SOIL PARAMETERS			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM
1	62.4	0	0	0
2	115	0	500	500
3	104	0	320	320
4	94	0	320	320
5	115	15	200	200
6	105	0	360	360
7	105	0	420	420
8	105	0	570	570
9	110	0	860	860
10	120	30	0	0

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT) DRIVING	SUMMATION OF FORCES (LB/FT) RESISTING	FACTOR OF SAFETY	UNFACTORED RESULTS NET FORCE (LB/FT)	UNFACTORED RESULTS CHANGE IN NET FORCE (LB/FT)	UNFACTORED RESULTS EQUIVALENT PRESSURE (PSF)	FACTORED RESULTS NET FORCE (LB/FT)	FACTORED RESULTS CHANGE IN NET FORCE (LB/FT)	FACTORED RESULTS EQUIVALENT PRESSURE (PSF)
Ⓐ ①	24,745	32,924	1.33	8,179	4,469	-372	-4,194	10,801	-900
Ⓑ ①	30,880	38,970	1.26	8,090	89	-18	-7,350	3,157	-631
Ⓒ ①	38,624	49,141	1.27	10,517	-2,427	405	-8,795	1,445	-241
Ⓓ ①	45,877	55,320	1.21	9,443	1,074	-153	-13,496	4,701	-672
Ⓔ ①	57,194	68,034	1.19	10,840	-1,397	127	-17,757	4,267	-387
Ⓕ ①	69,595	92,616	1.33	23,021	-12,181	1,015	-11,777	-5,981	498
Ⓖ ①	79,055	113,816	1.44	34,761	-11,740	1,304	-4,767	-7,010	779

SUMMARY OF ANALYSES

ITEM	UNFACTORED	FACTORED
FORCE BELOW T-WALL BASE, F_B (KIPS/FT)	3.0	15.2
MAXIMUM MOMENT (FT-KIPS/FT)	12.1	134.9

30' 0' 30'

NOTES: (1) BASED ON LANE'S WEIGHTED CREEP SEEPAGE ANALYSIS. THE T-WALL CUTOFF SHEETPILE MUST PENETRATE TO EL. -16.0 OR BELOW TO ACHIEVE A MINIMUM FACTOR OF SAFETY OF 3 AGAINST PIPING FOR WATER AT EL. 22.0.
(2) FACTORED SOIL PRESSURES CALCULATED BY MULTIPLYING THE DRIVING FORCES BY 1.50.
(3) THE HORIZONTAL COMPONENT OF THE LOAD ABOVE THE T-WALL BASE SHOULD BE ADDED TO THE LOAD PRESENTED ON THIS FIGURE TO CHECK THE OVERALL STABILITY OF THE SYSTEM.
(4) PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -65.0.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3028TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

WEST SIDE
T-WALL STABILITY ANALYSIS (SOUTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

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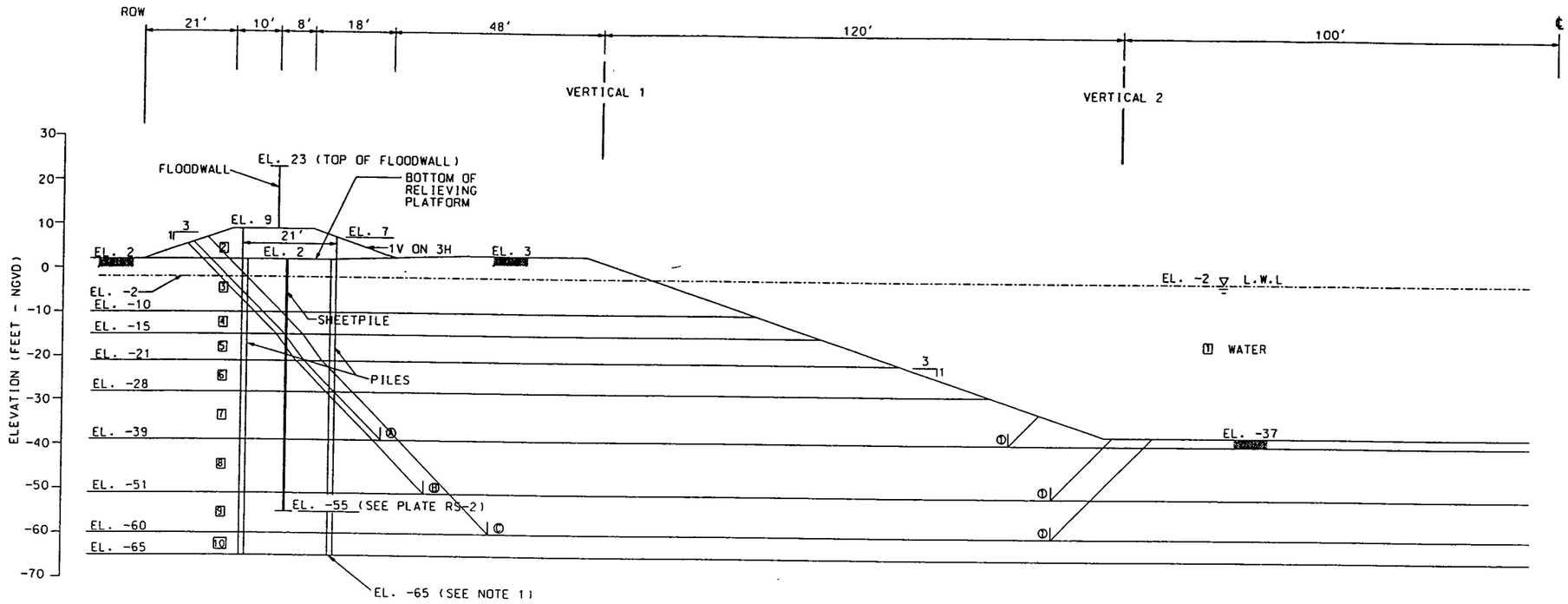
PLATE RS-12



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	85	30	0	0	85	30	0	0
3	104	0	320	320	110	0	300	300
4	94	0	320	320	94	0	320	320
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	71,864	96,824	1.35
Ⓑ ①	97,109	136,107	1.40
Ⓒ ①	113,738	181,686	1.60

NOTE: (1) ANALYSES SHOWN ARE FOR LEVEE EMBANKMENT WITH NO T-WALL OR RELIEVING PLATFORM. HOWEVER, A T-WALL WILL BE REQUIRED BECAUSE NO SOLUTION FOR AN I-WALL WAS ABLE TO BE COMPUTED FOR Q-CASE SOIL PARAMETERS AND WATER TO EL. 22.0.

(2) THE FAILURE WEDGES AND PLANES DISPLAYED WERE DETERMINED TO BE THE MOST CRITICAL AS VARIOUS OTHER STRATA AND FAILURE PLANES HAVE BEEN CHECKED.

(3) BASED ON LANE'S WEIGHTED CREEP ANALYSIS, A MINIMUM FACTOR OF SAFETY OF 3.0 AGAINST PIPING IS ACHIEVED FOR A SHEETPILE TIPPED AT EL. -16.0 FOR WATER AT EL. 22.0 AND RELIEVING PLATFORM AT EL. 2.0.

(4) ANALYSES ASSUME CHANNEL SLOPE IS FILLED WHERE REQUIRED TO CREATE A 1V ON 3H SLOPE.

30' 0' 30'

C:A>O

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3081 26TH ST. METAIRIE, LOUISIANA

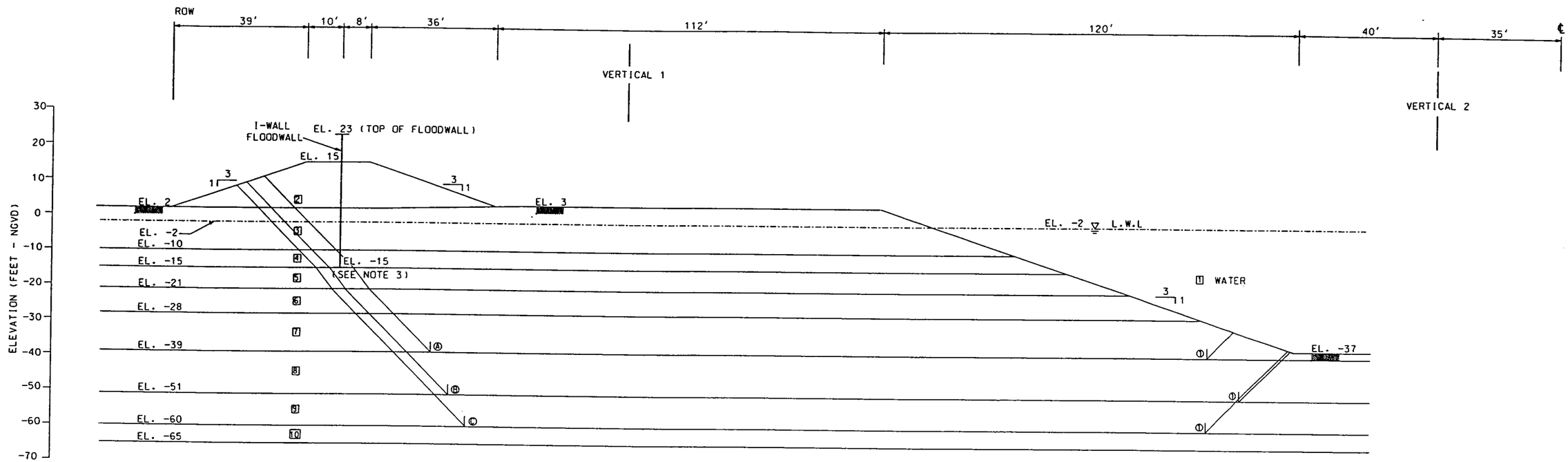
INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE
SLOPE STABILITY ANALYSIS (SOUTH, MAX. FILL HEIGHT)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP	PLOT SCALE:	PLOT DATE:	CADD FILE:
DRAWN BY: DNK			FILE NO.
CHECKED BY: CMP	DATE:		

PLATE RS-13



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	104	0	320	320	110	0	300	300
4	94	0	320	320	94	0	320	320
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	103,806	137,103	1.32
Ⓑ ①	136,859	190,724	1.39
Ⓒ ①	157,317	263,165	1.67

NOTE: (1) MINIMUM SHEETPILE TIP BASED ON 3:1 PENETRATION TO STICK UP RATIO = EL. -9.0. MINIMUM SHEETPILE TIP BASED ON OVERTURNING (S-CASE, F.S. = 1.0) = EL. -2.0. MAX. MOMENT = 18 FT-KIPS/FT.

(2) THE FAILURE WEDGES AND PLANES DISPLAYED WERE DETERMINED TO BE THE MOST CRITICAL AS VARIOUS OTHER STRATA AND FAILURE PLANES HAVE BEEN CHECKED.

(3) BASED ON LANE'S WEIGHTED CREEP ANALYSIS. A MINIMUM FACTOR OF SAFETY OF 3.0 AGAINST PIPING IS ACHIEVED FOR A SHEETPILE TIPPED AT EL. -15.0 FOR WATER AT EL. 22.0.

(4) ANALYSES ASSUME CHANNEL SLOPE IS FILLED WHERE REQUIRED TO CREATE A 1V ON 3H SLOPE.

30' 0' 30'

C·A·D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3081 28TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE (STA. 13+00 TO STA. 20+00)
SLOPE STABILITY ANALYSIS (NORTH, ALTERNATIVE I)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

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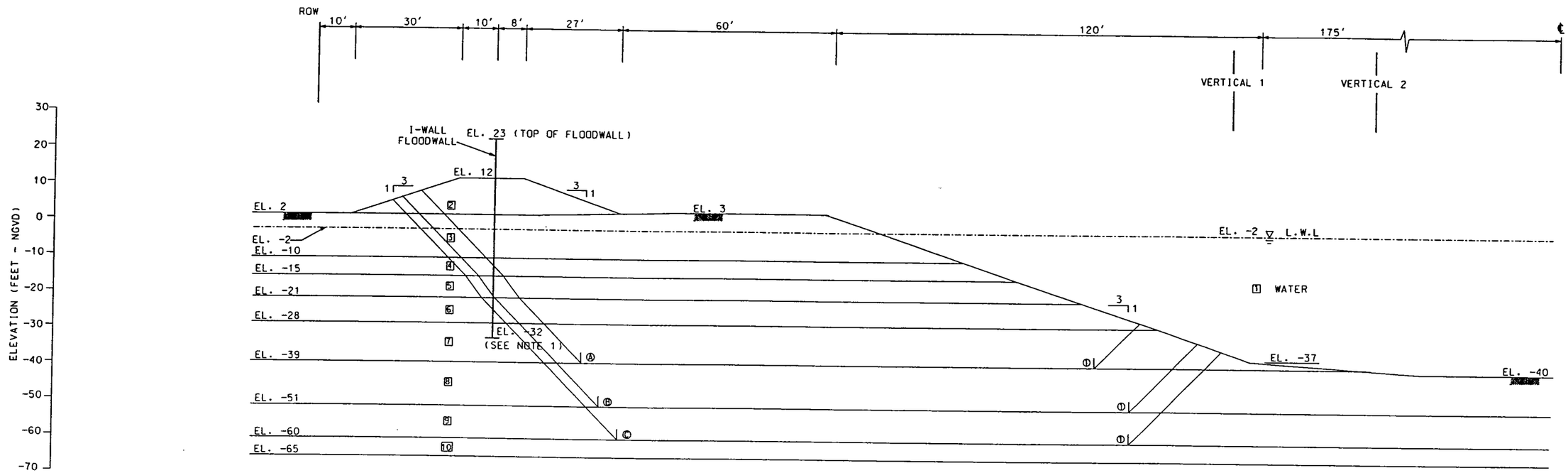
PLATE RS-14



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	104	0	320	320	110	0	300	300
4	94	0	320	320	94	0	320	320
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT) DRIVING	SUMMATION OF FORCES (LB/FT) RESISTING	FACTOR OF SAFETY
Ⓐ ①	84.320	110.072	1.31
Ⓑ ①	111.700	155.909	1.40
Ⓒ ①	130.135	223.200	1.72

NOTE: (1) SHEETPILE I-WALL GOVERNED BY O-CASE. F.S. = 1.25. MAX. MOMENT = 30FT-KIPS/FT. MINIMUM SHEETPILE TIP BASED ON 3:1 PENETRATION TO STICK UP RATIO = EL. -21.0.

(2) THE FAILURE WEDGES AND PLANES DISPLAYED WERE DETERMINED TO BE THE MOST CRITICAL AS VARIOUS OTHER STRATA AND FAILURE PLANES HAVE BEEN CHECKED.

(3) BASED ON LANE'S WEIGHTED CREEP ANALYSIS. A MINIMUM FACTOR OF SAFETY OF 3.0 AGAINST PIPING IS ACHIEVED FOR A SHEETPILE TIPPED AT EL. -18.0 FOR WATER AT EL. 22.0.

(4) ANALYSES ASSUME CHANNEL SLOPE IS FILLED WHERE REQUIRED TO CREATE A 1V ON 3H SLOPE.

30' 0' 30'

C•A•D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE (STA. 20+00 NORTHWARD)
SLOPE STABILITY ANALYSIS (NORTH, ALTERNATIVE I)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

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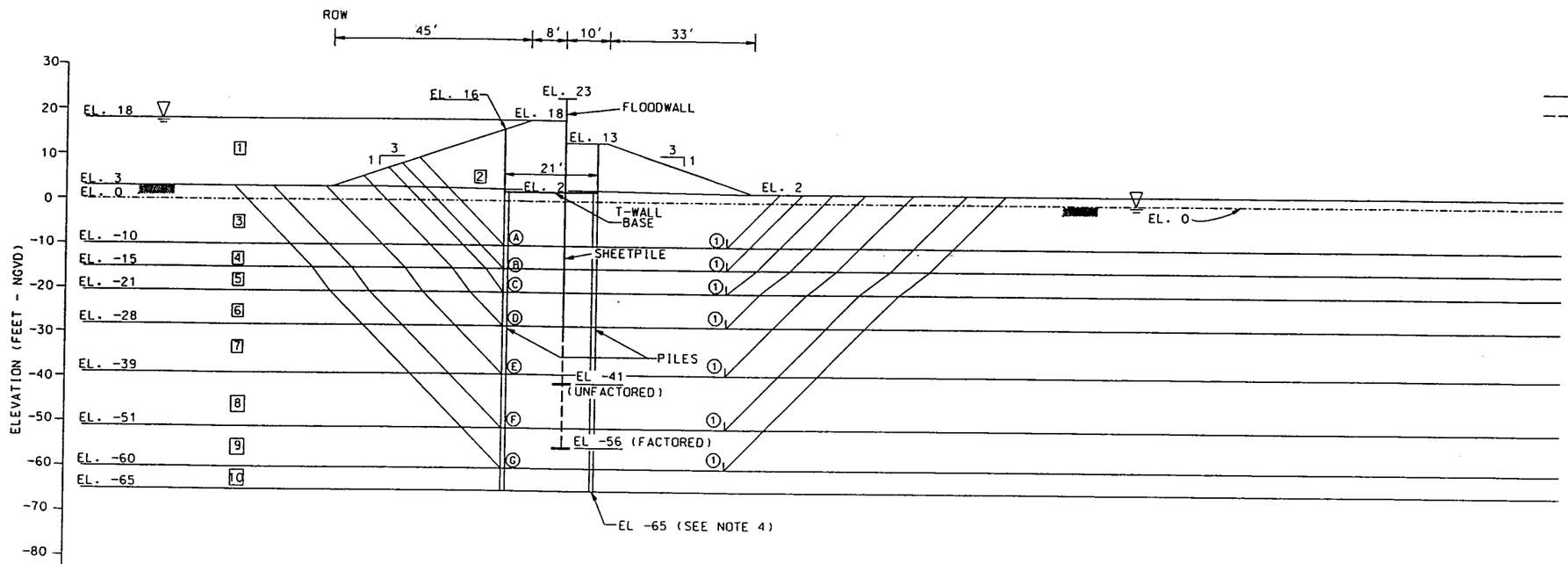
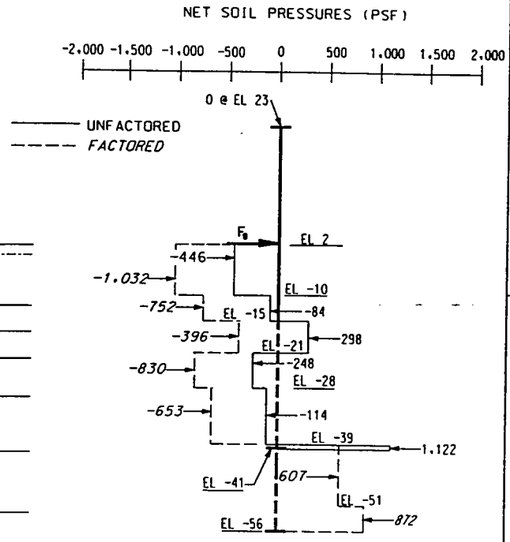
PLATE RS-15





STRATUM NUMBER	SOIL PARAMETERS			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM
1	62.4	0	0	0
2	115	0	500	500
3	104	0	320	320
4	94	0	320	320
5	115	15	200	200
6	105	0	360	360
7	105	0	420	420
8	105	0	570	570
9	110	0	860	860
10	120	30	0	0

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT) DRIVING	SUMMATION OF FORCES (LB/FT) RESISTING	FACTOR OF SAFETY	UNFACTORED RESULTS NET FORCE (LB/FT)	UNFACTORED RESULTS CHANGE IN NET FORCE (LB/FT)	UNFACTORED RESULTS EQUIVALENT PRESSURE (PSF)	FACTORED RESULTS NET FORCE (LB/FT)	FACTORED RESULTS CHANGE IN NET FORCE (LB/FT)	FACTORED RESULTS EQUIVALENT PRESSURE (PSF)
Ⓐ ①	27,846	38,308	1.38	10,462	5,357	-446	-3,461	12,381	-1,032
Ⓑ ①	34,530	44,573	1.29	10,043	419	-84	-7,222	3,761	-752
Ⓒ ①	42,853	54,683	1.28	11,830	-1,787	298	-9,597	2,375	-396
Ⓓ ①	50,992	61,084	1.20	10,092	1,738	-248	-15,404	5,808	-830
Ⓔ ①	62,848	71,686	1.14	8,838	1,254	-114	-22,586	7,182	-653
Ⓕ ①	75,197	97,498	1.30	22,301	-13,463	1,122	-15,298	-7,289	607
Ⓖ ①	84,510	119,317	1.41	34,807	-12,506	1,390	-7,448	-7,850	872

SUMMARY OF ANALYSES

ITEM	UNFACTORED	FACTORED
FORCE BELOW T-WALL BASE (KIPS/FT), F_s	4.7	19.9
MAXIMUM MOMENT (FT-KIPS/FT)	24.7	209.2

30' 0' 30'

NOTES: (1) BASED ON LANE'S WEIGHTED CREEP SEEPAGE ANALYSIS. THE T-WALL CUTOFF SHEETPILE MUST PENETRATE TO EL. -13.0 OR BELOW TO ACHIEVE A MINIMUM FACTOR OF SAFETY OF 3 AGAINST PIPING. FOR WATER AT EL. 22.0.
(2) FACTORED SOIL PRESSURES CALCULATED BY MULTIPLYING THE DRIVING FORCES BY 1.50.
(3) THE HORIZONTAL COMPONENT OF THE LOAD ABOVE THE T-WALL BASE SHOULD BE ADDED TO THE LOAD PRESENTED ON THIS FIGURE TO CHECK THE OVERALL STABILITY OF THE SYSTEM.
(4) PILES DRIVEN FOR SUPPORT OF RELIEVING PLATFORM SHOULD BE TIPPED AT OR BELOW EL. -65.0.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3041 28TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

WEST SIDE
T-WALL STABILITY ANALYSIS (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
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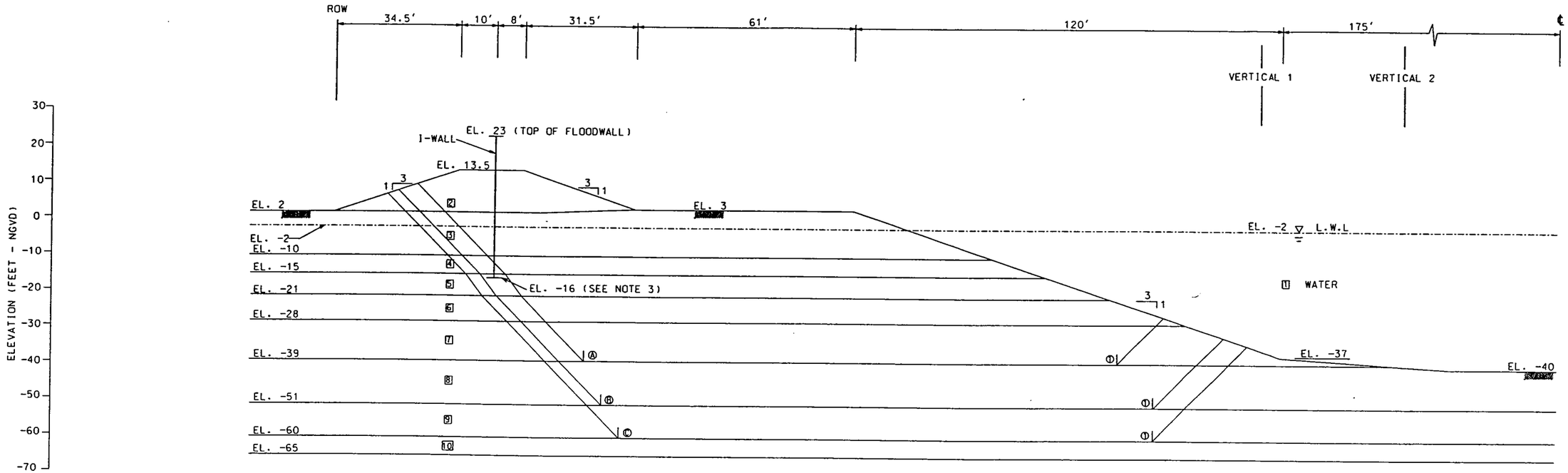
PLATE RS-16



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF) AVERAGE	COHESION (PSF) BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	104	0	320	320	110	0	300	300
4	94	0	320	320	94	0	320	320
5	115	15	200	200	115	15	200	200
6	105	0	360	360	110	0	300	300
7	105	0	420	420	104	0	300	300
8	105	0	570	570	100	0	420	420
9	110	0	860	860	104	0	500	500
10	120	30	0	0	120	30	0	0

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT) DRIVING	SUMMATION OF FORCES (LB/FT) RESISTING	FACTOR OF SAFETY
Ⓐ ①	87,742	113,531	1.29
Ⓑ ①	115,396	160,114	1.39
Ⓒ ①	134,050	228,853	1.71

NOTE: (1) MINIMUM SHEETPILE TIP BASED ON 3:1 PENETRATION TO STICK UP RATIO = EL -15.0.
MINIMUM SHEETPILE TIP BASED ON OVERTURNING (S-CASE, FS=1.0) = EL -7.0.
MAXIMUM MOMENT = 31 FT-KIPS/FT.

(2) THE FAILURE WEDGES AND PLANES DISPLAYED WERE DETERMINED TO BE THE MOST CRITICAL AS VARIOUS OTHER STRATA AND FAILURE PLANES HAVE BEEN CHECKED.

(3) BASED ON LANE'S WEIGHTED CREEP ANALYSIS. A MINIMUM FACTOR OF SAFETY OF 3.0 AGAINST PIPING IS ACHIEVED FOR A SHEETPILE TIPPED AT EL. -16.0 FOR WATER AT EL. 22.0.

(4) ANALYSES ASSUME CHANNEL SLOPE IS FILLED WHERE REQUIRED TO CREATE A 1V ON 3H SLOPE.

30' 0' 30'

C•A•D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3012 8TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-WEST SIDE (STA. 20+00 NORTHWARD)
SLOPE STABILITY ANALYSIS (NORTH, MAX. FILL HEIGHT)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

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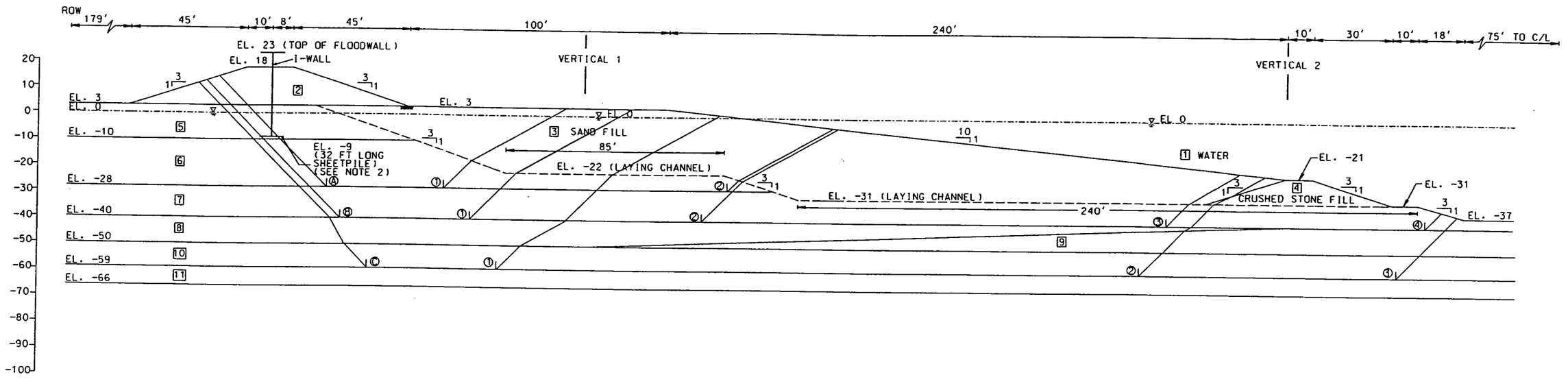
PLATE RS-17



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	120	30	0	0	120	30	0	0
4	130	40	0	0	130	40	0	0
5	99	0	200	200	99	0	200	200
6	95	0	200	200	110	0	300	300
7	100	0	380	380	104	0	300	300
8	120	30	0	0	120	30	0	0
9	100	0	420	420	100	0	420	420
10	110	0	380	380	104	0	500	500
11	120	30	0	0	120	30	0	0

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	51,206	67,561	1.32
Ⓐ ②	61,993	84,757	1.37
Ⓑ ①	58,060	106,288	1.83
Ⓑ ②	72,216	122,986	1.70
Ⓑ ③	100,749	161,273	1.60
Ⓑ ④	114,264	176,446	1.54
Ⓒ ①	66,881	188,419	2.82
Ⓒ ②	132,532	216,318	1.63
Ⓒ ③	165,932	247,756	1.49

NOTES: (1) SHEETPILE I-WALL OVERTURNING GOVERNED BY S-CASE. FS = 1.00 SOIL PARAMETERS WITH WATER TO EL 22.4 ON THE CANAL SIDE OF THE WALL. MAXIMUM MOMENT = 3.7 FT-KIPS/FT @ EL 13.4. TIP ELEVATION = 8.0

(2) BASED ON LANE'S WEIGHTED CREEP ANALYSIS. A MINIMUM SAFETY FACTOR OF 3.0 AGAINST PIPING IS ACHIEVED FOR A SHEETPILE TIPPED AT EL. -9.0 FOR WATER AT. EL. 22.0.

(3) THE FAILURE WEDGES AND PLANES DISPLAYED WERE DETERMINED TO BE THE MOST CRITICAL AS VARIOUS OTHER STRATA AND FAILURE PLANES HAVE BEEN CHECKED.

(4) ANALYSES ASSUME CHANNEL SLOPE IS FILLED WHERE REQUIRED TO CREATE A 1V ON 3H SLOPE.

(5) SHEETPILE TIP ELEVATION BASED ON 3:1 PENETRATION TO STICK UP RATIO=EL. 3.0.

20' 0' 20'

C·A·D

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3081 28TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-EAST SIDE
(MAX. GREEN SPACE)
SLOPE STABILITY ANALYSIS (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: CMP
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FILE NO.
DATE:

PLATE RS-18

STA. 18+00.0 WEST B/L = STA. 46+00.30 C/L CHANNEL
EAST SIDE LEVEE

THE CROSS SECTION IS PERPENDICULAR TO THE EAST BASELINE AZIMUTH SHOWN ON PLAN DRAWING. BASELINE AZIMUTH IS APPROXIMATELY PARALLEL TO C/L CHANNEL.

SCALE: 1'' = 10'

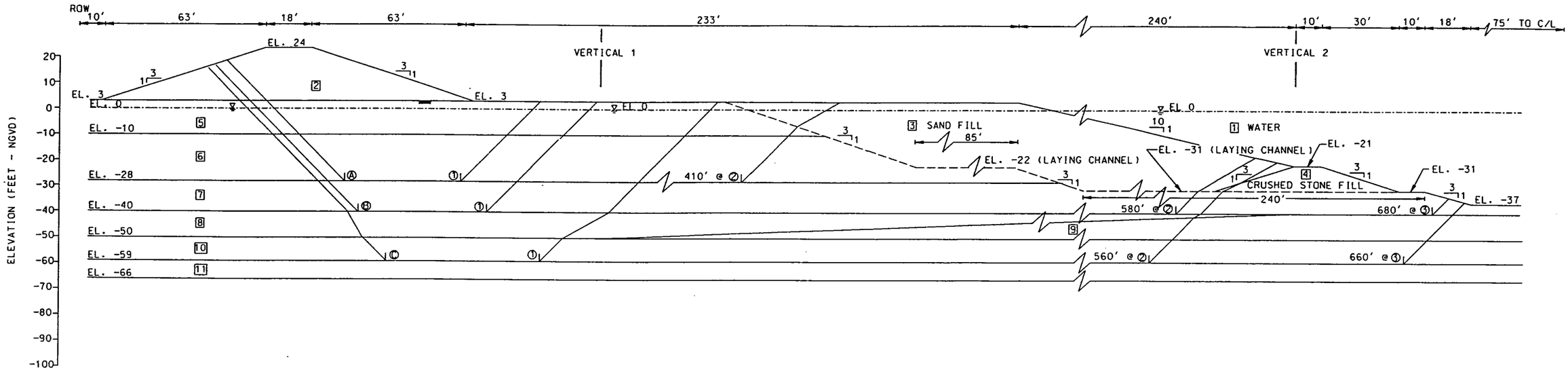
Brown Cunningham Gannuch
ENGINEERS • ARCHITECTS • CONSULTANTS
2701 KINGMAN ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATION CANAL
LOCK REPLACEMENT PROJECT
LATERAL FLOOD PROTECTION
DDR NO. 2 – ALTERNATIVE STUDY
ORLEANS PARISH, LOUISIANA
SHIP LOCK ALTERNATE
TYPICAL SECTIONS

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

DESIGNED BY: RWY DRAWN BY: JSB CHECKED BY: RWY	PLOT SCALE: 10	PLOT DATE: X	CADD FILE: X
	DATE: OCT. 2000		FILE NO. X

PLATE RS–19



STRATUM NUMBER	VERTICAL 1				VERTICAL 2			
	UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)		UNIT WT. (PCF)	FRICTION ANGLE (DEGREES)	COHESION (PSF)	
			AVERAGE	BOTTOM			AVERAGE	BOTTOM
1	62.4	0	0	0	62.4	0	0	0
2	115	0	500	500	115	0	500	500
3	120	30	0	0	120	30	0	0
4	130	40	0	0	130	40	0	0
5	99	0	200	200	99	0	200	200
6	95	0	200	200	110	0	300	300
7	100	0	380	380	104	0	300	300
8	120	30	0	0	120	30	0	0
9	100	0	420	420	100	0	420	420
10	110	0	380	380	104	0	500	500
11	120	30	0	0	120	30	0	0

FAILURE SURFACE	SUMMATION OF FORCES (LB/FT)		FACTOR OF SAFETY
	DRIVING	RESISTING	
Ⓐ ①	90.400	49.801	0.55
Ⓐ ②	92.681	119.507	1.29
Ⓑ ①	111.793	76.290	0.68
Ⓑ ②	138.256	223.023	1.61
Ⓑ ③	151.771	238.196	1.57
Ⓒ ①	141.667	157.218	1.11
Ⓒ ②	178.314	278.422	1.56
Ⓒ ③	211.061	308.453	1.46

NOTES: (1) THE FAILURE WEDGES AND PLANES DISPLAYED WERE DETERMINED TO BE THE MOST CRITICAL AS VARIOUS OTHER STRATA AND FAILURE PLANES HAVE BEEN CHECKED.

(2) ANALYSES ASSUME CHANNEL SLOPE IS FILLED WHERE REQUIRED TO CREATE A 1V ON 3H SLOPE.

20' 0' 20'

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3081 28TH ST. METAIRIE, LOUISIANA

INNER HARBOR NAVIGATIONAL CANAL
LOCK REPLACEMENT PROJECT
ORLEANS PARISH, LOUISIANA

SHIP LOCK PLAN-EAST SIDE
(MAX. GREEN SPACE)
SLOPE STABILITY ANALYSIS (NORTH)

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

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PLATE RS-20