

ENGINEERING ALTERNATIVES REPORT (EAR)

FOR

**WESTBANK AND VICINITY, NEW ORLEANS, LOUISIANA
HURRICANE PROTECTION PROJECT
PHASE 2 HURRICANE PROTECTION
ALGIERS CANAL LEVEE WEST,
ALGIERS LOCK TO HWY. 23
WBV-47.2
B/L STA. 770+70 to STA. 978+18
ORLEANS AND PLAQUEMINES PARISHES, LOUISIANA**

CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5

95% SUBMITTAL



**US Army Corps
of Engineers ®**



JULY 2008

**WESTBANK AND VICINITY, NEW ORLEANS, LOUISIANA
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1.0 EXECUTIVE SUMMARY

The Algiers Canal Levee West project (WBV 47.2) is located within Orleans and Plaquemines Parishes, between survey base line stations 770+70 and 978+18 along the west bank of the Algiers Canal. The Engineering Alternative Report analyzes three alternatives whose objective is to provide the 100-year level of protection. The alternatives included an un-reinforced levee section, a reinforced levee section and a T-wall. Although the cost and duration of constructing the T-wall is more expensive than the levee sections, it avoids the need to acquire significant amounts of real estate and eliminates the relocation of large numbers of local residents, which could become a considerable social and political obstacle for levee alternatives.

A fourth alternative to the three required in the scope of work was developed to lower the cost of the project while minimizing social impacts. This alternative uses a combination of T-wall and reinforced earthen levee to eliminate the relocation of local residents and demolition of houses and apartments. This alternative costs \$365,000,000 and is recommended in lieu of the three required alternatives.

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2.0 INTRODUCTION

The Algiers Canal Levee West project is a part of the Westbank and Vicinity (WBV) Hurricane Protection project, authorized via WRDA 1999 which combined three previously authorized projects under one heading. Through the hurricanes of 2005, this project was not completed as authorized. Subsequent to the hurricanes, additional federal authorizations have mandated the Corps of Engineers (USACE) to (i) accelerate the completion of pre-authorized work, (ii) repair and restore damaged sections, and (iii) raise the level of protection to enable participation in the National Flood Insurance Program. This current Engineering Alternatives Report (EAR) is related to the above mentioned increased level of protection for the Algiers Lock to LA Hwy. 23 portion of the project. The project (WBV Reach 47.2) is located within Orleans and Plaquemines Parishes, between survey base line stations 770+70 and 978+18 along the west bank of the Algiers Canal. This EAR is required as part of project planning phase and includes alternatives analysis, construction cost opinion, rights of way and relocation requirements for each alternative considered, drawings, possible operation and maintenance issues, design calculations, construction durations and impacts, geotechnical report and design documentation, etc.

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3.0 PURPOSE AND SCOPE OF STUDY

The purpose of the work is to raise the level of levee protection to provide protection against the 100-year storm event and also to enable participation in the National Flood Insurance Program. The intended level of protection is commonly referred to as a 100-year storm, or any storm that has a 1% probability of occurring during a given year. This Engineering Alternatives Report (EAR) is required for the current project as part of the project planning phase and includes alternatives analysis, construction cost opinion, rights of way and relocation requirements, drawings, possible operation and maintenance issues, design calculations, construction durations and impacts, geotechnical report and design documentation, etc. for each of the alternatives being considered. The following specific alternatives were required by the Scope of Work:

- i) All earthen levee, un-reinforced
- ii) All earthen levee with reinforcing geotextile
- iii) Reinforced concrete T-Wall along landside levee toe with existing levee as a barge barrier

The two earthen levee alternatives will outline a landside shift as directed by the Scope of Work. The landside shift dictates that the levee expansion will take place toward the protected side. Each alternative will include an 18 ft wide railroad swing

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gate across the New Orleans and Gulf Coast Railroad tracks with floodwall transitions. At the conclusion, we will evaluate a fourth alternative that combines the T-wall and levee alternative into one project.

This EAR is to serve as a summary of the preliminary design and will provide the technical basis for selection of the best alternative for protection against the 1% (100-year) hurricane event.

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4.0 DESCRIPTION OF EXISTING PROTECTION

From the beginning of the project (Station 770+70) to the end of the project (Station 978+18), the existing protection consists of an earthen un-reinforced levee section except at the location of two drainage pump stations. Due to settlement, the top of the levee elevation varies from an approximate el. +6 to el. +9.2 within the boundaries of this project. This is based upon survey data taken in November 2006 (NAVD 88 (2004.65) datum). The New Orleans Sewage and Water Board Pump Station No. 13 and Jefferson Parish Planters Pump Station, both located within the limits of this project, are each protected by concrete frontal structures.

Previously authorized projects had determined that these levees needed to be raised. Design plans were prepared for this level of protection, and the construction was completed in 2004 to an elevation of +9.5. Based on the survey elevations stated above, it could be seen that significant settlement had occurred over a short period of time. The 2005 hurricanes resulted in revised federal authorizations and changed the required level of protection to el. +14.0.

The Pumping Station Frontal Protection projects, separate from this EAR, will raise the frontal protection at the aforementioned pump stations to el. +15.0 utilizing pile

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supported concrete T-walls. The preliminary plan sheets of the frontal protection projects are included in the Design Calculations/Information appendix.

The baseline for the current levee project follows the approximate centerline of the existing levee. The existing right of way varies from 43 ft to 111 ft west of the baseline. The right of way is closest to the baseline and levee near the Algiers Lock where the canal is wider. Throughout the vast majority of the project length, except between stations 770+70 and 799+10.80, the existing right of way is approximately 100 ft or more off the baseline.

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5.0 DESCRIPTION OF PROPOSED ALTERNATIVES

In accordance with the Scope of Work provided by the USACE, three alternatives were required to be considered for increasing the level of protection. They are:

- i) All earthen levee, un-reinforced, with landside shift
- ii) All earthen levee with reinforcing geotextile, with landside shift
- iii) Reinforced concrete T-Wall along landside levee toe with existing levee as a barge barrier

Each alternative is discussed more fully in the following sections and goes from station 770+70 to station 978+18. A fourth alternative was prepared to address a possible combination of the required alternatives. This fourth alternative is the recommended alternative and will be discussed in the recommendations section of this report.

5.1 UN-REINFORCED LEVEE ALTERNATIVE

The first alternative considered is an un-reinforced earthen levee section. The levee section extends from station 773+50.00 to station 819+51.00, station 827+81.00 to station 872+28.44, station 882+92.74 to station 923+50.00 and station 935+75.00 to station 971+83.00. Sections of T-wall were designed at the beginning (station 770+70.00 to station 773+94.43) and end of the project (station 971+33.00 to 978+18.00), at the Woodlawn Highway (LA Hwy 308) bridge crossing (station

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819+01.00 to station 828+31.00), and at the tie-ins to the two Pump Station frontage protection projects. Two types of T-walls were designed and utilized. These are discussed in more detail in section 5.3. From station 974+93.00 to station 975+23.00, there is a 30 ft monolith for the 18 ft wide railroad swing gate. The centerline of T-wall sections overlap 50 ft with the centerline of earthen levee sections.

The alignment of this un-reinforced levee is based on a landside shift, which is a shift in the alignment to the west. For the 65% design, this landside shift was initially determined as the best fit. The survey sections were plotted and reviewed against the proposed levee section in an attempt to minimize cut while avoiding the need to place embankment on the flood side of the existing levee. Through revisions to the geotechnical analysis requested by the USACE between the 65% and 95% submittals, the levee shift changed significantly.

The proposed levee centerline is offset 201 ft from the baseline to the west. This fixed offset extends from beginning of the project to the end of project. The existing levee is degraded as part of the construction of the new un-reinforced levee.

The un-reinforced levee is constructed in four lifts as determined by the geotechnical analysis. With the 1st lift to occur in year 0, the subsequent lifts will be constructed in years 3, 18 and 33. The settlement of the final lift will be at or above the required elevation of +14.0 in 2057. Refer to Appendix A for more information.

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5.2 REINFORCED LEVEE ALTERNATIVE

The second alternative considered is a reinforced earthen levee section. The levee section extends from station 773+50.00 to station 820+33.00, station 826+99.00 to station 870+23.51, station 883+43.58 to station 925+82.58 and station 934+34.04 to station 972+78.00. Similar to the un-reinforced earthen levee alternative, sections of T-wall were designed for the beginning (station 770+70.00 to station 773+94.74) and end of the project (station 972+28.00 to station 978+18.00), at the Woodlawn Highway (LA Hwy 308) bridge crossing (station 819+83.00 to station 827+49.00) and at the tie-ins to the two Pump Station frontage protection projects. Two types of T-walls were designed and utilized. These are discussed in more detail in section 5.3. From station 975+05.00 to station 975+35.00, there is a 30 ft monolith for the 18 ft wide railroad swing gate. The centerline of T-wall sections overlap 50 ft with the centerline of earthen levee sections.

The alignment of this reinforced levee was based on a landside shift. As a result of the geotechnical analysis, however, it was determined that a 151 ft shift of the levee centerline was necessary. This removed the need to determine a best fit since the flood side of the proposed reinforced levee section was determined by the geotechnical analysis. The existing levee is degraded as part of the construction of the new reinforced levee.

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The reinforced levee is constructed in four lifts as determined by the geotechnical analysis. With the 1st lift to occur in year 0, the subsequent lifts will be constructed in years 3, 18 and 33. The settlement of the final lift will be at or above the required elevation of +14.0 in 2057. Refer to Appendix A for more information.

5.3 T-WALL ALTERNATIVE

The third alternative considered is a T-wall for the full length of the project. Two T-wall sections were designed based on the varying soil conditions. The Type 1 T-Wall was utilized for areas designated in the geotechnical report as Reach 1 and Reach 3. The Type 2 T-wall was utilized in areas designated in the geotechnical report as Reach 2. According to the scope of work, both T-walls were required to be placed on the protected side of the levee at the toe, utilizing the existing levee as a barge barrier.

The alignment of the T-wall was established to follow the toe of the existing levee on the protected side. Since there are two floodwall designs utilized as described above, the centerline of the T-wall is offset from the baseline a different distance for each type. The centerline of the Type 1 T-wall is offset 71 ft-9 in from the baseline, and the Type 2 T-wall is offset 49 ft-6 in from the baseline. The exact placement of the T-wall is discussed further in section 6.0. The larger offset for the Type 1 T-wall resulted in the existing levee being cut to grade and a berm constructed to a similar elevation will serve as the barge barrier.

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From station 975+39.00 to station 975+69.00, there is a 30 ft monolith with an 18 ft wide railroad swing gate across the New Orleans and Gulf Coast Railroad tracks.

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6.0 DESIGN CRITERIA

Design criteria for each alternative include any assumptions made, field data collection, hydraulic design criteria, geotechnical/civil design criteria, structural design criteria, relocation requirements and borrow requirements.

6.1 UN-REINFORCED LEVEE ALTERNATIVE

For this alternative, all survey data, soil borings and testing were provided by the Government. The identification of potential relocations came from Government provided survey data, site reconnaissance by the A/E, response to utility questionnaires received from local utility owners, and previously authorized projects, namely the East of Harvey Canal Hurricane Protection Project, Design Memorandum No. 2, East and West of Algiers Canal - Volume I. The A/E performed several site visits with various personnel on January 3, March 28, April 23, April 28 and May 13, 2008 to visually observe, photograph and become familiar with the site. Photographs of the project area with brief descriptions are included in Appendix J.

The Government provided the hydraulic design criteria. Design elevations for the unreinforced earthen levee are as follows:

Year 2007

Top of Levee: el +10.5 NAVD88 (2004.65)

Stillwater Level: el +9.0 NAVD88 (2004.65)

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Year 2057

Top of Levee: el +14.0 NAVD88 (2004.65)

Stillwater Level: el +11.0 NAVD88 (2004.65)

Low Water: el -1.0 NAVD88 (2004.65)

The geotechnical design criteria are discussed in full in the geotechnical report (Appendix A). The output of geotechnical analysis provided various levee sections for the different hydraulic design criteria required. The 2057 un-reinforced levee section has a 1:4 slope on the flood side, a 10 ft crown section at el. +14.0 and a 1:3 slope on the protected side. Both the flood side and protected side consist of a berm utilizing a 1:40 slope and the protected side has a short 1:3 slope length at the end down to natural ground. Per the scope of work, the worst condition was chosen for the design and utilized for the length of the project area. At station 850+00 (chosen as the worst condition) with the water level on the flood side at an el. +14.0, the un-reinforced levee section required a 150 ft shift to the landside and a 260 ft protected side berm width that was 12 ft thick. The flood side berm sloped up at 1:40 from the flood side toe of the existing levee, at an approximate elevation +2.1, up to the intersection with the proposed levee flood side slope, or an approximate el. +7.1. The 150 ft shift was measured from the flood side toe of the existing levee to the flood side toe of the new levee. This led to a baseline to centerline offset of 201 ft.

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The design of the section was prepared as follows:

To determine the shift, an offset of 150 ft was taken from the flood side toe of the existing levee at el. +2.1. The flood side levee slope was then created by sloping upward from this offset point at 1:4 to the desired crown elevation. The crown was 10 ft wide. The protected side slope began at that point with a 1:3 slope down to natural ground. This intersection point was approximately el. -4.1. The geotechnical engineer determined that the 2nd lift was most critical and governed for the placement of the berm. Thus to determine the farthest limit of the protected side berm, the 2nd lift would have to be drawn. The 12 ft thickness of the berm was measured at the point where the protected side slope intersected the natural ground at el. -4.1 when utilizing the 2nd lift constructed crown elevation. From this same point, the 260 ft distance would be measured. For all subsequent lifts, even when the constructed levee crown was at a higher elevation, the 260 ft berm was measured from the toe of the levee determined by the 2nd lift. The flood side berm begins at el. +2.1 at the flood side toe of the existing levee and slopes at 1:40 up to the flood side of the proposed levee.

More information regarding the design of the un-reinforced levee section at various lifts is included in Appendix A. Additionally there are hand sketches in Appendix C.

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The structural design criteria for these hurricane protection structures comply with standard engineering practice and criteria set forth in Engineering Manuals, Regulations and Technical Letters for civil works construction published by the Office, Chief of Engineers.

Specific references to design guidance documents are listed in the approved Design Quality Control Plan (DQCP) for this project, which is included in Appendix F to this report.

There are a number of utilities that will be impacted by the construction of an un-reinforced levee section and require relocation. In general, public utilities would be designed and relocated under the levee project in coordination with the Owner of the utility. Private utilities are generally relocated by the utility themselves at the request of the USACE. The potential for reimbursement of these costs would be determined by the USACE. Utility relocations are discussed further in section 8.0 of this report.

The borrow requirements will be significant for the construction of the un-reinforced levee section. Potential borrow locations have not been identified, but it is estimated that the four lifts needed to reach the 2057 level of protection will require approximately 3.6 million in place cubic yards of embankment material.

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The un-reinforced levee section with its large sloped berm on the protected side will lead to runoff concentrating at the end of the berm. Should this project progress to the DDR phase, the collection and transfer of storm water runoff from the levee berms would need to be addressed.

6.2 REINFORCED LEVEE ALTERNATIVE

For this alternative, all survey data, soil borings and testing were provided by the Government. The identification of potential relocations came from Government provided survey data, site reconnaissance by the A/E, response to utility questionnaires received from local utility owners, and previously authorized projects, namely the East of Harvey Canal Hurricane Protection Project, Design Memorandum No. 2, East and West of Algiers Canal - Volume I. The A/E performed several site visits with various personnel on January 3, March 28, April 23, April 28 and May 13, 2008 to visually observe, photograph and become familiar with the site. Photographs of the project area with brief descriptions are included in Appendix J.

The Government provided the hydraulic design criteria. Design elevations for the reinforced earthen levee are as follows:

Year 2007

Top of Levee: el +10.5 NAVD88 (2004.65)

Stillwater Level: el +9.0 NAVD88 (2004.65)

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Year 2057

Top of Levee: el +14.0 NAVD88 (2004.65)

Stillwater Level: el +11.0 NAVD88 (2004.65)

Low Water: el -1.0 NAVD88 (2004.65)

The geotechnical design criteria are discussed in full in the geotechnical report (Appendix A). The output of geotechnical analysis provided various levee sections for the different hydraulic design criteria required. The 2057 reinforced levee section has a 1:4 slope on the flood side, a 10 ft crown section at el. +14.0 and a 1:3 slope on the protected side. Both the flood side and protected side consist of a berm utilizing a 1:40 slope and the protected side has a short 1:3 slope length at the end down to natural ground. Per the scope of work, the worst condition was chosen for the design and utilized for the length of the project area. At station 850+00 (chosen as the worst condition) with the water level on the flood side at an el. +11.0, the reinforced levee section required a 100 ft shift to the landside and a 180 ft protected side berm width that was 9 ft thick. The flood side berm sloped up at 1:40 from the flood side toe of the existing levee, at an approximate elevation +2.1, up to the intersection with the proposed levee flood side slope, or an approximate el. +5.4. The 100 ft shift was measured from the flood side toe of the existing levee to the flood side toe of the proposed levee. This led to a baseline to centerline offset of 151 ft.

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The design of the section was prepared as follows:

To determine the shift, an offset of 100 ft was taken from the flood side toe of the existing levee at el. +2.1. The flood side levee slope was then created by sloping upward from this offset point at 1:4 to the desired crown elevation. The crown was 10 ft wide. The protected side slope began at that point with a 1:3 slope down to natural ground. This intersection point was approximately el. -4.1. The geotechnical engineer determined that the 2nd lift was most critical and governed for the placement of the berm. Thus to determine the farthest limit of the protected side berm, the 2nd lift would have to be drawn. The 12 ft thickness of the berm was measured at the point where the protected side slope intersected the natural ground at el. -4.1 when utilizing the 2nd lift constructed crown elevation. From this same point, the 180 ft distance would be measured. For all subsequent lifts, even when the constructed levee crown was at a higher elevation, the 180 ft berm was measured from the toe of the levee determined by the 2nd lift. The flood side berm begins at el. +2.1 at the flood side toe of the existing levee and slopes at 1:40 up to the flood side of the proposed levee.

More information regarding the design of the reinforced levee section at various lifts is included in Appendix A. Additionally there are hand sketches in Appendix C.

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There are a number of utilities that will be impacted by the construction of a reinforced levee section and require relocation. In general, public utilities would be designed and relocated under the levee project in coordination with the Owner of the utility. Private utilities are generally relocated by the utility themselves at the request of the USACE. The potential for reimbursement of these costs would be determined by the USACE. Utility relocations are discussed further in section 8.0 of this report.

Although less than the un-reinforced section, the borrow requirements will still be significant for the construction of the reinforced levee section. Potential borrow locations have not been identified, but it is estimated that the four lifts needed to reach the 2057 level of protection will require in excess of 2.7 million in place cubic yards of embankment material.

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6.3 T-WALL ALTERNATIVE

For this alternative, all survey data, soil borings and testing were provided by the Government. The identification of potential relocations came from Government provided survey data, site reconnaissance by the A/E, response to utility questionnaires received from local utility owners, and previously authorized projects, namely the East of Harvey Canal Hurricane Protection Project, Design Memorandum No. 2, East and West of Algiers Canal - Volume I. The A/E performed several site visits with various personnel on January 3, March 28, April 23, April 28 and May 13, 2008 to visually observe, photograph and become familiar with the site. Photographs of the project area with brief descriptions are included in Appendix J.

The Government provided the hydraulic design criteria. Design elevations for the T-wall are as follows:

Year 2057

Top of Structure: el +14.0 NAVD88 (2004.65)

Stillwater Level: el +11.0 NAVD88 (2004.65)

Low Water: el -1.0 NAVD88 (2004.65)

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The geotechnical design criteria are discussed in full in the geotechnical report (Appendix A).

The structural design criteria for these hurricane protection structures comply with standard engineering practice and criteria set forth in Engineering Manuals, Regulations and Technical Letters for civil works construction published by the Office, Chief of Engineers. Concrete structures were designed in accordance with ACI 318-05 as modified by EM 1110-2-2104 Strength Design for Reinforced Concrete Hydraulic Structures. The computer program CPGA (X0080) was used to calculate pile loads. The US Army Corps of Engineers provided the following design information, Hurricane and Storm Damage Reduction System Design Guidelines (updated 23 Oct 2007).

The T-wall structure will be placed near the toe of the existing levee, with compacted clay fill being placed between the levee and the wall. The existing levee will be used as a barge barrier for the Type 2 T-wall, but the levee will be degraded for the Type 1 T-wall and a new berm used as the barge barrier. With this design concept in mind, the following load cases were developed for the T-wall:

- Construction case; dead load of structure, with fill in place. Overload factor = 16 2/3%.

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- Construction case; same as above, with surcharge and drag loads added.
Overload factor = 16 2/3%
- Water at SWE; No overload.
- Water at top of wall; overload factor = 50%.
- Water at top of wall; 100 k barge impact. Overload factor = 67%.

Per the Scope of Work, a barge barrier will be in place to protect the T-wall; but, to be conservative, impact loading from barge collision was included as a load case with water at the top of the wall.

There are two types of T-wall design included. They are a T-wall (Type 2) without unbalanced loads (Reach 2), and a T-wall (Type 1) with unbalanced loads (Reach 1 and 3). The first (Type 2) is located between station 933+58.24 and station 978+18.00, and the second (Type 1) will be located between station 770+70 to station 925+82.00. The foundation for the Type 2 walls consists of 90 ft long, 14 in steel H-piles. Due to the large unbalanced loads computed in Reaches 1 and 3, the Type 1 walls will have a foundation consisting of 24 in diameter pipe piles that are approximately 115 ft long. Pile capacities were extrapolated from the capacity curves provided with the geotechnical analyses since most available soil boring were only 70 ft deep.

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The design criteria for this T-wall, as well as for all concrete structures, are as follows:

Ultimate compressive strength (f_c) = 4,000 psi

Reinforcing steel yield strength (f_y) = 60,000 psi

The applied loads (dead and live) were multiplied by a factor of 1.7 to calculate the ultimate design loads. In addition, since the T-wall is a hydraulic structure, an additional factor of 1.3 was applied. Thus, the ultimate design loads were:

$$U = (1.3 \times 1.7) \times (D + L).$$

This is in accordance with USACE Manual EM 1110-2-2104.

The stem thickness was determined by calculating the shear and moment at the base of the wall under the worst loading condition (fill in place, no berm, water to top of wall, plus 100 k barge impact) and applying the load factors to obtain the ultimate design moment and shear. A concrete section that provided the necessary resisting moment and shear was then determined. From the results obtained, a thickness of 2'-6" was provided. The slab thickness was calculated in a likewise manner and was computed to be 3'- 0" for Type 2 T-walls, for Type 1 T-walls the base thickness was increased to 3'-6" because the pile loads were higher.

The pile capacity curves for the Q condition, and considering critical slope failure surfaces as necessary (with load test, factor of safety = 2.0), were used to estimate the required pile tip elevation. It was assumed that the piles would resist the unbalanced

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loads and that sheet piles would be used to prevent seepage only. The sheet pile tip elevation was set at approximately 5 feet below the critical failure surface per the Hurricane and Storm Damage Reduction System Design Guidelines.

A swing gate was designed for the railroad gate monolith. The gate was designed with ASTM A-36 steel, and it is in accordance with COE Manuals EM 1110-2-2105 and EM 1110-2-2705, and AISC Manual of Steel Construction, 9th Edition. The gate consists of a pair of horizontal girders along the top and bottom connected by vertical intercostals spaced at equal intervals. A skin plate covers the flood side, and the gate will be painted for corrosion protection.

Specific references to other design guidance documents not mentioned here are listed in the approved Design Quality Control Plan (DQCP) for this project, which is included in Appendix F to this report.

There are a number of utilities that will be impacted by the construction of the T-wall alternative. The impact will be significantly less than under the levee alternatives since most utilities will not have to be relocated very far and can use sleeves to pass through the sheet piling beneath the T-wall.

The borrow requirements for the construction of the T-wall are limited compared to the levee options. Potential borrow locations have not been identified, but the

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estimated embankment material required to fill between the T-wall and existing levee is approximately 323,000 in place cubic yards.

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7.0 REAL ESTATE REQUIREMENTS

Right of way acquisition will be required for all three alternatives; however the levee alternatives require significantly more than the T-wall alternative. The criteria in the scope of work for this report stated that the new right of way boundary shall be defined as “the levee (or berm) toe plus 15' (i.e. the point 15' beyond the levee (or berm) embankment intersection with natural ground.” Although the T-wall alternative requires very limited property acquisition, it will require easements not necessary for the levee alternatives. Right of way and easement requirements by alternative are discussed more fully below.

7.1 UN-REINFORCED LEVEE ALTERNATIVE

An additional 425 to 495 ft of right of way is required for the entire length of this project alternative. Areas needing to be acquired include wooded property, private lots with residential housing, apartment complexes and agricultural land. The proposed right of way generally parallels the existing right of way line. Since the toe of the existing levee does not parallel the existing right of way, the new right of way line does not fall exactly 15 ft from the toe of the proposed levee section. A minimum of 15 ft is maintained at all times. The total area of right of way to be acquired under this alternative is 201.04 acres.

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The cost of real estate acquisition is a significant unaccounted for item under this alternative. The USACE real estate division, at their request, was provided copies of plan drawings for the un-reinforced levee alternative to began working on the cost estimate. Shortly after receiving the drawings they notified us that an alternative project (Sector Gate South) had been authorized and a real estate cost estimate was no longer required.

7.2 REINFORCED LEVEE ALTERNATIVE

An additional 295 to 360 ft of right of way is required for the entire length of this project alternative. Areas to be acquired include wooded property, private lots with residential housing, apartment complexes and agricultural land. The proposed right of way generally parallels the existing right of way line. Since the toe of the existing levee does not parallel the existing right of way, the new right of way line does not fall exactly 15 ft from the toe of the proposed levee section. A minimum of 15 ft is maintained at all times. The total area of right of way to be acquired under this alternative is 140.71 acres.

The cost of real estate acquisition is a significant unaccounted for item under this alternative. The USACE real estate division, at their request, was provided copies of plan drawings for the reinforced levee alternative to began working on the cost estimate. Shortly after receiving the drawings they notified us that an alternative

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project (Sector Gate South) had been authorized and a real estate cost estimate was no longer required.

7.3 T-WALL ALTERNATIVE

The T-wall alternative requires the least amount of right of way acquisition. The area to be acquired consists of undeveloped wooded property. From station 774+90.20 to station 797+80.27, a 49.75 ft wide piece of land is required. The 49.75 ft allows for a minimum of 15 ft from the T-wall to the proposed right of way line. The total area of right of way to be acquired under this alternative is 2.66 acres, which is significantly less than either of the levee options.

The T-wall alternative will additionally require an easement since the batter piles will extend outside of the right of way at some depth. The shallowest they extend outside of the right of way is approximately 36 ft deep. Issues to be addressed in design include batter piles extending beneath residential housing, apartment complexes, bridge structures and gas pipelines. The total area of easement required under this alternative is 22.31 acres.

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8.0 RELOCATIONS

Utilities were identified through Government provided survey data, site reconnaissance by the A/E, response to utility questionnaires received from local utility owners, and previously authorized projects, namely the East of Harvey Canal Hurricane Protection Project, Design Memorandum No. 2, East and West of Algiers Canal - Volume I. Utility questionnaires and responses available at the time of this submittal are included in Appendix H.

The following table outlines all utilities potentially requiring relocation under the various alternatives:

Description	Station	Owner	Disposition
12" Gas Pipeline	805+62.31	Gulf South Pipeline	-
42" Sewer Force Main	786+49.35	New Orleans Sewerage and Water Board	-
Transmission Line/Tower	795+86	Entergy	-
Communication Line	823+85	US Government	-
30" Gas Pipeline	823+98.11 to 884+00	Bridgeline	-
Transmission Line	823+02	Entergy	-
12" Waterline	869+76.36	New Orleans Sewerage and Water Board	-
Unknown Pipeline	948+74	Unknown	-
Transmission Line/Tower	920+90	Entergy	-
Distribution Line	975+28	Entergy	-

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Description	Station	Owner	Disposition
Telephone Line	977+93	Unknown	-
36-4" Telephone Conduit	977+59	Unknown	-
2-5" Anchored Telephone Cables	978+03	Unknown	-
Transmission Line/Tower	966+90	Entergy	-
12" Waterline	977+83	Plaquemines Parish	-

Disposition tables for the above utilities are located on the right-of-way drawings and vary for the different alternatives. For the un-reinforced and reinforced earthen levee options several of these utilities will need to be relocated at each lift of the construction phase. The T-Wall option will require a single initial relocation of these utilities. Estimated costs for relocation of utilities can be found in Section 9 and Appendix D.

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9.0 COST ENGINEERING

Cost opinions were prepared for each of the three alternatives. These costs do not include land/property acquisitions as directed by the USACE Real Estate Division. These costs will most significantly impact the two earthen levee alternatives and make direct cost comparisons difficult. All cost opinions include a 25% contingency item as required by the scope of work for this report. Back up data for the quantity calculations/cost estimates are included in Appendix D.

Construction durations were prepared for each alternative. Back up data relating to construction duration estimates along with assumptions are included in Appendix E.

9.1 UN-REINFORCED LEVEE ALTERNATIVE

The 95% submittal cost estimate for the un-reinforced levee section is **\$266,200,000.00**. This cost has been separated into 4 lifts as shown below.

**Opinion of Probable Construction Cost
Un-reinforced Earthen Levee Option
1st Lift**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price	Estimated Amount
1	Mobilization (5%)	LS	1	\$8,800,000.00	\$8,800,000.00
2	Demolition of Structures	SF	1,190,100	\$6.00	\$7,140,600.00
3	Clearing and Grubbing	AC	23	\$9,000.00	\$207,000.00
4	Excavation	CY	77,100	\$15.00	\$1,156,500.00
5	14x73 Steel H-Piles	LF	35,600	\$85.00	\$3,026,000.00

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1st Lift

6	24 Diameter Steel Pipe Piles	LF	179,300	\$160.00	\$28,688,000.00
7	Pile Load Test	LS	1	\$250,000.00	\$250,000.00
8	Steel Sheet Pile Cut Off Wall (PZ22)	SF	194,300	\$30.00	\$5,829,000.00
9	Painting PZ 22 Sheet Piles	SF	15,800	\$6.00	\$94,800.00
10	Painting H-Piles	SF	12,400	\$6.00	\$74,400.00
11	Painting Pipe Piles	SF	49,400	\$6.00	\$296,400.00
12	Reinforced Concrete for Wall Base	CY	9,100	\$550.00	\$5,005,000.00
13	Reinforced Concrete for Wall Stem	CY	5,100	\$850.00	\$4,335,000.00
14	Railroad Gate	LS	1	\$560,000.00	\$560,000.00
15	Embankment (Compacted)	CY	3,143,100	\$35.00	\$110,008,500.00
16	Seeding and Fertilizing	AC	207	\$2,600.00	\$538,824.00
17	Geotextile Fabric	SY	0	\$18.00	\$0.00
18	Install and Remove Temporary Access Road	SY	32,000	\$68.00	\$2,176,000.00
19	Relocation of Utilities	LS	1	\$6,544,000.00	\$6,544,000.00
20	Real Estate Acquisition**	LS	1	\$0.00	\$0.00
21	Drainage Canal	LS	1	\$245,000.00	\$245,000.00
				Contingency (25%)	\$46,200,000.00
				TOTAL	\$231,175,024.00
				ROUNDED TOTAL	\$231,200,000.00

Real Estate Acquisition costs were not done as directed by the USACE Real
 ** Estate Division

**Opinion of Probable Construction Cost
Un-reinforced Earthen Levee Option
2nd Lift**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price	Estimated Amount
1	Mobilization (5%)	LS	1	\$415,000.00	\$415,000.00
2	Demolition of Structures	SF	0	\$6.00	\$0.00
3	Clearing and Grubbing	AC	0	\$9,000.00	\$0.00
4	Excavation	CY	10,900	\$15.00	\$163,500.00
5	14x73 Steel H-Piles	LF	0	\$85.00	\$0.00
6	24 Diameter Steel Pipe Piles	LF	0	\$160.00	\$0.00
7	Pile Load Test	LS	0	\$250,000.00	\$0.00
8	Steel Sheet Pile Cut Off Wall (PZ22)	SF	0	\$30.00	\$0.00
9	Painting PZ 22 Sheet Piles	SF	0	\$6.00	\$0.00

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Opinion of Probable Construction Cost

Un-reinforced Earthen Levee Option

2nd Lift

10	Painting H-Piles	SF	0	\$6.00	\$0.00
11	Painting Pipe Piles	SF	0	\$6.00	\$0.00
12	Reinforced Concrete for Wall Base	CY	0	\$550.00	\$0.00
13	Reinforced Concrete for Wall Stem	CY	0	\$850.00	\$0.00
14	Railroad Gate	LS	0	\$560,000.00	\$0.00
15	Embankment (Compacted)	CY	144,000	\$35.00	\$5,040,000.00
16	Seeding and Fertilizing	AC	208.00	\$2,600.00	\$540,800.00
17	Geotextile Fabric	SY	0	\$18.00	\$0.00
18	Install and Remove Temporary Access Road	SY	32,000	\$68.00	\$2,176,000.00
19	Relocation of Utilities	LS	1	\$374,000.00	\$374,000.00
20	Real Estate Acquisition	LS	1	\$0.00	\$0.00
21	Drainage Canal	LS	1	\$0.00	\$0.00
				Contingency (25%)	\$2,200,000.00
				TOTAL	\$10,909,300.00
				ROUNDED TOTAL	\$11,000,000.00

Opinion of Probable Construction Cost

Un-reinforced Earthen Levee Option

3rd Lift

Item No.	Item Description	Unit	Estimated Quantity	Unit Price	Estimated Amount
1	Mobilization (5%)	LS	1	\$419,000.00	\$419,000.00
2	Demolition of Structures	SF	0	\$6.00	\$0.00
3	Clearing and Grubbing	AC	0.00	\$9,000.00	\$0.00
4	Excavation	CY	11,900	\$15.00	\$178,500.00
5	14x73 Steel H-Piles	LF	0	\$85.00	\$0.00
6	24 Diameter Steel Pipe Piles	LF	0	\$160.00	\$0.00
7	Pile Load Test	LS	0	\$250,000.00	\$0.00
8	Steel Sheet Pile Cut Off Wall (PZ22)	SF	0	\$30.00	\$0.00
9	Painting PZ 22 Sheet Piles	SF	0	\$6.00	\$0.00
10	Painting H-Piles	SF	0	\$6.00	\$0.00
11	Painting Pipe Piles	SF	0	\$6.00	\$0.00
12	Reinforced Concrete for Wall Base	CY	0	\$550.00	\$0.00
13	Reinforced Concrete for Wall Stem	CY	0	\$850.00	\$0.00
14	Railroad Gate	LS	0	\$560,000.00	\$0.00
15	Embankment (Compacted)	CY	146,000	\$35.00	\$5,110,000.00
16	Seeding and Fertilizing	AC	208.00	\$2,600.00	\$540,800.00

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17	Geotextile Fabric	SY	0	\$18.00	\$0.00
18	Install and Remove Temporary Access Road	SY	32,000	\$68.00	\$2,176,000.00
19	Relocation of Utilities	LS	1	\$374,000.00	\$374,000.00
20	Real Estate Acquisition	LS	1	\$0.00	\$0.00
21	Drainage Canal	LS	1	\$0.00	\$0.00
				Contingency (25%)	\$2,200,000.00
				TOTAL	\$10,998,300.00
				ROUNDED TOTAL	\$11,000,000.00

**Opinion of Probable Construction Cost
Un-reinforced Earthen Levee Option
4th Lift**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price	Estimated Amount
1	Mobilization (5%)	LS	1	\$491,000.00	\$491,000.00
2	Demolition of Structures	SF	0	\$6.00	\$0.00
3	Clearing and Grubbing	AC	0.00	\$9,000.00	\$0.00
4	Excavation	CY	13,700	\$15.00	\$205,500.00
5	14x73 Steel H-Piles	LF	0	\$85.00	\$0.00
6	24 Diameter Steel Pipe Piles	LF	0	\$160.00	\$0.00
7	Pile Load Test	LS	0	\$250,000.00	\$0.00
8	Steel Sheet Pile Cut Off Wall (PZ22)	SF	0	\$30.00	\$0.00
9	Painting PZ 22 Sheet Piles	SF	0	\$6.00	\$0.00
10	Painting H-Piles	SF	0	\$6.00	\$0.00
11	Painting Pipe Piles	SF	0	\$6.00	\$0.00
12	Reinforced Concrete for Wall Base	CY	0	\$550.00	\$0.00
13	Reinforced Concrete for Wall Stem	CY	0	\$850.00	\$0.00
14	Railroad Gate	LS	0	\$560,000.00	\$0.00
15	Embankment (Compacted)	CY	186,000	\$35.00	\$6,510,000.00
16	Seeding and Fertilizing	AC	209.00	\$2,600.00	\$543,400.00
17	Geotextile Fabric	SY	0	\$18.00	\$0.00
18	Install and Remove Temporary Access Road	SY	32,000	\$68.00	\$2,176,000.00
19	Relocation of Utilities	LS	1	\$374,000.00	\$374,000.00
20	Real Estate Acquisition	LS	1	\$0.00	\$0.00
21	Drainage Canal	LS	1	\$0.00	\$0.00
				Contingency (25%)	\$2,600,000.00
				TOTAL	\$12,899,900.00
				ROUNDED TOTAL	\$13,000,000.00

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**Opinion of Probable Construction Cost
 Un-reinforced Earthen Levee Option
 Summary of Lifts 1, 2, 3, and 4**

Opinion of Probable Construction Cost - Lift 1	\$231,200,000
Opinion of Probable Construction Cost - Lift 2	\$11,000,000
Opinion of Probable Construction Cost - Lift 3	\$11,000,000
Opinion of Probable Construction Cost - Lift 4	\$13,000,000
 Total Opinion of Probable Construction Cost - Lifts 1-4	 \$266,200,000

The estimated construction duration for the first lift of this alternative is 549 calendar days. After the first lift is constructed, the subsequent lifts will take place in 3 years, 18 years and 33 years according to the lift schedules included with Appendix A.

9.2 REINFORCED LEVEE ALTERNATIVE

The 95% submittal cost estimate for the un-reinforced levee section is **\$230,600,000.00**. This cost has been separated into 4 lifts as shown below.

**Opinion of Probable Construction Cost
 Reinforced Earthen Levee Option
 1st Lift**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price	Estimated Amount
1	Mobilization (5%)	LS	1	\$7,200,000.00	\$7,200,000.00
2	Demolition of Structures	SF	1,005,100	\$6.00	\$6,030,600.00
3	Clearing and Grubbing	AC	23.00	\$9,000.00	\$207,000.00
4	Excavation	CY	172,400	\$15.00	\$2,586,000.00
5	14x73 Steel H-Piles	LF	35,800	\$85.00	\$3,043,000.00
6	24 Diameter Steel Pipe Piles	LF	183,700	\$160.00	\$29,392,000.00
7	Pile Load Test	LS	1	\$250,000.00	\$250,000.00
8	Steel Sheet Pile Cut Off Wall (PZ22)	SF	198,300	\$30.00	\$5,949,000.00
9	Painting PZ 22 Sheet Piles	SF	16,100	\$6.00	\$96,600.00

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Reinforced Earthen Levee Option

1st Lift

10	Painting H-Piles	SF	12,500	\$6.00	\$75,000.00
11	Painting Pipe Piles	SF	50,700	\$6.00	\$304,200.00
12	Reinforced Concrete for Wall Base	CY	9,300	\$550.00	\$5,115,000.00
13	Reinforced Concrete for Wall Stem	CY	5,300	\$850.00	\$4,505,000.00
14	Railroad Gate	LS	1	\$560,000.00	\$560,000.00
15	Embankment (Compacted)	CY	2,092,100	\$35.00	\$73,223,500.00
16	Seeding and Fertilizing	AC	162.00	\$2,600.00	\$421,200.00
17	Geotextile Fabric	SY	180,200	\$18.00	\$3,243,600.00
18	Install and Remove Temporary Access Road	SY	32,000	\$68.00	\$2,176,000.00
19	Relocation of Utilities	LS	1	\$6,283,000.00	\$6,283,000.00
20	Real Estate Acquisition**	LS	1	\$0.00	\$0.00
21	Drainage Canal	LS	1	\$245,000.00	\$245,000.00
				Contingency (25%)	\$37,700,000.00
				TOTAL	\$188,605,700.00
				ROUNDED TOTAL	\$189,000,000.00

** Real Estate Acquisition costs were not done as directed by the USACE Real Estate Division

Opinion of Probable Construction Cost

Reinforced Earthen Levee Option

2nd Lift

Item No.	Item Description	Unit	Estimated Quantity	Unit Price	Estimated Amount
1	Mobilization (5%)	LS	1	\$513,000.00	\$513,000.00
2	Demolition of Structures	SF	0	\$6.00	\$0.00
3	Clearing and Grubbing	AC	0.00	\$9,000.00	\$0.00
4	Excavation	CY	13,800	\$15.00	\$207,000.00
5	14x73 Steel H-Piles	LF	0	\$85.00	\$0.00
6	24 Diameter Steel Pipe Piles	LF	0	\$160.00	\$0.00
7	Pile Load Test	LS	0	\$250,000.00	\$0.00
8	Steel Sheet Pile Cut Off Wall (PZ22)	SF	0	\$30.00	\$0.00
9	Painting PZ 22 Sheet Piles	SF	0	\$6.00	\$0.00
10	Painting H-Piles	SF	0	\$6.00	\$0.00
11	Painting Pipe Piles	SF	0	\$6.00	\$0.00
12	Reinforced Concrete for Wall Base	CY	0	\$550.00	\$0.00
13	Reinforced Concrete for Wall Stem	CY	0	\$850.00	\$0.00
14	Railroad Gate	LS	0	\$560,000.00	\$0.00

ALGIERS CANAL LEVEE WEST, ALGIERS LOCK TO HWY. 23, WBV-47.2

B/L STA. 770+70 TO STA. 978+18

ORLEANS AND PLAQUEMINES PARISHES, LOUISIANA

CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5

15	Embankment (Compacted)	CY	204,800	\$35.00	\$7,168,000.00
16	Seeding and Fertilizing	AC	163.00	\$2,600.00	\$423,800.00
17	Geotextile Fabric	SY	0	\$18.00	\$0.00
18	Install and Remove Temporary Access Road	SY	32,000	\$68.00	\$2,176,000.00
19	Relocation of Utilities	LS	1	\$280,500.00	\$280,500.00
20	Real Estate Acquisition	LS	1	\$0.00	\$0.00
21	Drainage Canal	LS	1	\$0.00	\$0.00
				Contingency (25%)	\$2,700,000.00
				TOTAL	\$13,468,300.00
				ROUNDED TOTAL	\$13,500,000.00

**Opinion of Probable Construction Cost
Reinforced Earthen Levee Option
3rd Lift**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price	Estimated Amount
1	Mobilization (5%)	LS	1	\$484,200.00	\$484,200.00
2	Demolition of Structures	SF	0	\$6.00	\$0.00
3	Clearing and Grubbing	AC	0.00	\$9,000.00	\$0.00
4	Excavation	CY	14,900	\$15.00	\$223,500.00
5	14x73 Steel H-Piles	LF	0	\$85.00	\$0.00
6	24 Diameter Steel Pipe Piles	LF	0	\$160.00	\$0.00
7	Pile Load Test	LS	0	\$250,000.00	\$0.00
8	Steel Sheet Pile Cut Off Wall (PZ22)	SF	0	\$30.00	\$0.00
9	Painting PZ 22 Sheet Piles	SF	0	\$6.00	\$0.00
10	Painting H-Piles	SF	0	\$6.00	\$0.00
11	Painting Pipe Piles	SF	0	\$6.00	\$0.00
12	Reinforced Concrete for Wall Base	CY	0	\$550.00	\$0.00
13	Reinforced Concrete for Wall Stem	CY	0	\$850.00	\$0.00
14	Railroad Gate	LS	0	\$560,000.00	\$0.00
15	Embankment (Compacted)	CY	188,000	\$35.00	\$6,580,000.00
16	Seeding and Fertilizing	AC	163.00	\$2,600.00	\$423,800.00
17	Geotextile Fabric	SY	0	\$18.00	\$0.00
18	Install and Remove Temporary Access Road	SY	32,000	\$68.00	\$2,176,000.00
19	Relocation of Utilities	LS	1	\$280,500.00	\$280,500.00
20	Real Estate Acquisition	LS	1	\$0.00	\$0.00
21	Drainage Canal	LS	1	\$0.00	\$0.00
				Contingency (25%)	\$2,600,000.00
				TOTAL	\$12,768,000.00
				ROUNDED TOTAL	\$12,800,000.00

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**Opinion of Probable Construction Cost
 Reinforced Earthen Levee Option
 4th Lift**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price	Estimated Amount
1	Mobilization (5%)	LS	1	\$577,000.00	\$577,000.00
2	Demolition of Structures	SF	0	\$6.00	\$0.00
3	Clearing and Grubbing	AC	0.00	\$9,000.00	\$0.00
4	Excavation	CY	16,700	\$15.00	\$250,500.00
5	14x73 Steel H-Piles	LF	0	\$85.00	\$0.00
6	24 Diameter Steel Pipe Piles	LF	0	\$160.00	\$0.00
7	Pile Load Test	LS	0	\$250,000.00	\$0.00
8	Steel Sheet Pile Cut Off Wall (PZ22)	SF	0	\$30.00	\$0.00
9	Painting PZ 22 Sheet Piles	SF	0	\$6.00	\$0.00
10	Painting H-Piles	SF	0	\$6.00	\$0.00
11	Painting Pipe Piles	SF	0	\$6.00	\$0.00
12	Reinforced Concrete for Wall Base	CY	0	\$550.00	\$0.00
13	Reinforced Concrete for Wall Stem	CY	0	\$850.00	\$0.00
14	Railroad Gate	LS	0	\$560,000.00	\$0.00
15	Embankment (Compacted)	CY	240,100	\$35.00	\$8,403,500.00
16	Seeding and Fertilizing	AC	163.00	\$2,600.00	\$423,800.00
17	Geotextile Fabric	SY	0	\$18.00	\$0.00
18	Install and Remove Temporary Access Road	SY	32,000	\$68.00	\$2,176,000.00
19	Relocation of Utilities	LS	1	\$280,500.00	\$280,500.00
20	Real Estate Acquisition	LS	1	\$0.00	\$0.00
21	Drainage Canal	LS	1	\$0.00	\$0.00
				Contingency (25%)	\$3,100,000.00
				TOTAL	\$15,211,300.00
				ROUNDED TOTAL	\$15,300,000.00

**Opinion of Probable Construction Cost
 Reinforced Earthen Levee Option
 Summary of Lifts 1, 2, 3, and 4**

Opinion of Probable Construction Cost - Lift 1	\$189,000,000
Opinion of Probable Construction Cost - Lift 2	\$13,500,000
Opinion of Probable Construction Cost - Lift 3	\$12,800,000
Opinion of Probable Construction Cost - Lift 4	\$15,300,000
 Total Opinion of Probable Construction Cost - Lifts 1-4	 \$230,600,000

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The estimated construction duration for the first lift of this alternative is 467 calendar days. After the first lift is constructed, the subsequent lifts will take place in 3 years, 18 years and 33 years according to the lift schedules included with Appendix A.

9.3 T-WALL ALTERNATIVE

The 95% submittal cost estimate for the T-wall section is **\$425,000,000.00**.

Opinion of Probable Construction Cost
T-Wall Option

Item No.	Item Description	Unit	Estimated Quantity	Unit Price	Estimated Amount
1	Mobilization (5%)	LS	1	\$16,200,000.00	\$16,200,000.00
2	Demolition of Structures	SF	24,800	\$6.00	\$148,800.00
3	Clearing and Grubbing	AC	23.00	\$9,000.00	\$207,000.00
4	Excavation	CY	84,800	\$15.00	\$1,272,000.00
5	14x73 Steel H-Piles	LF	201,200	\$85.00	\$17,102,000.00
6	24 Diameter Steel Pipe Piles	LF	1,179,000	\$160.00	\$188,640,000.00
7	Pile Load Test	LS	1	\$250,000.00	\$250,000.00
8	Steel Sheet Pile Cut Off Wall (PZ22)	SF	1,240,200	\$30.00	\$37,206,000.00
9	Painting PZ 22 Sheet Piles	SF	100,000	\$6.00	\$600,000.00
10	Painting H-Piles	SF	69,900	\$6.00	\$419,400.00
11	Painting Pipe Piles	SF	324,800	\$6.00	\$1,948,800.00
12	Reinforced Concrete for Wall Base	CY	58,200	\$550.00	\$32,010,000.00
13	Reinforced Concrete for Wall Stem	CY	32,500	\$850.00	\$27,625,000.00
14	Railroad Gate	LS	1	\$560,000.00	\$560,000.00
15	Embankment (Compacted)	CY	322,600	\$35.00	\$11,291,000.00
16	Seeding and Fertilizing	AC	29.00	\$2,600.00	\$75,400.00
17	Geotextile Fabric	SY	0	\$18.00	\$0.00
18	Install and Remove Temporary Access Road	SY	34,000	\$68.00	\$2,312,000.00
19	Relocation of Utilities	LS	1	\$1,595,000.00	\$1,595,000.00
20	Real Estate Acquisition**	LS	1	\$0.00	\$0.00
				Contingency (25%)	\$85,000,000.00
				TOTAL	\$424,462,400.00
				ROUNDED TOTAL	\$425,000,000.00

The estimated construction duration for this alternative is 750 calendar days.

10.0 QUALITY IMPLEMENTATION

An effective Design Quality Control Plan (DQCP) to assure that all services, designs and drawings required under the provided scope of work are performed, reviewed and provided in a manner that meets professional engineering quality standards was prepared, submitted and approved by the Government for this project. The DQCP outlines the procedures to be followed, and a copy is included in the appendices of this report.

Under the requirements of the DQCP, an Independent Technical Review (ITR) will be performed to assure the desired quality product is obtained. Document reviews, comments and comment resolutions from the 65% USACE review and both the 65% and 95% ITR's are included in Appendix G of this report.

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ORLEANS AND PLAQUEMINES PARISHES, LOUISIANA
CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5**

11.0 RECOMMENDATIONS

All of the alternatives required by the Scope of Work contain significant downsides. The levee alternatives look attractive from a cost standpoint, but this is misleading. Real estate costs are not included for reasons discussed in section 7.0. Acquisition of such a large number of inhabited properties would prove to be costly and time consuming. The affected general public, regardless of the benefits, are likely to be against the acquisition and demolition of their apartments and houses.

The T-wall alternative is very expensive and does not afford the benefit of being constructed in phases over a 40 to 50 year time period. The attractiveness of this alternative, however, is that it requires minimal acquisition of property and no demolition of nearby apartments or houses. Another benefit of the T-Wall alternative is the immediate protection to flood height, which is not afforded by any of the earthen levee alternatives.

Although the Scope of Work required only the three alternatives discussed in section 5.0, it was realized that the best alternative would be some combination of the other alternatives. Since the reinforced levee has a smaller footprint and is less expensive than the un-reinforced levee, the fourth alternative is a combination of T-wall and reinforced levee.

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Pending the availability of land and the relocation of certain utilities, a reinforced levee section is much more advantageous from a cost standpoint. The following criteria were used when determining which type of flood protection worked best for a given area:

- Minimize the acquisition of property and avoid the need demolish occupied structures (i.e. property with houses or apartment complexes)
- Avoid the need to relocate Entergy transmission towers. (This item was a USACE review comment.)
- Assess any other relocation features being impacted by either alternative choice.
- Consider that the T-wall and levee sections have a minimum 50 ft transition anytime you switch from one to the other (for that 50 ft section you are essentially paying for both types of protection), plus an offset adjustment (centerline of levee is approximately 79 ft further away from baseline than the centerline of the T-wall) and overlapping embankment from the down slope of the levee section.
- It was felt that 1,000 feet should be the minimum length of levee section constructed at any one time.

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The outcome is that this alternative consists of approximately 3,900 feet of reinforced levee section and the remainder is T-wall. The reinforced levee sections extend from station 890+00.00 to station 918+10.00 and station 934+34.04 to station 945+75.00. As with all of the alternatives, the T-wall section was required for the beginning and end of the project, at the Woodlawn Highway (LA Hwy 308) bridge crossing and at the tie-ins to the two Pump Station frontage protection projects. Most of the T-wall sections were required to avoid the demolition of residences. Near station 795+86 and station 920+90, the earthen levee section was avoided to eliminate the need to relocate Entergy transmission towers. From station 975+39.00 to station 975+69.00, there is a 30 ft monolith for the 18 ft wide railroad swing gate.

The cost estimate for the combined T-Wall & Reinforced Levee Option is **\$365,000,000.00** for a 14.1% savings over the all-earthen reinforced levee option. As stated earlier, the real estate costs will make the cost savings even more significant.

**Opinion of Probable Construction Cost
T-Wall & Reinforced Earthen Levee Option**

Item No.	Item Description	Unit	Estimated Quantity	Unit Price	Estimated Amount
1	Mobilization (5%)	LS	1	\$13,900,000.00	\$13,900,000.00
2	Demolition of Structures	SF	24,800	\$6.00	\$148,800.00
3	Clearing and Grubbing	AC	23.00	\$9,000.00	\$207,000.00
4	Excavation	CY	109,700	\$15.00	\$1,645,500.00
5	14x73 Steel H-Piles	LF	157,200	\$85.00	\$13,362,000.00
6	24 Diameter Steel Pipe Piles	LF	931,000	\$160.00	\$148,960,000.00

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CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5

**Opinion of Probable Construction Cost
T-Wall & Reinforced Earthen Levee Option**

7	Steel Sheet Pile Cut Off Wall (PZ22)	SF	977,500	\$30.00	\$29,325,000.00
8	Painting PZ 22 Sheet Piles	SF	78,700	\$6.00	\$472,200.00
9	Painting H-Piles	SF	70,000	\$6.00	\$420,000.00
10	Painting Pipe Piles	SF	257,000	\$6.00	\$1,542,000.00
11	Reinforced Concrete for Wall Base	CY	46,000	\$550.00	\$25,300,000.00
12	Reinforced Concrete for Wall Stem	CY	25,600	\$850.00	\$21,760,000.00
13	Railroad Gate	LS	1	\$560,000.00	\$560,000.00
14	Embankment (Compacted)	CY	796,500	\$35.00	\$27,877,500.00
15	Seeding and Fertilizing	AC	23.00	\$2,600.00	\$59,800.00
16	Geotextile Fabric	SY	35,600	\$18.00	\$640,800.00
17	Install and Remove Temporary Access Road	SY	34,000	\$68.00	\$2,312,000.00
18	Relocation of Utilities	LS	1	\$1,595,000.00	\$1,595,000.00
19	Real Estate Acquisition**	LS	1	\$0.00	\$0.00
20	Drainage Canal	LS	1	\$56,000.00	\$56,000.00
				Contingency (25%)	\$73,000,000.00
				TOTAL	\$363,393,600.00
				ROUNDED TOTAL	\$365,000,000.00

** Real Estate Acquisition costs were not done as directed by the USACE Real Estate Division

The estimated construction duration for this alternative is 736 calendar days. This includes only the 1st lift for the reinforced levee section. The additional levee sections would be constructed 3, 18 and 33 years from the completion of the 1st lift construction.

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CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5**

12.0 OPERATION AND MAINTENANCE

Operation and maintenance (O&M) of the features installed under the various design alternatives consists of cutting grass for un-reinforced levee and reinforced levee sections and inspection of structures and removal of graffiti for T-wall sections. Since the levee sections also have T-wall sections they would need to address all O&M issues.

The operation and maintenance of the railroad swing gate (included in all alternatives) would require routine inspections, and regular operation to assure proper functioning along with painting.

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ORLEANS AND PLAQUEMINES PARISHES, LOUISIANA
CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5**

13.0 DESCRIPTION OF APPENDICES

13.1 APPENDIX "A" GEOTECHNICAL REPORT

The Geotechnical Report was submitted to the USACE separately for review as requested by the USACE and is not included with this 65% submittal report.

13.2 APPENDIX "B" DRAWINGS

This appendix includes all drawings for this submittal.

13.3 APPENDIX "C" DESIGN CALCULATIONS / INFORMATION

This appendix consists of design calculations and other pertinent information as well as CSV output results.

13.4 APPENDIX "D" COST ESTIMATE

A cost estimate for each option is presented in this appendix along with supporting quantity calculations.

13.5 APPENDIX "E" CONSTRUCTION DURATION

An opinion of construction duration with assumptions is included in this appendix. For the purposes of this report, only the first lift was examined.

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ORLEANS AND PLAQUEMINES PARISHES, LOUISIANA
CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5**

13.6 APPENDIX "F" DESIGN QUALITY CONTROL PLAN (DQCP)

A copy of the latest revised DQCP (dated April 2008) is included in this appendix.

13.7 APPENDIX "G" INDEPENDENT TECHNICAL REVIEW

Review comments and resolutions from the USACE 65% review and ITR 65% and 95% reviews comments are included in this section.

13.8 APPENDIX "H" UTILITY QUESTIONNAIRES

All aspects of the utility investigations at this time are included in this appendix. This includes the initial field investigation notes, a copy of all correspondence to the utility owners affected, and all responses received to date.

13.9 APPENDIX "I" SURVEY CONTROL

Per the scope of work, we contacted Mr. Mark Huber with the USACE to request the specified controlling benchmark, BEL-1. The enclosed survey control point data sheet was provided to us.

13.10 APPENDIX "J" PHOTOGRAPHS

This appendix includes a compilation of field photos taken over the last four months and are arranged in order to include an approximate station number and general orientation of each photo.

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CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5**

14.0 DRAWINGS

Drawing sheets were prepared to meet the intent of the described scope of work in accordance with the referenced CADD standards. Mr. Mike Brennan, the Civil Branch representative, was contacted to obtain the latest CADD standards and supplemental documents used to prepare the drawing sheets. All drawing sheets were prepared on full size sheets (22" x 34") but will be submitted on half size sheets (11" x 17") as required by the scope of work.

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ORLEANS AND PLAQUEMINES PARISHES, LOUISIANA
CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5**

**APPENDIX 'A'
GEOTECHNICAL REPORT**



July 29, 2008

U.S. Army Engineer District, New Orleans
ATTN: Mr. Ellsworth Pilie
P.O. Box 60267
New Orleans, LA 70160-0267

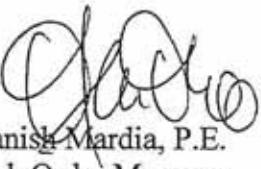
Subject: West Bank and Vicinity Hurricane Protection Project
Phase 2 Hurricane Protection
Algiers Canal Levee West. Algiers Lock to Hwy 23 (WBV 47.2)
B/L Sta. 770+70 to Sta. 978+18
Orleans and Plaquemines Parishes, Louisiana
Contract No. W912P8-08-D-0002-Task Order 0005

Dear Mr. Pilie:

As discussed, we will submit the updated Geotech Report separately in advance of the day in which the 95% EAR submittal will be made to allow the COE to begin their review early. Please find enclosed three (3) hard copies and one (1) electronic copy of the geotech report.

Should you have any questions, please feel free to contact me.

Sincerely,
Hurricane Protection Alliance
Joint-Venture, LLC



Manish Mardia, P.E.
Task Order Manager

Enclosure

cc: Mr. Craig Waugaman MVN, USACE (w/o enclosure)
Mr. Tom Hickey P.E., HPA (w/o enclosure)

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ORLEANS AND PLAQUEMINES PARISHES, LOUISIANA
CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5**

APPENDIX 'B'

DRAWINGS

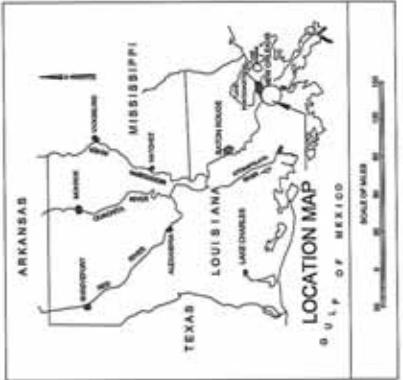
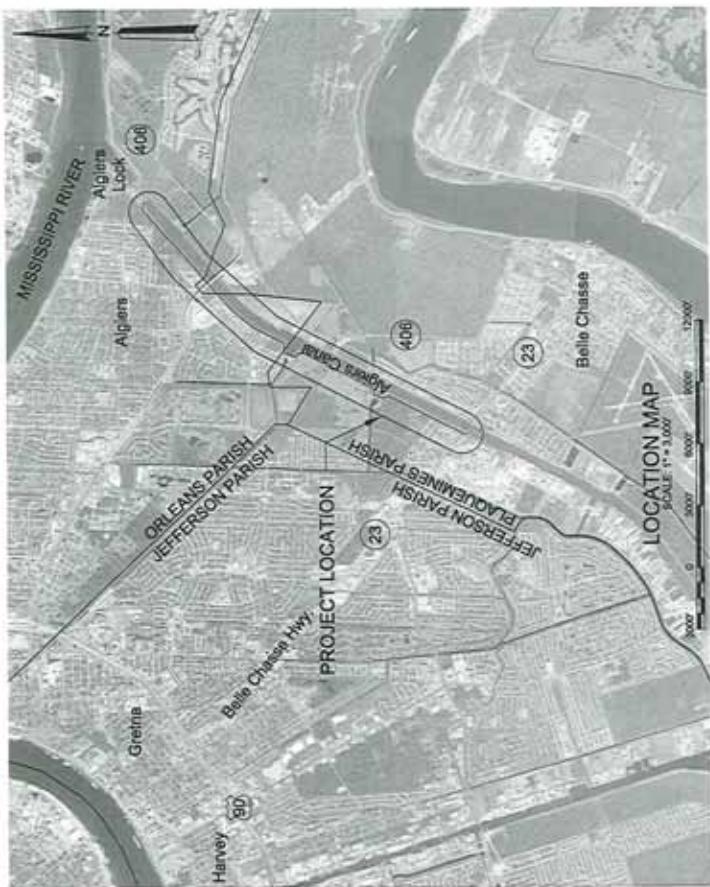


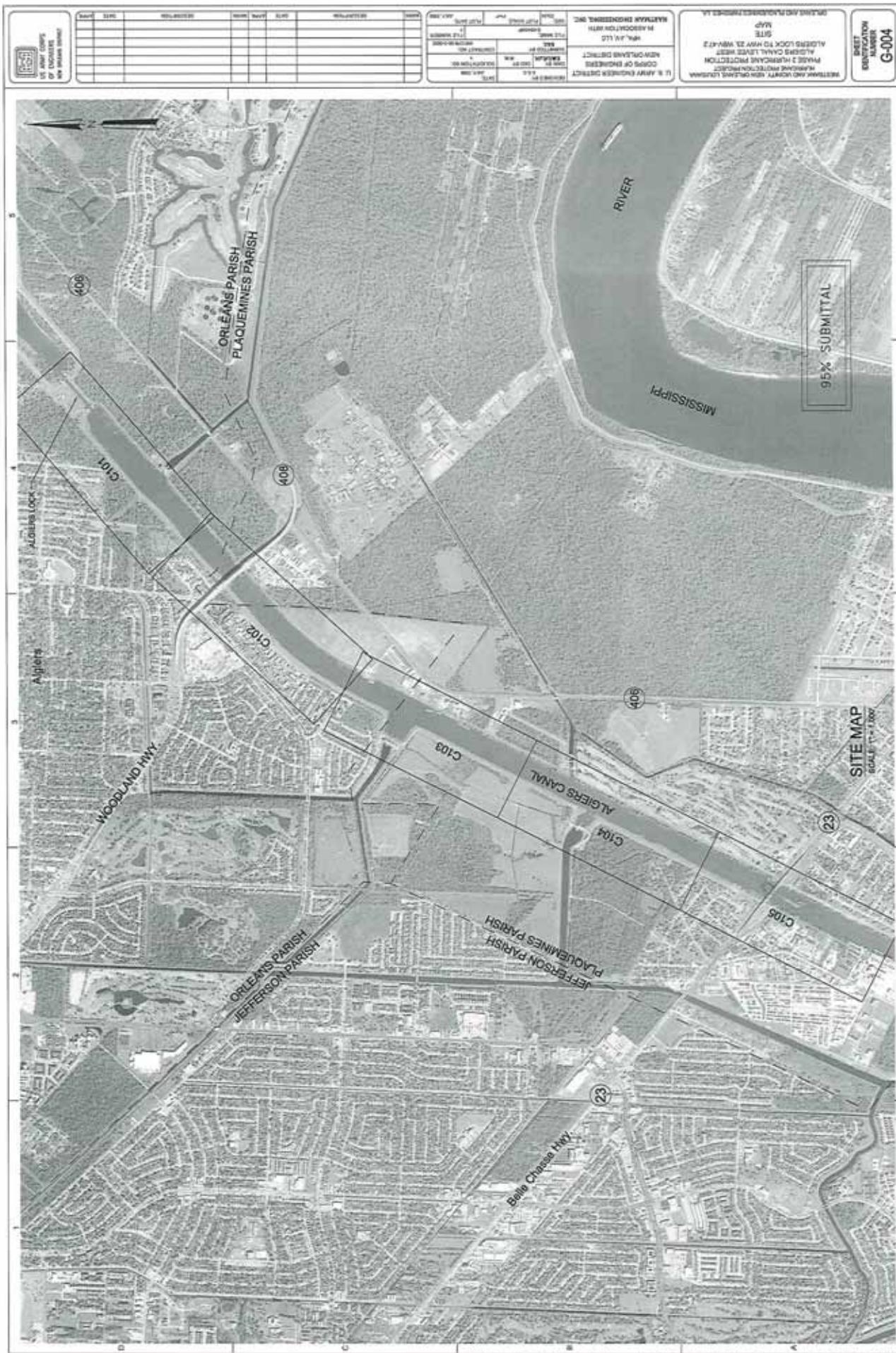
US Army Corps
of Engineers
New Orleans District

West Bank And Vicinity, New Orleans, LA.
Hurricane Protection Project
Phase 2 Hurricane Protection
Algiers Canal Levee West
Algiers Lock to Hwy. 23
Orleans and Plaquemines Parishes, La.
(WBV-47.2)

SOLICITATION NO.:
CONTRACT NO.: W912P8-08-D-0002
July, 2008

 <p>US Army Corps of Engineers New Orleans District</p>	<p>West Bank And Vicinity, New Orleans, LA. Hurricane Protection Project Phase 2 Hurricane Protection Algiers Canal Levee West Algiers Lock to Hwy. 23 Orleans and Plaquemines Parishes, La. (WBV-47.2)</p>	<p>5 4 3 2 1 0</p> <p>THE NAMES BELOW INDICATE THE OFFICIALS THAT ORIGINALLY SIGNED THIS SET OF DRAWINGS. APPROVAL RECOMMENDED BY: THIS PREDICTION WAS DESIGNED BY THE US ARMY CORPS OF ENGINEERS. THE NAME AND SIGNATURE OF THE INDIVIDUALS WHO APPROVED AND REGISTERED THIS DOCUMENTATION OF INDIVIDUALS APPEAR ON THESE PROJECT DOCUMENTS WITHIN THE SCOPE OF THEIR EMPLOYMENT AS REQUIRED BY ER 110-4.1.2. REGULAR APPROVALS INDICATE IN THESE DOCUMENTS OF ALL BRANCHES IN THIS SET.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">APPROVED BY:</td> <td style="width: 33%;">FTL</td> <td style="width: 33%;">X</td> </tr> <tr> <td>SUBDIRECTOR COMMANDER</td> <td>CIVIL</td> <td>BRANCH</td> </tr> <tr> <td></td> <td>X</td> <td></td> </tr> <tr> <td></td> <td>CIVIL</td> <td>BRANCH</td> </tr> <tr> <td></td> <td>X</td> <td></td> </tr> <tr> <td></td> <td>ENGINERING</td> <td>DIVISION</td> </tr> </table> <p>95% SUBMITTAL</p> <p>SOLICITATION NO.: CONTRACT NO.: W912P8-08-D-0002 July, 2008</p>	APPROVED BY:	FTL	X	SUBDIRECTOR COMMANDER	CIVIL	BRANCH		X			CIVIL	BRANCH		X			ENGINERING	DIVISION
APPROVED BY:	FTL	X																		
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	CIVIL	BRANCH																		
	X																			
	ENGINERING	DIVISION																		

 <p>U.S. ARMY CORPS OF ENGINEERS www.usace.army.mil</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Project</td><td>WBV-47.2</td></tr> <tr><td>WATERBODY</td><td>MISCELLANEOUS</td></tr> <tr><td>OWNER</td><td>OWNER</td></tr> <tr><td>DESIGNER</td><td>DESIGNER</td></tr> <tr><td>BUILDER</td><td>BUILDER</td></tr> <tr><td>MANUFACTURER</td><td>MANUFACTURER</td></tr> <tr><td>INSPECTOR</td><td>INSPECTOR</td></tr> <tr><td>PERMITTING</td><td>PERMITTING</td></tr> <tr><td>CONTRACTOR</td><td>CONTRACTOR</td></tr> <tr><td>GENERAL CONTRACTOR</td><td>GENERAL CONTRACTOR</td></tr> <tr><td>MANUFACTURER</td><td>MANUFACTURER</td></tr> <tr><td>INSPECTOR</td><td>INSPECTOR</td></tr> <tr><td>PERMITTING</td><td>PERMITTING</td></tr> <tr><td>CONTRACTOR</td><td>CONTRACTOR</td></tr> <tr><td>GENERAL CONTRACTOR</td><td>GENERAL CONTRACTOR</td></tr> </table>	Project	WBV-47.2	WATERBODY	MISCELLANEOUS	OWNER	OWNER	DESIGNER	DESIGNER	BUILDER	BUILDER	MANUFACTURER	MANUFACTURER	INSPECTOR	INSPECTOR	PERMITTING	PERMITTING	CONTRACTOR	CONTRACTOR	GENERAL CONTRACTOR	GENERAL CONTRACTOR	MANUFACTURER	MANUFACTURER	INSPECTOR	INSPECTOR	PERMITTING	PERMITTING	CONTRACTOR	CONTRACTOR	GENERAL CONTRACTOR	GENERAL CONTRACTOR	<p>U. S. ARMY CORPS OF ENGINEERS MISSISSIPPI RIVER AND GULF COAST DISTRICT NEW ORLEANS FIELD OFFICE 1000 PELICAN DR NEW ORLEANS, LA 70112-2000 PHONE: 504-843-5400 FAX: 504-843-5401 E-MAIL: WBV-47.2@usace.army.mil</p>	<p>PHASE 2 HURRICANE PROTECTION ALGIERS CANAL LEVEE WEST ALGIERS LOCK TO HWY 23, WBV-47.2</p>	<p>95% SUBMITTAL</p>	<p>SOLICITATION NO: SHEET NUMBER G-002</p>
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1	2	3	4																							
<p>GENERAL NOTES:</p> <ol style="list-style-type: none"> 1. ALL DIMINISHES ARE GEODETIC AZIMUTHS TURNED IN A CLOCKWISE DIRECTION FROM 0° OF TRUE NORTH. 2. UNLESS OTHERWISE NOTED, ALL ELEVATIONS ARE EXPRESSED IN FEET AND REFER TO NORTH AMERICAN VERTICAL DATUM NAVD88 - 2004.69. 3. ALL DISTANCES ARE MEASURED PERPENDICULAR TO THE BASELINE LINES OTHERWISE, NOTED. 4. DO NOT INTERFERE (ARTIFICIAL AND NATURAL) DRAMATIC FLIGHTS DURING CONSTRUCTION. 5. INSIDE THE PLAN AREA, POLYGRAPHIC PROJECTION 1930 NAD88 (NORTH AMERICAN DATUM) IS SHOWN BY SOLID TICKS, AND LAMBERT CONFORMAL CONIC PROJECTION IS SHOWN BY DASHED TICKS. PREPARED FROM AERIAL PHOTOS FLown SEPTEMBER 2005. 6. LOCATION OF EXISTING UTILITIES INDICATED ON THE PLAN SHEETS ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY AND ARE NOT IN PART, THE CONTRACTOR IS RESPONSIBLE TO VERIFY ALL EXISTING UTILITY LOCATIONS PRIOR TO CONSTRUCTION. <p>7. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES CAUSED BY CONSTRUCTION OPERATIONS. THE DAMAGE SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.</p> <p>8. THE CONTRACTOR MUST VERIFY ELEVATIONS OF ALL EXISTING STRUCTURES THAT ARE A PART OF THIS JOB.</p> <p>9. NOISE CONTROL - CONTRACTOR SHALL TAKE APPROPRIATE MEASURES TO AVOID UNNECESSARY NOISE APPROPRIATE FOR THE CONSTRUCTION ACTIVITIES IN THE AREA. ALL CONSTRUCTION ACTIVITIES SHALL BE CONDUCTED IN A MANNER THAT IS REASONABLE AND REASONABLY PRACTICAL, BUT NOT HARMFUL TO NEIGHBORS AND OTHERS IN A MANNER TO CAUSE NOISE LEVELS NOT TO EXCEED 75dB AT THE LIMIT OF CONSTRUCTION IN ACCORDANCE WITH LOCAL ORDINANCE.</p> <p>10. DUST CONTROL - ALL TEMPORARY HAUL ROADS AND BARE EARTHEN SURFACES WITHIN THE CONSTRUCTION LIMITS SHALL BE WATERED DOWN TO PREVENT DUST FROM DRIFTING INTO ADJACENT AREAS. THE CONTRACTOR SHALL AT ALL TIMES HAVE EQUIPMENT ON SITE TO WATER TEMPORARY HAUL ROADS AND BARE EARTHEN SURFACES. FAILURE TO CONTROL DUST WILL RESULT IN THE CONTRACTOR STOPPING RELATED OPERATIONS UNTIL A SUITABLE PLANT TO CONTROL DUST IS IMPLEMENTED.</p> <p>11. ALL WORK AROUND HIGH VOLTAGE POWER LINES SHALL BE IN ACCORDANCE WITH ENERGY REGULATIONS AND WITH THE PROJECT SPECIFICATIONS.</p>																										
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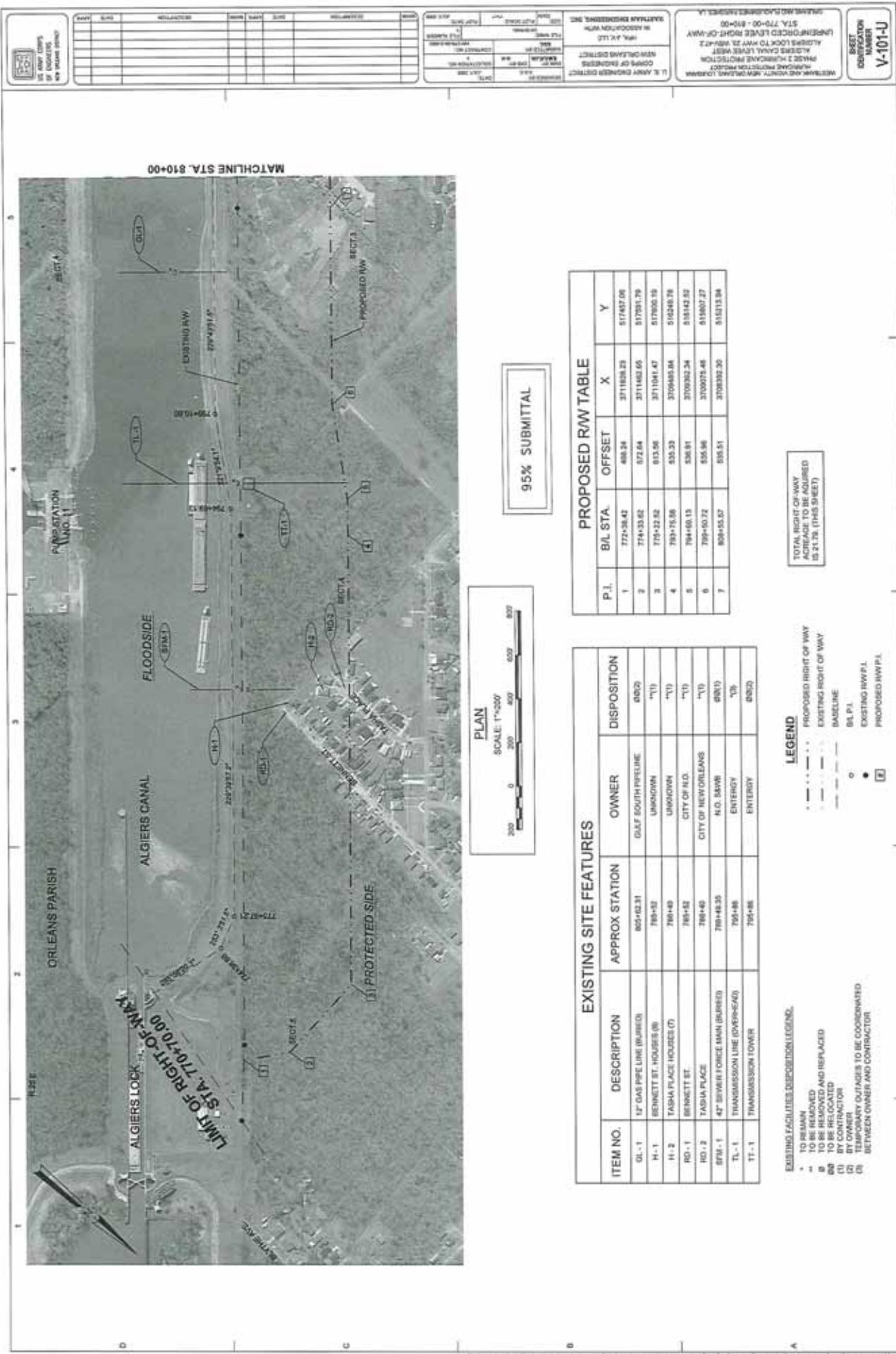
PROJECT BASELINE					
STATION	LENGTH (FT.)	AZIMUTH			
770+70.00	388.88'	289°59'03.3"			
774+58.88	183.33'	289°58'31.8"			
779+07.21	1,071.87'	229°59'07.2"			
794+00.13	441.61"	221°10'04.1"			
799+10.90	2,064.81	229°43'51.5"			
820+05.31	268.34'	228°19'45.3"			
823+72.65	817.83'	238°12'19.1"			
829+91.18	669.48'	229°57'17.1"			
839+48.83	273.28'	227°48'53.8"			
839+24.91	248.43'	224°48'32.2"			
841+03.40	244.29'	221°34'47.7"			
845+27.68	278.20'	219°03'14.7"			
848+06.88	281.86'	216°37'13.3"			
851+02.75	187.89'	213°31'05.3"			
853+00.70	247.23'	211°49'19.8"			
858+27.93	215.93'	209°22'55.0"			
859+43.86	1,054.07'	207°22'53.1"			
860+07.93	173.67'	235°03'00.8"			
871+17.40	295.61"	287°49'26.1"			
874+49.21	641.51"	202°19'27.2"			
881+00.72	284.70"	127°50'38.2"			
883+03.48	198.42"	185°20'24.0"			
885+00.90	1,472.29"	202°28'35.1"			
900+00.18	2,323.29"	207°29'30.4"			
923+91.42	195.74"	241°19'23.5"			
925+45.16	198.89"	206°09'36.3"			
927+58.85	811.90"	202°49'44.8"			
932+00.78	120.61"	154°21'28.1"			
933+41.36	203.81"	168°02'16.3"			
935+47.87	2,193.11"	201°34'34.8"			
963+54.08	1463.07"	207°41'03.5"			
978+17.96					

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Cleaned surface and later disturbed</p> <p>(1) Denotes location of consolidated-drained direct shear shear test **</p> <p>(2) Denotes location of consolidated undrained triaxial compression test **</p> <p>(3) Denotes location of unconsolidated undrained triaxial compression test **</p> <p>(4) Denotes location of samples subjected to consolidation test and each of the above three types of shear test **</p> <p>FW Denotes free water encountered in boring or sample</p> <p>FIGURES TO RIGHT OF BORING</p> <p>All values of resistance in this log R, from undrained compression tests</p> <p>In parentheses are driving resistances in kips per foot determined when a standard split spoon sampler (1/8" I.D., T.O.) and a 100 driving hammer were used at 50 ft.</p> <p>Where undrained with a solid thin diameter laboratory permeability in centimeters per second or sample remade to the extended natural void ratio</p> <p>* The D_u of a soil is the grain diameter in millimeters of which 10% of the soil is finer, and 60% coarser than D_u.</p> <p>** Most of these tests are available for inspection in the U.S. Army Engineers District Office. If these symbols appear at end of the boring log or BORING</p> <p>95% SUBMITTAL</p>						MAJOR DIVISION	TYPE	LETTER SYMBOL	SOLID SYMBOL	TYPICAL NAMES		COARSE - GRAINED SOILS	CLEAN GRAVEL	GW		GRAVEL, Well Graded; gravel and sand, little or no fines		GRAVEL, Poorly Graded, gravel and sand, little or no fines	GP		GRAVEL, Poorly Graded; gravel and sand, little or no fines		GRAVEL WITH FINE SAND	GM		SILTY GRAVEL; gravel and sand, all mature		GRAVEL, Poorly Graded, gravel and sand, all mature	GC		CLAYEY GRAVEL; gravel and clay, mature		SAND, Well Drained, gravity, sands	SW		SAND, Well Drained; gravity, sands		SAND, Poorly Graded, gravity, sands	SP		SILTY SAND, poorly graded		SANDS, WITH FINE SAND	SM		SILTY SAND, sand and silt mixture		SANDS, WITH FINE SAND, CLAY	SC		CLAYEY SAND, sand-clay mixture		SILTS AND CLAYS	ML		SILT & very fine sand, silty or clayey fine sand or clayey silt with slight plasticity		CLAY, FAIRLY PLASTIC	CL		LEAN CLAY; Clay, Silty Clay, of low to medium plasticity		HEAVY ORGANIC SOILS	ORGANIC SILTS AND CLAYS OF LOW PLASTICITY	OL		ORGANIC SILTS; and organic silty clays of low plasticity		SILTS AND CLAYS	MH		SILT, fine sandy or silty soil with high plasticity		CLAYS	CH		FAT CLAY; inorganic clay of high plasticity		ORGANIC CLAYS OF MODERATE TO HIGH PLASTICITY	OH		ORGANIC CLAYS		PEAT AND OTHER HIGHLY ORGANIC SOILS	PI		PEAT, and other highly organic soil		WOOD	WD		WOOD		SHELLS	SI		SHELLS		NO SAMPLE	NS		No Sample Retrieved	
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DEScriptive SYMBOLS		MODIFICATIONS					
COLOR	SYMBOL	CONSISTENCY FOR COHESIVE SOILS:		SYMBOL	MODIFICATION		SYMBOL
		CONSISTENCY IN LB/SQ FT. FROM UNCONFINED COMPRESSION TEST					
TAN	T	VERY SOFT	< 250	s	Thin	T	F
YELLOW	Y	SOFT	250-500	ss	Medium	M	M
RED	H	MEDIUM	500-1000	sm	Crumb	C	C
BLACK	Bl	STIFF	1000-2000	m	Coarse	CL	CL
GRAY	Gz	VERY STIFF	2000-4000	sl	Rocks	R	R
LIGHT GRAY	Gr				Lignite fragments	L	L
DARK GRAY	gr				Shale fragments	sh	sh
BROWN	Br	HARD	> 4000	H	Bentonite fragments	bs	bs
LIGHT BROWN	br				Shale fragments	sf	sf
DARK BROWN	bb				Organic material	O	O
BUDDYSON GRAY	br-Gr				Chlorite or mica	Cl	Cl
GRAYISH-BROWN	bl-Br				Silt or sand or loam	S	S
GREENISH GRAY	gr-Gr				Sand or silt or loam	SL	SL
GRAYISH-GREEN	gr-Gr				Sand	S	S
GREEN	Gr				Gravelly	G	G
BLUE	Bl				Gravel	G	G
BLUE-GREEN	br-Bl				Silt-sand	SL	SL
WHITE	Wh				Wood	W	W
MOTTLED	Abr				Outcrop	Ca	Ca

PLASTICITY CHART							
For classification of the ground soils in accordance with ASTM D 2487							
LL = Liquid Limit	WL = Water Limit	Pl = Plasticity Index	CH = Cohesion				
0	40	60	80				
4	20	40	60				
8	12	16	20				
12	16	20	24				
16	20	24	28				
20	24	28	32				
24	28	32	36				
28	32	36	40				
32	36	40	44				
36	40	44	48				
40	44	48	52				
44	48	52	56				
48	52	56	60				
52	56	60	64				
56	60	64	68				
60	64	68	72				
64	68	72	76				
68	72	76	80				
72	76	80	84				
76	80	84	88				
80	84	88	92				
84	88	92	96				
88	92	96	100				

TYPICAL NOTES:	
1. WHILE THE BORINGS ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THEIR RESPECTIVE LOCATIONS AND FOR THEIR RESPONDING VERTICAL REACHES, LOCAL VARIATIONS CHARACTERISTIC OF THE SUBSURFACE MATERIALS OF THE REGION ARE ANTICIPATED AND, IF ENCOUNTERED, SUCH VARIATIONS WILL NOT BE CONSIDERED AS DIFFERENT MATERIALLY WITHIN THE FRAMEWORK OF THE CONTRACT CLAUSE ENTITLED "DIFFERING SITE CONDITIONS".	
2. GROUND WATER ELEVATIONS SHOWN ON THE BORING LOGS REPRESENT GROUND WATER SURFACES ENCOUNTERED IN SUCH BORINGS ON THE DATE SHOWN. ABSENCE OF WATER SURFACE DATA ON CERTAIN BORINGS INDICATES THAT NO GROUND WATER DATA ARE AVAILABLE FROM THE BORING BUT DOES NOT NECESSARILY MEAN THAT GROUND WATER WAS NOT ENCOUNTERED AT THE LOCATIONS OR WITHIN THE VERTICAL REACHES OF SUCH BORINGS.	
3. CONSISTENCY OF COHESIVE SOIL BORINGS ON THE BORING LOGS IS BASED ON DRILLER'S LOG AND VISUAL EXAMINATION AND IS APPROXIMATE, EXCEPT NEARLY THOSE VERTICAL REACHES OF THE BORINGS WHERE BOREHOLE STRAIGHTNESS IS PROVEN BY COMPRESSION TESTS AS SHOWN.	
4. UNLESS OTHERWISE NOTED:	
A. UNDISTURBED BORINGS, INDICATED BY THE LETTER "U", ARE TAKEN WITH A 1" ID. PISTON TYPE SAMPLER.	
B. GENERAL TYPE BORINGS ARE TAKEN WITH A 1" ID. TUBE SAMPLER, AND/OR A 1 3/8" ID. SPLIT BROWN SAMPLER.	



MAP OF THE PROPOSED RIGHT-OF-WAY FOR THE NEW ORLEANS PLACERED LINE

This map shows the proposed right-of-way for the New Orleans Placered Line, specifically the segment between Matchline STA. 810+00 and STA. 860+00. The map includes a detailed aerial photograph of the area, showing streets, buildings, and various geographical features like canals and rivers. Key features labeled include the Algiers Canal, Woodland Hwy, and Plaquemines Parish/Oreleans Parish boundary. The map also shows several utility lines and structures, such as gas pipelines, water mains, and electrical distribution lines.

PROPOSED RIGHT-OF-WAY LINES

- Proposed Right-of-Way:** A thick black line representing the proposed right-of-way for the New Orleans Placered Line.
- Existing Right-of-Way:** A dashed line representing the existing right-of-way for the New Orleans Placered Line.
- Existing Right-of-Way (W&L):** A thin solid line representing the existing right-of-way for the New Orleans Placered Line.
- Baseline:** A thin dashed line representing the baseline for the proposed right-of-way.

EXISTING SITE FEATURES

ITEM NO.	DESCRIPTION	APPROX STATION	OWNER	DISPOSITION
NFT - 1	APARTMENT UNITS	810+47 - 861+91	UNKNOWN	"T1"
NFT - 2	APARTMENT UNITS	810+47 - 863+20	UNKNOWN	"T1"
BR - 1	BRIDGE WOODLAND HWY (LA 600)	812+73.63	LADOT	"*
CL - 1	COMMUNICATION LINE	812+485	UNITED STATES GOVERNMENT	"S0529"
GL - 2	3P GAS PIPELINE	812+701.11 - 864+00	PROGEME	"S0272"
H - 3	JOYCE LN ER. HOUSES (2B)	813+21 - 821+98	UNKNOWN	"T19"
H - 4	MELBOURNE ST. HOUSES (7)	813+25 - 819+58	UNKNOWN	"T10"
H - 5	FIELDS ST. HOUSES (11)	813+78 - 820+28	UNKNOWN	"T10"
H - 6	TUMBER GROVE HOUSES (22)	853+05 - 853+43	UNKNOWN	"T10"
HL - 3	JOYCE LN ER.	813+21 - 821+96	CITY OF NO.	"T10"
HL - 4	MELBOURNE ST.	813+25 - 819+28	CITY OF NO.	"T10"
HL - 5	TUMBER GROVE	853+05 - 854+63	CITY OF NO.	"T10"
TL - 2	TRANSMISSION LINE (OVERHEAD)	813+02	ENTERGY	"T10"

PROPOSED R/W TABLE

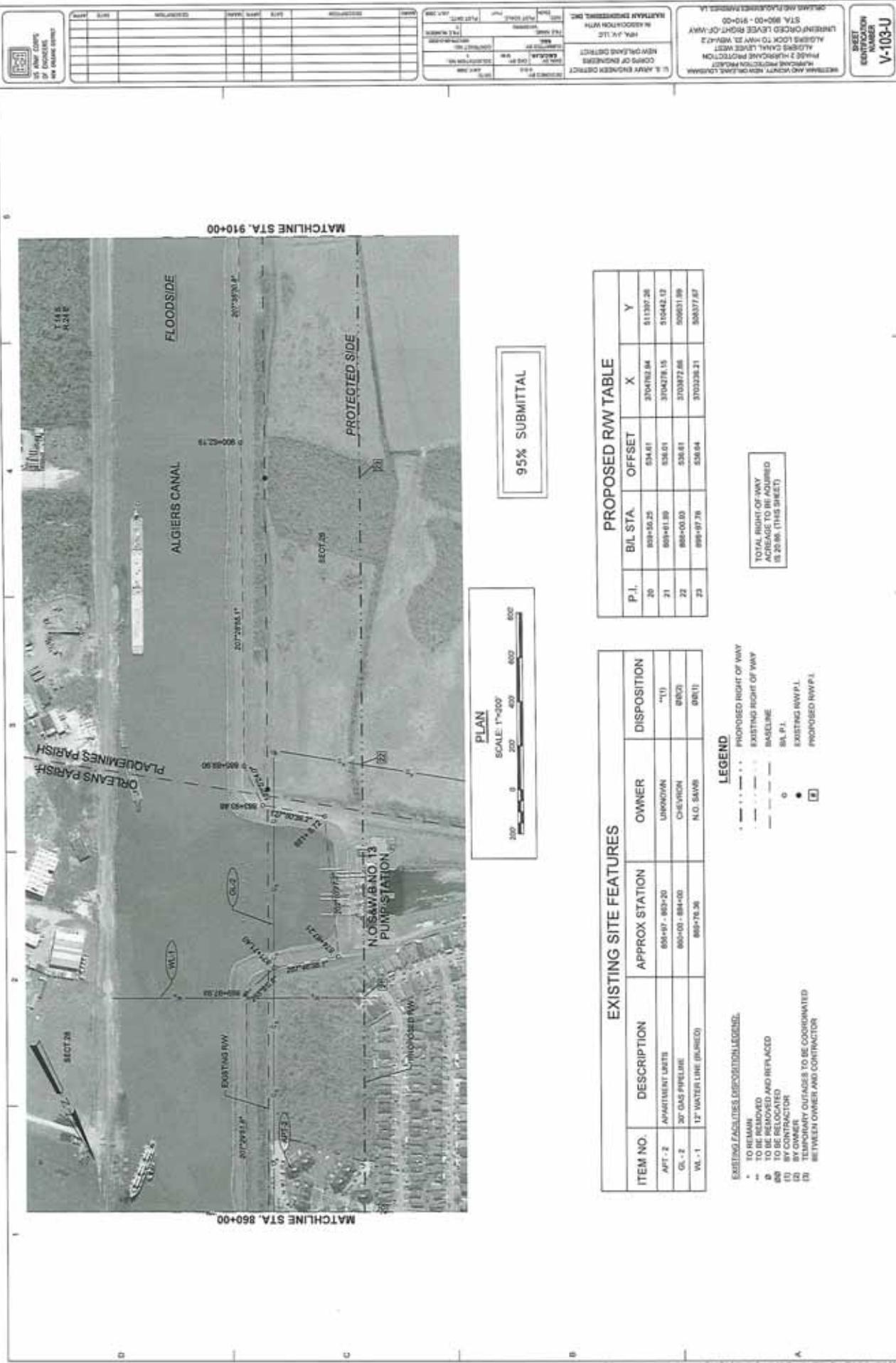
P.L.	B/L STA.	OFFSET	X	Y
8	812+423.36	±10 ft	3702415.27	614374.08
9	812+403.65	±10 ft	3702410.00	613813.65
10	813+701.63	±10 ft	3702415.00	613323.00
11	813+708.69	±10 ft	3702419.11	613347.98
12	813+64.90	±10 ft	3702401.18	613297.03
13	842+29.42	±10 ft	3702401.33	613297.03
14	843+00.73	±10 ft	3702401.56	613272.97
15	843+29.86	±10 ft	3702417.35	613250.84
16	843+45.30	±10 ft	3702516.74	612350.57
17	853+18.26	±10 ft	3702516.31	612093.18
18	854+06.86	±10 ft	3702648.12	511912.47
19	853+20.44	±10 ft	3702624.16	511701.64

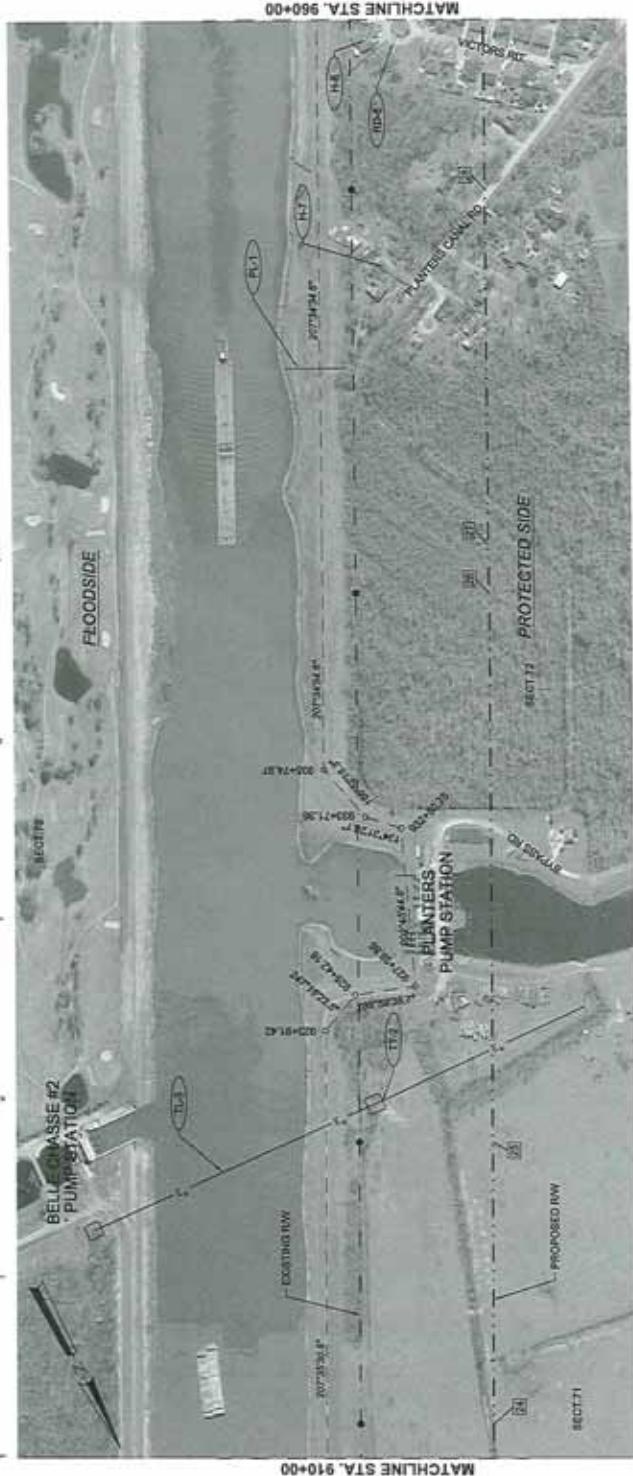
LEGEND

- + TO REMAIN
- TO BE REMOVED
- TO BE RELOCATED AND REPLACED
- TO BE RELOCATED
- (1) BY CONTRACTOR
- (2) BY OWNER
- (3) TEMPORARY OUTAGES TO BE COORDINATED BETWEEN OWNER AND CONTRACTOR

NOTES

- EXISTING FACILITIES DISPOSITION LEGEND
- PROPOSED RIGHT-OF-WAY
- EXISTING RIGHT-OF-WAY
- BASELINE
- EXISTING R/W P.L.
- PROPOSED R/W P.L.
- TOTAL RIGHT-OF-WAY AGREEMENT TO BE ACQUIRED IS 24.3K (THIS SHEET)





95% SUBMITAL

PLAN SCALE 1"=300'

PROPOSED R/W TABLE

PROPOSED RW TABLE					
P.I.	B/L STA.	OFFSET	X	Y	Z
24	811115.02	636.46	20304865.67	6017822.43	
25	820+30.18	535.07	3102217.96	506417.10	
26	941+42.31	538.16	3101440.26	504785.47	
27	941+98.35	536.54	3101380.26	504785.23	
28	954+52.40	536.01	3100618.59	503772.30	

TOTAL RIGHT-OF-WAY
ACROSS TO BE ACQUIRED
IS 2140 (TEN SHELL)

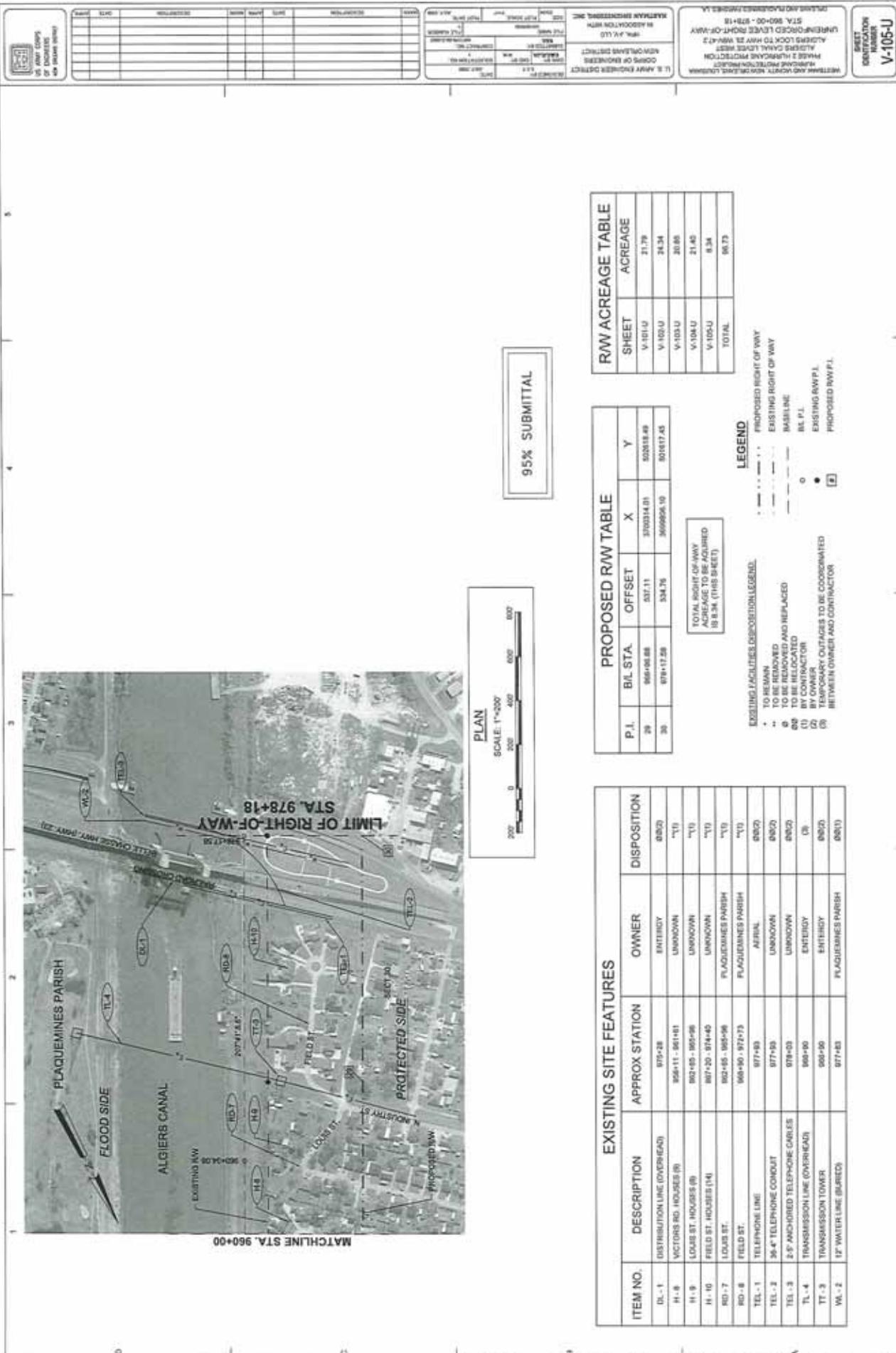
EXISTING SITE FEATURES

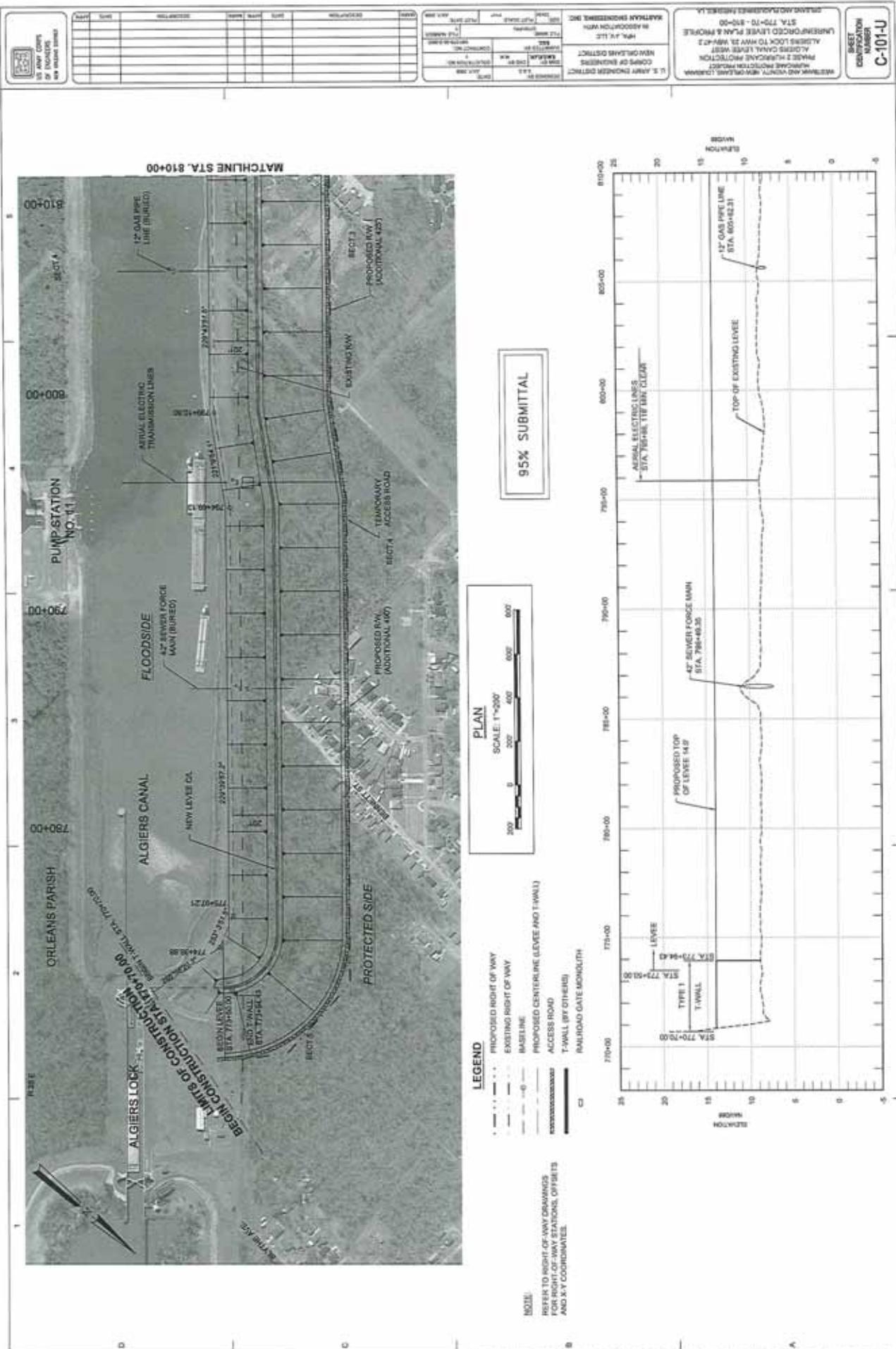
EXISTING SITE FEATURES					
ITEM NO.	DESCRIPTION	APPROX STATION	OWNER	DISPOSITION	
H-7	PLANTER CANAL RD. (ROUTE 98)	95+14.65	UNKNOWN	"(1)	
H-8	VICTORS RD. HOUSES (8)	95+11 + 98+18	UNKNOWN	"(1)	
P-1	PIPE LINE	94+74	UNKNOWN	94(2)	
HQ-8	VICTORS RD.	95+11 + 96+21	PLAQUEMINE PARISH	"(1)	
H-3	TRANSMISSION LINE (DVE/SH/ATC)	95+00	ENTERGY	"(1)	
T-2	TRANSFORMER STATION	820+00	ENTERGY	820(2)	

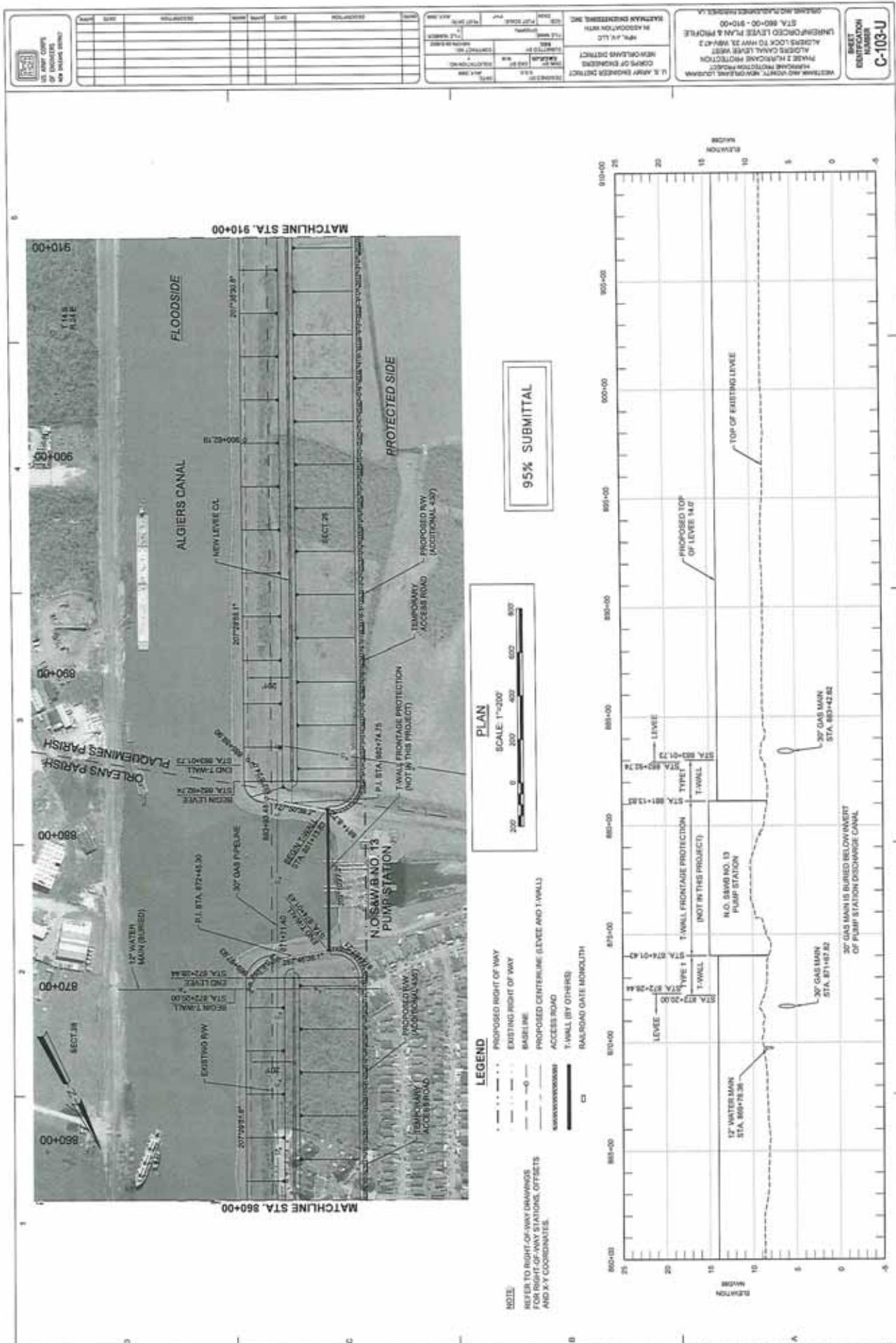
EGEND

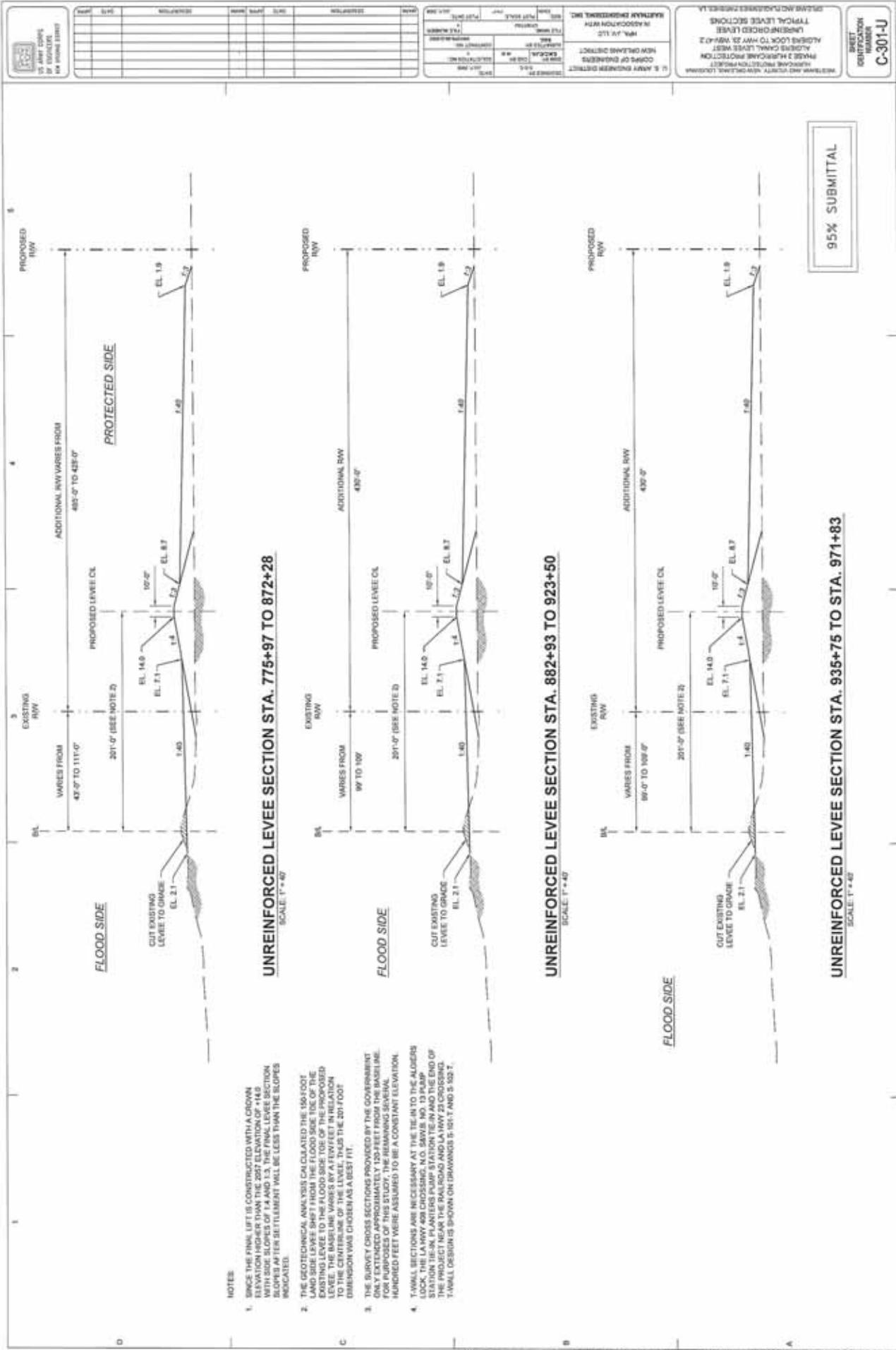
DISPOSITION LEGEND:

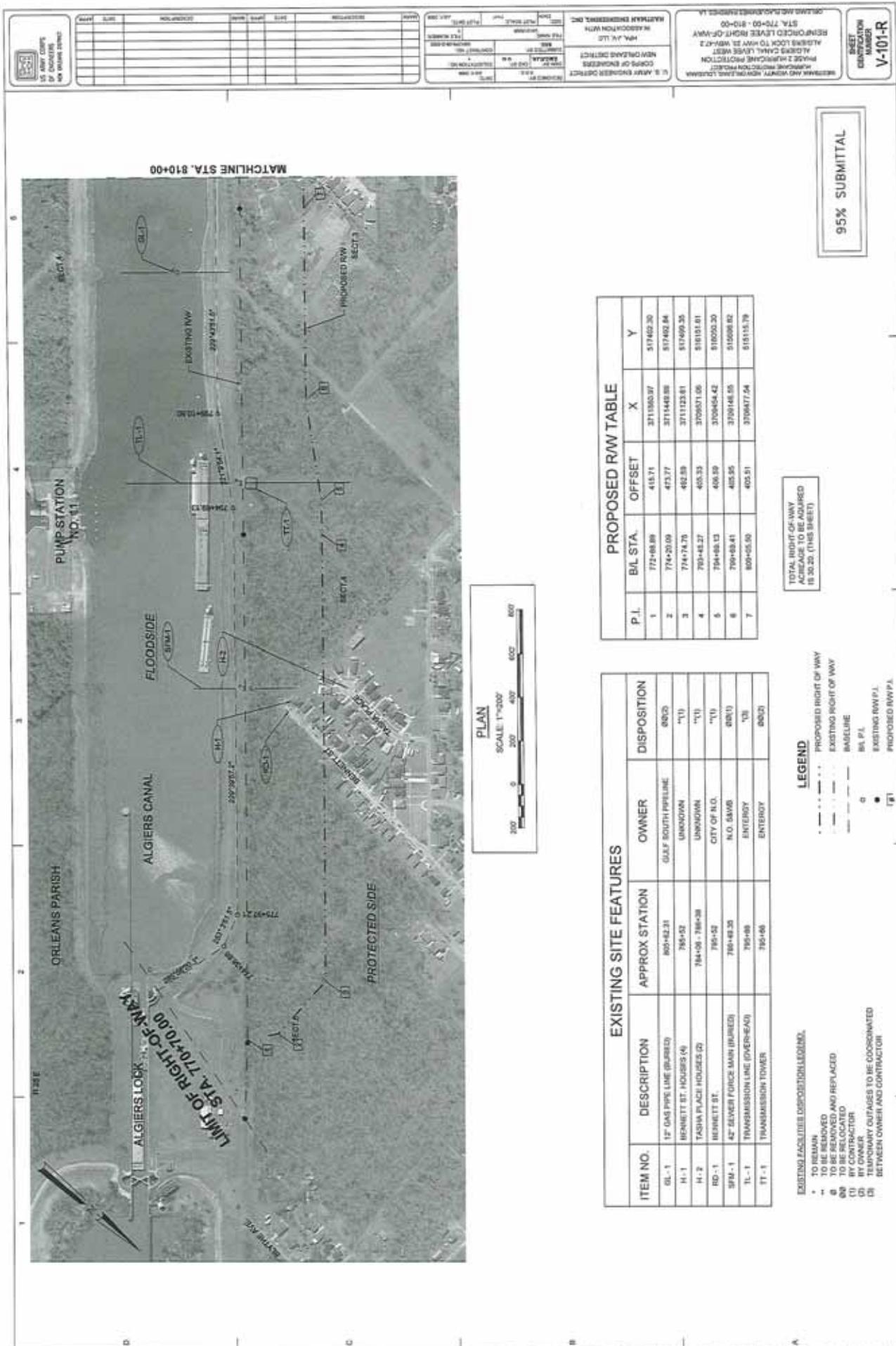
- TO ISRAEL
- TO BE REMOVED
- TO BE REMOVED AND REPLACED
- TO BE RELOCATED
- BY CONTRACTOR
- BY OWNER
- TEMPORARY OUTGAGES TO COORDINATOR
- BETWEEN OWNER AND CONTRACTOR

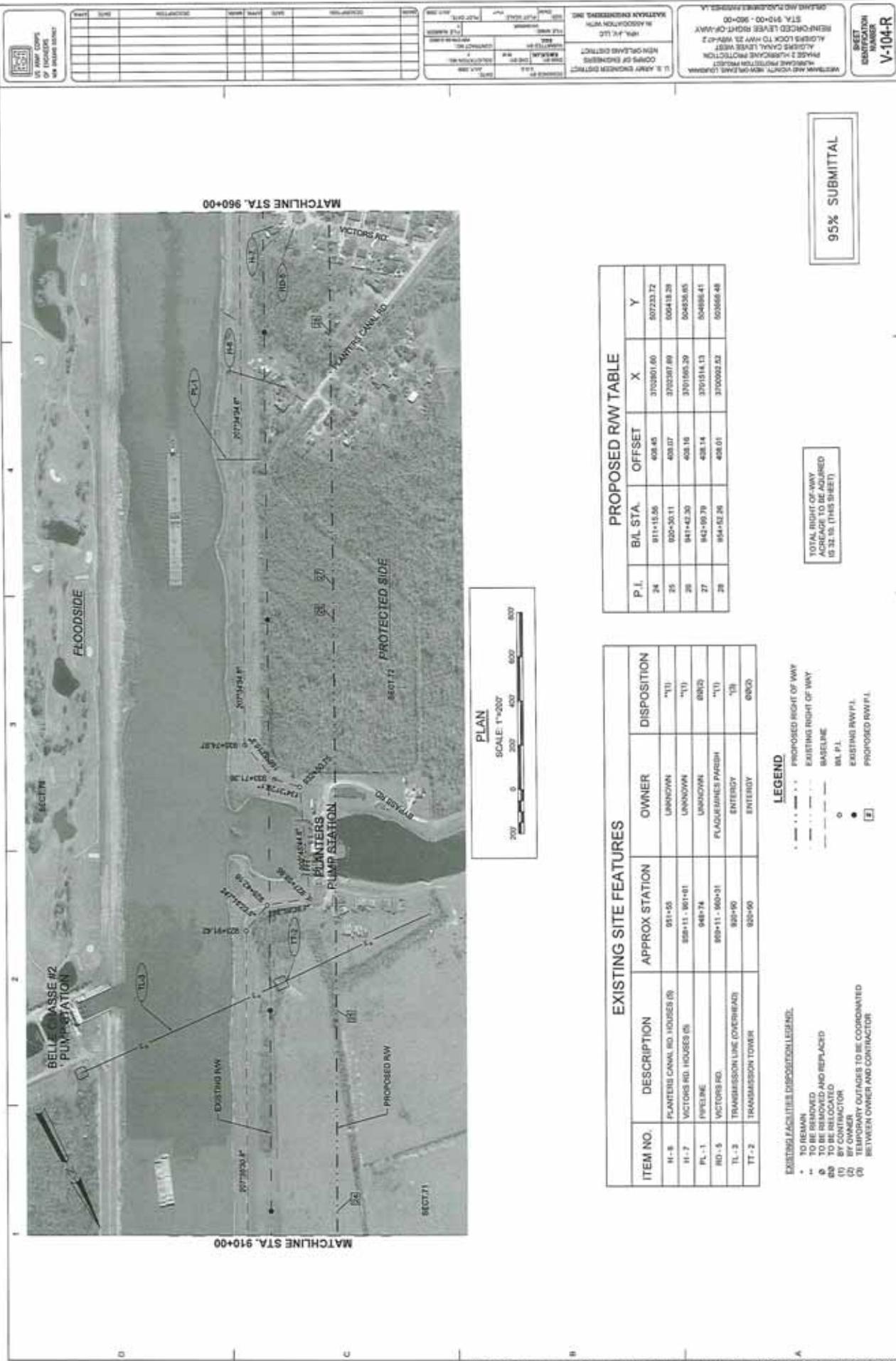


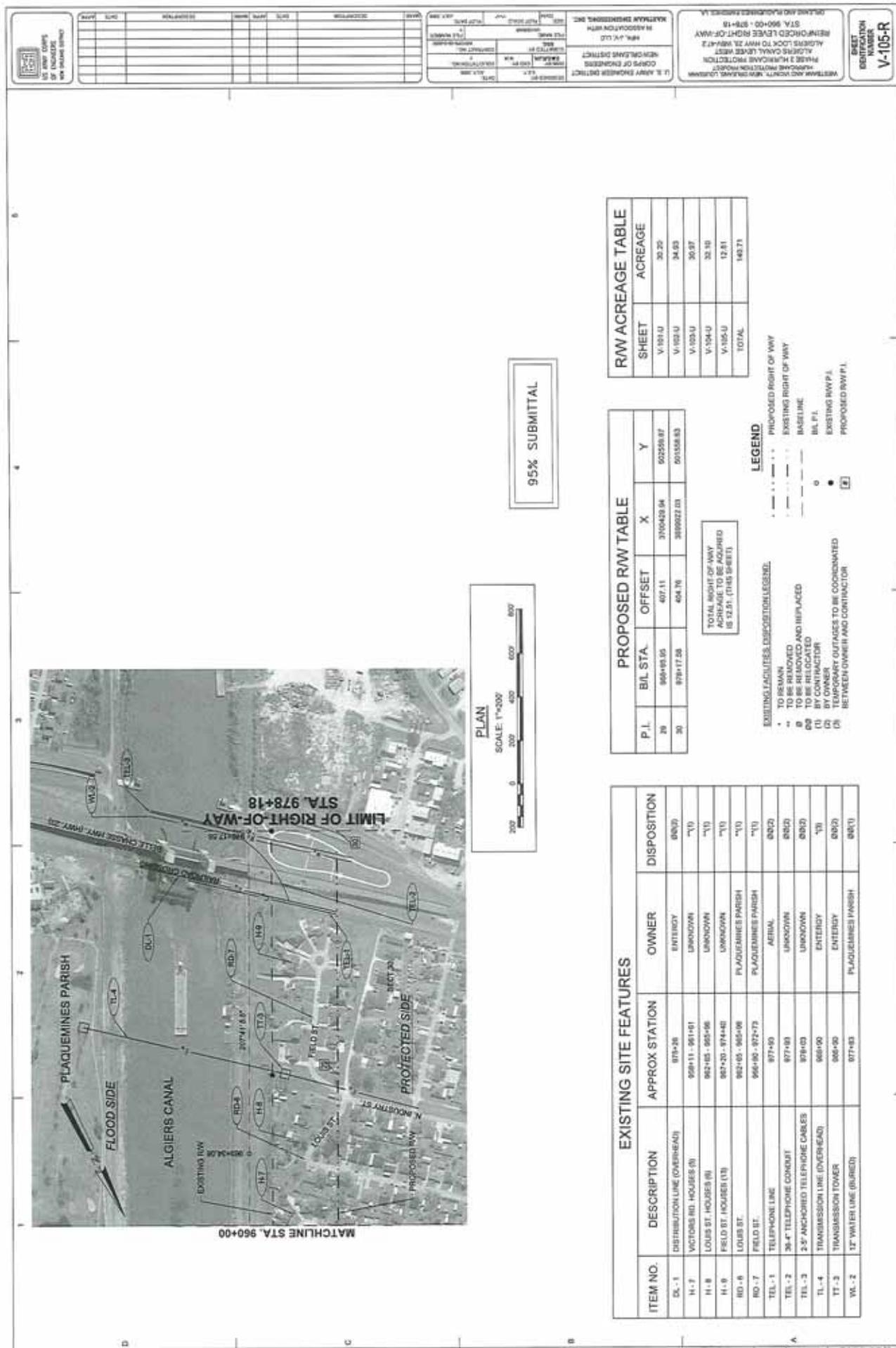


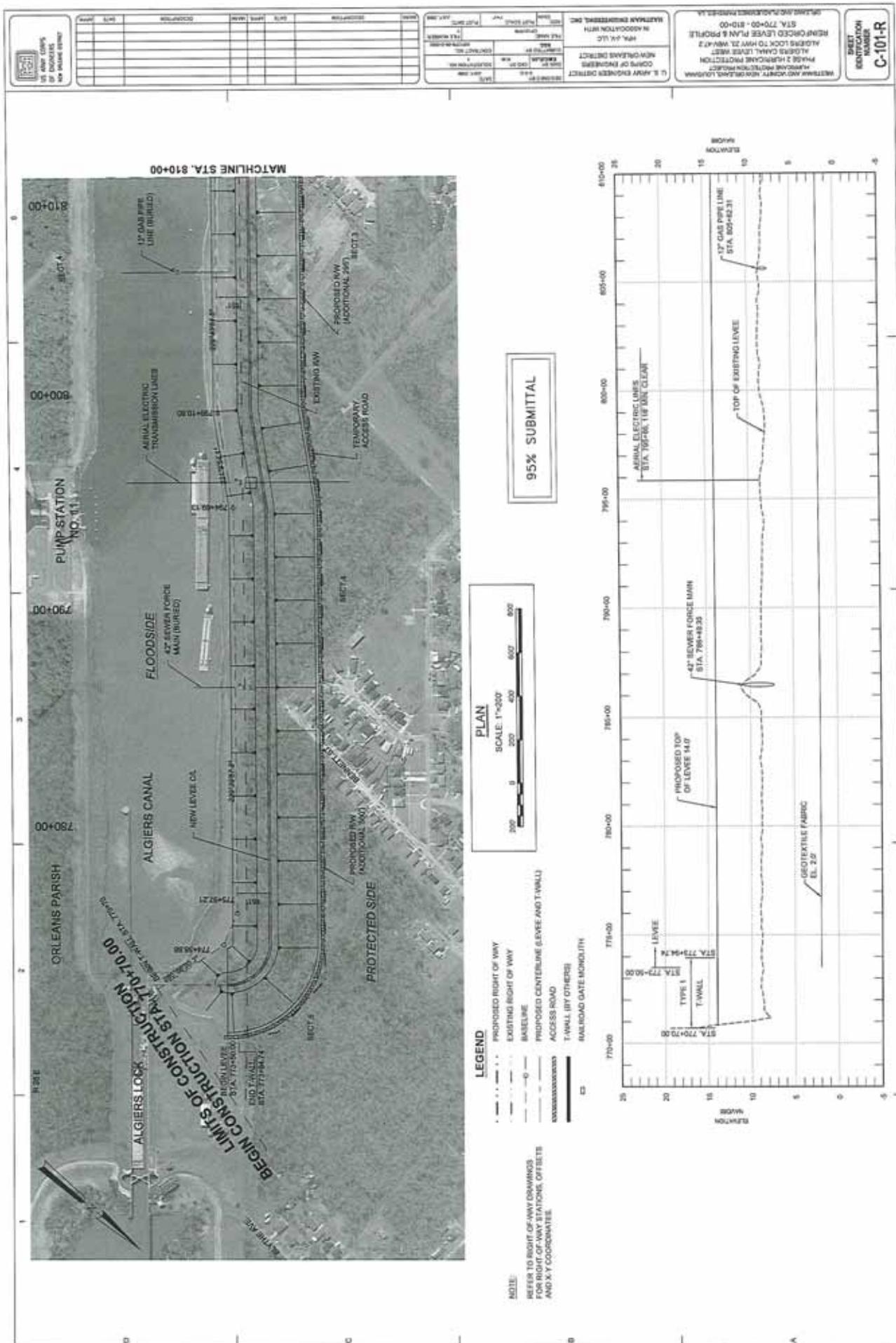


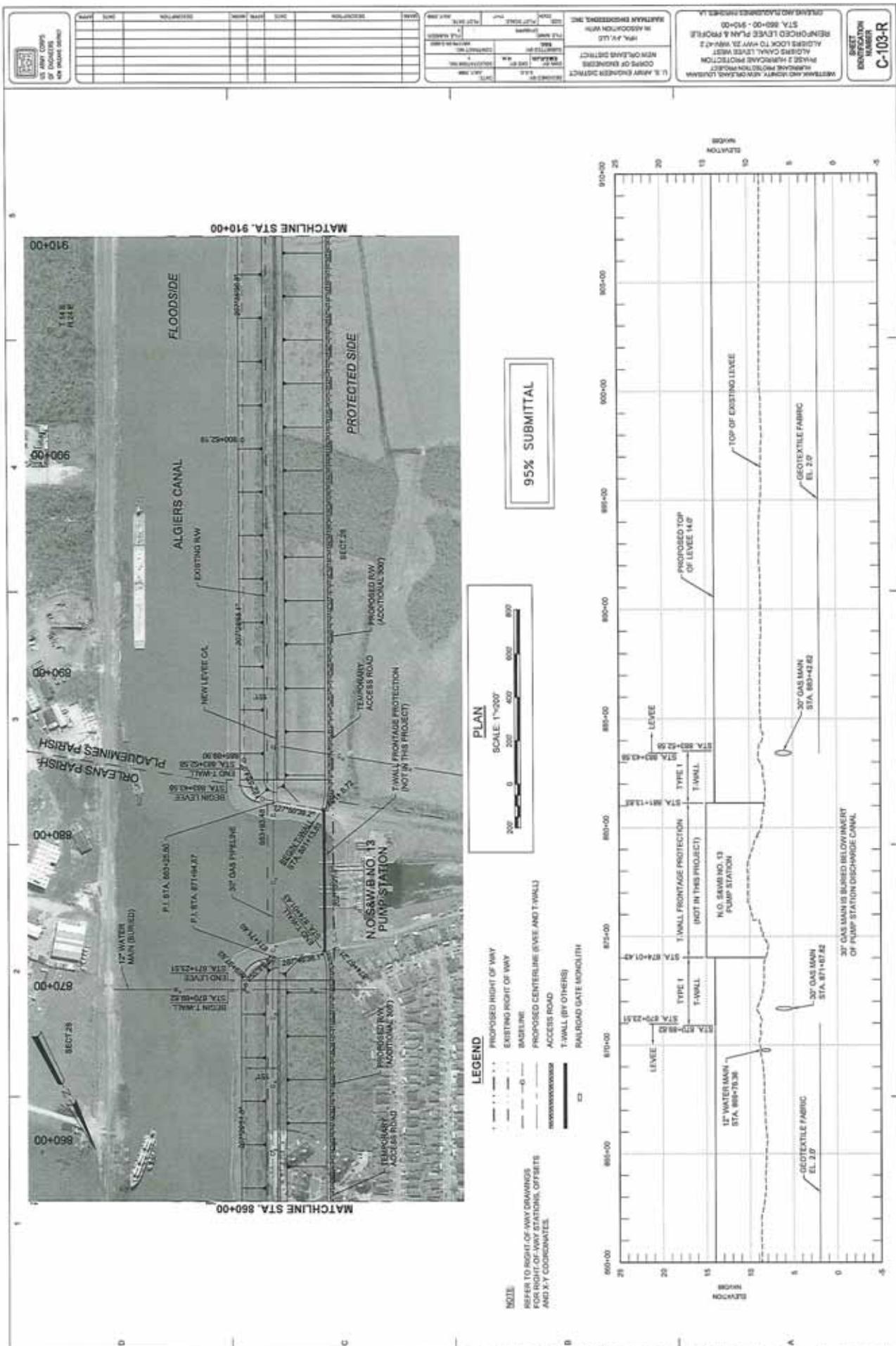


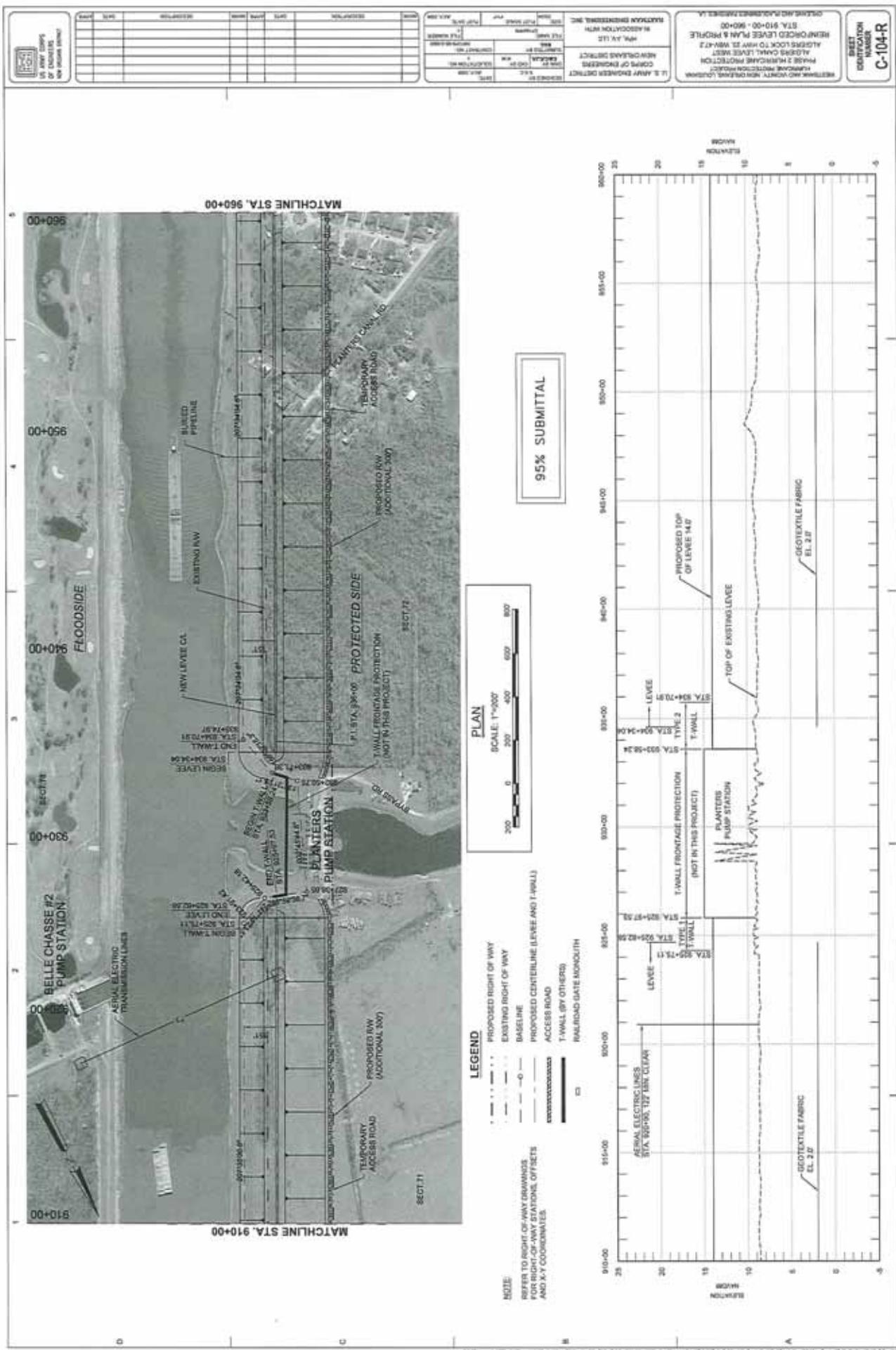


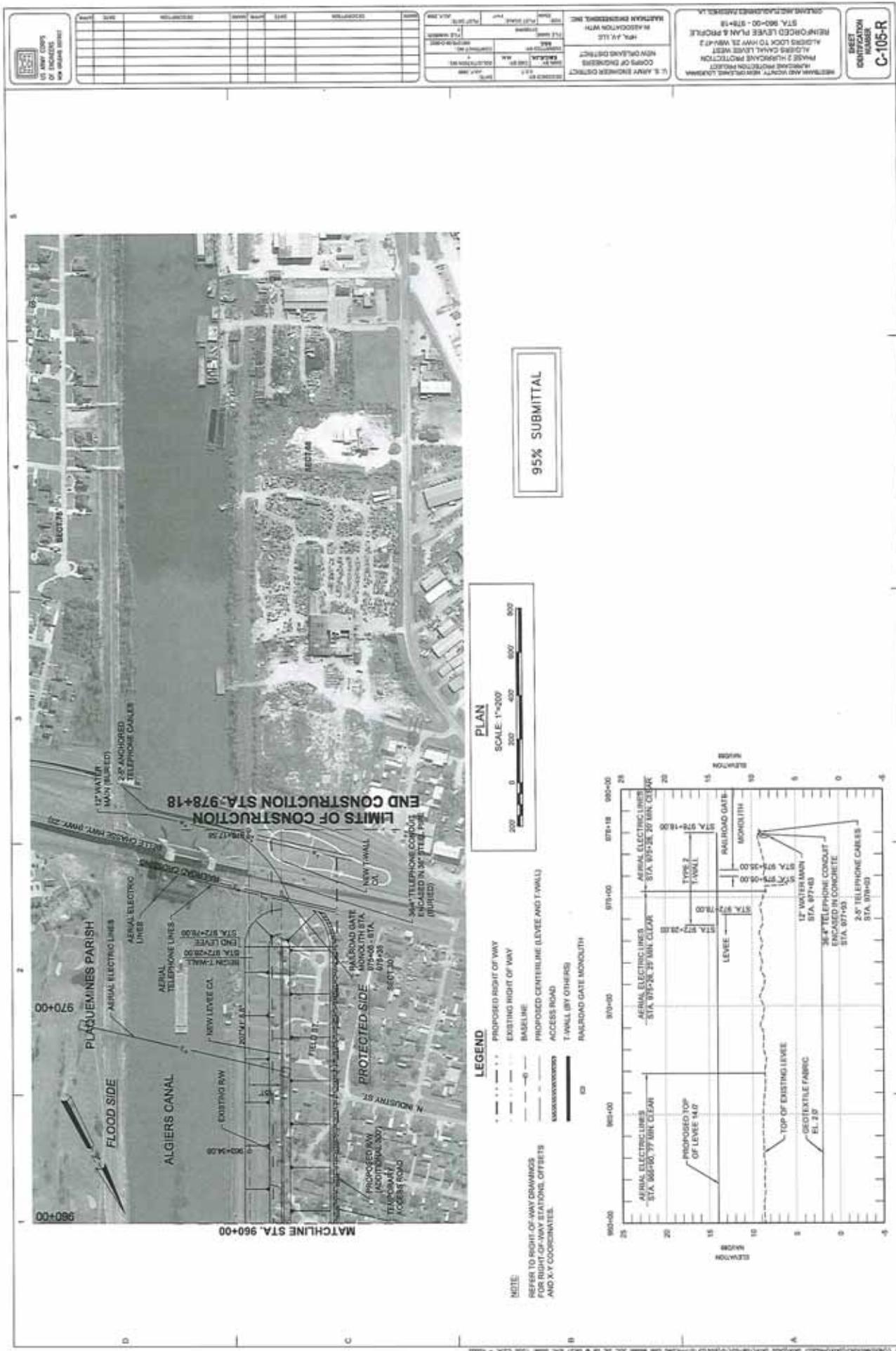


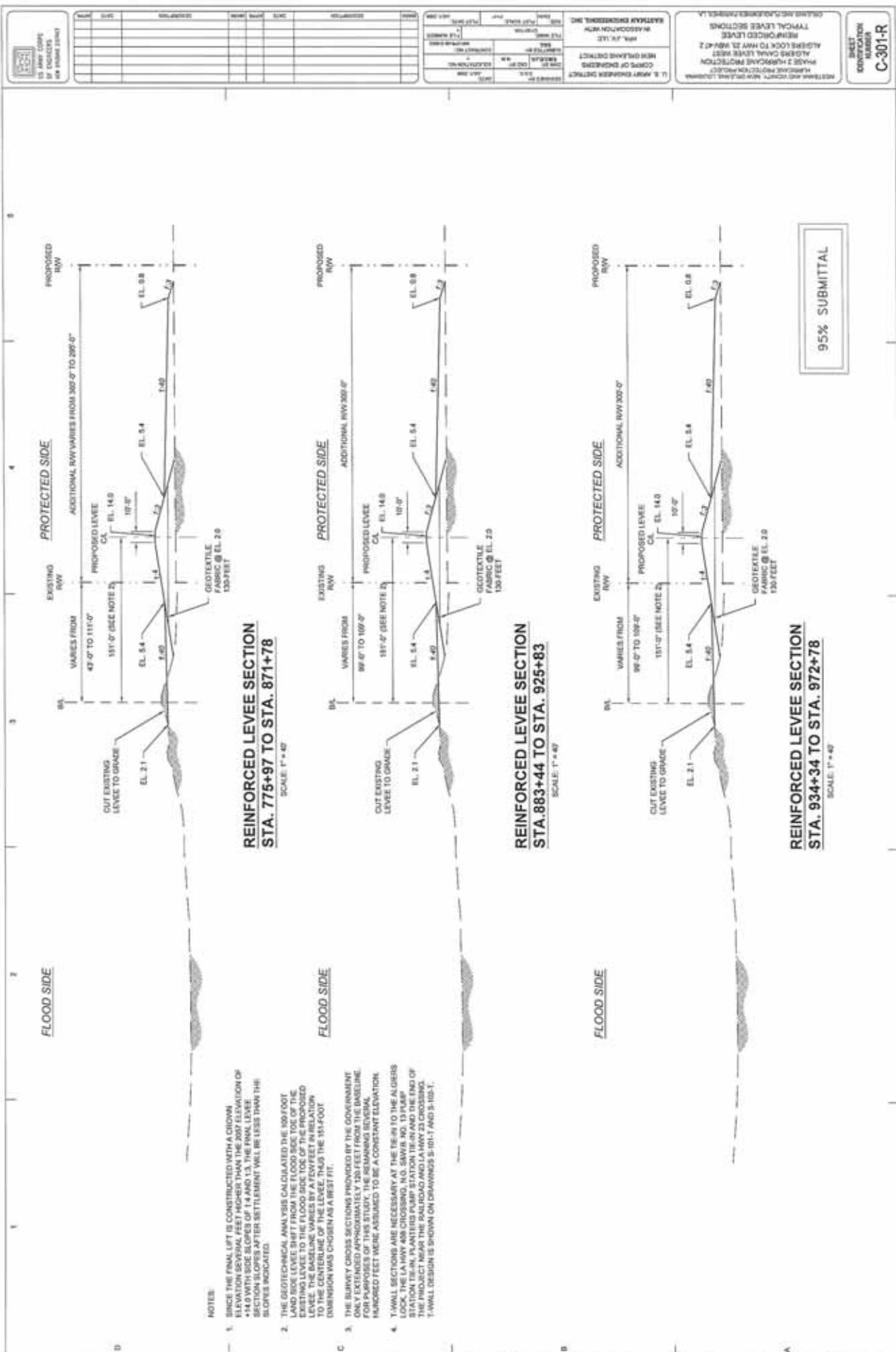












NOTE:

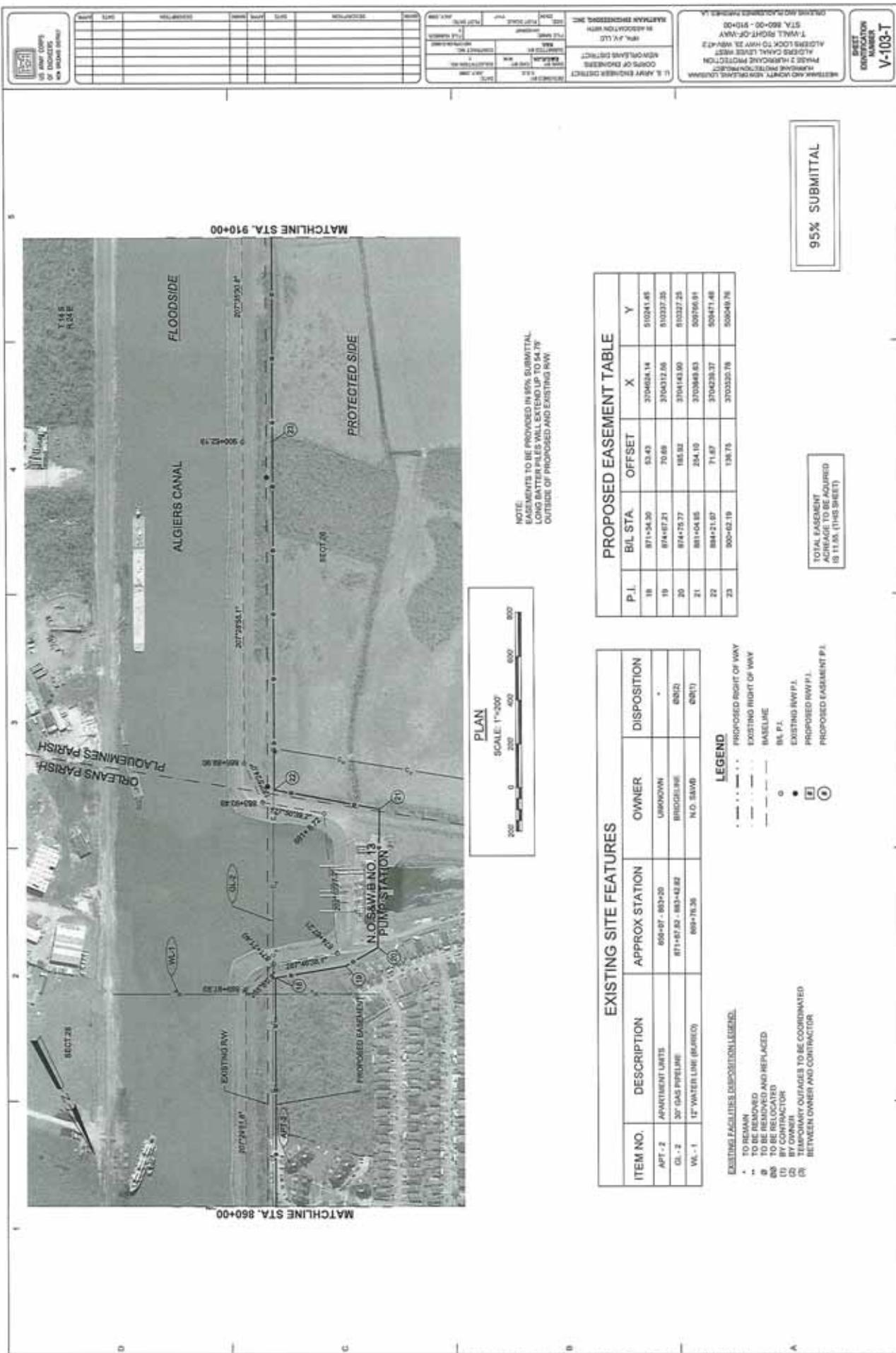
5. SINCE THE FINAL UPLIFT IS CONSTRUCTED WITH A CROWN ELEVATION SEVERAL FEET HIGHER THAN THE 2007 ELEVATION OF +4.0 WITH SIDE SLOPES OF 1/4 AND 1A, THE FINAL LEVEE SECTION SLOPES AFTER SETTLEMENT WILL BE LESS THAN THE SLOPES INDICATED.

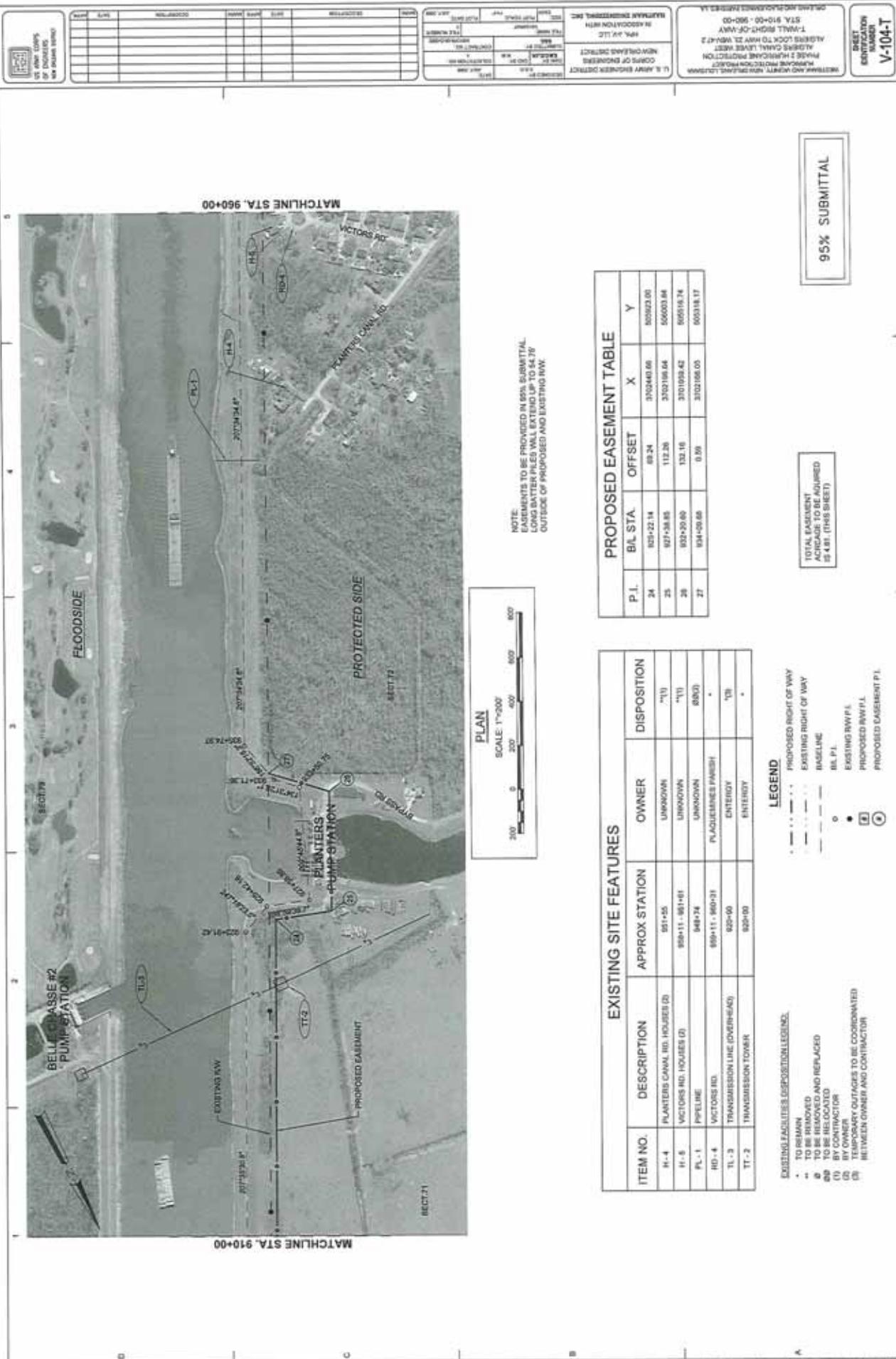
2. THE GEOTECHNICAL ANALYSIS CALCULATED THE 100-FOOT LAND-SIDE ELEVATION SHIFT FROM THE FLOOD SIGHT TOE OF THE EXISTING LEVEE TO THE FLOOD SITE OF THE PROPOSED LEVEE. THE BASELINE VARIES BY A FEW FEET IN RELATION TO THE CENTERLINE OF THE LEVEE. THIS 100-FOOT ELEVATION WAS CHOSEN AS A BEST FIT.

3. THE BURROW CLOUD SECTION PROVIDED BY THE GOVERNMENT ONLY EXTENDED APPROXIMATELY 120 FEET FROM THE BASELINE FOR PURPOSES OF THIS STUDY, THE REMAINDER BEING A HUNDRED FEET AS ASSUMED TO BE A CONSTANT ELEVATION.
4. T-WALL SECTION ARE NECESSARY AT THE END TO THE ALGERS LOCK LA HAY 440 CROSSES PUMP STATION NO. 54910, 13 PUMP STATION TEAM, PLANTER PUMP STATION TEAM AND END OF THE PROJECT NEAR THE BAIL ROAD AND LA HAY 23 CROSSING. TEAM LARASIER IS POSITIONED ON CRABSONS RD. 1A AND 2A, S.W. 1

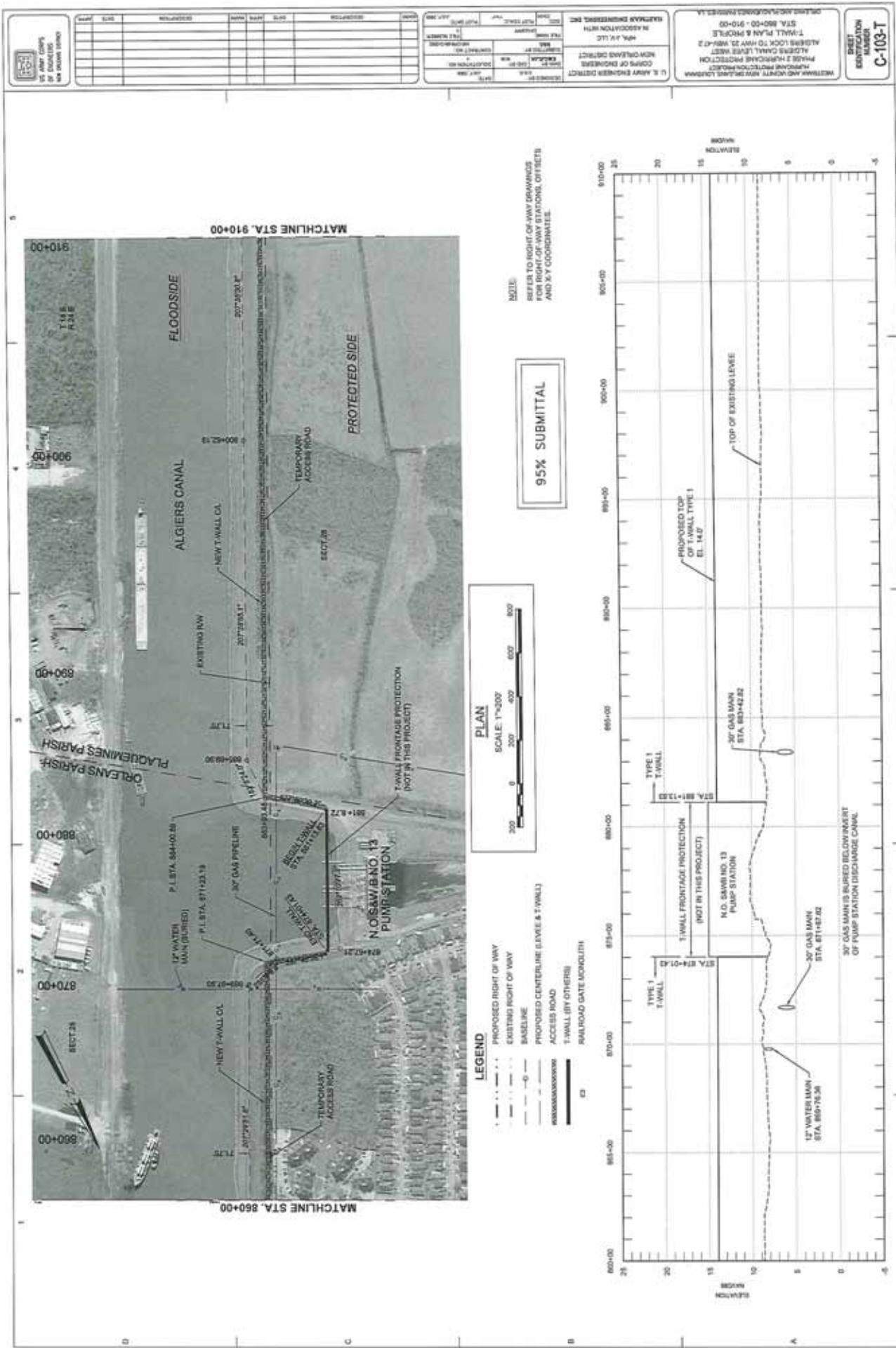
Journal of Health Politics, Policy and Law

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<p style="text-align: center;">1</p> <p style="text-align: center;">2</p> <p style="text-align: center;">3</p> <p style="text-align: center;">4</p> <p style="text-align: center;">5</p> <p style="text-align: center;">6</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; vertical-align: top; padding: 5px;"> <p style="text-align: center;">D</p> </td> <td style="width: 90%; vertical-align: top; padding: 5px;"> <p style="text-align: center;">95% SUBMITTAL</p> </td> </tr> </table>	<p style="text-align: center;">D</p>	<p style="text-align: center;">95% SUBMITTAL</p>	<p style="text-align: center;">A</p>																																																												
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		<p>PLAN</p> <p>SCALE 1"=200'</p>	<p>NOTE: EASEMENTS TO BE PROVIDED IN 95% SUBMITTAL. LONG MATERI'EL ENCL. WILL EXTEND UP TO 54' 7" OUTSIDE OF PROPOSED AND EXISTING RW.</p>	<p>R/W ACREAGE TABLE</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>SHEET</th> <th>ACREAGE</th> </tr> </thead> <tbody> <tr> <td>V-105-T</td> <td>2.06</td> </tr> <tr> <td>TOTAL</td> <td>2.06</td> </tr> </tbody> </table>	SHEET	ACREAGE	V-105-T	2.06	TOTAL	2.06																																																						
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C-301-T

**T-WALL SECTION - TYPE 1
STA. 770+70 TO STA. 874+01 AND
STA. 881+14 TO STA. 925+82**

*PROPOSED ADDITIONAL NEW ONE Y REQUIRED FROM STA. 774+90.20 - STA. 779+60.77

SCALE: 1" = 40'

FLOOD SIDE

This diagram shows a cross-section of a river bank. The 'FLOOD SIDE' is on the left, and the 'PROTECTED SIDE' is on the right. A vertical line represents the 'EXISTING R/W' at EL. 4.0'. Above it, a horizontal line represents the 'PROPOSED R/W' at EL. 4.0'. The elevation 'EL. 2.1' is marked on the flood side. A shaded area indicates 'CUT EXISTING LEVEE TO GRADE'. Elevation 'EL. 8.5'' is shown above 'EL. 2.1'. The elevation 'EL. 14.0'' is marked on the protected side. A vertical dimension line between the two elevations is labeled 'VARIES FROM 4.0' TO 11''. A horizontal dimension line between the two elevations is labeled '40'-0''. A small note '1'-0'' is shown near the bottom. A label 'SHEET FILE' is located at the bottom right.

**T-WALL SECTION - TYPE 2
STA. 933+58 TO STA. 978+18**

SCALE: 1" = 40'

FLOOD SIDE

This diagram shows a cross-section of a river bank. The 'FLOOD SIDE' is on the left, and the 'PROTECTED SIDE' is on the right. A vertical line represents the 'EXISTING R/W' at EL. 4.0'. Above it, a horizontal line represents the 'PROPOSED R/W' at EL. 4.0'. The elevation 'EL. 3.00' is marked on the flood side. A shaded area indicates 'EXISTING LEVEE'. Elevation 'EL. 6.5'' is shown above 'EL. 3.00'. The elevation 'EL. 14.0'' is marked on the protected side. A vertical dimension line between the two elevations is labeled 'VARIES FROM 3.00' TO 14''. A horizontal dimension line between the two elevations is labeled '40'-0''. A small note '1'-0'' is shown near the bottom. A label 'SHEET FILE' is located at the bottom right.

95% SUBMITTAL

**BEST
IDENTIFICATION
NUMBER
C-301-T**

95% SUBMITTAL

T-WALL SECTION - TYPE 2
STA. 933+58 TO STA. 978+18

PROTECTED SIDE

FLOOD SIDE

EXISTING RW

VALVES FROM NW TO NW

T-HALL
CA.
48°/48°

EL. 6.5
EL. 14.0
EL. 9.0'

ENDERWALL

STREET PILE

EL. 10.0'

Detailed description: This cross-sectional diagram illustrates a bridge pier foundation. On the left, a vertical line labeled 'EXISTING RW' has a bracket above it labeled 'VALVES FROM NW TO NW'. To the right of this line is a vertical column of elevations: 'T-HALL CA. 48°/48°' at EL. 6.5, 'EL. 14.0' at EL. 9.0', and 'EL. 10.0'' at the bottom. A horizontal line extends from the top of the 'T-HALL CA.' section to the right, where it meets a vertical line labeled 'ENDERWALL'. From the 'ENDERWALL' line, a diagonal line extends down to a point labeled 'STREET PILE'. The area between the 'ENDERWALL' and 'STREET PILE' lines is shaded grey.

T-WALL SECTION - TYPE 1
STA. 770+70 TO STA. 874+01 AND
STA. 881+14 TO STA. 925+82

PLAN VIEW - TYPE 1

SECTION A-A

NOTES:
TYPE T-WALL TO BE LOCATED IN REACH 1 AND 2
(STA. 770+70.00 - STA. 925+82.00)

LEGEND:
~~~~~ - PIPE SHEET PILE  
○ - 24"Ø PIPE PILE (ARROW INDICATES DIRECTION OF SLOPE)

**SCALE: 1/8" = 1'-0"**

**SECTION**

**SECTION A-A**

**SCALE: 1/8" = 1'-0"**

**95% SUBMITTAL**

5

4

3

2

1

0

-1

-2

-3

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**FLOOD SIDE**

**PROTECTED SIDE**

**LEGEND**

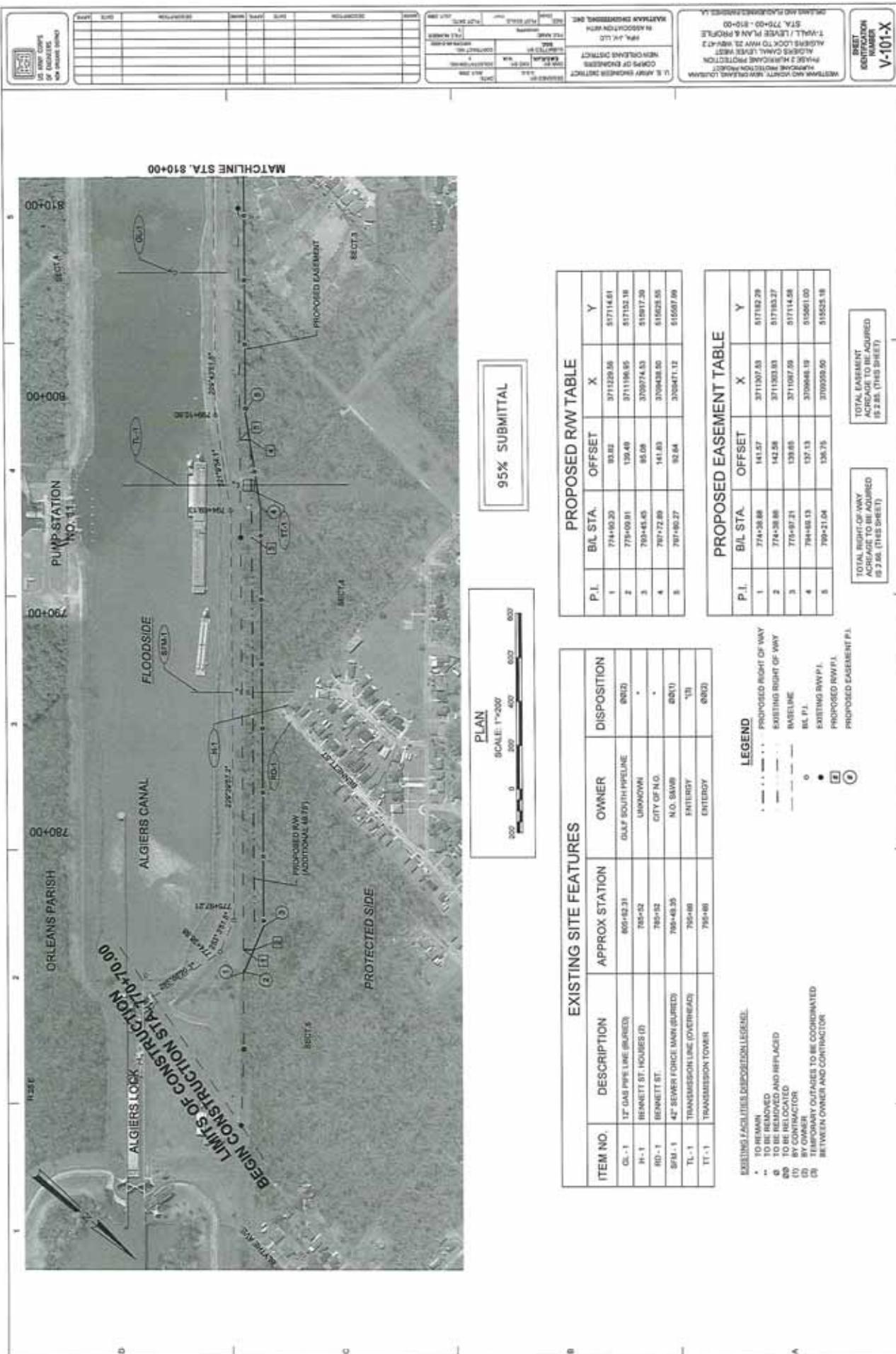
**PLAN VIEW**  
SCALE: 1IN = 1'-0"

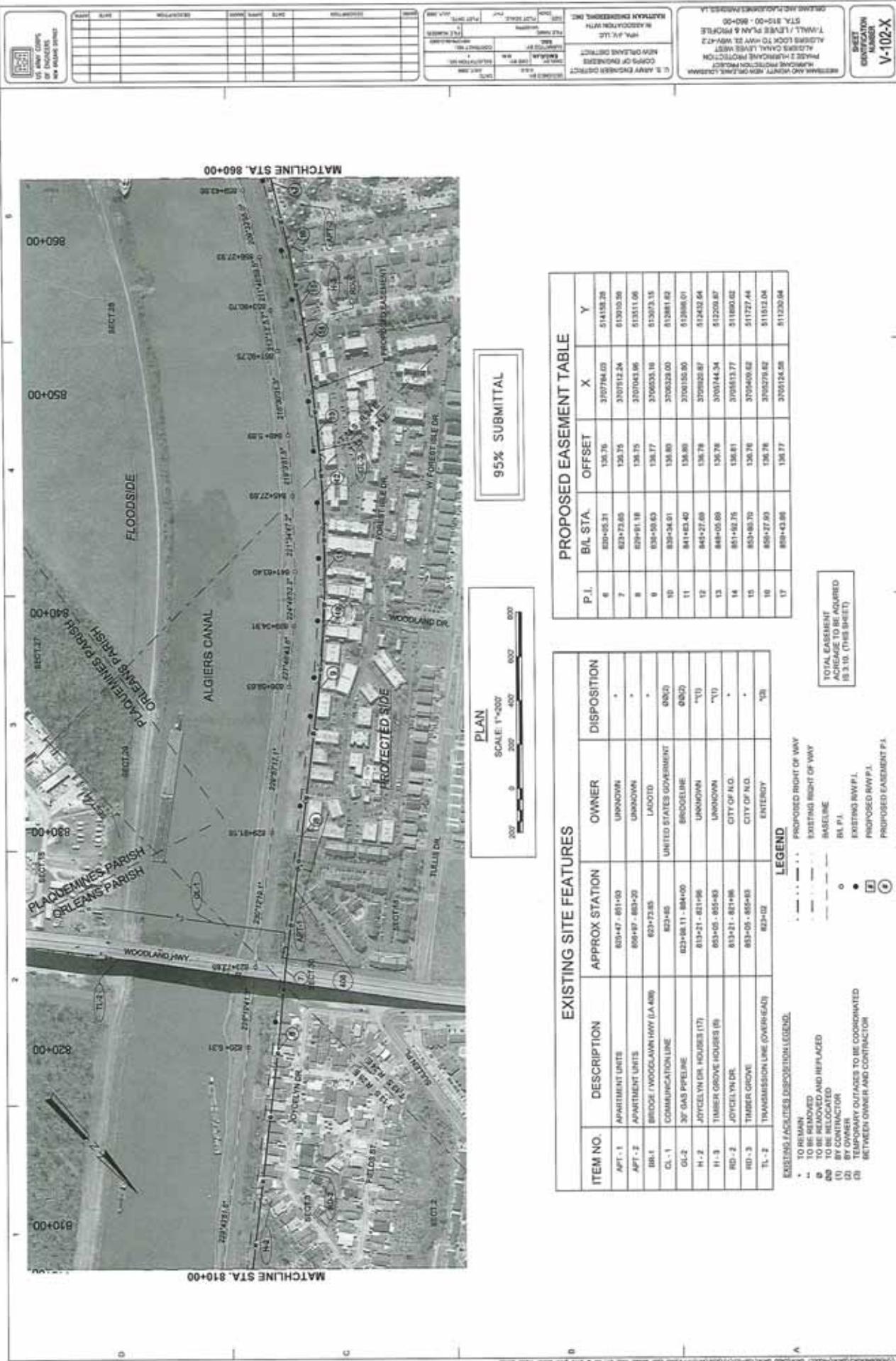
**SECTION**  
SCALE: 1IN = 1'-0"

S-104-T

95% SUBMITAL

**SECTION** SCALE 1:5000

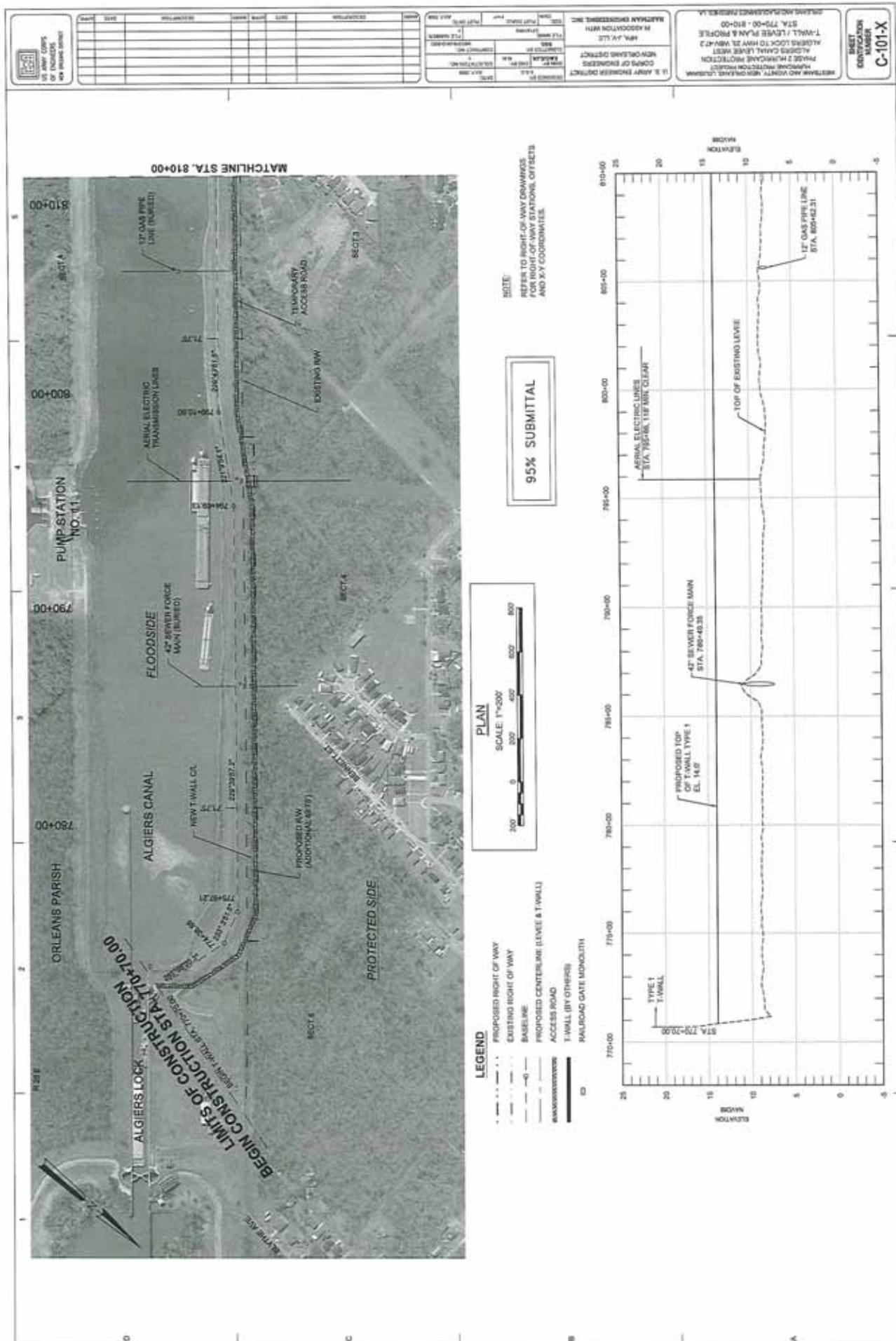






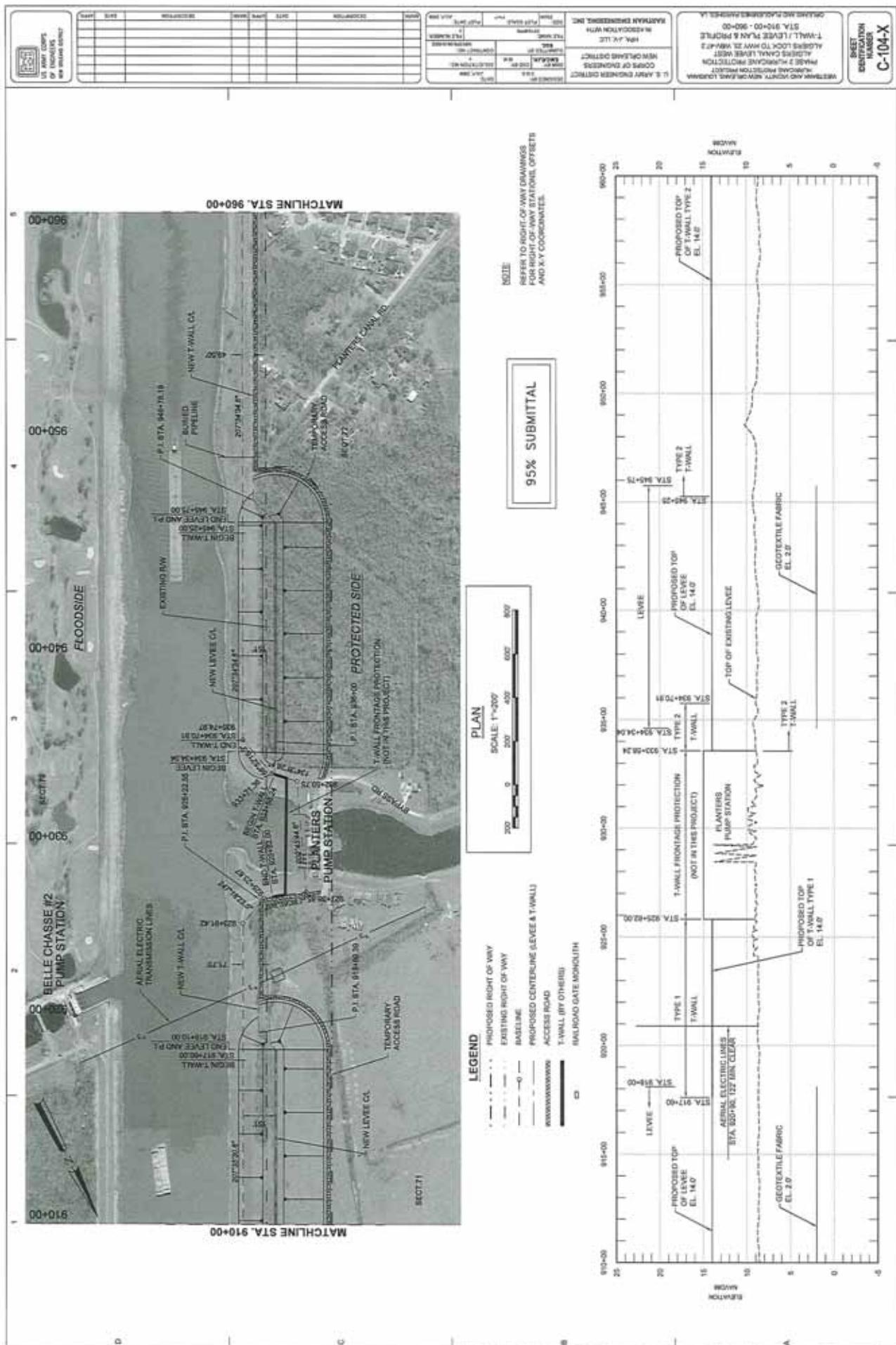














**ALGIERS CANAL LEVEE WEST, ALGIERS LOCK TO HWY. 23, WBV-47.2  
B/L STA. 770+70 TO STA. 978+18  
ORLEANS AND PLAQUEMINES PARISHES, LOUISIANA  
CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5**

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**APPENDIX 'C'**

**DESIGN CALCULATIONS/INFORMATION**

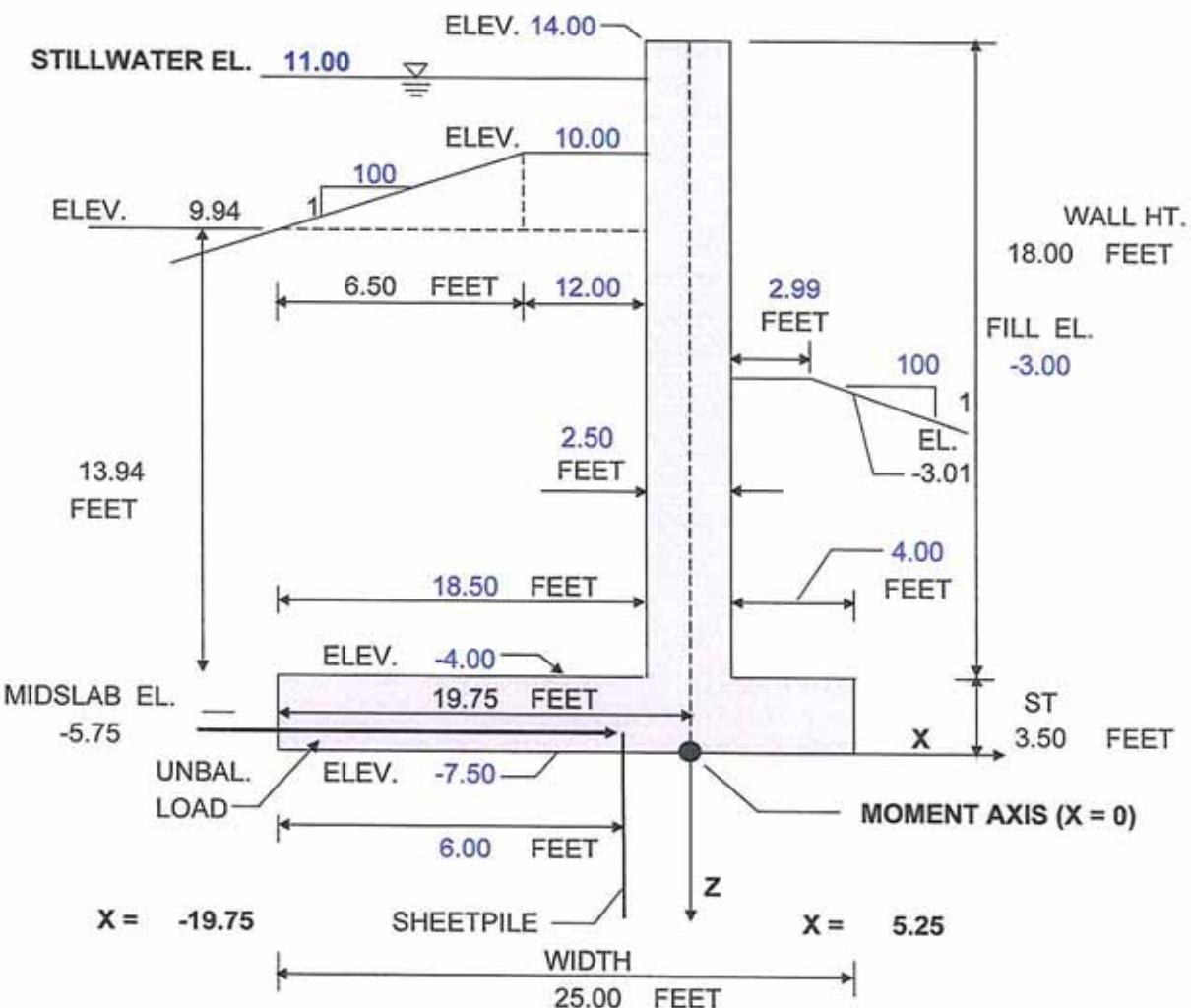
**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 1 T - WALL ALTERNATIVE FINAL**  
**BASIC T-WALL GEOMETRY**

DATE: 7/26/2008

BY: RWY CHKD:

|                       |                  |
|-----------------------|------------------|
| CONCRETE STRENGTH     | 4,000            |
| REINFORCING STRENGTH  | 60,000           |
| WALL INTERVAL         | 0.66             |
| SLAB INTERVAL         | 1                |
| MONOLITH LENGTH       | 60               |
| BACKFILL WEIGHT<br>Ko | 120.0 PCF<br>0.8 |

|                                  |         |             |
|----------------------------------|---------|-------------|
| <b>UNBALANCED SOILS LOADING:</b> |         |             |
| 6.0                              | K / FT. | STILLWATER  |
| 10.9                             | K / FT. | TOP OF WALL |
| IMPACT                           |         |             |
| 100                              | K       |             |



#### DESIGN CRITERIA

**CONCRETE:** EM1110-2-2104 "STRENGTH DESIGN FOR REINFORCED HYDRAULIC STRUCTURES"  
**HYDRAULIC FACTOR (Hf) = 1.3**  
**DL & LL LOAD FACTORS = 1.7**  
**MAX. REINFORCING = 0.375 RHO<sub>bal</sub>**

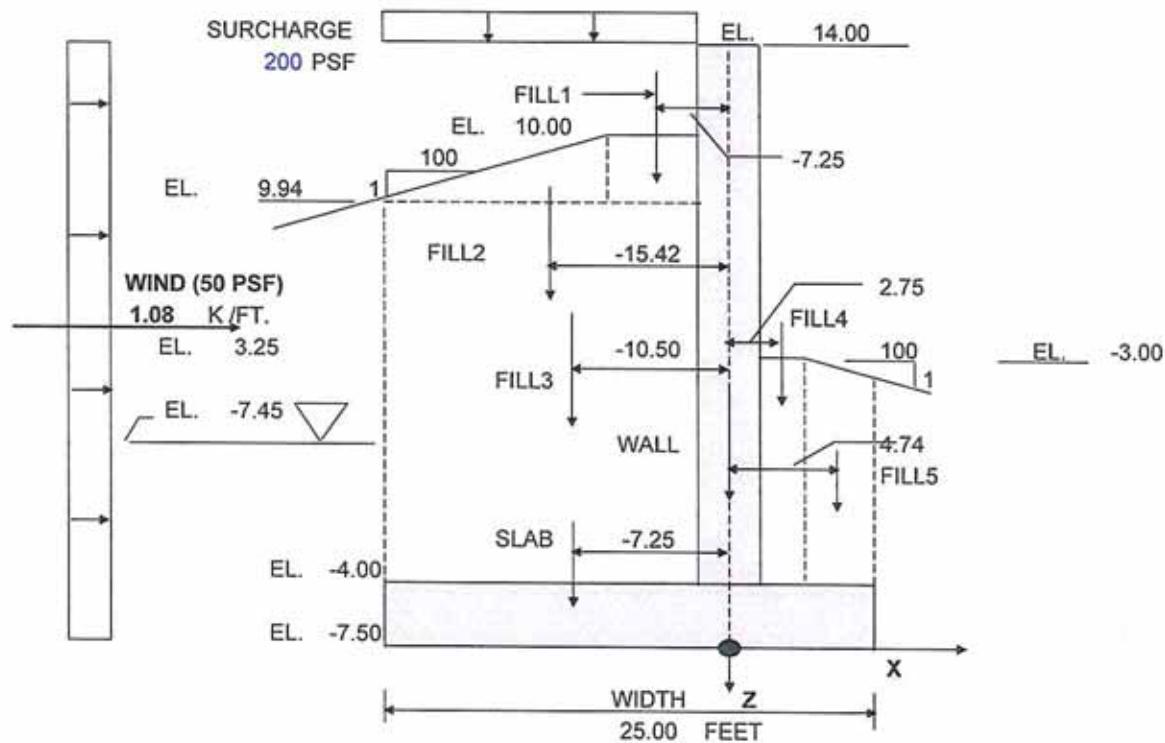
**REINFORCING PER EQS. D-3 & D-4, AXIAL LOADS IGNORED**

**ALLOWABLE SHEAR PER ACI 318, EQ. 11-3**

**CLEAR COVER:** **4** INCHES IN WALL AND TOP OF SLAB (ARCHITECTURAL WALLS - 5")  
**9** INCHES IN BOTTOM OF SLAB TO ALLOW FOR PILES

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 1 T - WALL ALTERNATIVE FINAL**  
**CASE 1 - CONSTRUCTION**

FLOODSIDE WATER ELEV. -7.45  
 UPLIFT - PROT. SIDE -7.45  
 ALLOWABLE OVERSTRESS 16.66 %

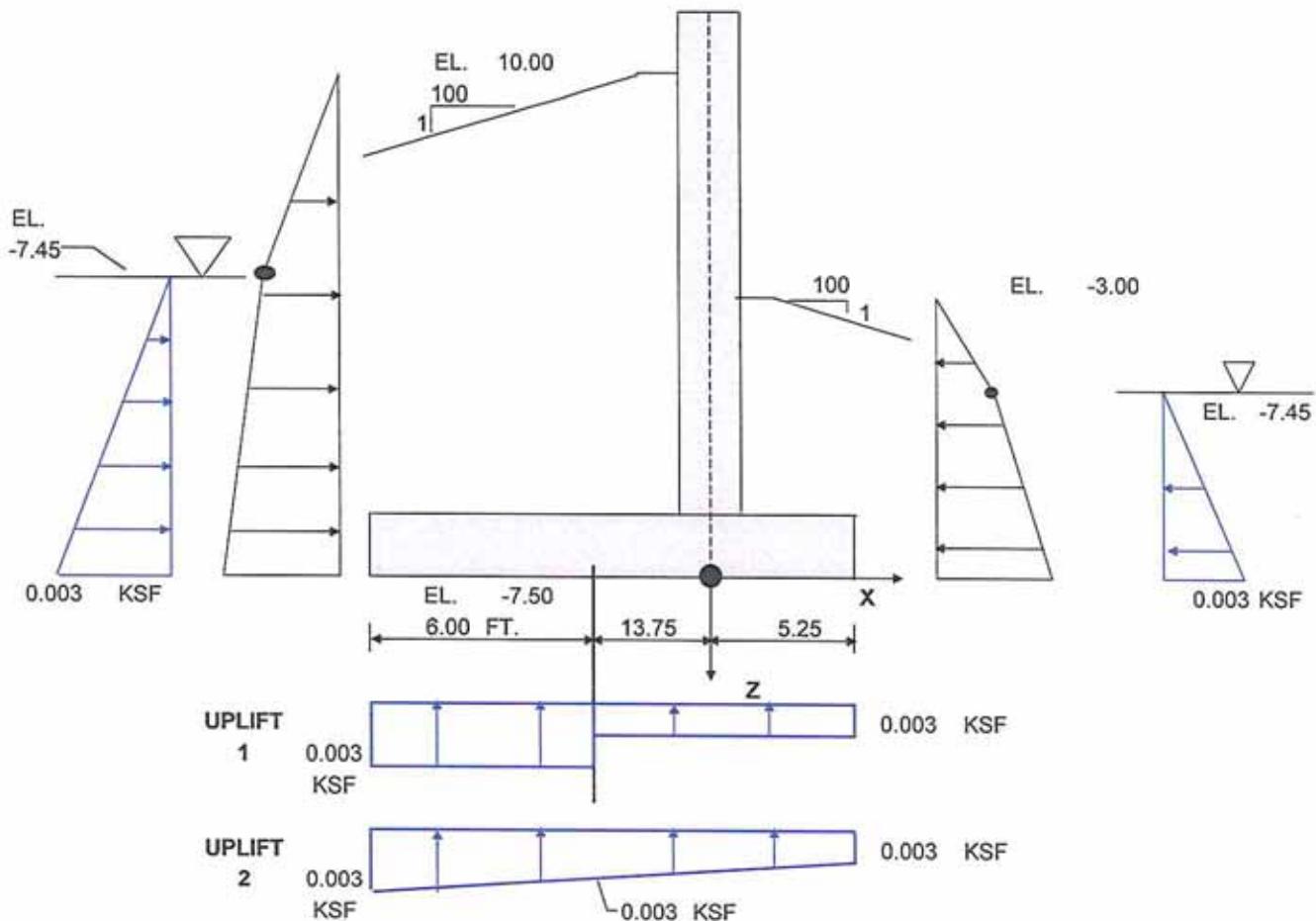


**FLOODWALL APPLIED GRAVITY LOADING - CASE 1**

| ITEM                 | FORCE Z<br>(WEIGHT) | X CENT.<br>FEET | Y CENT.<br>FEET | Myy<br>FT.-K | Mzz<br>FT.-K |
|----------------------|---------------------|-----------------|-----------------|--------------|--------------|
| CONCRETE SLAB        | 13.13               | -7.25           | 0.00            | 95.2         | 0            |
| CONCRETE WALL        | 6.75                | 0.00            | 0.00            | 0.0          | 0            |
| FLOODSIDE FILL1      | 0.09                | -7.25           | 0.00            | 0.7          | 0            |
| FLOODSIDE FILL2      | 0.03                | -15.42          | 0.00            | 0.4          | 0            |
| FLOODSIDE FILL3      | 30.94               | -10.50          | 0.00            | 324.8        | 0            |
| PROTECTED SIDE FILL4 | 0.36                | 2.75            | 0.00            | -1.0         | 0            |
| PROTECTED SIDE FILL5 | 0.12                | 4.74            | 0.00            | -0.6         | 0            |
| FLOODSIDE WATER      | 0.00                | -42.93          | 0.00            | 0.0          | 0            |
| FLOODSIDE WATER      | 0.00                | 0.00            | 0.00            | 0.0          | 0            |

|                     |       |        |        |       |
|---------------------|-------|--------|--------|-------|
| TOTALS              | 51.41 | -8.16  | 419.49 | 0     |
| CONCRETE            | 19.88 | -4.79  | 95.16  | 0     |
| FLOODSIDE FILL 1-3  | 31.05 | -10.49 | 325.89 | 0     |
| PROT. SIDE FILL 4-5 | 0.48  | 3.25   | -1.56  | 0     |
| FLOODSIDE WATER     | 0.00  | -      | 0.00   | 0     |
|                     | KIPS  |        | FT.-K  | FT.-K |

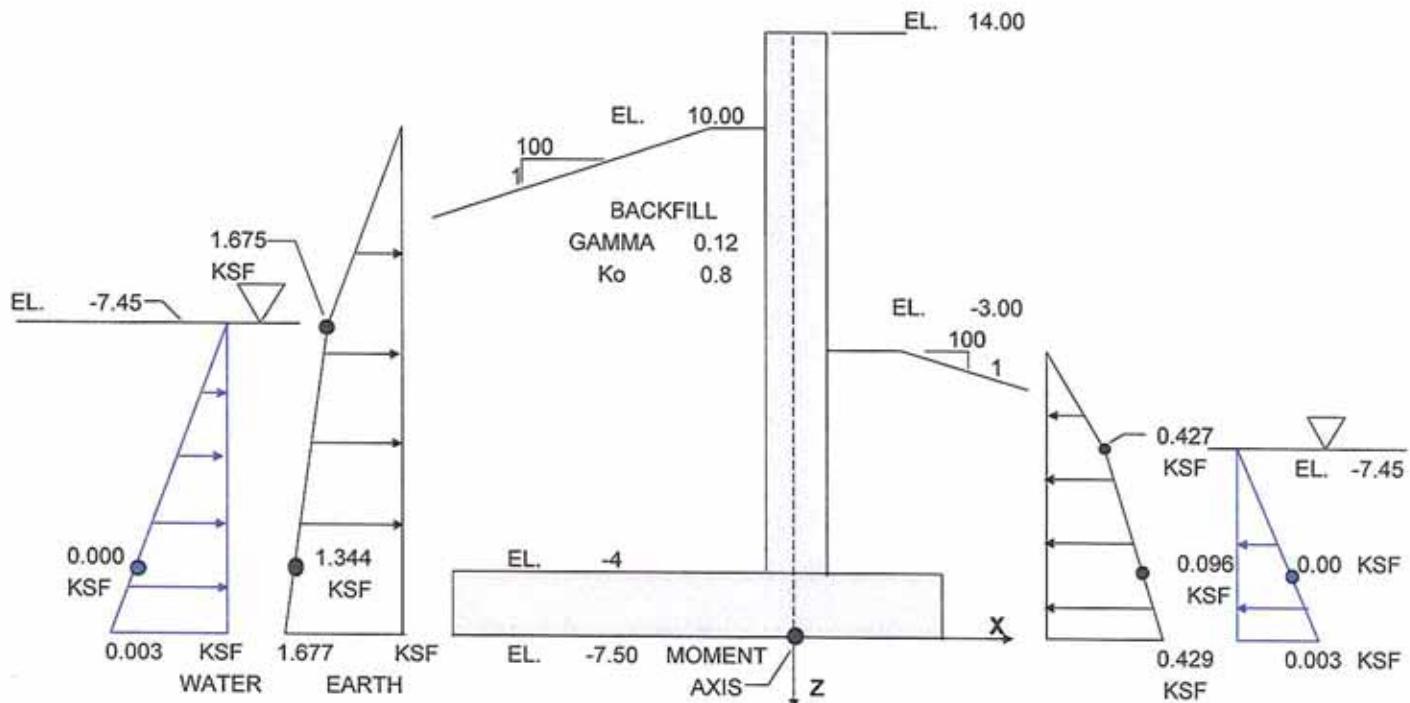
**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 1 T - WALL ALTERNATIVE FINAL**  
**CASE 1 - CONSTRUCTION**



| ITEM            | WIDTH | PRESS | FORCE Z | X CENT.<br>FEET | Y CENT.<br>FEET | Myy<br>FT.-K | Mzz<br>FT.-K |
|-----------------|-------|-------|---------|-----------------|-----------------|--------------|--------------|
| FLOODSIDE:      |       |       |         |                 |                 |              |              |
| UPLIFT 1        | 6.00  | 0.00  | -0.02   | -16.75          | 0.00            | 0            | 0            |
| PROTECTED SIDE: |       |       |         |                 |                 |              |              |
| UPLIFT 1        | 19.00 | 0.00  | -0.06   | -4.25           | 0.00            | 0            | 0            |
| TOTALS          |       |       | -0.08   | -7.25           | -0.58           | 0            |              |
| FLD.SIDE        |       |       | -0.02   | -16.75          | -0.32           | 0            |              |
| PROT. SIDE      |       |       | -0.06   | -4.25           | -0.26           | 0            |              |
|                 |       |       | KIPS    |                 | FT.-K           | FT.-K        |              |

| ITEM            | WIDTH | PRESS | FORCE Z | X CENT.<br>FEET | Y CENT.<br>FEET | Myy<br>FT.-K | Mzz<br>FT.-K |
|-----------------|-------|-------|---------|-----------------|-----------------|--------------|--------------|
| FLOODSIDE:      |       |       |         |                 |                 |              |              |
| UPLIFT 2 (UNIF) | 6.00  | 0.003 | -0.02   | -16.75          | 0.00            | -0.32        | 0.00         |
| UPLIFT 2 (TRI)  | 6.00  | 0.000 | 0.00    | -17.75          | 0.00            | 0.00         | 0.00         |
| PROTECTED SIDE: |       |       |         |                 |                 |              |              |
| UPLIFT 2 (UNIF) | 19.00 | 0.003 | -0.06   | -4.25           | 0.00            | -0.26        | 0.00         |
| UPLIFT 2 (TRI)  | 19.00 | 0.000 | 0.00    | -7.42           | 0.00            | 0.00         | 0.00         |
| TOTALS          |       |       | -0.08   | -7.25           | -0.58           | 0.00         |              |
| FLOOD SIDE      |       |       | -0.02   | -16.75          | -0.32           | 0.00         |              |
| PROT. SIDE      |       |       | -0.06   | -4.25           | -0.26           | 0.00         |              |
|                 |       |       | KIPS    |                 | FT.-K           | FT.-K        |              |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 1 T - WALL ALTERNATIVE FINAL**  
**CASE 1 - CONSTRUCTION**

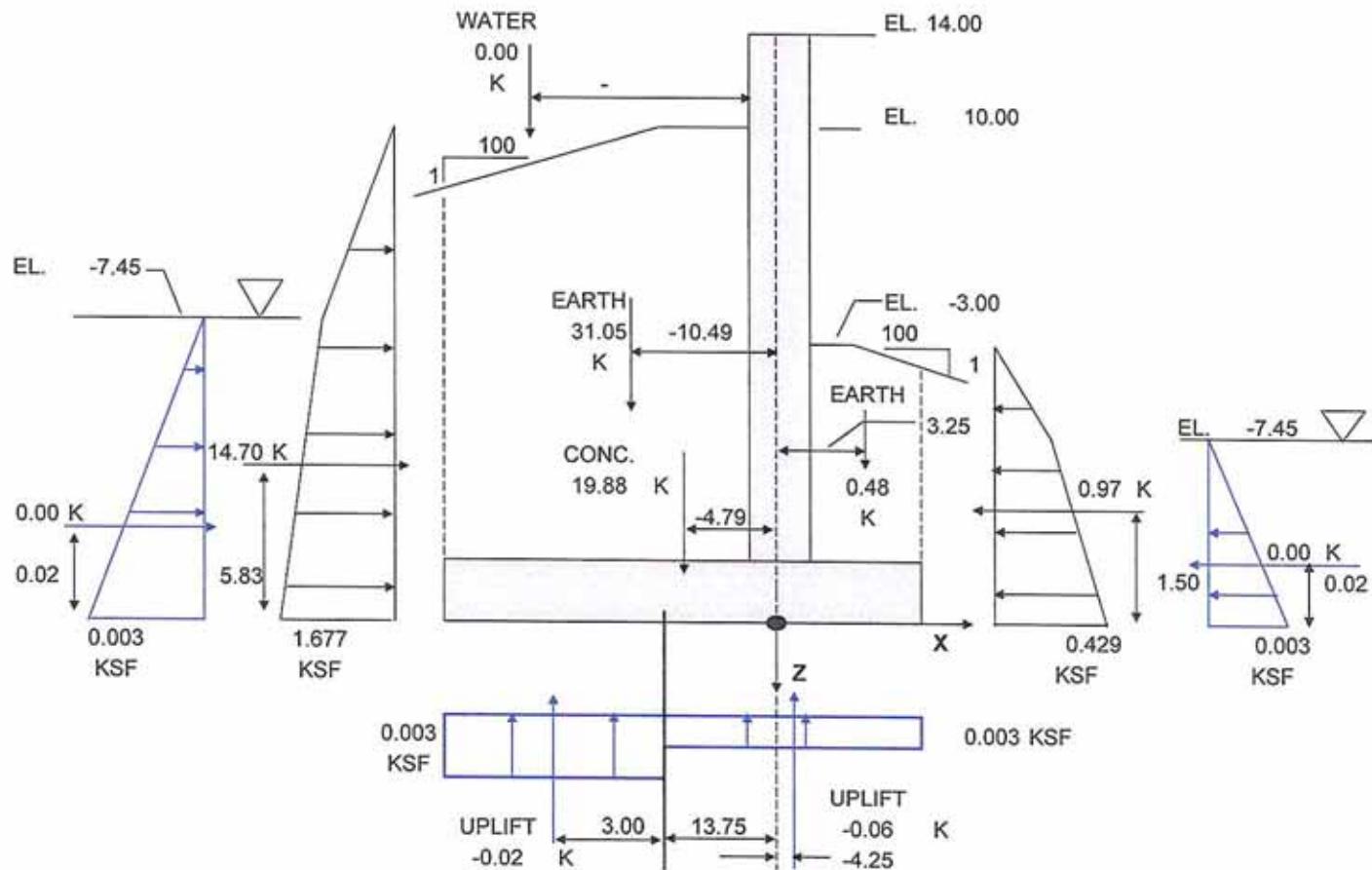


FLOODWALL HORIZONTAL LOADING - CASE 1

| ITEM       | HEIGHT | PRESS | FORCE X |      | Y CENT. FEET | Z CENT. FEET | Mzz FT-K/FT | Myy FT-K/FT |
|------------|--------|-------|---------|------|--------------|--------------|-------------|-------------|
| FLOODSIDE: |        |       |         |      |              |              |             |             |
| EARTH 1    | 17.45  | 1.675 | 14.62   | k/ft | 0.00         | -5.87        | 0           | -85.7       |
| EARTH 2    | 0.05   | 1.675 | 0.08    | k/ft | 0.00         | -0.02        | 0           | 0.0         |
| EARTH 3    | 0.05   | 0.002 | 0.00    | k/ft | 0.00         | -0.02        | 0           | 0.0         |
| GRND WATER | 0.05   | 0.003 | 0.00    | k/ft | 0.00         | -0.02        | 0           | 0.0         |
| PROTECTED: |        |       |         |      |              |              |             |             |
| EARTH 4    | 4.45   | 0.427 | -0.95   | k/ft | 0.00         | -1.53        | 0           | 1.5         |
| EARTH 5    | 0.05   | 0.427 | -0.02   | k/ft | 0.00         | -0.02        | 0           | 0.0         |
| EARTH 6    | 0.05   | 0.429 | 0.0     | k/ft | 0.00         | -0.02        | 0           | 0.0         |
| GRND WATER | 0.05   | 0.003 | 0.0     | k/ft | 0.00         | -0.02        | 0           | 0.0         |

|                        | FORCE X    | Y CENT. FEET | Z CENT. FEET | Mzz FT-K/FT. | Myy FT-K/FT. |
|------------------------|------------|--------------|--------------|--------------|--------------|
| FLOODSIDE EARTH FORCE  | 14.70      | 0.00         | -5.83        | -85.75       |              |
| FLOODSIDE WATER FORCE  | 0.00       | 0.00         | -0.02        | 0.00         |              |
| TOTAL FLOODSIDE FORCE  | 14.70 k/ft | 0.00         | -5.83        | 0.0          | -85.8        |
| PROT. SIDE EARTH FORCE | -0.97      | 0.00         | -1.50        | 1.5          |              |
| PROT. SIDE WATER FORCE | 0.00       | 0.00         | -0.02        | 0.0          |              |
| TOTAL PROT. SIDE FORCE | -0.97 k/ft | 0.00         | -1.50        | 0.0          | 1.5          |
| TOTAL NET HORIZ. FORCE | 13.73 k/ft | 0.00         | -6.14        | 0.0          | -84.3        |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 1 T - WALL ALTERNATIVE FINAL**  
**CASE 1 - CONSTRUCTION**



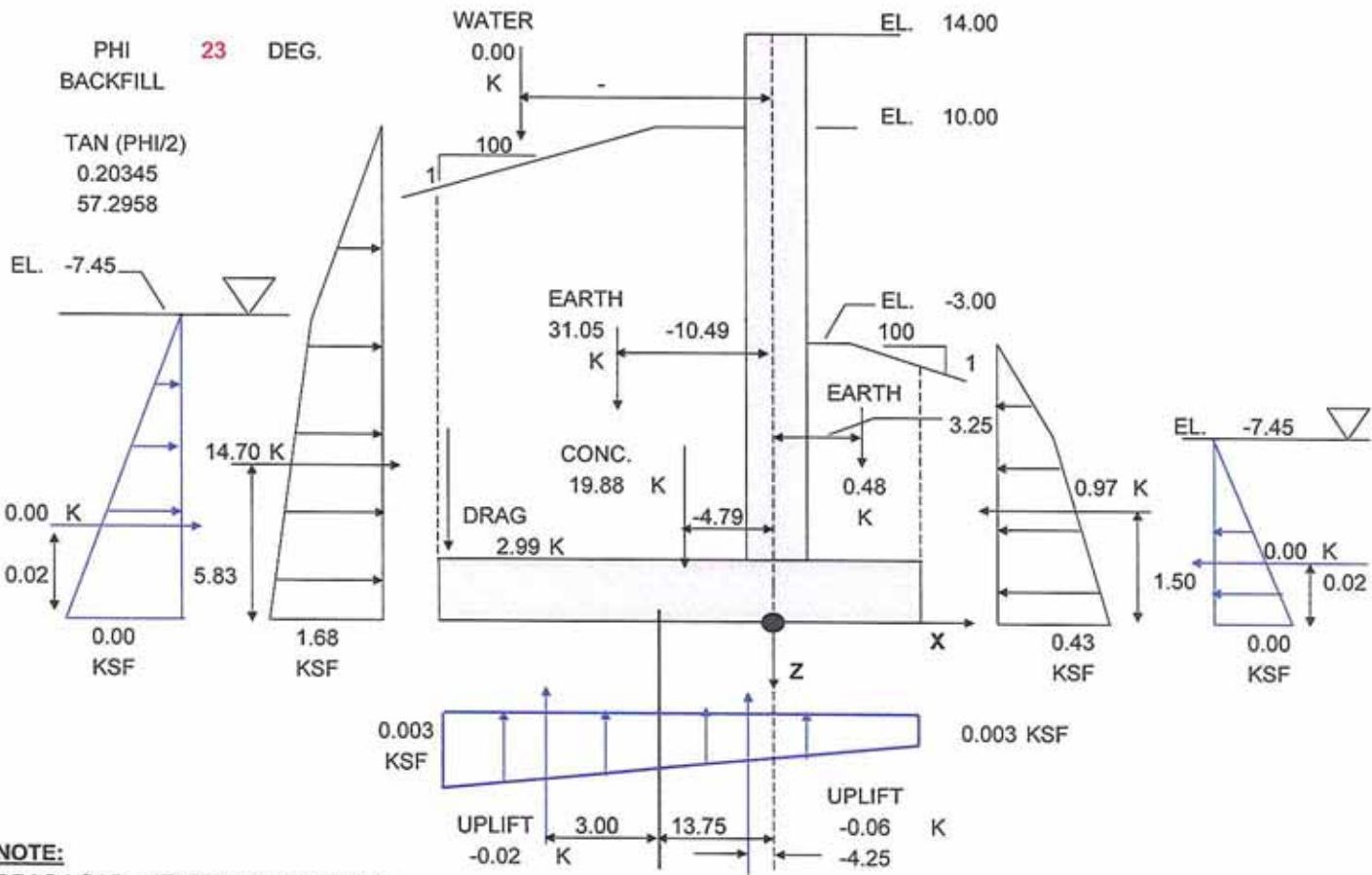
LOADING SUMMARY - CASE 1 WITH MINIMUM UPLIFT

| 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     | 19.9 k/ft | -4.79        | 0.00         | 95.156      | 0           |
| FLDSIDE FILL    | 0.0     | 0.0     | 31.1 k/ft | -10.49       | 0.00         | 325.894     | 0           |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.5 k/ft  | 3.25         | 0.00         | -1.557      | 0           |
| F. SIDE UPLIFT  | 0.0     | 0.0     | 0.0 k/ft  | -16.75       | 0.00         | -0.322      | 0           |
| P. SIDE UPLIFT  | 0.0     | 0.0     | -0.1 k/ft | -4.25        | 0.00         | -0.258      | 0           |
| F. S. EARTH Pr. | 14.7    | 0.0     | 0.0 k/ft  | -            | -5.83        | -85.750     | 0           |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0 k/ft  | -            | -1.50        | 0.000       | 0           |
| F. S. WATER Pr. | 0.0     | 0.0     | 0.0 k/ft  | -            | -0.02        | 0.000       | 0           |
| P. S. WATER Pr. | 0.0     | 0.0     | 0.0 k/ft  | -            | -0.02        | 0.000       | 0           |

|             | X     | Y   | Z      | Mxx | Myy   | Mzz |
|-------------|-------|-----|--------|-----|-------|-----|
| TOTALS      | 14.7  | 0.0 | 51.3   | 0   | 333   | 0   |
| MONO. TOTAL | 882.0 | 0.0 | 3079.7 | 0   | 19990 | 0   |

IGNORE

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 1 T - WALL ALTERNATIVE FINAL**  
**CASE 1 - CONSTRUCTION**



LOADING SUMMARY - CASE 1 WITH DRAG LOAD

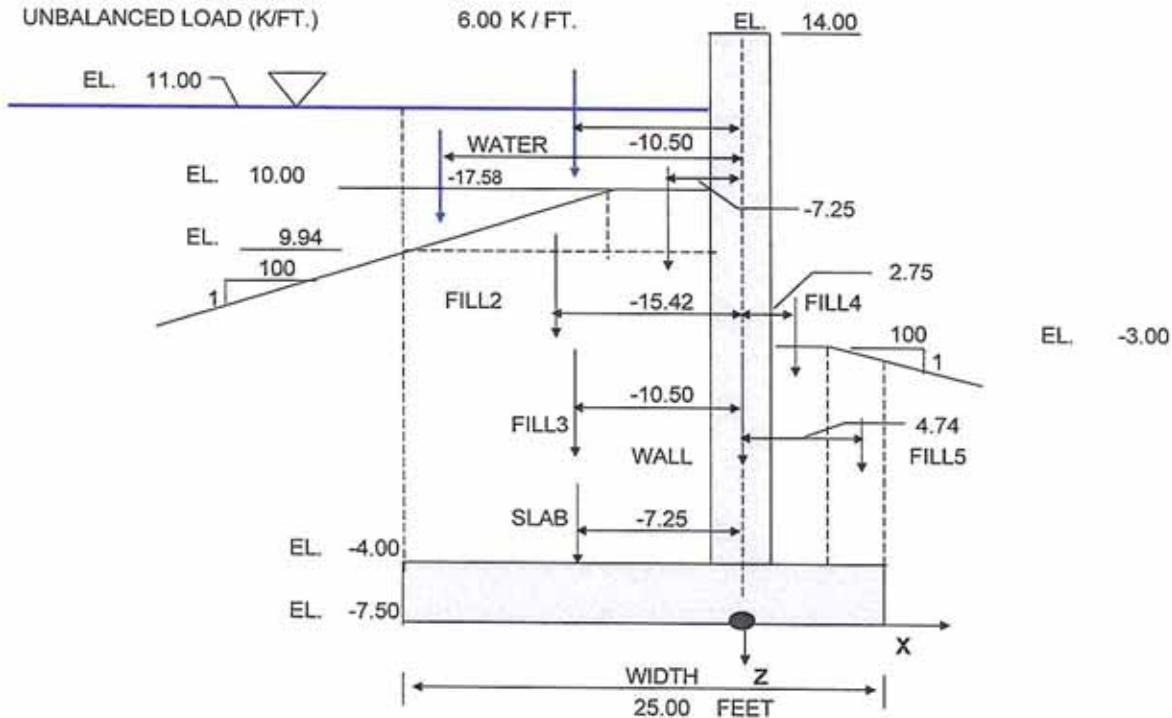
| ITEM            | FORCE X | FORCE Y | FORCE Z |      | X CENT. FEET | Z CENT. FEET | Myy FT-K/FT | Mzz FT-K/FT |
|-----------------|---------|---------|---------|------|--------------|--------------|-------------|-------------|
| CONCRETE        | 0.0     | 0.0     | 19.9    | k/ft | -4.79        | 0.00         | 95          | 0           |
| FLDSIDE FILL    | 0.0     | 0.0     | 31.1    | k/ft | -10.49       | 0.00         | 326         | 0           |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.5     | k/ft | 3.25         | 0.00         | -2          | 0           |
| DRAG LOAD       | 0.0     | 0.0     | 3.0     | k/ft | -19.75       | 0.00         | 59          | 0           |
| SURCHARGE       | 0.0     | 0.0     | 3.7     | k/ft | -10.50       | 0.00         | 39          | 0           |
| F. SIDE UPLIFT  | 0.0     | 0.0     | 0.0     | k/ft | -16.75       | 0.00         | 0           | 0           |
| P. SIDE UPLIFT  | 0.0     | 0.0     | -0.1    | k/ft | -4.25        | 0.00         | 0           | 0           |
| F. S. EARTH Pr. | 14.7    | 0.0     | 0.0     | k/ft | -            | -5.83        | -86         | 0           |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -1.50        | 0           | 0           |
| F. S. WATER Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -0.02        | 0           | 0           |
| P. S. WATER Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -0.02        | 0           | 0           |

|             | X     | Y   | Z      |  | Mxx   | Myy   | Mzz   |
|-------------|-------|-----|--------|--|-------|-------|-------|
| TOTALS      | 14.7  | 0.0 | 58.0   |  | 0     | 431   | 0     |
| MONO. TOTAL | 882.0 | 0.0 | 3481.2 |  | 0     | ##### | 0     |
|             |       |     |        |  | X     | Y     | Z     |
| VERTICAL    |       |     | 3481   |  | -8.91 |       |       |
| HORIZ       |       |     | 882    |  |       |       | -5.83 |

-0.4

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 1 T - WALL ALTERNATIVE FINAL**  
**CASE 2 - CANAL AT STILLWATER**

FLOODSIDE WATER ELEV. **11.00**  
 UPLIFT - PROT. SIDE -4.00  
 ALLOWABLE OVERSTRESS 0  
 UNBALANCED LOAD (K/FT.) 6.00 K / FT.

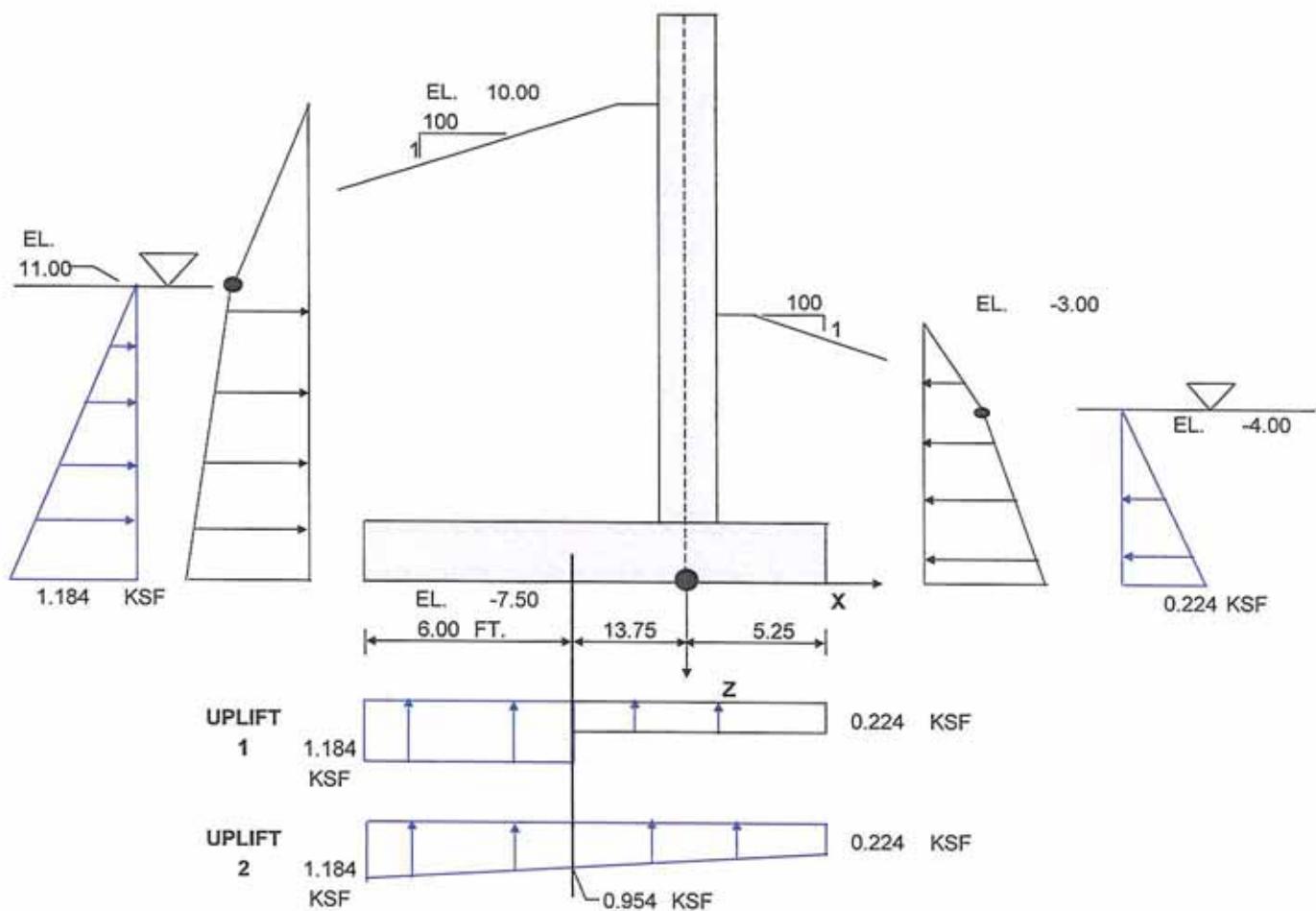


**FLOODWALL APPLIED GRAVITY LOADING - CASE 2**

| ITEM                 | FORCE Z<br>(WEIGHT) | X CENT.<br>FEET | Y CENT.<br>FEET | Myy<br>FT.-K  | Mzz<br>FT.-K |
|----------------------|---------------------|-----------------|-----------------|---------------|--------------|
| CONCRETE SLAB        | 13.13               | -7.25           | 0.00            | 95            | 0            |
| CONCRETE WALL        | 6.75                | 0.00            | 0.00            | 0             | 0            |
| FLOODSIDE FILL1      | 0.09                | -7.25           | 0.00            | 1             | 0            |
| FLOODSIDE FILL2      | 0.03                | -15.42          | 0.00            | 0             | 0            |
| FLOODSIDE FILL3      | 30.94               | -10.50          | 0.00            | 325           | 0            |
| PROTECTED SIDE FILL4 | 0.36                | 2.75            | 0.00            | -1            | 0            |
| PROTECTED SIDE FILL5 | 0.12                | 4.74            | 0.00            | -1            | 0            |
| FLOODSIDE WATER      | 0.01                | -17.58          | 0.00            | 0             | 0            |
| FLOODSIDE WATER      | 1.18                | -10.50          | 0.00            | 12            | 0            |
| <hr/>                |                     |                 |                 |               |              |
| <b>TOTALS</b>        | <b>52.61</b>        | <b>-8.22</b>    |                 | <b>432.16</b> | <b>0</b>     |
| CONCRETE             | 19.88               | -4.79           |                 | 95.16         | 0            |
| FLOODSIDE FILL 1-3   | 31.05               | -10.49          |                 | 325.89        | 0            |
| PROT. SIDE FILL 4-5  | 0.48                | 3.25            |                 | -1.56         | 0            |
| FLOODSIDE WATER      | 1.20                | -10.58          |                 | 12.67         | 0            |
|                      |                     |                 | KIPS            | FT.-K         | FT.-K        |

|                     |              |              |               |          |
|---------------------|--------------|--------------|---------------|----------|
| <b>TOTALS</b>       | <b>52.61</b> | <b>-8.22</b> | <b>432.16</b> | <b>0</b> |
| CONCRETE            | 19.88        | -4.79        | 95.16         | 0        |
| FLOODSIDE FILL 1-3  | 31.05        | -10.49       | 325.89        | 0        |
| PROT. SIDE FILL 4-5 | 0.48         | 3.25         | -1.56         | 0        |
| FLOODSIDE WATER     | 1.20         | -10.58       | 12.67         | 0        |
|                     |              |              | KIPS          | FT.-K    |

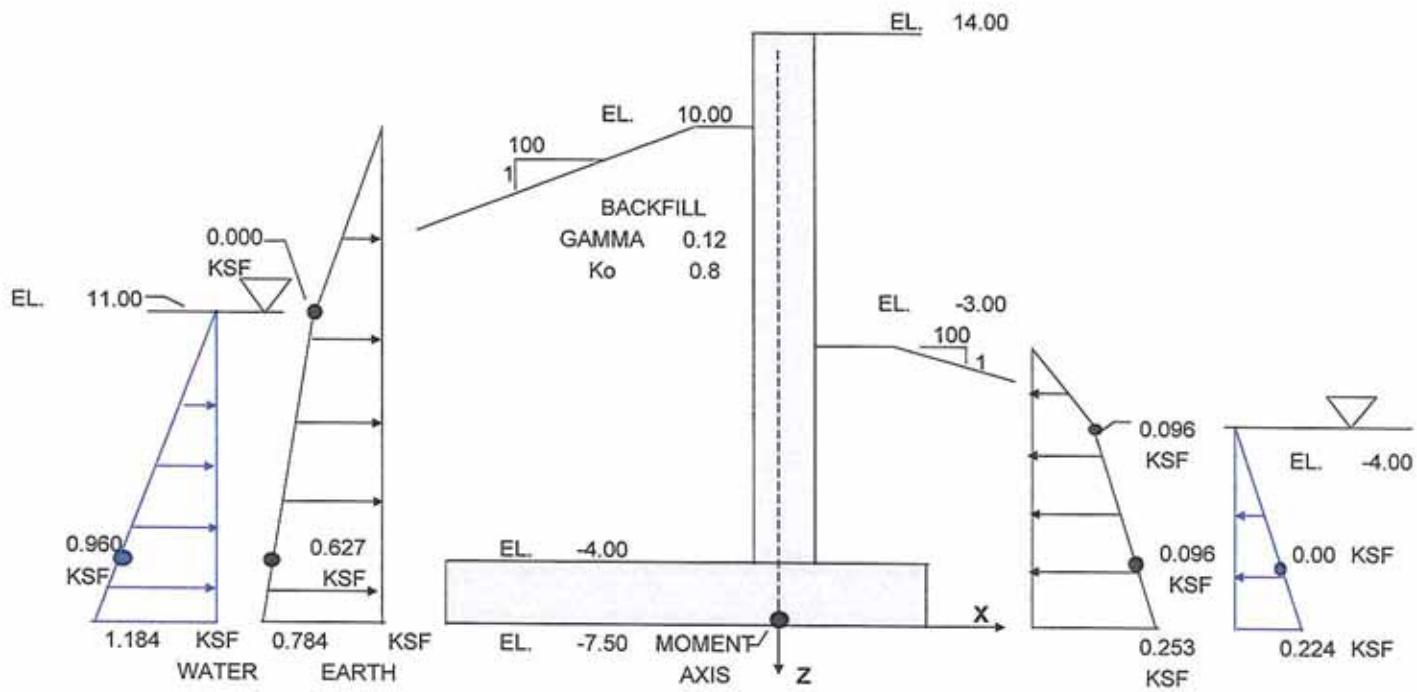
**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 1 T - WALL ALTERNATIVE FINAL**  
**CASE 2 - CANAL AT STILLWATER**



| ITEM            | WIDTH | PRESS | FORCE Z | X CENT. FEET | Y CENT. FEET | Myy FT.-K | Mzz FT.-K |
|-----------------|-------|-------|---------|--------------|--------------|-----------|-----------|
| FLOODSIDE:      |       |       |         |              |              |           |           |
| UPLIFT 1        | 6.00  | 1.18  | -7.10   | -16.75       | 0.00         | -119      | 0         |
| PROTECTED SIDE: |       |       |         |              |              |           |           |
| UPLIFT 1        | 19.00 | 0.22  | -4.26   | -4.25        | 0.00         | -18       | 0         |
| TOTALS          |       |       | -11.36  | -12.07       |              | -137      | 0         |
| FLD.SIDE        |       |       | -7.10   | -16.75       |              | -118.99   | 0         |
| PROT. SIDE      |       |       | -4.26   | -4.25        |              | -18.09    | 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 (UNIF) | 6.00  | 0.954 | -5.72   | -16.75       | 0.00         | -95.84    | 0.00      |
| UPLIFT 2 (TRI)  | 6.00  | 0.230 | -0.69   | -17.75       | 0.00         | -12.27    | 0.00      |
| PROTECTED SIDE: |       |       |         |              |              |           |           |
| UPLIFT 2 (UNIF) | 19.00 | 0.224 | -4.26   | -4.25        | 0.00         | -18.09    | 0.00      |
| UPLIFT 2 (TRI)  | 19.00 | 0.730 | -6.93   | -7.42        | 0.00         | -51.41    | 0.00      |
| TOTALS          |       |       | -17.60  | -10.09       |              | -177.60   | 0.00      |
| FLOOD SIDE      |       |       | -6.41   | -16.86       |              | -108.11   | 0.00      |
| PROT. SIDE      |       |       | -11.19  | -6.21        |              | -69.49    | 0.00      |
|                 |       |       | KIPS    |              |              | FT.-K     | FT.-K     |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 1 T - WALL ALTERNATIVE FINAL**  
**CASE 2 - CANAL AT STILLWATER**



3.136

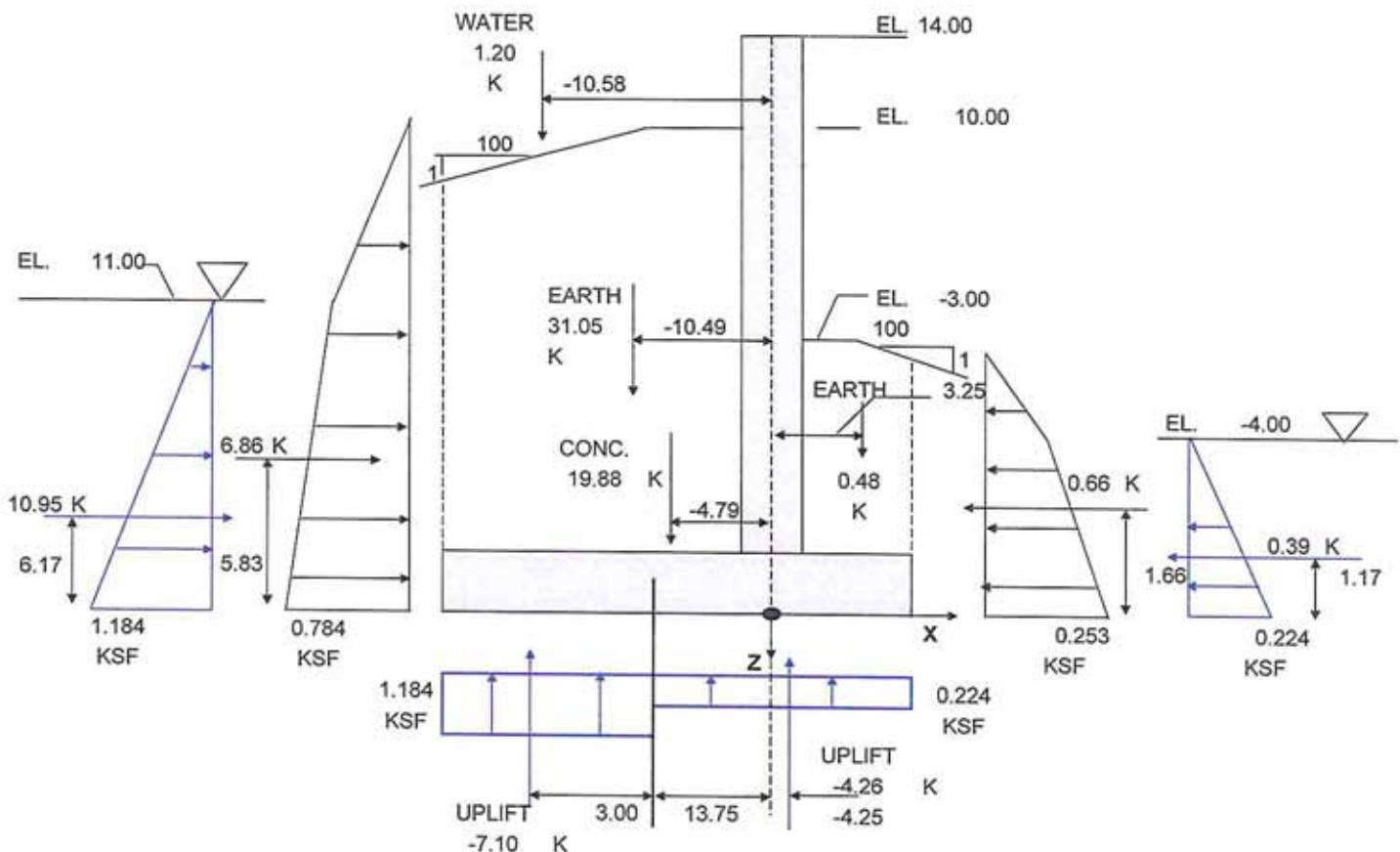
8.288

**FLOODWALL HORIZONTAL LOADING - CASE 2**

| 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    | 17.50  | 0.000 | 0.00 k/ft  | 0.00         | 0.00         | 0           | 0.0         |
| EARTH 3    | 17.50  | 0.784 | 6.86 k/ft  | 0.00         | -5.83        | 0           | -40.0       |
| GRND WATER | 18.50  | 1.184 | 10.95 k/ft | 0.00         | -6.17        | 0           | -67.5       |
| PROTECTED: |        |       |            |              |              |             |             |
| EARTH 4    | 1.00   | 0.096 | -0.05 k/ft | 0.00         | -3.83        | 0           | 0.2         |
| EARTH 5    | 3.50   | 0.096 | -0.34 k/ft | 0.00         | -1.75        | 0           | 0.6         |
| EARTH 6    | 3.50   | 0.253 | -0.27 k/ft | 0.00         | -1.17        | 0           | 0.3         |
| GRND WATER | 3.50   | 0.224 | -0.39 k/ft | 0.00         | -1.17        | 0           | 0.5         |

|                        | FORCE X    | Y CENT. FEET | Z CENT. FEET | Mzz FT-K/FT. | Myy FT-K/FT. |
|------------------------|------------|--------------|--------------|--------------|--------------|
| FLOODSIDE EARTH FORCE  | 6.86       | 0.00         | -5.83        | -40.0167     |              |
| FLOODSIDE WATER FORCE  | 10.95      | 0.00         | -6.17        | -67.5373     |              |
| TOTAL FLOODSIDE FORCE  | 17.81 k/ft | 0.00         | -6.04        | 0.0          | -107.6       |
| PROT. SIDE EARTH FORCE | -0.66      | 0.00         | -1.66        | 1.1          |              |
| PROT. SIDE WATER FORCE | -0.39      | 0.00         | -1.17        | 0.5          |              |
| TOTAL PROT. SIDE FORCE | -1.05 k/ft | 0.00         | -1.48        | 0.0          | 1.5          |
| TOTAL NET HORIZ. FORCE | 16.76 k/ft | 0.00         | -6.32        | 0.0          | -106.0       |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 1 T - WALL ALTERNATIVE FINAL**  
**CASE 2 - CANAL AT STILLWATER**

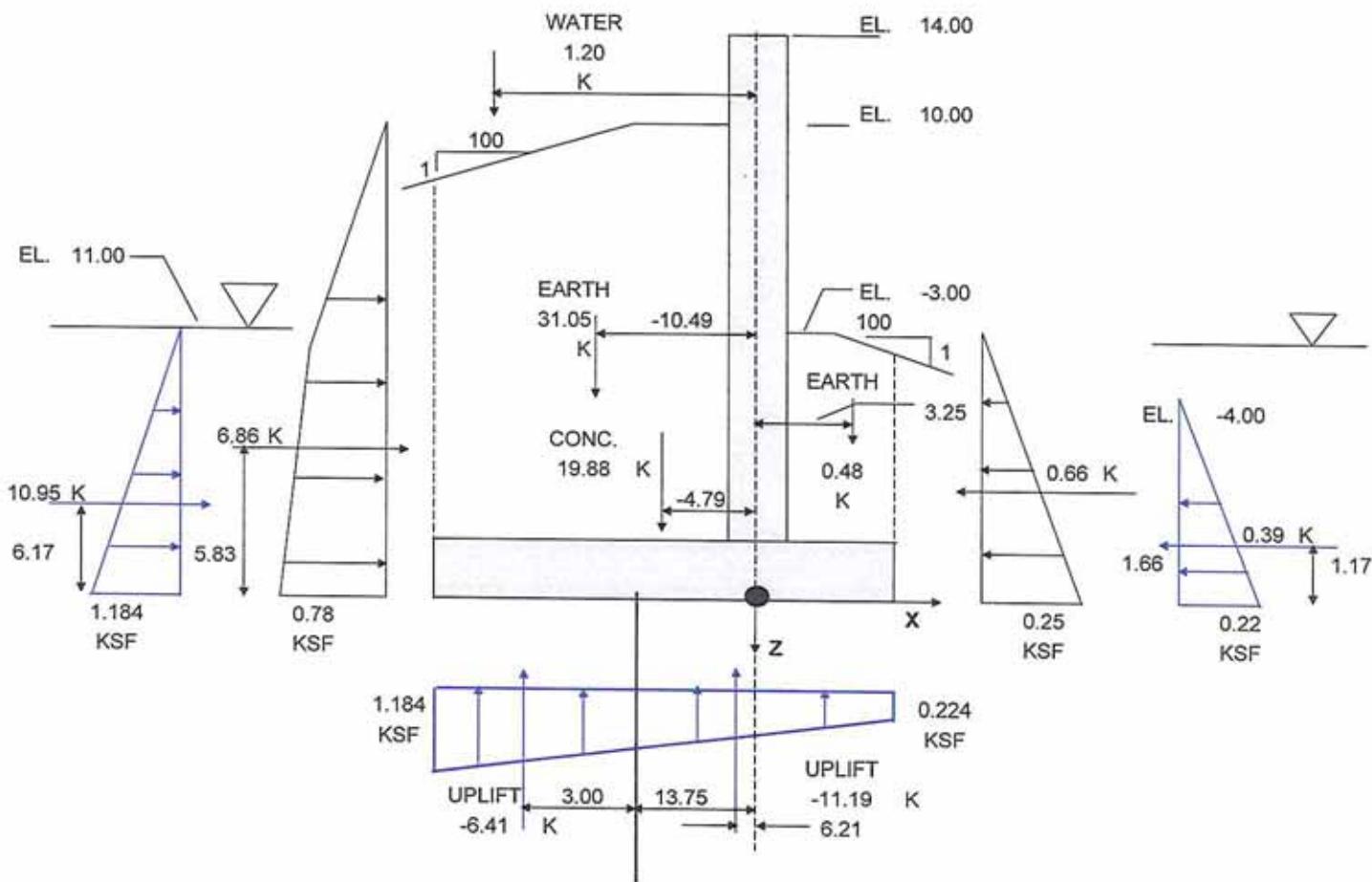


**LOADING SUMMARY - CASE 2 WITH MINIMUM UPLIFT**

| 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     | 19.9    | k/ft | -4.79        | 0.00         | 95          | 0           |
| FLDSIDE FILL    | 0.0     | 0.0     | 31.1    | k/ft | -10.49       | 0.00         | 326         | 0           |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.5     | k/ft | 3.25         | 0.00         | -2          | 0           |
| F.SIDE WATER    | 0.0     | 0.0     | 1.2     | k/ft | -10.58       | 0.00         | 13          | 0           |
| F. SIDE UPLIFT  | 0.0     | 0.0     | -7.1    | k/ft | -16.75       | 0.00         | -119        | 0           |
| P. SIDE UPLIFT  | 0.0     | 0.0     | -4.3    | k/ft | -4.25        | 0.00         | -18         | 0           |
| F. S. EARTH Pr. | 6.9     | 0.0     | 0.0     | k/ft | -            | -5.83        | -40         | 0           |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -1.66        | 0           | 0           |
| F. S. WATER Pr. | 11.0    | 0.0     | 0.0     | k/ft | -            | -6.17        | -68         | 0           |
| P. S. WATER Pr. | -0.4    | 0.0     | 0.0     | k/ft | -            | -1.17        | 0           | 0           |

|             | X      | Y   | Z      |  | Mxx | Myy     | Mzz |
|-------------|--------|-----|--------|--|-----|---------|-----|
| TOTALS      | 17.4   | 0.0 | 41.2   |  | 0   | 187.987 | 0   |
| MONO. TOTAL | 1045.2 | 0.0 | 2474.8 |  | 0   | 11279   | 0   |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 1 T - WALL ALTERNATIVE FINAL**  
**CASE 2 - CANAL AT STILLWATER**



LOADING SUMMARY - CASE 2 WITH MAXIMUM UPLIFT

| ITEM            | FORCE<br>X | FORCE<br>Y | FORCE<br>Z | k/ft | X CENT.<br>FEET | Z CENT.<br>FEET | Myy<br>FT-K/FT | Mzz<br>FT-K/FT |
|-----------------|------------|------------|------------|------|-----------------|-----------------|----------------|----------------|
| CONCRETE        | 0.0        | 0.0        | 19.9       | k/ft | -4.79           | 0.00            | 95             | 0              |
| FLDSIDE FILL    | 0.0        | 0.0        | 31.1       | k/ft | -10.49          | 0.00            | 326            | 0              |
| PROTSIDE FILL   | 0.0        | 0.0        | 0.5        | k/ft | 3.25            | 0.00            | -2             | 0              |
| F. SIDE WATER   | 0.0        | 0.0        | 1.2        | k/ft | -10.58          | 0.00            | 13             | 0              |
| F. SIDE UPLIFT  | 0.0        | 0.0        | -6.4       | k/ft | -16.86          | 0.00            | -108           | 0              |
| P. SIDE UPLIFT  | 0.0        | 0.0        | -11.2      | k/ft | -6.21           | 0.00            | -69            | 0              |
| F. S. EARTH Pr. | 6.9        | 0.0        | 0.0        | k/ft | -               | -5.83           | -40            | 0              |
| P. S. EARTH Pr. | 0.0        | 0.0        | 0.0        | k/ft | -               | -1.66           | 0              | 0              |
| F. S. WATER Pr. | 11.0       | 0.0        | 0.0        | k/ft | -               | -6.17           | -68            | 0              |
| P. S. WATER Pr. | -0.4       | 0.0        | 0.0        | k/ft | -               | -1.17           | 0              | 0              |

|             |        |     |        |  |     |      |     |
|-------------|--------|-----|--------|--|-----|------|-----|
|             | X      | Y   | Z      |  | Mxx | Myy  | Mzz |
| TOTALS      | 17.4   | 0.0 | 35.0   |  | 0   | 147  | 0   |
| MONO. TOTAL | 1045.2 | 0.0 | 2100.4 |  | 0   | 8848 | 0   |

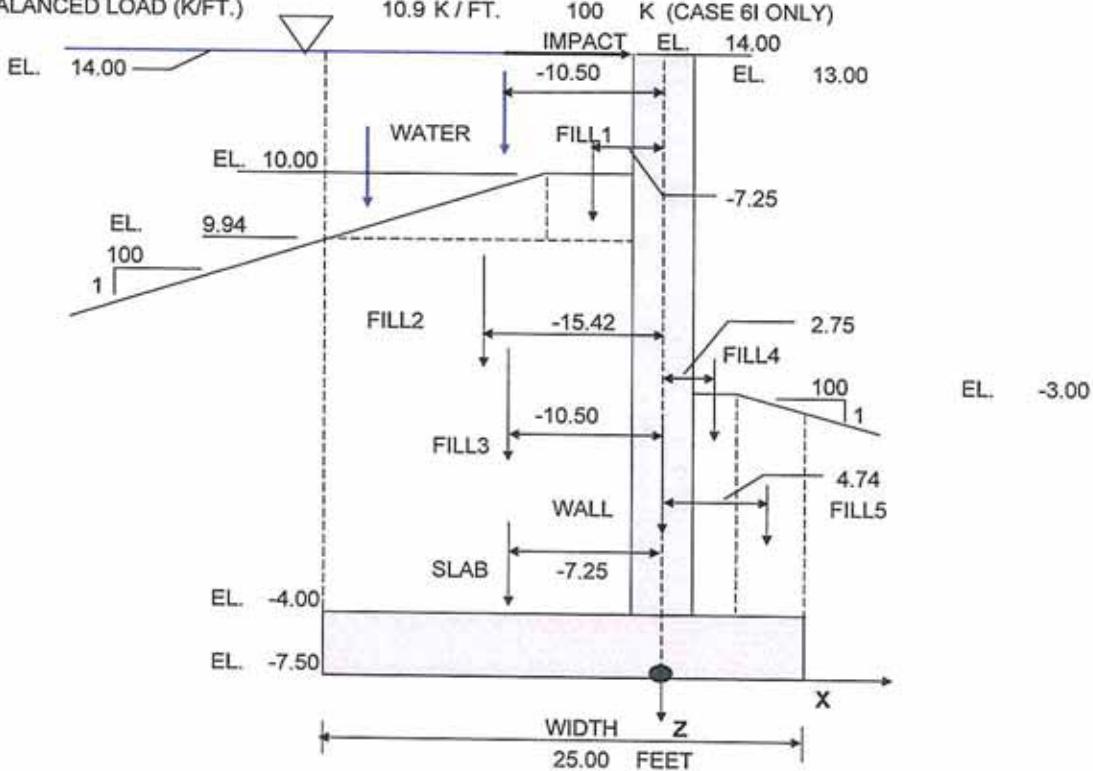
|          |      |  |       |
|----------|------|--|-------|
| VERTICAL | 2100 |  | -7.27 |
| HORIZ    | 1045 |  | -6.15 |

254.56

-107.10

**WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 1 T - WALL ALTERNATIVE FINAL  
CASE 3 - CANAL AT TOP OF WALL**

FLOODSIDE WATER ELEV. 14.00  
 UPLIFT - PROT. SIDE -4.00  
 ALLOWABLE OVERSTRESS 50.0 %  
 UNBALANCED LOAD (K/FT.) 10.9 K/FT. 100 K (CASE 6I ONLY)

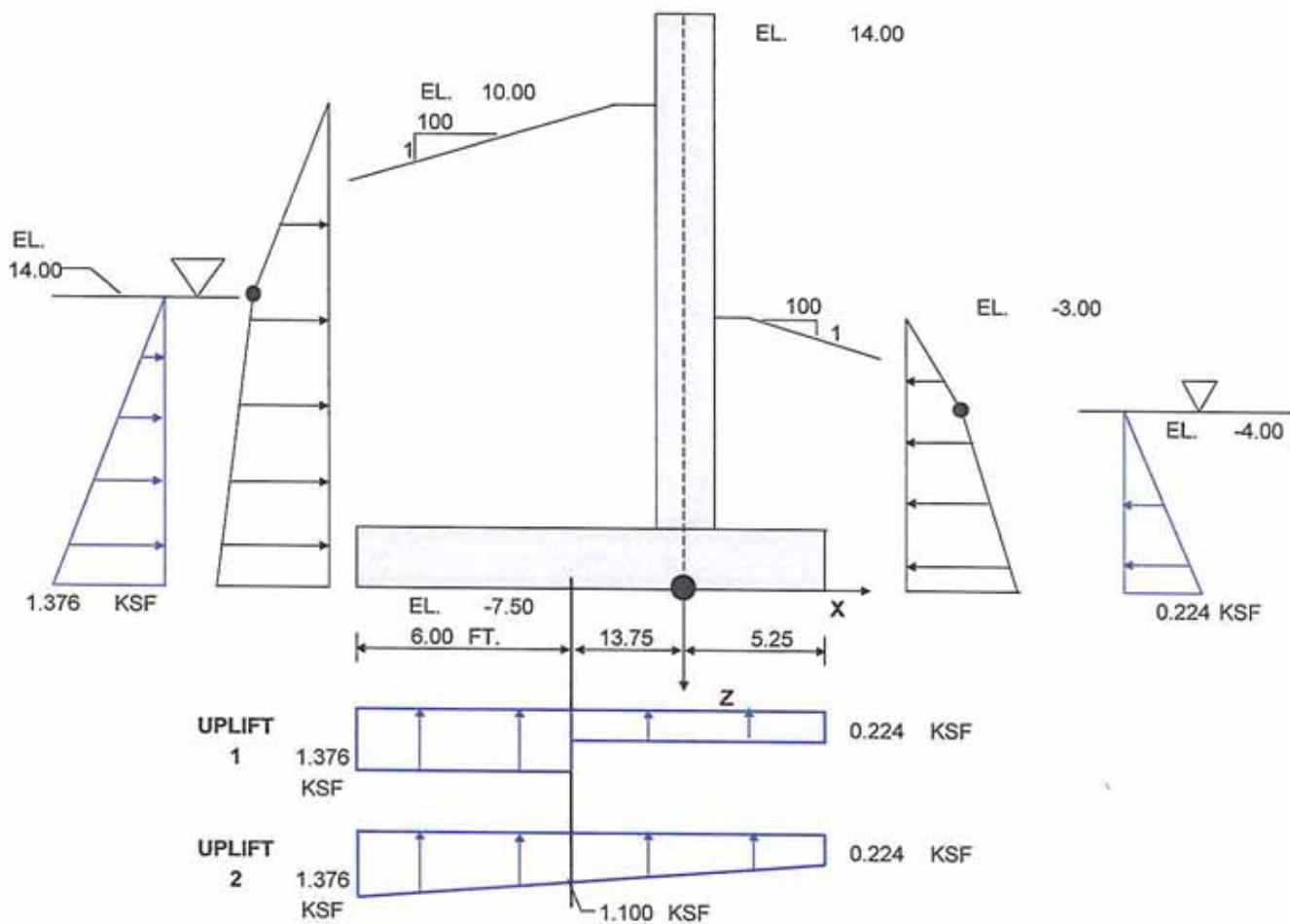


FLOODWALL APPLIED GRAVITY LOADING - CASE 3

| ITEM                 | FORCE Z<br>(WEIGHT) | X CENT.<br>FEET | Y CENT.<br>FEET | Myy<br>FT.-K | Mzz<br>FT.-K |
|----------------------|---------------------|-----------------|-----------------|--------------|--------------|
| CONCRETE SLAB        | 13.13               | -7.25           | 0.00            | 95           | 0            |
| CONCRETE WALL        | 6.75                | 0.00            | 0.00            | 0            | 0            |
| FLOODSIDE FILL1      | 0.09                | -7.25           | 0.00            | 1            | 0            |
| FLOODSIDE FILL2      | 0.03                | -15.42          | 0.00            | 0            | 0            |
| FLOODSIDE FILL3      | 30.94               | -10.50          | 0.00            | 325          | 0            |
| PROTECTED SIDE FILL4 | 0.36                | 2.75            | 0.00            | -1           | 0            |
| PROTECTED SIDE FILL5 | 0.12                | 4.74            | 0.00            | -1           | 0            |
| FLOODSIDE WATER      | 0.01                | -17.58          | 0.00            | 0            | 0            |
| FLOODSIDE WATER      | 4.74                | -10.50          | 0.00            | 50           | 0            |
|                      |                     |                 |                 |              |              |

|                            |              |               |               |          |
|----------------------------|--------------|---------------|---------------|----------|
| <b>TOTALS</b>              | <b>56.16</b> | <b>-8.36</b>  | <b>469.46</b> | <b>0</b> |
| <b>CONCRETE</b>            | <b>19.88</b> | <b>-4.79</b>  | <b>95.16</b>  | <b>0</b> |
| <b>FLOODSIDE FILL 1-3</b>  | <b>31.05</b> | <b>-10.49</b> | <b>325.89</b> | <b>0</b> |
| <b>PROT. SIDE FILL 4-5</b> | <b>0.48</b>  | <b>3.25</b>   | <b>-1.56</b>  | <b>0</b> |
| <b>FLOODSIDE WATER</b>     | <b>4.75</b>  | <b>-10.52</b> | <b>49.97</b>  | <b>0</b> |
|                            | KIPS         |               | FT.-K         | FT.-K    |

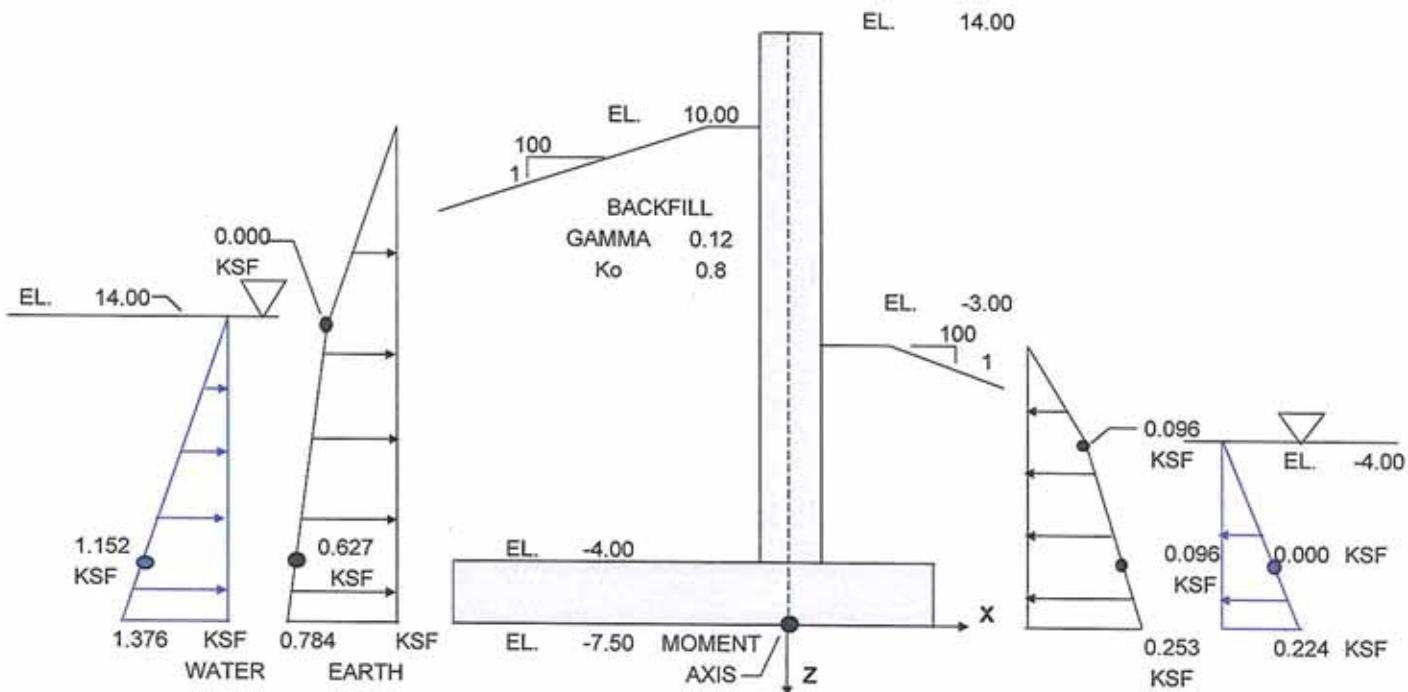
**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 1 T - WALL ALTERNATIVE FINAL**  
**CASE 3 - CANAL AT TOP OF WALL**



| ITEM                   | WIDTH | PRESS | FORCE Z       | X CENT. FEET  | Y CENT. FEET | Myy FT.-K   | Mzz FT.-K |
|------------------------|-------|-------|---------------|---------------|--------------|-------------|-----------|
| <b>FLOODSIDE:</b>      |       |       |               |               |              |             |           |
| UPLIFT 1               | 6.00  | 1.38  | -8.26         | -16.75        | 0.00         | -138        | 0         |
| <b>PROTECTED SIDE:</b> |       |       |               |               |              |             |           |
| UPLIFT 1               | 19.00 | 0.22  | -4.26         | -4.25         | 0.00         | -18         | 0         |
| <b>TOTALS</b>          |       |       | <b>-12.51</b> | <b>-12.50</b> |              | <b>-156</b> | <b>0</b>  |
| FLD.SIDE               |       |       | -8.26         | -16.75        |              | -138.29     | 0         |
| PROT. SIDE             |       |       | -4.26         | -4.25         |              | -18.09      | 0         |
|                        |       |       | KIPS          |               |              | FT.-K       | FT.-K     |

| ITEM                   | WIDTH | PRESS | FORCE Z       | X CENT. FEET  | Y CENT. FEET | Myy FT.-K      | Mzz FT.-K   |
|------------------------|-------|-------|---------------|---------------|--------------|----------------|-------------|
| <b>FLOODSIDE:</b>      |       |       |               |               |              |                |             |
| UPLIFT 2 (UNIF)        | 6.00  | 1.100 | -6.60         | -16.75        | 0.00         | -110.50        | 0.00        |
| UPLIFT 2 (TRI)         | 6.00  | 0.276 | -0.83         | -17.75        | 0.00         | -14.72         | 0.00        |
| <b>PROTECTED SIDE:</b> |       |       |               |               |              |                |             |
| UPLIFT 2 (UNIF)        | 19.00 | 0.224 | -4.26         | -4.25         | 0.00         | -18.09         | 0.00        |
| UPLIFT 2 (TRI)         | 19.00 | 0.876 | -8.32         | -7.42         | 0.00         | -61.69         | 0.00        |
| <b>TOTALS</b>          |       |       | <b>-20.00</b> | <b>-10.25</b> |              | <b>-205.00</b> | <b>0.00</b> |
| FLOOD SIDE             |       |       | -7.43         | -16.86        |              | -125.22        | 0.00        |
| PROT. SIDE             |       |       | -12.57        | -6.34         |              | -79.78         | 0.00        |
|                        |       |       | KIPS          |               |              | FT.-K          | FT.-K       |

WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 1 T - WALL ALTERNATIVE FINAL  
CASE 3 - CANAL AT TOP OF WALL

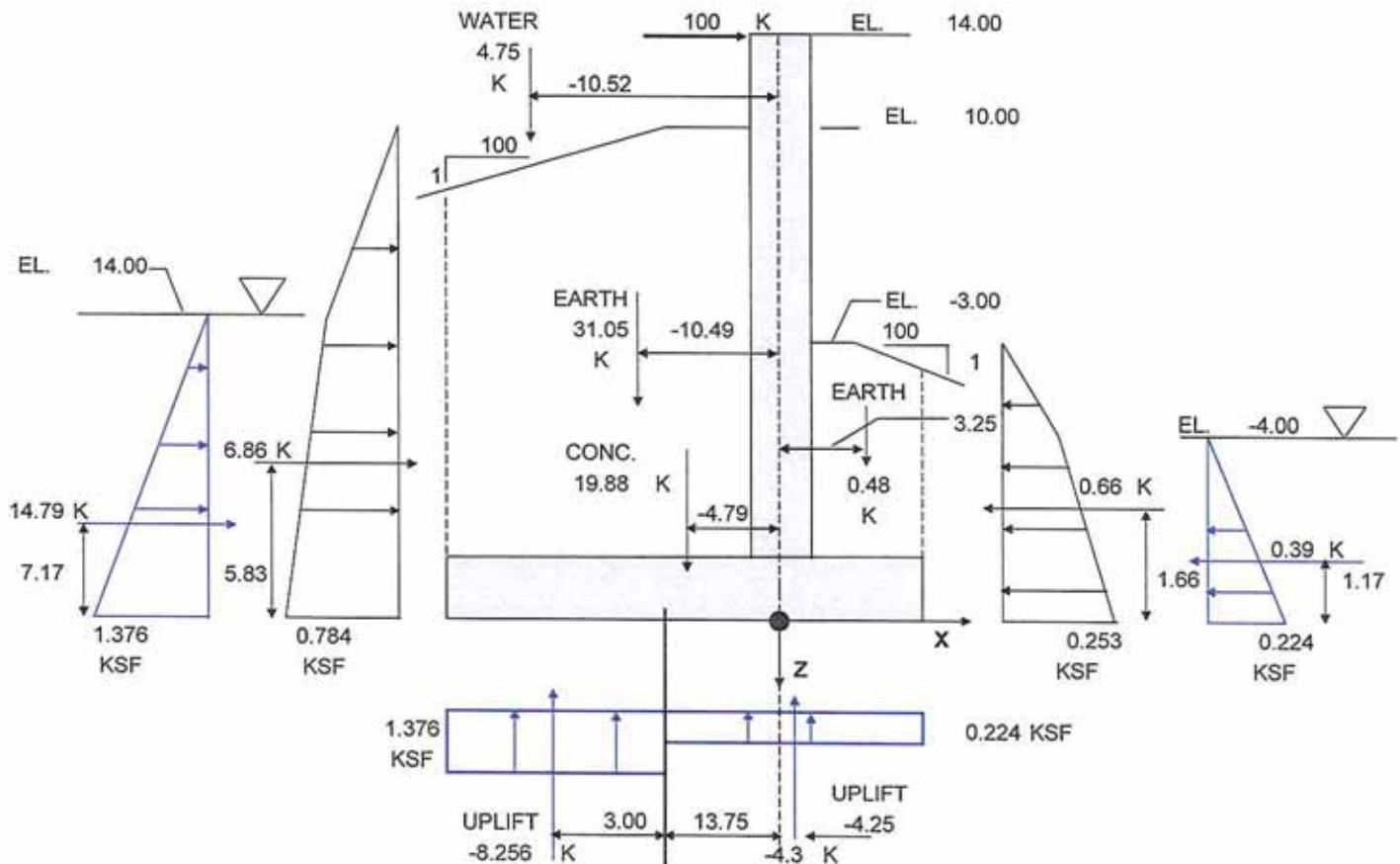


FLOODWALL HORIZONTAL LOADING - CASE 3

| 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    | 17.50  | 0.000 | 0.00    | k/ft | 0.00         | 0.00         | 0           | 0.0         |
| EARTH 3    | 17.50  | 0.784 | 6.86    | k/ft | 0.00         | -5.83        | 0           | -40.0       |
| GRND WATER | 21.50  | 1.376 | 14.79   | k/ft | 0.00         | -7.17        | 0           | -106.0      |
| PROTECTED: |        |       |         |      |              |              |             |             |
| EARTH 4    | 1.00   | 0.096 | -0.05   | k/ft | 0.00         | -3.83        | 0           | 0.2         |
| EARTH 5    | 3.50   | 0.096 | -0.34   | k/ft | 0.00         | -1.75        | 0           | 0.6         |
| EARTH 6    | 3.50   | 0.253 | -0.27   | k/ft | 0.00         | -1.17        | 0           | 0.3         |
| GRND WATER | 3.50   | 0.224 | -0.39   | k/ft | 0.00         | -1.17        | 0           | 0.5         |

|                        | FORCE X | Y CENT. FEET | Z CENT. FEET | Mzz FT-K/FT. | Myy FT-K/FT. |
|------------------------|---------|--------------|--------------|--------------|--------------|
| FLOODSIDE EARTH FORCE  | 6.86    | 0.00         | -5.83        |              | -40.0167     |
| FLOODSIDE WATER FORCE  | 14.79   | 0.00         | -7.17        |              | -106.009     |
| TOTAL FLOODSIDE FORCE  | 21.65   | k/ft         | 0.00         | -6.74        | 0.0          |
| PROT. SIDE EARTH FORCE | -0.66   | 0.00         | -1.66        |              | 1.1          |
| PROT. SIDE WATER FORCE | -0.39   | 0.00         | -1.17        |              | 0.5          |
| TOTAL PROT. SIDE FORCE | -1.05   | k/ft         | 0.00         | -1.48        | 0.0          |
| TOTAL NET HORIZ. FORCE | 20.60   | k/ft         | 0.00         | -7.01        | 0.0          |
|                        |         |              |              |              | -144.5       |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 1 T - WALL ALTERNATIVE FINAL**  
**CASE 3 - CANAL AT TOP OF WALL**



LOADING SUMMARY - CASE 3 WITH MINIMUM UPLIFT

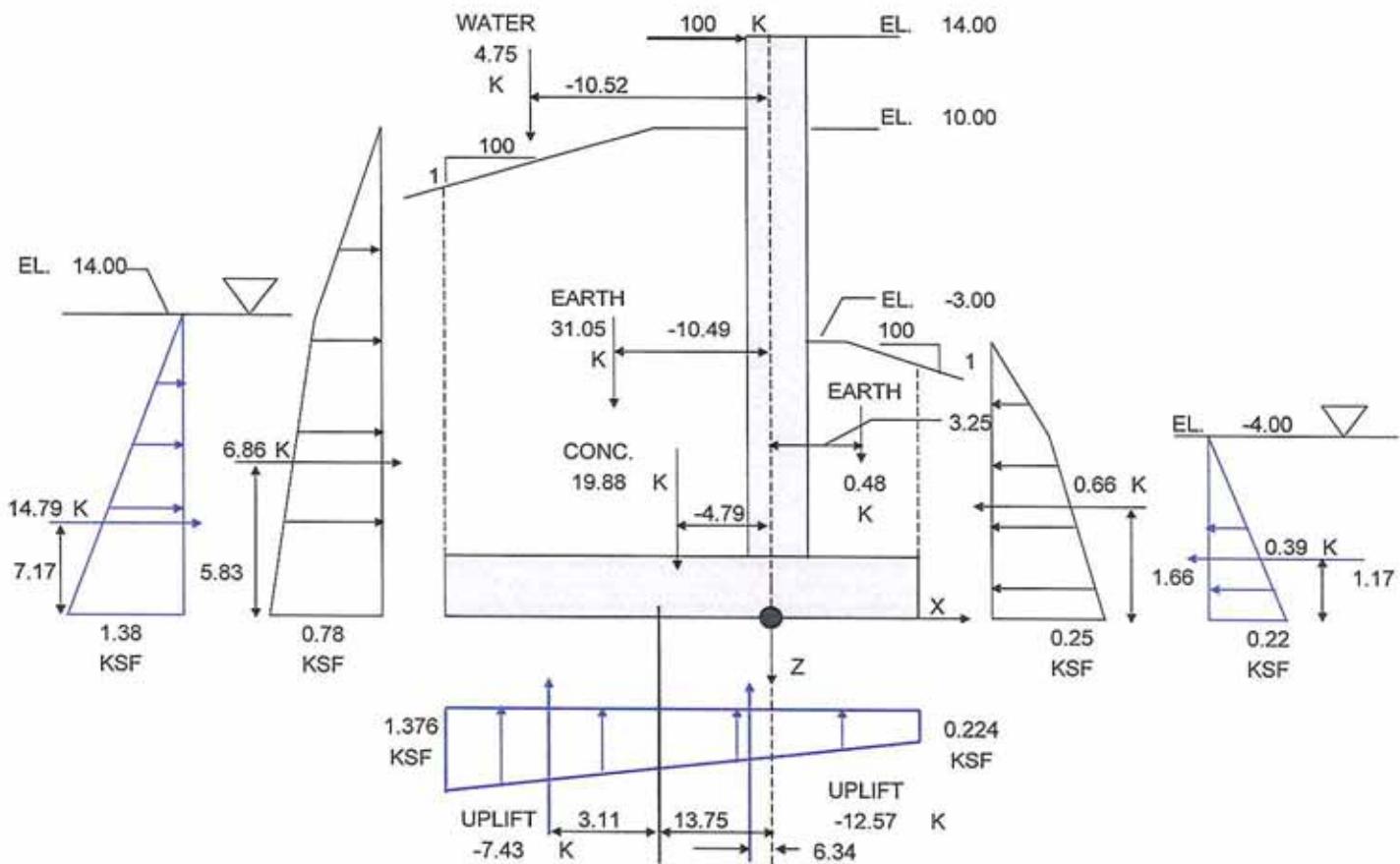
| ITEM            | FORCE X | FORCE Y | FORCE Z   | X CENT. FEET | Z CENT. FEET | Myy FT-K/FT | Mzz FT-K/FT |
|-----------------|---------|---------|-----------|--------------|--------------|-------------|-------------|
| CONCRETE        | 0.0     | 0.0     | 19.9 k/ft | -4.79        | 0.00         | 95          | 0           |
| FLDSIDE FILL    | 0.0     | 0.0     | 31.1 k/ft | -10.49       | 0.00         | 326         | 0           |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.5 k/ft  | 3.25         | 0.00         | -2          | 0           |
| F.SIDE WATER    | 0.0     | 0.0     | 4.7 k/ft  | -10.52       | 0.00         | 50          | 0           |
| F. SIDE UPLIFT  | 0.0     | 0.0     | -8.3 k/ft | -16.75       | 0.00         | -138        | 0           |
| P. SIDE UPLIFT  | 0.0     | 0.0     | -4.3 k/ft | -4.25        | 0.00         | -18         | 0           |
| F. S. EARTH Pr. | 6.9     | 0.0     | 0.0 k/ft  | -            | -5.83        | -40         | 0           |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0 k/ft  | -            | -1.66        | 0           | 0           |
| F. S. WATER Pr. | 14.8    | 0.0     | 0.0 k/ft  | -            | -7.17        | -106        | 0           |
| P. S. WATER Pr. | -0.4    | 0.0     | 0.0 k/ft  | -            | -1.17        | 0           | 0           |

SUM M  
313.08

SUM M  
-145.57

|                 | X      | Y   | Z      | Mxx | Myy    | Mzz |
|-----------------|--------|-----|--------|-----|--------|-----|
| TOTALS          | 21.3   | 0.0 | 43.6   | 0   | 168    | 0   |
| MONO. TOTAL     | 1275.6 | 0.0 | 2618.8 | 0   | 10051  | 0   |
| IMPACT (CASE 9) | 100.0  |     |        |     | -2150  |     |
| TOTAL CASE 9    | 1375.6 | 0.0 | 2618.8 | 0.0 | 7900.9 | 0.0 |

WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 1 T - WALL ALTERNATIVE FINAL  
CASE 3 - CANAL AT TOP OF WALL



LOADING SUMMARY - CASE 3 WITH MAXIMUM UPLIFT

| 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     | 19.9 k/ft  |  | -4.79        | 0.00         | 95          | 0           |
| FLDSIDE FILL    | 0.0     | 0.0     | 31.1 k/ft  |  | -10.49       | 0.00         | 326         | 0           |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.5 k/ft   |  | 3.25         | 0.00         | -2          | 0           |
| F. SIDE WATER   | 0.0     | 0.0     | 4.7 k/ft   |  | -10.52       | 0.00         | 50          | 0           |
| F. SIDE UPLIFT  | 0.0     | 0.0     | -7.4 k/ft  |  | -16.86       | 0.00         | -125        | 0           |
| P. SIDE UPLIFT  | 0.0     | 0.0     | -12.6 k/ft |  | -6.34        | 0.00         | -80         | 0           |
| F. S. EARTH Pr. | 6.9     | 0.0     | 0.0 k/ft   |  | -            | -5.83        | -40         | 0           |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0 k/ft   |  | -            | -1.66        | 0           | 0           |
| F. S. WATER Pr. | 14.8    | 0.0     | 0.0 k/ft   |  | -            | -7.17        | -106        | 0           |
| P. S. WATER Pr. | -0.4    | 0.0     | 0.0 k/ft   |  | -            | -1.17        | 0           | 0           |

SUM M  
264.46

SUM M  
-145.57

|                  | X      | Y   | Z      | Mxx | Myy     | Mzz   |
|------------------|--------|-----|--------|-----|---------|-------|
| TOTALS           | 21.3   | 0.0 | 36.2   | 0   | 119     | 0     |
| MONO. TOTAL      | 1275.6 | 0.0 | 2169.5 | 0   | 7133    | 0     |
| IMPACT (CASE 10) | 100.0  |     |        |     | -2150.0 |       |
| TOTAL CASE 10    | 1375.6 | 0.0 | 2169.5 | 0.0 | 4983.4  | 0.0   |
| VERTICAL         |        |     | 2170   |     | -7.31   |       |
| HORIZ            |        |     | 1276   |     |         | -6.85 |

**WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 1 T - WALL ALTERNATIVE FINAL**

| LOAD CASE | LOAD CONDITION                                                            | FDN OVERSTR ALLOWED |       |   | FOUNDATION LOADS |     |        |
|-----------|---------------------------------------------------------------------------|---------------------|-------|---|------------------|-----|--------|
|           |                                                                           | X                   | Y     | Z | Mxx              | Myy | Mzz    |
| 1         | CONSTRUCTION W / WIND                                                     | 1.166               | 946   | 0 | 3,080            | 0   | 19,296 |
| 1a        | CONST. W/ DRAG & SURCHARGE LDS                                            | 1.166               | 882   | 0 | 3,481            | 0   | 25,865 |
| Not Used  | CANAL @ STILLWATER (EL. 11.6)<br>MINIMUM UPLIFT                           | 1.000               | 1,045 | 0 | 2,475            | 0   | 11,279 |
|           | CANAL @ STILLWATER (EL. 11.6)<br>MAXIMUM UPLIFT                           | 1.000               | 1,045 | 0 | 2,100            | 0   | 8,848  |
| 2a        | CANAL @ STILLWATER (EL. 11.6)<br>MIN. UPLIFT, UNBAL. LOAD                 | 1.000               | 1,405 | 0 | 2,475            | 0   | 11,279 |
| 2b        | CANAL @ STILLWATER (EL. 11.6)<br>MAX. UPLIFT, UNBAL. LOAD                 | 1.000               | 1,405 | 0 | 2,100            | 0   | 8,848  |
| 2c        | CANAL @ STILLWATER (EL. 11.6)<br>MIN. UPLIFT, UNBAL. LOAD; IMPACT         | 1.333               | 1,505 | 0 | 2,475            | 0   | 9,129  |
| 2d        | CANAL @ STILLWATER (EL. 11.6)<br>MAX. UPLIFT, UNBAL. LOAD; IMPACT         | 1.333               | 1,505 | 0 | 2,100            | 0   | 6,698  |
| 3a        | CANAL @ STILLWATER (EL. 11.6)<br>MIN. UPLIFT, UNBAL. & WAVE LOADS         | 1.333               | 1,448 | 0 | 2,475            | 0   | 10,449 |
| 3b        | CANAL @ STILLWATER (EL. 11.6)<br>MAX. UPLIFT, UNBAL. & WAVE LOADS         | 1.333               | 1,448 | 0 | 2,100            | 0   | 8,018  |
| 4a        | CANAL @ STILLWATER (EL. 11.6)<br>MIN. UL - UNBAL. LD., WAVE & IMPACT      | 1.500               | 1,548 | 0 | 2,475            | 0   | 8,299  |
| 4b        | CANAL @ STILLWATER (EL. 11.6)<br>MAX. UL - UNBAL. LD., WAVE & IMPACT      | 1.500               | 1,548 | 0 | 2,100            | 0   | 5,868  |
| Not Used  | CANAL @ TOP OF WALL (EL. 14.0)<br>MINIMUM UPLIFT                          | N/A                 | 1,276 | 0 | 2,619            | 0   | 10,051 |
|           | CANAL @ TOP OF WALL (EL. 14.0)<br>MAXIMUM UPLIFT                          | N/A                 | 1,276 | 0 | 2,170            | 0   | 7,133  |
| (DC A)    | CANAL @ TOP OF WALL (EL. 14.0)<br>MIN. UPLIFT, UNBAL. LOAD                | 1.500               | 1,930 | 0 | 2,619            | 0   | 10,051 |
| (DC B)    | CANAL @ TOP OF WALL (EL. 14.0)<br>MAX. UPLIFT, UNBAL. LOAD                | 1.500               | 1,930 | 0 | 2,170            | 0   | 7,133  |
| (DC C)    | CANAL @ TOP OF WALL (EL. 14.0)<br>MIN. UPLIFT - W/ WO UNBAL. LD. + IMPACT | 1.666               | 2,030 | 0 | 2,619            | 0   | 7,901  |
| (DC D)    | CANAL @ TOP OF WALL (EL. 14.0)<br>MAX. UPLIFT - W/ WO UNBAL. LD. + IMPACT | 1.666               | 2,030 | 0 | 2,170            | 0   | 4,983  |

SHEETPILE ANCHOR FORCE ANALYSIS  
 (PER URS MATHCAD SPREADSHEET)  
 ALGIERS TWALL REACH 1

|                                              |                 |      |
|----------------------------------------------|-----------------|------|
| GROUND SURFACE ELEVATION                     | 10.0            |      |
| TWALL BASE EL. (BASE)                        | -7.5            |      |
| COHESION - C                                 | 300             | PSF  |
| EFF. GRADE (EG) FOR NO UNBALANCED LDS.       | -62             |      |
| <br>                                         |                 |      |
| CURRENT FAILURE SURFACE EL. (CFS)            | <b>-49.0</b>    |      |
| <br>                                         |                 |      |
| COMPUTED UNBALANCED LOAD                     | <b>24,300</b>   | #/FT |
| <br>                                         |                 |      |
| (BASE - CFS)                                 | 41.5            |      |
| <br>                                         |                 |      |
| PRESSURE FROM UNBALANCED LD. (P)             | 411.9           | PSF  |
| <br>                                         |                 |      |
| P*(BASE-CFS)                                 | 17092.4         |      |
| <br>                                         |                 |      |
| TR1 = 4C/1.5                                 | 800.0           | PSF  |
| <br>                                         |                 |      |
| TR2 = 4C/1.0                                 | 1,200           | PSF  |
| <br>                                         |                 |      |
| A = TR2                                      | 1,200           |      |
| <br>                                         |                 |      |
| B = -2*TR2*BASE                              | 18,000          |      |
| <br>                                         |                 |      |
| $C = \frac{2 * TR2 * EG * BASE}{TR2 * EG^2}$ |                 |      |
| <br>                                         |                 |      |
| (B^2 - 4AC)^0.5                              | 143,225         |      |
| <br>                                         |                 |      |
| TE2 (REQ'D RESIST PRESSURE DEPTH)            | -67.18          |      |
| <br>                                         |                 |      |
| Required Anchor Force                        | <b>10879.80</b> | #    |
| (P*(BASE-CFS) - TR2*(EG-TE2))                |                 |      |

1000 ALGIERS CANAL WEST - REACH 1 - ANCH=10.9 PIPE PILES  
1010 PROP 29000 2549 2549 36.9 1.8 0 ALL  
1030 SOIL ES 0.025 L 100.0 0 1 TO 30  
1035 SOIL ES 0.040 L 100.0 0 31 TO 40  
1060 ALLOW R 120. 74. 831. 831. 5311. 5311. ALL  
1070 PIN ALL  
1100 PILE 1 -16.75 -27.0 0.  
1110 ROW Y 10 1 9 at 6.0  
1150 PILE 11 -11.75 -27.0 0.  
1155 ROW Y 10 11 9 at 6.0  
1160 PILE 21 -5.25 -27.0 0.  
1165 ROW Y 10 21 9 at 6.0  
1170 PILE 31 2.0 -27.0 0.  
1175 ROW Y 10 31 9 at 6.0  
1215 BATTER 2.0 1 TO 10  
1216 BATTER 2.0 11 TO 40  
1230 ANGLE 180 1 TO 10  
1240 ANGLE 0 11 TO 40  
1340 LOA 1 950 0 3080 0 19300 0  
1345 LOA 2 880 0 3480 0 26870 0  
1350 LOA 3 1410 0 2475 0 11280 0  
1355 LOA 4 1410 0 2100 0 8850 0  
1357 LOA 7 1450 0 2475 0 10450 0  
1359 LOA 8 1450 0 2100 0 8020 0  
1380 LOA 11 1930 0 2620 0 10050 0  
1385 LOA 12 1930 0 2170 0 7140 0  
1390 LOA 13 2030 0 2620 0 7900 0  
1395 LOA 14 2030 0 2170 0 4980 0  
1500 TOUT 1 2 4 5  
1510 FOUT 1 2 4 5 A1FINAL.OUT  
1530 PFO 1 10 11 20 21 30 31 40

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\* CORPS PROGRAM # X0080 \* CPGA - CASE PILE GROUP ANALYSIS PROGRAM  
\* VERSION NUMBER # 1993/03/29 \* RUN DATE 26-JUL-2008 RUN TIME 12.19.09  
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ALGIERS CANAL WEST - REACH 1 - ANCH=10.9 PIPE PILES

FILE: **A1FINAL.OUT**

THERE ARE 40 PILES AND  
10 LOAD CASES IN THIS RUN.

ALL PILE COORDINATES ARE CONTAINED WITHIN A BOX

|                               | X        | Y        | Z     |
|-------------------------------|----------|----------|-------|
| WITH DIAGONAL COORDINATES = ( | -16.75 , | -27.00 , | .00 ) |
|                               | ( 2.00 , | 27.00 ,  | .00 ) |

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PILE PROPERTIES AS INPUT

|            |            |            |            |            |            |
|------------|------------|------------|------------|------------|------------|
| E          | I1         | I2         | A          | C33        | B66        |
| KSI        | IN**4      | IN**4      | IN**2      |            |            |
| .29000E+05 | .25490E+04 | .25490E+04 | .36900E+02 | .18000E+01 | .00000E+00 |

THESE PILE PROPERTIES APPLY TO THE FOLLOWING PILES -

ALL

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SOIL DESCRIPTIONS AS INPUT

|            |         |            |            |    |
|------------|---------|------------|------------|----|
| ES         | ESOIL   | LENGTH     | L          | LU |
|            | K/IN**2 |            | FT         | FT |
| .25000E-01 | L       | .10000E+03 | .00000E+00 |    |

THIS SOIL DESCRIPTION APPLIES TO THE FOLLOWING PILES -

|    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |    |    |

|            |         |            |            |    |
|------------|---------|------------|------------|----|
| ES         | ESOIL   | LENGTH     | L          | LU |
|            | K/IN**2 |            | FT         | FT |
| .40000E-01 | L       | .10000E+03 | .00000E+00 |    |

THIS SOIL DESCRIPTION APPLIES TO THE FOLLOWING PILES -

|    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
|----|----|----|----|----|----|----|----|----|----|

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## PILE GEOMETRY AS INPUT AND/OR GENERATED

| NUM | X<br>FT | Y<br>FT | Z<br>FT | BATTER | ANGLE  | LENGTH<br>FT | FIXITY |
|-----|---------|---------|---------|--------|--------|--------------|--------|
| 1   | -16.75  | -27.00  | .00     | 2.00   | 180.00 | 100.00       | P      |
| 2   | -16.75  | -21.00  | .00     | 2.00   | 180.00 | 100.00       | P      |
| 3   | -16.75  | -15.00  | .00     | 2.00   | 180.00 | 100.00       | P      |
| 4   | -16.75  | -9.00   | .00     | 2.00   | 180.00 | 100.00       | P      |
| 5   | -16.75  | -3.00   | .00     | 2.00   | 180.00 | 100.00       | P      |
| 6   | -16.75  | 3.00    | .00     | 2.00   | 180.00 | 100.00       | P      |
| 7   | -16.75  | 9.00    | .00     | 2.00   | 180.00 | 100.00       | P      |
| 8   | -16.75  | 15.00   | .00     | 2.00   | 180.00 | 100.00       | P      |
| 9   | -16.75  | 21.00   | .00     | 2.00   | 180.00 | 100.00       | P      |
| 10  | -16.75  | 27.00   | .00     | 2.00   | 180.00 | 100.00       | P      |
| 11  | -11.75  | -27.00  | .00     | 2.00   | .00    | 100.00       | P      |
| 12  | -11.75  | -21.00  | .00     | 2.00   | .00    | 100.00       | P      |
| 13  | -11.75  | -15.00  | .00     | 2.00   | .00    | 100.00       | P      |
| 14  | -11.75  | -9.00   | .00     | 2.00   | .00    | 100.00       | P      |
| 15  | -11.75  | -3.00   | .00     | 2.00   | .00    | 100.00       | P      |
| 16  | -11.75  | 3.00    | .00     | 2.00   | .00    | 100.00       | P      |
| 17  | -11.75  | 9.00    | .00     | 2.00   | .00    | 100.00       | P      |
| 18  | -11.75  | 15.00   | .00     | 2.00   | .00    | 100.00       | P      |
| 19  | -11.75  | 21.00   | .00     | 2.00   | .00    | 100.00       | P      |
| 20  | -11.75  | 27.00   | .00     | 2.00   | .00    | 100.00       | P      |
| 21  | -5.25   | -27.00  | .00     | 2.00   | .00    | 100.00       | P      |
| 22  | -5.25   | -21.00  | .00     | 2.00   | .00    | 100.00       | P      |
| 23  | -5.25   | -15.00  | .00     | 2.00   | .00    | 100.00       | P      |
| 24  | -5.25   | -9.00   | .00     | 2.00   | .00    | 100.00       | P      |
| 25  | -5.25   | -3.00   | .00     | 2.00   | .00    | 100.00       | P      |
| 26  | -5.25   | 3.00    | .00     | 2.00   | .00    | 100.00       | P      |
| 27  | -5.25   | 9.00    | .00     | 2.00   | .00    | 100.00       | P      |
| 28  | -5.25   | 15.00   | .00     | 2.00   | .00    | 100.00       | P      |
| 29  | -5.25   | 21.00   | .00     | 2.00   | .00    | 100.00       | P      |
| 30  | -5.25   | 27.00   | .00     | 2.00   | .00    | 100.00       | P      |
| 31  | 2.00    | -27.00  | .00     | 2.00   | .00    | 100.00       | P      |
| 32  | 2.00    | -21.00  | .00     | 2.00   | .00    | 100.00       | P      |
| 33  | 2.00    | -15.00  | .00     | 2.00   | .00    | 100.00       | P      |
| 34  | 2.00    | -9.00   | .00     | 2.00   | .00    | 100.00       | P      |
| 35  | 2.00    | -3.00   | .00     | 2.00   | .00    | 100.00       | P      |
| 36  | 2.00    | 3.00    | .00     | 2.00   | .00    | 100.00       | P      |
| 37  | 2.00    | 9.00    | .00     | 2.00   | .00    | 100.00       | P      |
| 38  | 2.00    | 15.00   | .00     | 2.00   | .00    | 100.00       | P      |
| 39  | 2.00    | 21.00   | .00     | 2.00   | .00    | 100.00       | P      |
| 40  | 2.00    | 27.00   | .00     | 2.00   | .00    | 100.00       | P      |
|     |         |         |         |        |        | -----        |        |
|     |         |         |         |        |        | 4000.00      |        |

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## APPLIED LOADS

| LOAD<br>CASE | PX<br>K | PY<br>K              | PZ<br>K | MX<br>FT-K                   | MY<br>FT-K | MZ<br>FT-K |
|--------------|---------|----------------------|---------|------------------------------|------------|------------|
| 1            | 950.0   | .0                   | 3080.0  | .0                           | 19300.0    | .0         |
| 2            | 880.0   | .0                   | 3480.0  | .0                           | 26870.0    | .0         |
| 3            | 1410.0  | .0                   | 2475.0  | .0                           | 11280.0    | .0         |
| 4            | 1410.0  | .0                   | 2100.0  | .0                           | 8850.0     | .0         |
| 7            | 1450.0  | .0                   | 2475.0  | .0                           | 10450.0    | .0         |
| 8            | 1450.0  | .0                   | 2100.0  | .0                           | 8020.0     | .0         |
| 11           | 1930.0  | .0                   | 2620.0  | .0                           | 10050.0    | .0         |
| 12           | 1930.0  | .0                   | 2170.0  | .0                           | 7140.0     | .0         |
| 13           | 2030.0  | .0                   | 2620.0  | .0                           | 7900.0     | .0         |
| 14           | 2030.0  | .0                   | 2170.0  | .0                           | 4980.0     | .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 = | 10.        |            |
| LOAD CASE    | 4.      | NUMBER OF FAILURES = | 0.      | NUMBER OF PILES IN TENSION = | 10.        |            |
| LOAD CASE    | 7.      | NUMBER OF FAILURES = | 0.      | NUMBER OF PILES IN TENSION = | 10.        |            |
| LOAD CASE    | 8.      | NUMBER OF FAILURES = | 0.      | NUMBER OF PILES IN TENSION = | 10.        |            |
| LOAD CASE    | 11.     | NUMBER OF FAILURES = | 20.     | NUMBER OF PILES IN TENSION = | 10.        |            |
| LOAD CASE    | 12.     | NUMBER OF FAILURES = | 20.     | NUMBER OF PILES IN TENSION = | 10.        |            |
| LOAD CASE    | 13.     | NUMBER OF FAILURES = | 30.     | NUMBER OF PILES IN TENSION = | 10.        |            |
| LOAD CASE    | 14.     | NUMBER OF FAILURES = | 20.     | NUMBER OF PILES IN TENSION = | 10.        |            |

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## PILE CAP DISPLACEMENTS

| LOAD<br>CASE | DX<br>IN   | DY<br>IN   | DZ<br>IN   | RX<br>RAD  | RY<br>RAD  | RZ<br>RAD  |
|--------------|------------|------------|------------|------------|------------|------------|
| 1            | -.9358E-02 | .1390E-06  | .8158E-01  | -.1766E-11 | -.2029E-03 | -.7093E-11 |
| 2            | -.4144E-02 | .2036E-06  | .7253E-01  | -.2587E-11 | -.3984E-04 | -.1039E-10 |
| 3            | .8810E-01  | -.3791E-07 | .2130E-01  | .4815E-12  | .5150E-04  | .1934E-11  |
| 4            | .1126E+00  | -.8129E-07 | -.2397E-02 | .1033E-11  | .1597E-03  | .4146E-11  |
| 7            | .8878E-01  | -.4743E-07 | .2349E-01  | .6025E-12  | .2683E-04  | .2419E-11  |
| 8            | .1133E+00  | -.9081E-07 | -.2151E-03 | .1154E-11  | .1351E-03  | .4632E-11  |
| 11           | .1669E+00  | -.1409E-06 | -.1577E-01 | .1790E-11  | .2644E-03  | .7187E-11  |
| 12           | .1963E+00  | -.1929E-06 | -.4427E-01 | .2451E-11  | .3947E-03  | .9842E-11  |
| 13           | .1679E+00  | -.1647E-06 | -.9670E-02 | .2093E-11  | .1977E-03  | .8403E-11  |
| 14           | .1972E+00  | -.2168E-06 | -.3808E-01 | .2754E-11  | .3273E-03  | .1106E-10  |

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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 CONSTRUCTION WITH WIND

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF | CBF |
|------|---------|---------|---------|------------|------------|------------|-----|-----|
| 1    | .0      | .0      | 65.3    | .0         | 4.3        | .0         | .54 | .08 |
| 10   | .0      | .0      | 65.3    | .0         | 4.3        | .0         | .54 | .08 |
| 11   | -.1     | .0      | 69.3    | .0         | 14.0       | .0         | .58 | .09 |
| 20   | -.1     | .0      | 69.3    | .0         | 14.0       | .0         | .58 | .09 |
| 21   | -.2     | .0      | 92.0    | .0         | 17.1       | .0         | .77 | .11 |
| 30   | -.2     | .0      | 92.0    | .0         | 17.1       | .0         | .77 | .11 |
| 31   | -.3     | .0      | 117.4   | .0         | 26.0       | .0         | .98 | .15 |
| 40   | -.3     | .0      | 117.4   | .0         | 26.0       | .0         | .98 | .15 |

LOAD CASE - 2 CONSTRUCTION WITH SURCHARGE

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF | CBF |
|------|---------|---------|---------|------------|------------|------------|-----|-----|
| 1    | -.1     | .0      | 95.6    | .0         | 11.0       | .0         | .80 | .12 |
| 10   | -.1     | .0      | 95.6    | .0         | 11.0       | .0         | .80 | .12 |
| 11   | -.1     | .0      | 93.1    | .0         | 14.7       | .0         | .78 | .11 |
| 20   | -.1     | .0      | 93.1    | .0         | 14.7       | .0         | .78 | .11 |
| 21   | -.1     | .0      | 97.6    | .0         | 15.3       | .0         | .81 | .12 |
| 30   | -.1     | .0      | 97.6    | .0         | 15.3       | .0         | .81 | .12 |
| 31   | -.2     | .0      | 102.5   | .0         | 20.2       | .0         | .85 | .13 |
| 40   | -.2     | .0      | 102.5   | .0         | 20.2       | .0         | .85 | .13 |

LOAD CASE - 3 STILLWATER WITH UNBALAMCED - NO SEEPAGE

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF | CBF |
|------|---------|---------|---------|------------|------------|------------|-----|-----|
| 1    | -.4     | .0      | -17.8   | .0         | 40.7       | .0         | .24 | .03 |
| 10   | -.4     | .0      | -17.8   | .0         | 40.7       | .0         | .24 | .03 |
| 11   | .3      | .0      | 104.3   | .0         | -28.9      | .0         | .87 | .13 |
| 20   | .3      | .0      | 104.3   | .0         | -28.9      | .0         | .87 | .13 |
| 21   | .3      | .0      | 98.5    | .0         | -29.7      | .0         | .82 | .12 |
| 30   | .3      | .0      | 98.5    | .0         | -29.7      | .0         | .82 | .12 |
| 31   | .4      | .0      | 92.1    | .0         | -38.7      | .0         | .77 | .12 |
| 40   | .4      | .0      | 92.1    | .0         | -38.7      | .0         | .77 | .12 |

## LOAD CASE - 4 STILLWATER WITH UNBALAMCED - NO SEEPAGE

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF | CBF |
|------|---------|---------|---------|------------|------------|------------|-----|-----|
| 1    | -.5     | .0      | -38.2   | .0         | 49.9       | .0         | .52 | .06 |
| 10   | -.5     | .0      | -38.2   | .0         | 49.9       | .0         | .52 | .06 |
| 11   | .4      | .0      | 109.7   | .0         | -40.1      | .0         | .91 | .14 |
| 20   | .4      | .0      | 109.7   | .0         | -40.1      | .0         | .91 | .14 |
| 21   | .4      | .0      | 91.8    | .0         | -42.6      | .0         | .77 | .12 |
| 30   | .4      | .0      | 91.8    | .0         | -42.6      | .0         | .77 | .12 |
| 31   | .6      | .0      | 71.9    | .0         | -57.3      | .0         | .60 | .10 |
| 40   | .6      | .0      | 71.9    | .0         | -57.3      | .0         | .60 | .10 |

## LOAD CASE - 7 STILLWATER WITH WAVE &amp; UNBALAMCED - NO SEEPAGE

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF | CBF |
|------|---------|---------|---------|------------|------------|------------|-----|-----|
| 1    | -.4     | .0      | -22.3   | .0         | 40.4       | .0         | .30 | .03 |
| 10   | -.4     | .0      | -22.3   | .0         | 40.4       | .0         | .30 | .03 |
| 11   | .3      | .0      | 102.9   | .0         | -29.4      | .0         | .86 | .13 |
| 20   | .3      | .0      | 102.9   | .0         | -29.4      | .0         | .86 | .13 |
| 21   | .3      | .0      | 99.9    | .0         | -29.8      | .0         | .83 | .13 |
| 30   | .3      | .0      | 99.9    | .0         | -29.8      | .0         | .83 | .13 |
| 31   | .4      | .0      | 96.5    | .0         | -38.3      | .0         | .80 | .12 |
| 40   | .4      | .0      | 96.5    | .0         | -38.3      | .0         | .80 | .12 |

## LOAD CASE - 8 STILLWATER WITH WAVE &amp; UNBALAMCED - SEEPAGE

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF | CBF |
|------|---------|---------|---------|------------|------------|------------|-----|-----|
| 1    | -.5     | .0      | -42.6   | .0         | 49.6       | .0         | .58 | .06 |
| 10   | -.5     | .0      | -42.6   | .0         | 49.6       | .0         | .58 | .06 |
| 11   | .4      | .0      | 108.3   | .0         | -40.7      | .0         | .90 | .14 |
| 20   | .4      | .0      | 108.3   | .0         | -40.7      | .0         | .90 | .14 |
| 21   | .4      | .0      | 93.2    | .0         | -42.7      | .0         | .78 | .12 |
| 30   | .4      | .0      | 93.2    | .0         | -42.7      | .0         | .78 | .12 |
| 31   | .6      | .0      | 76.3    | .0         | -56.9      | .0         | .64 | .10 |
| 40   | .6      | .0      | 76.3    | .0         | -56.9      | .0         | .64 | .10 |

## LOAD CASE - 11 WATER AT TOP OF WALL WITH UNBALAMCED - NO SEEPAGE

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF  | CBF |
|------|---------|---------|---------|------------|------------|------------|------|-----|
| 1    | -.7     | .0      | -66.2   | .0         | 72.7       | .0         | .89  | .09 |
| 10   | -.7     | .0      | -66.2   | .0         | 72.7       | .0         | .89  | .09 |
| 11   | .6      | .0      | 150.7   | .0         | -61.1      | .0         | 1.26 | .19 |
| 20   | .6      | .0      | 150.7   | .0         | -61.1      | .0         | 1.26 | .19 |
| 21   | .6      | .0      | 121.1   | .0         | -65.2      | .0         | 1.01 | .16 |
| 30   | .6      | .0      | 121.1   | .0         | -65.2      | .0         | 1.01 | .16 |
| 31   | .9      | .0      | 88.0    | .0         | -88.1      | .0         | .73  | .12 |
| 40   | .9      | .0      | 88.0    | .0         | -88.1      | .0         | .73  | .12 |

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## LOAD CASE - 12 WATER AT TOP OF WALL WITH UNBALAMCED - SEEPAGE

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF  | CBF |   |
|------|---------|---------|---------|------------|------------|------------|------|-----|---|
| 1    | -.8     | .0      | -90.6   | .0         | 83.7       | .0         | 1.22 | .12 | * |
| 10   | -.8     | .0      | -90.6   | .0         | 83.7       | .0         | 1.22 | .12 | * |
| 11   | .7      | .0      | 157.3   | .0         | -74.6      | .0         | 1.31 | .20 | * |
| 20   | .7      | .0      | 157.3   | .0         | -74.6      | .0         | 1.31 | .20 | * |
| 21   | .8      | .0      | 113.1   | .0         | -80.7      | .0         | .94  | .15 |   |
| 30   | .8      | .0      | 113.1   | .0         | -80.7      | .0         | .94  | .15 |   |
| 31   | 1.2     | .0      | 63.8    | .0         | -110.5     | .0         | .53  | .10 |   |
| 40   | 1.2     | .0      | 63.8    | .0         | -110.5     | .0         | .53  | .10 |   |

## LOAD CASE - 13 TOW WITH IMPACT &amp; UNBALAMCED - NO SEEPAGE

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF  | CBF |   |
|------|---------|---------|---------|------------|------------|------------|------|-----|---|
| 1    | -.7     | .0      | -77.3   | .0         | 71.6       | .0         | 1.05 | .11 | * |
| 10   | -.7     | .0      | -77.3   | .0         | 71.6       | .0         | 1.05 | .11 | * |
| 11   | .6      | .0      | 146.7   | .0         | -62.2      | .0         | 1.22 | .19 | * |
| 20   | .6      | .0      | 146.7   | .0         | -62.2      | .0         | 1.22 | .19 | * |
| 21   | .6      | .0      | 124.5   | .0         | -65.2      | .0         | 1.04 | .16 | * |
| 30   | .6      | .0      | 124.5   | .0         | -65.2      | .0         | 1.04 | .16 | * |
| 31   | .9      | .0      | 99.8    | .0         | -86.7      | .0         | .83  | .14 |   |
| 40   | .9      | .0      | 99.8    | .0         | -86.7      | .0         | .83  | .14 |   |

## LOAD CASE - 14 TOW WITH IMPACT &amp; UNBALAMCED - SEEPAGE

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF  | CBF |   |
|------|---------|---------|---------|------------|------------|------------|------|-----|---|
| 1    | -.8     | .0      | -101.8  | .0         | 82.6       | .0         | 1.38 | .14 | * |
| 10   | -.8     | .0      | -101.8  | .0         | 82.6       | .0         | 1.38 | .14 | * |
| 11   | .7      | .0      | 153.2   | .0         | -75.6      | .0         | 1.28 | .20 | * |
| 20   | .7      | .0      | 153.2   | .0         | -75.6      | .0         | 1.28 | .20 | * |
| 21   | .8      | .0      | 116.5   | .0         | -80.6      | .0         | .97  | .16 |   |
| 30   | .8      | .0      | 116.5   | .0         | -80.6      | .0         | .97  | .16 |   |
| 31   | 1.2     | .0      | 75.6    | .0         | -109.0     | .0         | .63  | .11 |   |
| 40   | 1.2     | .0      | 75.6    | .0         | -109.0     | .0         | .63  | .11 |   |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 RAILROAD GATE MONOLITH**  
**BASIC T-WALL GEOMETRY**

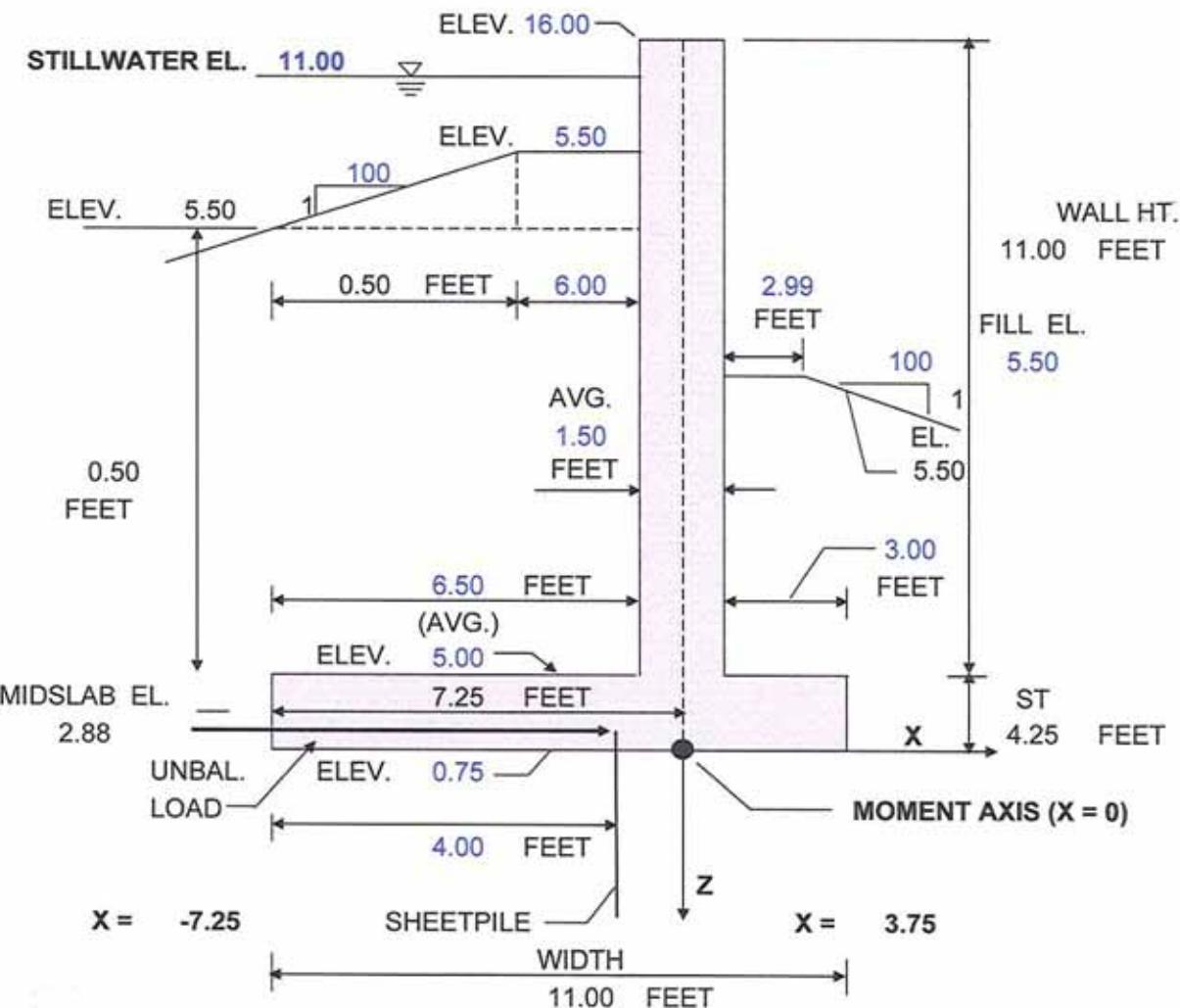
DATE: 6/18/2008

BY: RWY CHKD:

|                      |           |
|----------------------|-----------|
| CONCRETE STRENGTH    | 4,000     |
| REINFORCING STRENGTH | 60,000    |
| WALL INTERVAL        | 0.66      |
| SLAB INTERVAL        | 1         |
| MONOLITH LENGTH      | 30        |
| BACKFILL WEIGHT      | 120.0 PCF |
| Ko                   | 0.8       |

**UNBALANCED SOILS LOADING:**

|             |             |
|-------------|-------------|
| 0.0 K / FT. | STILLWATER  |
| 0.0 K / FT. | TOP OF WALL |
| IMPACT      |             |
| 0 K         |             |



**DESIGN CRITERIA**

CONCRETE: EM1110-2-2104 "STRENGTH DESIGN FOR REINFORCED HYDRAULIC STRUCTURES"

HYDRAULIC FACTOR ( $H_f$ ) = 1.3

DL & LL LOAD FACTORS = 1.7

MAX. REINFORCING = 0.375 RHO<sub>bal</sub>

REINFORCING PER EQS. D-3 & D-4, AXIAL LOADS IGNORED

ALLOWABLE SHEAR PER ACI 318, EQ. 11-3

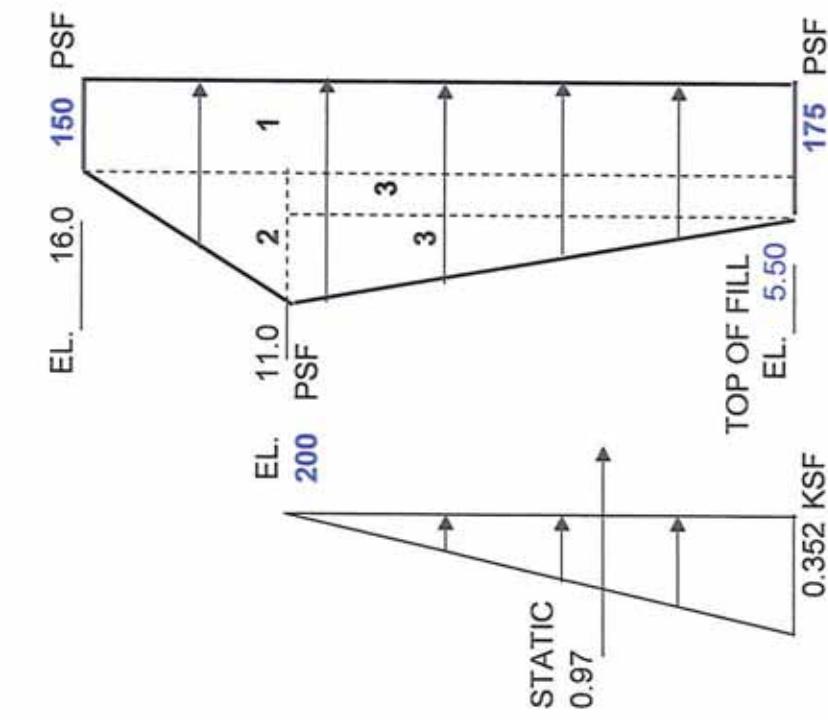
CLEAR COVER:

- 4 INCHES IN WALL AND TOP OF SLAB (ARCHITECTURAL WALLS - 5")
- 9 INCHES IN BOTTOM OF SLAB TO ALLOW FOR PILES

WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 2 RAILROAD GATE MONOLITH

DATE: 6/18/2008

BY: RWY CHKD:

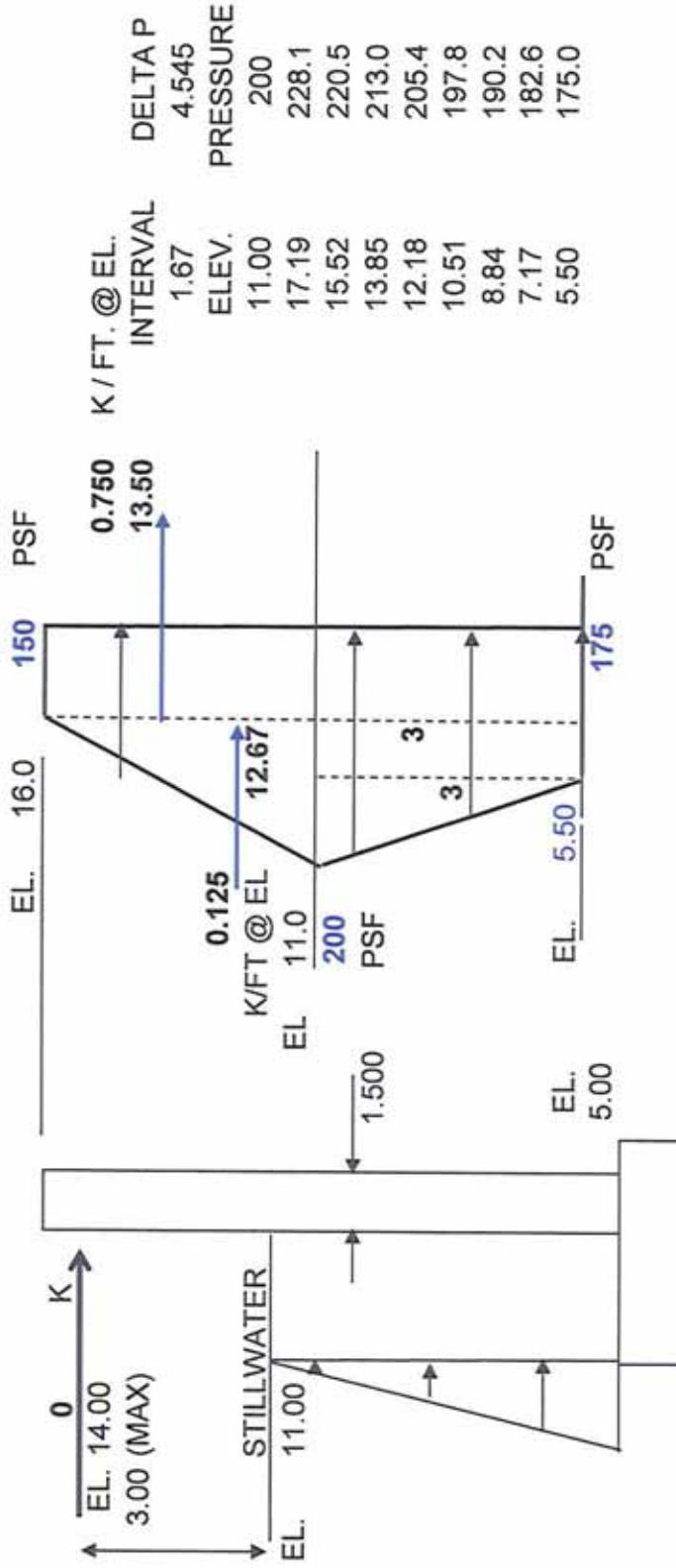


| WAVE PRESSURES                                         |                  |                  |                  |                                                     |               |
|--------------------------------------------------------|------------------|------------------|------------------|-----------------------------------------------------|---------------|
|                                                        | P1<br>200<br>PSF | P2<br>150<br>PSF | P3<br>175<br>PSF |                                                     |               |
| <b>Stillwater Top Wall Top of Fill<br/>WAVE FORCES</b> |                  |                  |                  |                                                     |               |
|                                                        | PRESS            | HEIGHT           | FORCE            | LEVER ARM                                           | BASE MOMENT   |
| 1 UNIFORM                                              | 150              | 10.5             | 1.575 K          | 5.25                                                | 8.27          |
| 2 TRIANG.                                              | 50               | 5                | 0.125 K          | 7.17                                                | 0.90          |
| 3 UNIFORM                                              | 25               | 5.5              | 0.138 K          | 2.75                                                | 0.38          |
| 3 TRIANG.                                              | 25               | 5.5              | 0.069 K          | 3.67                                                | 0.25          |
| <b>WAVE TOTAL</b>                                      |                  |                  | <b>1.906 K</b>   |                                                     | <b>9.795</b>  |
| <b>TOTAL</b>                                           |                  |                  | <b>RESULTANT</b> | <b>5.14 FT.<br/>ABOVE TOP OF FILL<br/>EL. 10.64</b> |               |
| FORCE (STATIC + WAVE)<br><b>2.874 K / FT.</b>          |                  |                  | HT. TO BASE      | <b>4.75 FT.</b>                                     |               |
| <b>BASE MOMENT / FT.<br/>WIDTH</b>                     |                  |                  |                  | <b>18.85 FT.-K / FT.<br/>HORIZ.</b>                 | <b>MOMENT</b> |
| <b>TOTAL LOADS</b>                                     |                  | <b>30</b>        |                  | <b>57</b>                                           | <b>-565</b>   |

**WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 2 RAILROAD GATE MONOLITH**

DATE: 6/18/2008

BY: RWY CHKD:



| STILLWATER ELEV. PRESS. | FORCES V M (K) | IMPACT FORCES ABOVE STILLWATER |      |      | WAVE FORCES BELOW STILLWATER |       |       |        |     |
|-------------------------|----------------|--------------------------------|------|------|------------------------------|-------|-------|--------|-----|
|                         |                | V                              | M    | V    | M                            | V     | M     |        |     |
| 11.00                   | 0.00           | 0.00                           | 0.0  | 0.0  | 0.875                        | 2.08  | 0.000 | 0.0    |     |
| 17.19                   | -0.40          | 1.23                           | -2.5 | 0.00 | 0.0                          | 0.875 | -3.33 | -1.325 | 4.0 |
| 15.52                   | -0.29          | 0.65                           | -1.0 | 0.00 | 0.0                          | 0.875 | -1.87 | -0.950 | 2.1 |
| 13.85                   | -0.18          | 0.26                           | -0.2 | 0.00 | 0.0                          | 0.875 | -0.41 | -0.588 | 0.8 |
| 12.18                   | -0.08          | 0.04                           | 0.0  | 0.00 | 0.0                          | 0.875 | 1.05  | -0.239 | 0.1 |
| 10.51                   | 0.03           | 0.01                           | 0.0  | 0.00 | 0.0                          | 0.875 | 2.51  | 0.097  | 0.0 |
| 8.84                    | 0.14           | 0.15                           | 0.1  | 0.00 | 0.0                          | 0.875 | 3.97  | 0.421  | 0.5 |
| 7.17                    | 0.25           | 0.47                           | 0.6  | 0.00 | 0.0                          | 0.875 | 5.43  | 0.733  | 1.4 |
| 5.50                    | 0.35           | 0.97                           | 1.8  | 0.00 | 0.0                          | 0.875 | 6.90  | 1.031  | 2.9 |
| 5.00                    | 0.38           | 1.15                           | 2.3  | 0.00 | 0.0                          | 0.875 | 7.33  | 1.031  | 3.4 |

**WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 2 RAILROAD GATE MONOLITH**

DATE: 6/18/2008

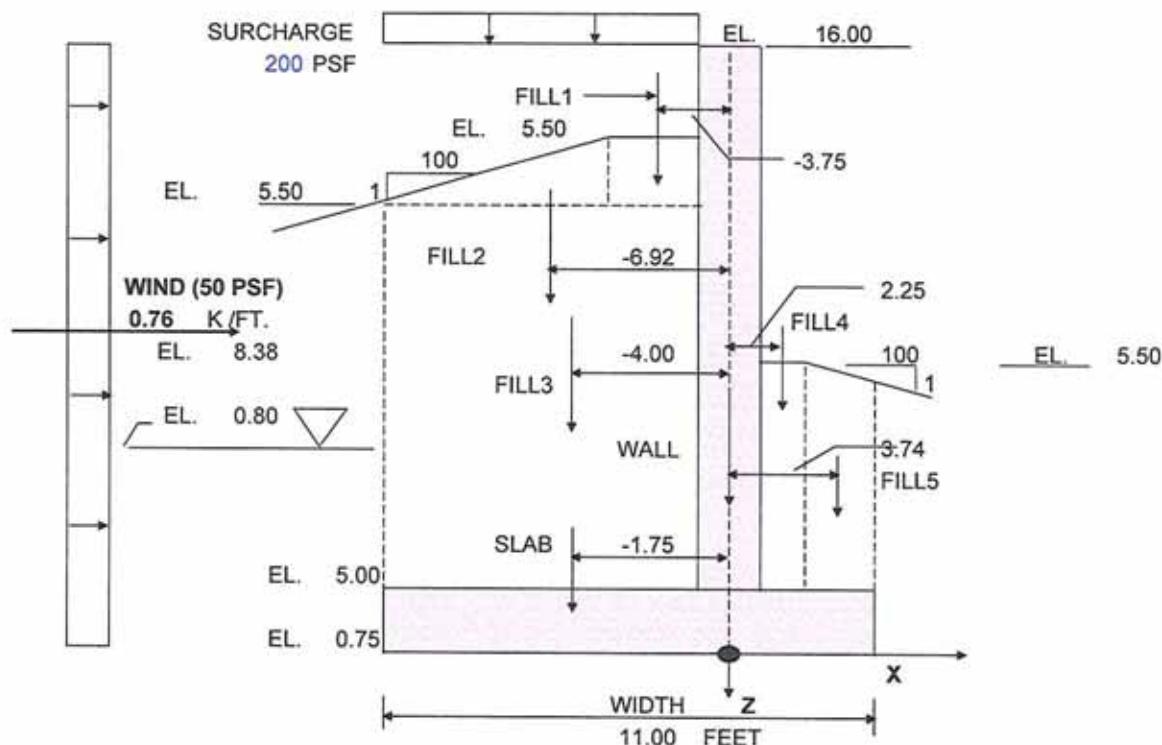
BY: RWY CHKD:

**TOTAL FORCES - STILLWATER PLUS WAVE PLUS IMPACT**

| ELEV. | V<br>(K) | M<br>(FT-K) | TOTAL          |                | t    | d<br>(t-4.5) | SIMPLE                  |                                      | OVERSTRESS          |             | DETAILED |  |
|-------|----------|-------------|----------------|----------------|------|--------------|-------------------------|--------------------------------------|---------------------|-------------|----------|--|
|       |          |             | V <sub>U</sub> | M <sub>U</sub> |      |              | SHEAR<br>CAP.<br>(KIPS) | A <sub>s</sub><br>(Mu/4d)<br>(no OS) | %<br>A <sub>s</sub> | As<br>REQ'D |          |  |
| 11.00 | 0.88     | 2.08        | 1.93           | 4.6            | 18.0 | 13.50        | 29.1                    | 0.09                                 | 0.051               | 0.045       |          |  |
| 17.19 | 0.78     | -1.85       | 1.72           | -4.1           | 18.0 | 13.50        | 29.1                    | -0.08                                | -0.045              | -0.040      |          |  |
| 15.52 | 0.58     | -0.74       | 1.28           | -1.6           | 18.0 | 13.50        | 29.1                    | -0.03                                | -0.018              | -0.016      |          |  |
| 13.85 | 0.55     | 0.17        | 1.21           | 0.4            | 18.0 | 13.50        | 29.1                    | 0.01                                 | 0.004               | 0.004       |          |  |
| 12.18 | 0.68     | 1.17        | 1.50           | 2.6            | 18.0 | 13.50        | 29.1                    | 0.05                                 | 0.029               | 0.026       |          |  |
| 10.51 | 0.98     | 2.54        | 2.17           | 5.6            | 18.0 | 13.50        | 29.1                    | 0.10                                 | 0.062               | 0.055       |          |  |
| 8.84  | 1.45     | 4.54        | 3.19           | 10.0           | 18.0 | 13.50        | 29.1                    | 0.19                                 | 0.111               | 0.099       |          |  |
| 7.17  | 2.08     | 7.46        | 4.59           | 16.5           | 18.0 | 13.50        | 29.1                    | 0.31                                 | 0.183               | 0.164       |          |  |
| 5.50  | 2.87     | 11.57       | 6.35           | 25.6           | 18.0 | 13.50        | 29.1                    | 0.47                                 | 0.284               | 0.256       |          |  |
| 5.00  | 3.06     | 13.05       | 6.76           | 28.8           | 18.0 | 13.50        | 29.1                    | 0.53                                 | 0.320               | 0.289       |          |  |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 RAILROAD GATE MONOLITH**  
**CASE 1 - CONSTRUCTION**

FLOODSIDE WATER ELEV. 0.80  
 UPLIFT - PROT. SIDE 0.80  
 ALLOWABLE OVERSTRESS 16.66 %

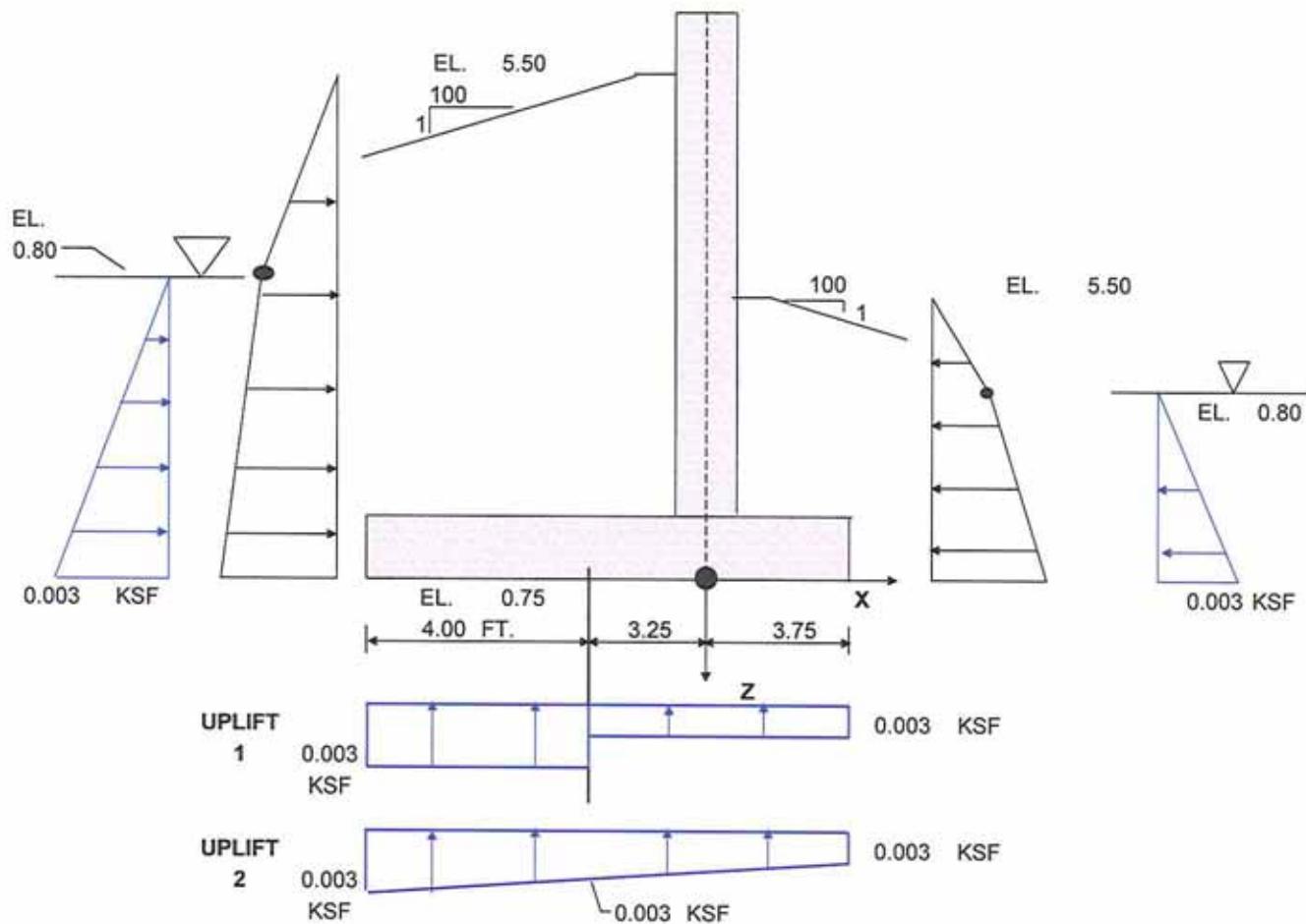


FLOODWALL APPLIED GRAVITY LOADING - CASE 1

| ITEM                 | FORCE Z<br>(WEIGHT) | X CENT.<br>FEET | Y CENT.<br>FEET | Myy<br>FT.-K | Mzz<br>FT.-K |
|----------------------|---------------------|-----------------|-----------------|--------------|--------------|
| CONCRETE SLAB        | 7.01                | -1.75           | 0.00            | 12.3         | 0            |
| CONCRETE WALL        | 2.48                | 0.00            | 0.00            | 0.0          | 0            |
| FLOODSIDE FILL1      | 0.00                | -3.75           | 0.00            | 0.0          | 0            |
| FLOODSIDE FILL2      | 0.00                | -6.92           | 0.00            | 0.0          | 0            |
| FLOODSIDE FILL3      | 0.39                | -4.00           | 0.00            | 1.5          | 0            |
| PROTECTED SIDE FILL4 | 0.18                | 2.25            | 0.00            | -0.4         | 0            |
| PROTECTED SIDE FILL5 | 0.00                | 3.74            | 0.00            | 0.0          | 0            |
| FLOODSIDE WATER      | 0.00                | -13.51          | 0.00            | 0.0          | 0            |
| FLOODSIDE WATER      | 0.00                | 0.00            | 0.00            | 0.0          | 0            |

|                     |       |       |       |       |
|---------------------|-------|-------|-------|-------|
| TOTALS              | 10.06 | -1.33 | 13.43 | 0     |
| CONCRETE            | 9.49  | -1.29 | 12.27 | 0     |
| FLOODSIDE FILL 1-3  | 0.39  | -4.00 | 1.56  | 0     |
| PROT. SIDE FILL 4-5 | 0.18  | 2.25  | -0.40 | 0     |
| FLOODSIDE WATER     | 0.00  | -     | 0.00  | 0     |
|                     |       |       | FT.-K | FT.-K |

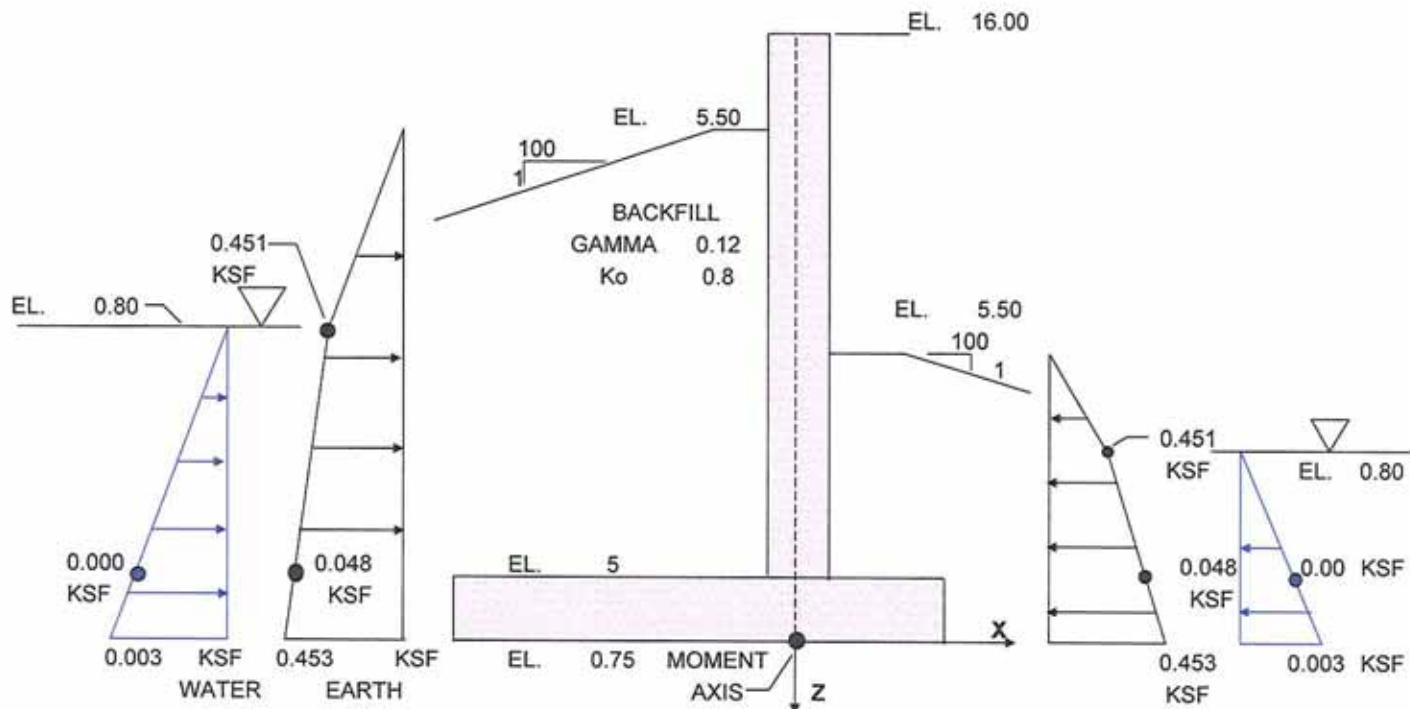
**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 RAILROAD GATE MONOLITH**  
**CASE 1 - CONSTRUCTION**



| ITEM            | WIDTH | PRESS | FORCE Z | X CENT. FEET | Y CENT. FEET | Myy FT.-K | Mzz FT.-K |
|-----------------|-------|-------|---------|--------------|--------------|-----------|-----------|
| FLOODSIDE:      |       |       |         |              |              |           |           |
| UPLIFT 1        | 4.00  | 0.00  | -0.01   | -5.25        | 0.00         | 0         | 0         |
| PROTECTED SIDE: |       |       |         |              |              |           |           |
| UPLIFT 1        | 7.00  | 0.00  | -0.02   | 0.25         | 0.00         | 0         | 0         |
| TOTALS          |       |       | -0.04   | -1.75        |              | -0.06     | 0         |
| FLD.SIDE        |       |       | -0.01   | -5.25        |              | -0.07     | 0         |
| PROT. SIDE      |       |       | -0.02   | 0.25         |              | 0.01      | 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 (UNIF) | 4.00  | 0.003 | -0.01   | -5.25        | 0.00         | -0.07     | 0.00      |
| UPLIFT 2 (TRI)  | 4.00  | 0.000 | 0.00    | -5.92        | 0.00         | 0.00      | 0.00      |
| PROTECTED SIDE: |       |       |         |              |              |           |           |
| UPLIFT 2 (UNIF) | 7.00  | 0.003 | -0.02   | 0.25         | 0.00         | 0.01      | 0.00      |
| UPLIFT 2 (TRI)  | 7.00  | 0.000 | 0.00    | -0.92        | 0.00         | 0.00      | 0.00      |
| TOTALS          |       |       | -0.04   | -1.75        |              | -0.06     | 0.00      |
| FLOOD SIDE      |       |       | -0.01   | -5.25        |              | -0.07     | 0.00      |
| PROT. SIDE      |       |       | -0.02   | 0.25         |              | 0.01      | 0.00      |
|                 |       |       | KIPS    |              |              | FT.-K     | FT.-K     |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 RAILROAD GATE MONOLITH**  
**CASE 1 - CONSTRUCTION**

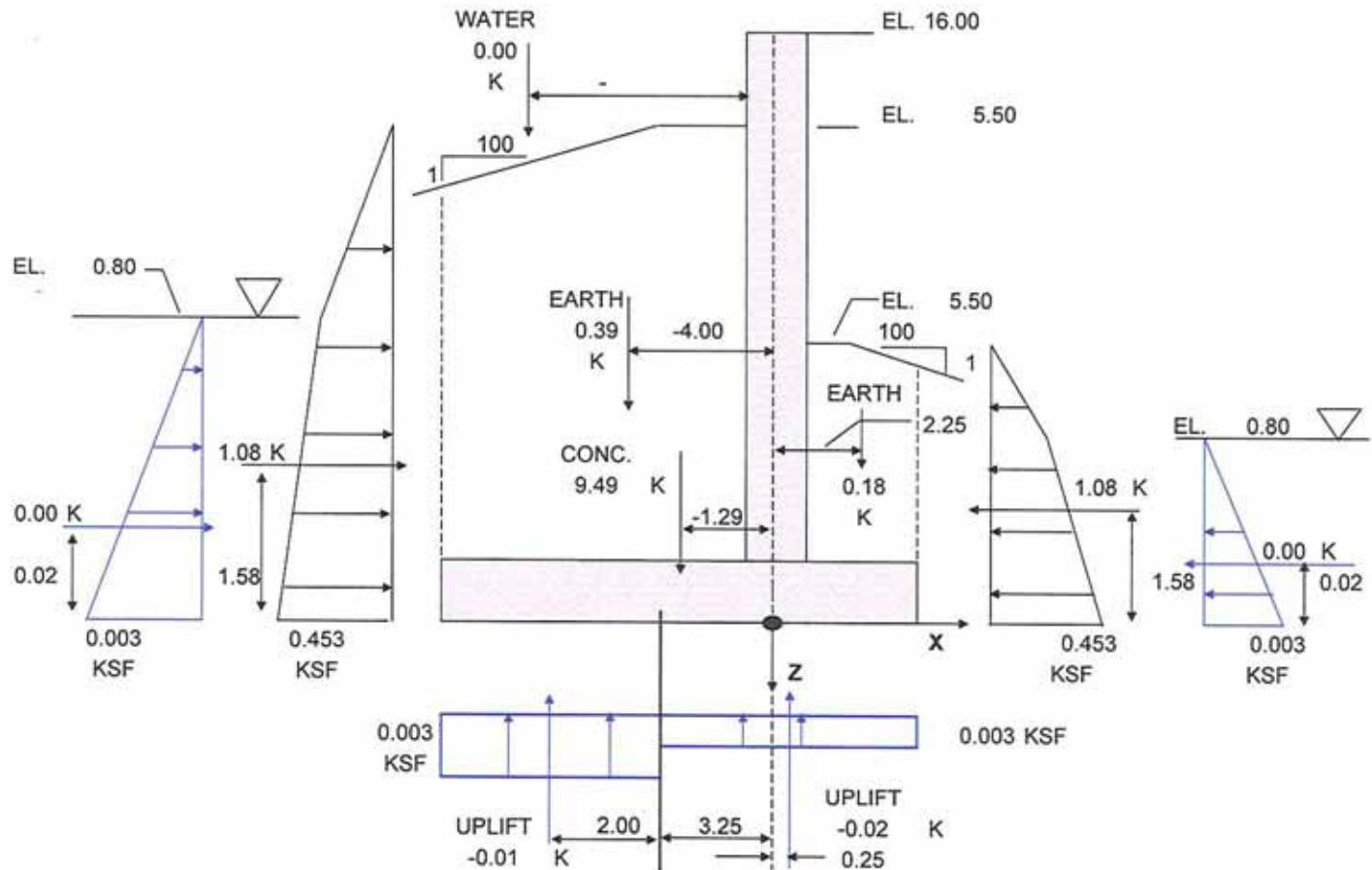


FLOODWALL HORIZONTAL LOADING - CASE 1

| ITEM       | HEIGHT | PRESS | FORCE X |      | Y CENT.<br>FEET | Z CENT.<br>FEET | Mzz<br>FT-K/FT | Myy<br>FT-K/FT |
|------------|--------|-------|---------|------|-----------------|-----------------|----------------|----------------|
| FLOODSIDE: |        |       |         |      |                 |                 |                |                |
| EARTH 1    | 4.70   | 0.451 | 1.06    | k/ft | 0.00            | -1.62           | 0              | -1.7           |
| EARTH 2    | 0.05   | 0.451 | 0.02    | k/ft | 0.00            | -0.03           | 0              | 0.0            |
| EARTH 3    | 0.05   | 0.002 | 0.00    | k/ft | 0.00            | -0.02           | 0              | 0.0            |
| GRND WATER | 0.05   | 0.003 | 0.00    | k/ft | 0.00            | -0.02           | 0              | 0.0            |
| PROTECTED: |        |       |         |      |                 |                 |                |                |
| EARTH 4    | 4.70   | 0.451 | -1.06   | k/ft | 0.00            | -1.62           | 0              | 1.7            |
| EARTH 5    | 0.05   | 0.451 | -0.02   | k/ft | 0.00            | -0.03           | 0              | 0.0            |
| EARTH 6    | 0.05   | 0.453 | 0.0     | k/ft | 0.00            | -0.02           | 0              | 0.0            |
| GRND WATER | 0.05   | 0.003 | 0.0     | k/ft | 0.00            | -0.02           | 0              | 0.0            |

|                        | FORCE X    | Y CENT. FEET | Z CENT. FEET | Mzz FT-K/FT. | Myy FT-K/FT. |
|------------------------|------------|--------------|--------------|--------------|--------------|
| FLOODSIDE EARTH FORCE  | 1.08       | 0.00         | -1.58        |              | -1.71        |
| FLOODSIDE WATER FORCE  | 0.00       | 0.00         | -0.02        |              | 0.00         |
| TOTAL FLOODSIDE FORCE  | 1.08 k/ft  | 0.00         | -1.58        | 0.0          | -1.7         |
| PROT. SIDE EARTH FORCE | -1.08      | 0.00         | -1.58        |              | 1.7          |
| PROT. SIDE WATER FORCE | 0.00       | 0.00         | -0.02        |              | 0.0          |
| TOTAL PROT. SIDE FORCE | -1.08 k/ft | 0.00         | -1.58        | 0.0          | 1.7          |
| TOTAL NET HORIZ. FORCE | 0.00 k/ft  | 0.00         | 2.70         | 0.0          | 0.0          |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 RAILROAD GATE MONOLITH**  
**CASE 1 - CONSTRUCTION**



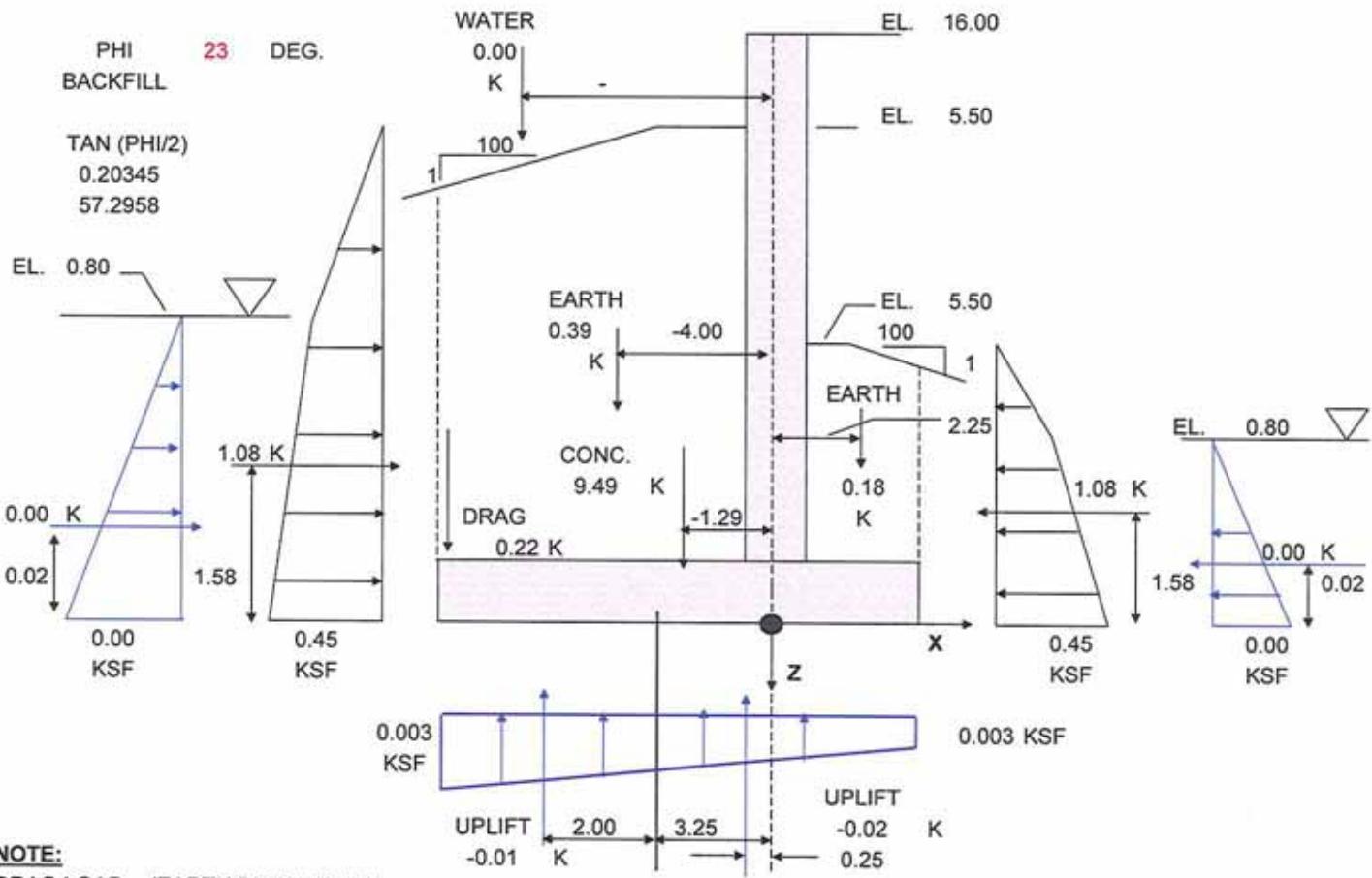
LOADING SUMMARY - CASE 1 WITH MINIMUM UPLIFT

| 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     | 9.5     | k/ft | -1.29        | 0.00         | 12.272      | 0           |
| FLDSIDE FILL    | 0.0     | 0.0     | 0.4     | k/ft | -4.00        | 0.00         | 1.559       | 0           |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.2     | k/ft | 2.25         | 0.00         | -0.405      | 0           |
| F. SIDE UPLIFT  | 0.0     | 0.0     | 0.0     | k/ft | -5.25        | 0.00         | -0.067      | 0           |
| P. SIDE UPLIFT  | 0.0     | 0.0     | 0.0     | k/ft | 0.25         | 0.00         | 0.006       | 0           |
| F. S. EARTH Pr. | 1.1     | 0.0     | 0.0     | k/ft | -            | -1.58        | -1.715      | 0           |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -1.58        | 0.000       | 0           |
| F. S. WATER Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -0.02        | 0.000       | 0           |
| P. S. WATER Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -0.02        | 0.000       | 0           |

IGNORE

|             | X    | Y   | Z     |  | Mxx | Myy | Mzz |
|-------------|------|-----|-------|--|-----|-----|-----|
| TOTALS      | 1.1  | 0.0 | 10.0  |  | 0   | 12  | 0   |
| MONO. TOTAL | 32.5 | 0.0 | 300.7 |  | 0   | 349 | 0   |

WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 2 RAILROAD GATE MONOLITH  
CASE 1 - CONSTRUCTION



NOTE:

$$\text{DRAG LOAD} = (\text{EARTH P}) * \text{TAN}(\text{PHI}/2)$$

LOADING SUMMARY - CASE 1 WITH DRAG LOAD

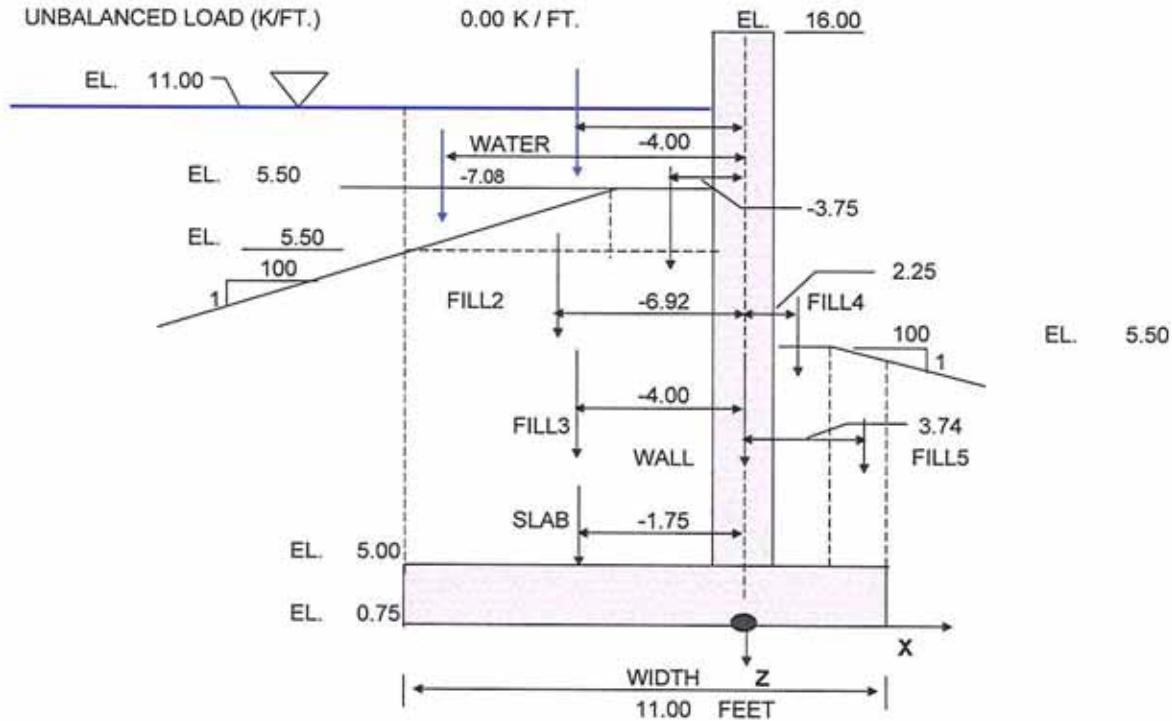
| ITEM            | FORCE X | FORCE Y | FORCE Z |      | X CENT. FEET | Z CENT. FEET | Myy FT-K/FT | Mzz FT-K/FT |
|-----------------|---------|---------|---------|------|--------------|--------------|-------------|-------------|
| CONCRETE        | 0.0     | 0.0     | 9.5     | k/ft | -1.29        | 0.00         | 12          | 0           |
| FLDSIDE FILL    | 0.0     | 0.0     | 0.4     | k/ft | -4.00        | 0.00         | 2           | 0           |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.2     | k/ft | 2.25         | 0.00         | 0           | 0           |
| DRAG LOAD       | 0.0     | 0.0     | 0.2     | k/ft | -7.25        | 0.00         | 2           | 0           |
| SURCHARGE       | 0.0     | 0.0     | 1.3     | k/ft | -4.00        | 0.00         | 5           | 0           |
| F. SIDE UPLIFT  | 0.0     | 0.0     | 0.0     | k/ft | -5.25        | 0.00         | 0           | 0           |
| P. SIDE UPLIFT  | 0.0     | 0.0     | 0.0     | k/ft | 0.25         | 0.00         | 0           | 0           |
| F. S. EARTH Pr. | 1.1     | 0.0     | 0.0     | k/ft | -            | -1.58        | -2          | 0           |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -1.58        | 0           | 0           |
| F. S. WATER Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -0.02        | 0           | 0           |
| P. S. WATER Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -0.02        | 0           | 0           |

|             | X    | Y   | Z     | Mxx | Myy     | Mzz   |
|-------------|------|-----|-------|-----|---------|-------|
| TOTALS      | 1.1  | 0.0 | 11.5  | 0   | 18      | 0     |
| MONO. TOTAL | 32.5 | 0.0 | 346.3 | 0   | 553.405 | 0     |
|             |      |     |       | X   | Y       | Z     |
| VERTICAL    |      |     | 346   | -   | -1.75   |       |
| HORIZ       |      |     | 32    |     |         | -1.58 |

-1.5

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 RAILROAD GATE MONOLITH**  
**CASE 2 - CANAL AT STILLWATER**

FLOODSIDE WATER ELEV.                   **11.00**  
 UPLIFT - PROT. SIDE                    5.00  
 ALLOWABLE OVERSTRESS                 0  
 UNBALANCED LOAD (K/FT.)             0.00 K / FT.

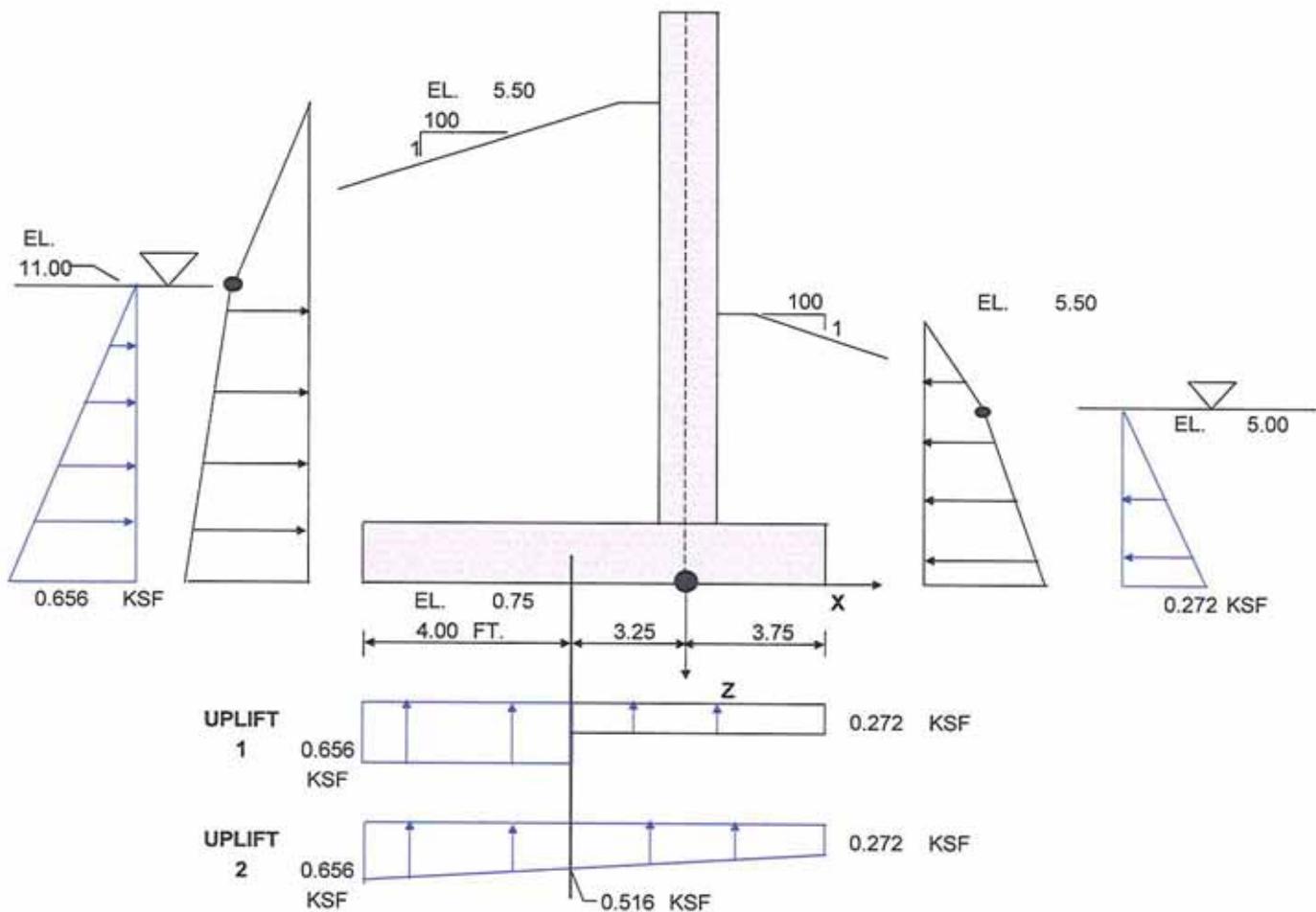


**FLOODWALL APPLIED GRAVITY LOADING - CASE 2**

| ITEM                 | FORCE Z<br>(WEIGHT) | X CENT.<br>FEET | Y CENT.<br>FEET | Myy<br>FT.-K | Mzz<br>FT.-K |
|----------------------|---------------------|-----------------|-----------------|--------------|--------------|
| CONCRETE SLAB        | 7.01                | -1.75           | 0.00            | 12           | 0            |
| CONCRETE WALL        | 2.48                | 0.00            | 0.00            | 0            | 0            |
| FLOODSIDE FILL1      | 0.00                | -3.75           | 0.00            | 0            | 0            |
| FLOODSIDE FILL2      | 0.00                | -6.92           | 0.00            | 0            | 0            |
| FLOODSIDE FILL3      | 0.39                | -4.00           | 0.00            | 2            | 0            |
| PROTECTED SIDE FILL4 | 0.18                | 2.25            | 0.00            | 0            | 0            |
| PROTECTED SIDE FILL5 | 0.00                | 3.74            | 0.00            | 0            | 0            |
| FLOODSIDE WATER      | 0.00                | -7.08           | 0.00            | 0            | 0            |
| FLOODSIDE WATER      | 2.29                | -4.00           | 0.00            | 9            | 0            |
|                      |                     |                 |                 |              |              |
| <b>TOTALS</b>        | <b>12.35</b>        | <b>-1.83</b>    |                 | <b>22.58</b> | <b>0</b>     |
| CONCRETE             | 9.49                | -1.29           |                 | 12.27        | 0            |
| FLOODSIDE FILL 1-3   | 0.39                | -4.00           |                 | 1.56         | 0            |
| PROT. SIDE FILL 4-5  | 0.18                | 2.25            |                 | -0.40        | 0            |
| FLOODSIDE WATER      | 2.29                | -4.00           |                 | 9.15         | 0            |
|                      |                     |                 |                 | FT.-K        | FT.-K        |

|                     |       |       |       |       |
|---------------------|-------|-------|-------|-------|
| TOTALS              | 12.35 | -1.83 | 22.58 | 0     |
| CONCRETE            | 9.49  | -1.29 | 12.27 | 0     |
| FLOODSIDE FILL 1-3  | 0.39  | -4.00 | 1.56  | 0     |
| PROT. SIDE FILL 4-5 | 0.18  | 2.25  | -0.40 | 0     |
| FLOODSIDE WATER     | 2.29  | -4.00 | 9.15  | 0     |
|                     |       |       | FT.-K | FT.-K |

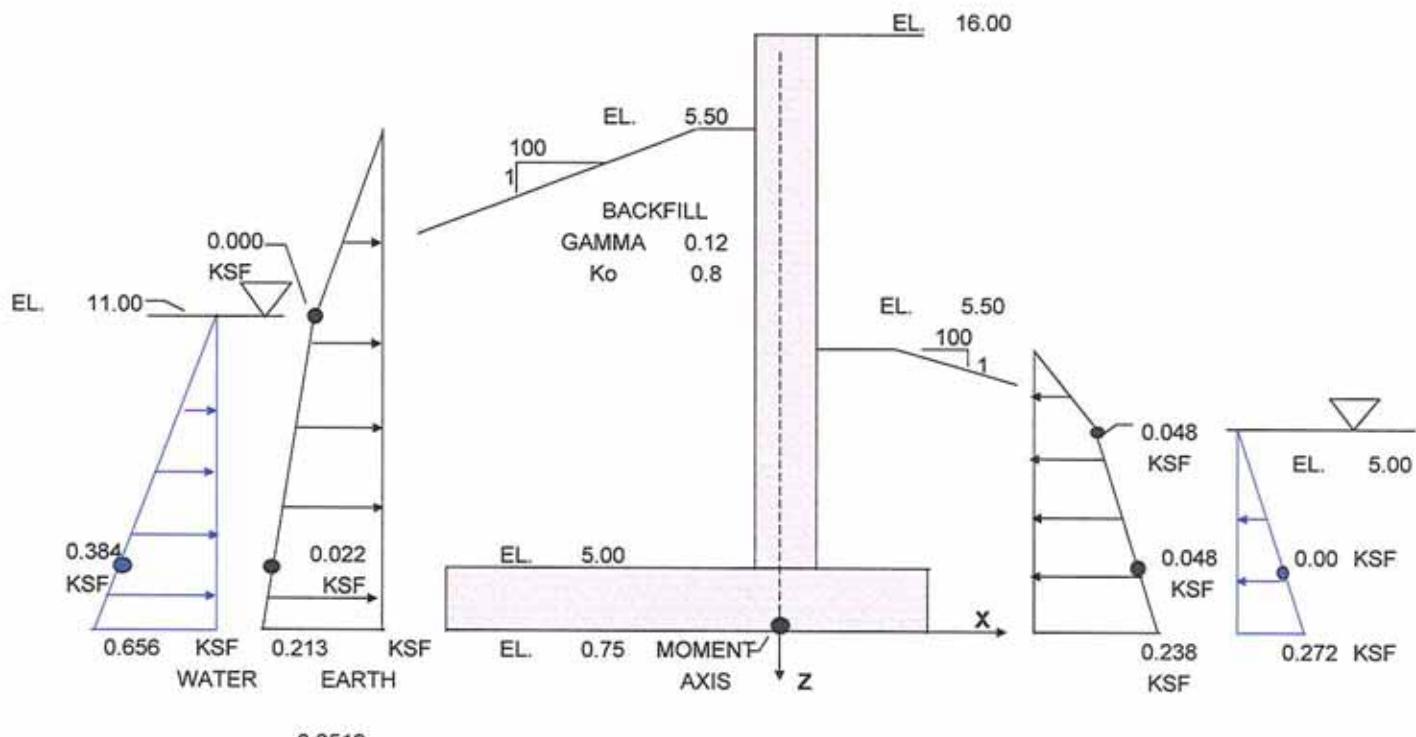
WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 2 RAILROAD GATE MONOLITH  
CASE 2 - CANAL AT STILLWATER



| ITEM            | WIDTH | PRESS | FORCE Z | X CENT. FEET | Y CENT. FEET | Myy FT.-K | Mzz FT.-K |
|-----------------|-------|-------|---------|--------------|--------------|-----------|-----------|
| FLOODSIDE:      |       |       |         |              |              |           |           |
| UPLIFT 1        | 4.00  | 0.66  | -2.62   | -5.25        | 0.00         | -14       | 0         |
| PROTECTED SIDE: |       |       |         |              |              |           |           |
| UPLIFT 1        | 7.00  | 0.27  | -1.90   | 0.25         | 0.00         | 0         | 0         |
| TOTALS          |       |       | -4.53   | -2.94        |              | -13       | 0         |
| FLD.SIDE        |       |       | -2.62   | -5.25        |              | -13.78    | 0         |
| PROT. SIDE      |       |       | -1.90   | 0.25         |              | 0.48      | 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 (UNIF) | 4.00  | 0.516 | -2.07   | -5.25        | 0.00         | -10.84    | 0.00      |
| UPLIFT 2 (TRI)  | 4.00  | 0.140 | -0.28   | -5.92        | 0.00         | -1.65     | 0.00      |
| PROTECTED SIDE: |       |       |         |              |              |           |           |
| UPLIFT 2 (UNIF) | 7.00  | 0.272 | -1.90   | 0.25         | 0.00         | 0.48      | 0.00      |
| UPLIFT 2 (TRI)  | 7.00  | 0.244 | -0.86   | -0.92        | 0.00         | -0.78     | 0.00      |
| TOTALS          |       |       | -5.10   | -2.51        |              | -12.80    | 0.00      |
| FLOOD SIDE      |       |       | -2.34   | -5.33        |              | -12.50    | 0.00      |
| PROT. SIDE      |       |       | -2.76   | -0.11        |              | -0.31     | 0.00      |
|                 |       |       | KIPS    |              |              | FT.-K     | FT.-K     |

WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 2 RAILROAD GATE MONOLITH  
CASE 2 - CANAL AT STILLWATER



0.8512

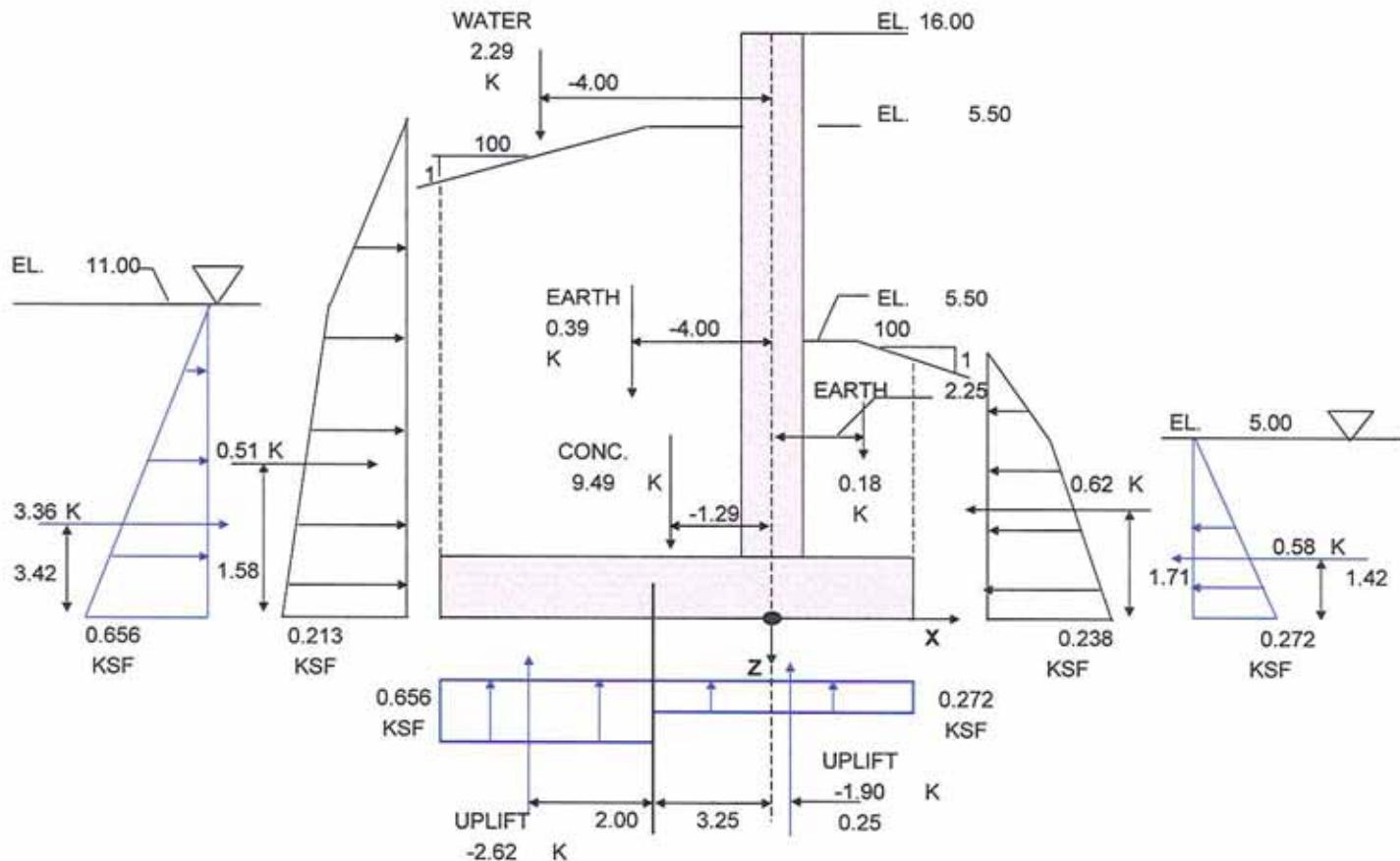
4.592

FLOODWALL HORIZONTAL LOADING - CASE 2

| 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    | 4.75   | 0.000 | 0.00    | k/ft | 0.00         | 0.00         | 0           | 0.0         |
| EARTH 3    | 4.75   | 0.213 | 0.51    | k/ft | 0.00         | -1.58        | 0           | -0.8        |
| GRND WATER | 10.25  | 0.656 | 3.36    | k/ft | 0.00         | -3.42        | 0           | -11.5       |
| PROTECTED: |        |       |         |      |              |              |             |             |
| EARTH 4    | 0.50   | 0.048 | -0.01   | k/ft | 0.00         | -4.42        | 0           | 0.1         |
| EARTH 5    | 4.25   | 0.048 | -0.20   | k/ft | 0.00         | -2.13        | 0           | 0.4         |
| EARTH 6    | 4.25   | 0.238 | -0.40   | k/ft | 0.00         | -1.42        | 0           | 0.6         |
| GRND WATER | 4.25   | 0.272 | -0.58   | k/ft | 0.00         | -1.42        | 0           | 0.8         |

| ITEM                   | HEIGHT | FORCE X |      | Y CENT. FEET | Z CENT. FEET | Mzz FT-K/FT | Myy FT-K/FT |
|------------------------|--------|---------|------|--------------|--------------|-------------|-------------|
|                        |        | FEET    | FEET |              |              |             |             |
| FLOODSIDE EARTH FORCE  |        | 0.51    |      | 0.00         | -1.58        | -0.80022    |             |
| FLOODSIDE WATER FORCE  |        | 3.36    |      | 0.00         | -3.42        | -11.4868    |             |
| TOTAL FLOODSIDE FORCE  |        | 3.87    | k/ft | 0.00         | -3.18        | 0.0         | -12.3       |
| PROT. SIDE EARTH FORCE |        | -0.62   |      | 0.00         | -1.71        | 1.1         |             |
| PROT. SIDE WATER FORCE |        | -0.58   |      | 0.00         | -1.42        | 0.8         |             |
| TOTAL PROT. SIDE FORCE |        | -1.20   | k/ft | 0.00         | -1.57        | 0.0         | 1.9         |
| TOTAL NET HORIZ. FORCE |        | 2.67    | k/ft | 0.00         | -3.90        | 0.0         | -10.4       |

WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 2 RAILROAD GATE MONOLITH  
CASE 2 - CANAL AT STILLWATER

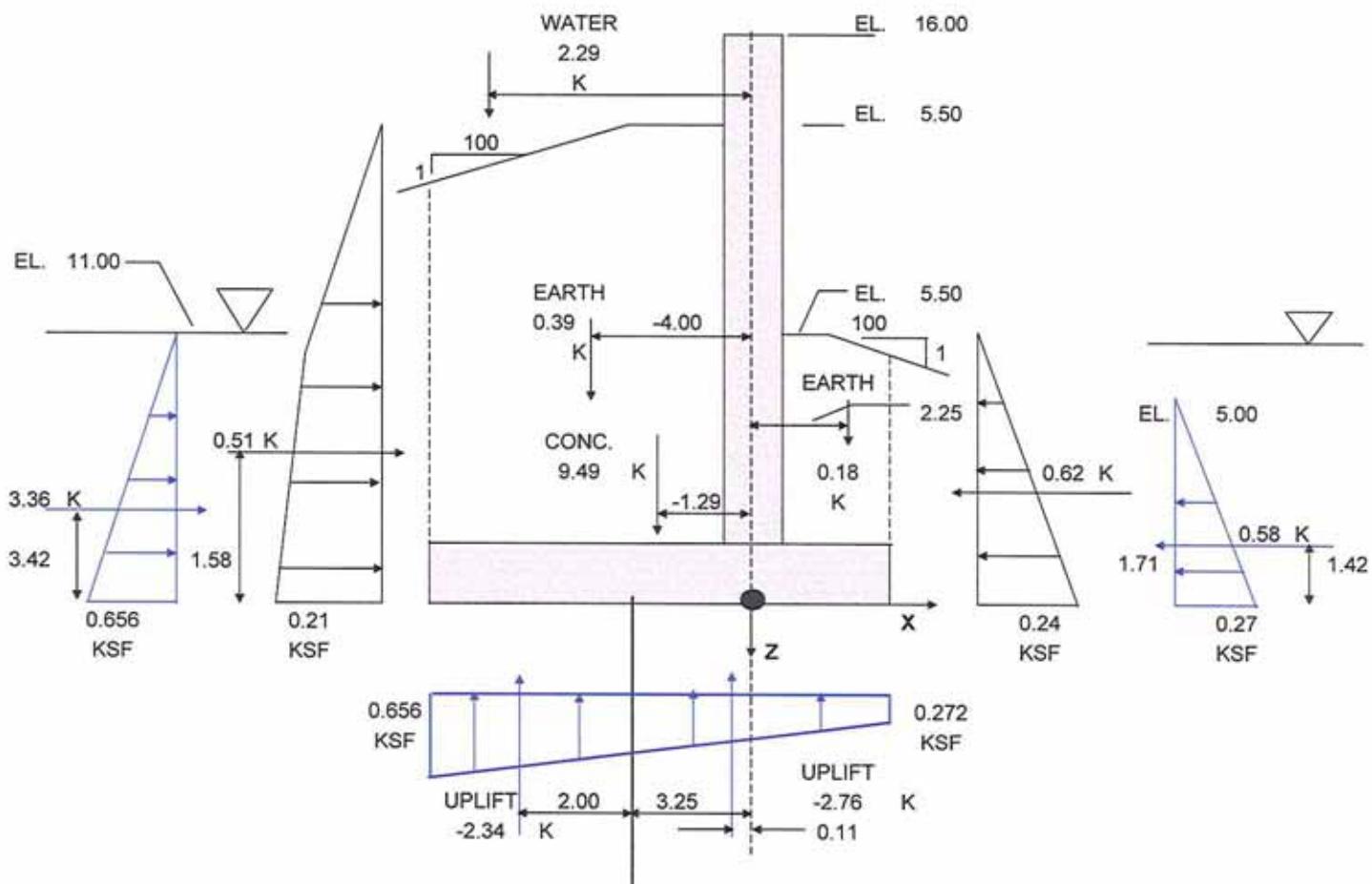


LOADING SUMMARY - CASE 2 WITH MINIMUM UPLIFT

| 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     | 9.5     | k/ft | -1.29        | 0.00         | 12          | 0           |
| FLDSIDE FILL    | 0.0     | 0.0     | 0.4     | k/ft | -4.00        | 0.00         | 2           | 0           |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.2     | k/ft | 2.25         | 0.00         | 0           | 0           |
| F.SIDE WATER    | 0.0     | 0.0     | 2.3     | k/ft | -4.00        | 0.00         | 9           | 0           |
| F. SIDE UPLIFT  | 0.0     | 0.0     | -2.6    | k/ft | -5.25        | 0.00         | -14         | 0           |
| P. SIDE UPLIFT  | 0.0     | 0.0     | -1.9    | k/ft | 0.25         | 0.00         | 0           | 0           |
| F. S. EARTH Pr. | 0.5     | 0.0     | 0.0     | k/ft | -            | -1.58        | -1          | 0           |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -1.71        | 0           | 0           |
| F. S. WATER Pr. | 3.4     | 0.0     | 0.0     | k/ft | -            | -3.42        | -11         | 0           |
| P. S. WATER Pr. | -0.6    | 0.0     | 0.0     | k/ft | -            | -1.42        | 1           | 0           |

|             | X    | Y   | Z     | Mxx | Myy    | Mzz |
|-------------|------|-----|-------|-----|--------|-----|
| TOTALS      | 3.3  | 0.0 | 7.8   | 0   | -2.190 | 0   |
| MONO. TOTAL | 98.7 | 0.0 | 234.5 | 0   | -66    | 0   |

WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 2 RAILROAD GATE MONOLITH  
CASE 2 - CANAL AT STILLWATER

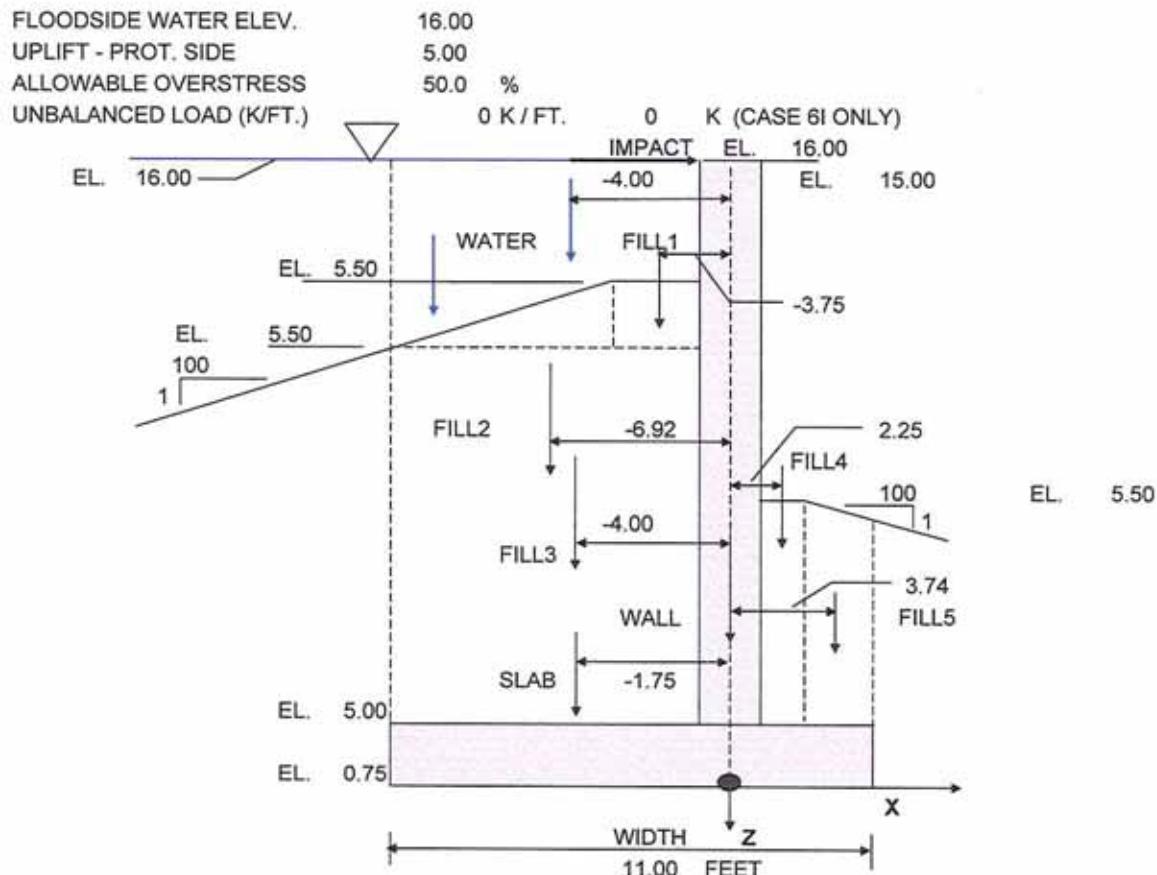


LOADING SUMMARY - CASE 2 WITH MAXIMUM UPLIFT

| 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     | 9.5 k/ft  | -1.29        | 0.00         | 12          | 0           |
| FLDSIDE FILL    | 0.0     | 0.0     | 0.4 k/ft  | -4.00        | 0.00         | 2           | 0           |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.2 k/ft  | 2.25         | 0.00         | 0           | 0           |
| F. SIDE WATER   | 0.0     | 0.0     | 2.3 k/ft  | -4.00        | 0.00         | 9           | 0           |
| F. SIDE UPLIFT  | 0.0     | 0.0     | -2.3 k/ft | -5.33        | 0.00         | -12         | 0           |
| P. SIDE UPLIFT  | 0.0     | 0.0     | -2.8 k/ft | -0.11        | 0.00         | 0           | 0           |
| F. S. EARTH Pr. | 0.5     | 0.0     | 0.0 k/ft  | -            | -1.58        | -1          | 0           |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0 k/ft  | -            | -1.71        | 0           | 0           |
| F. S. WATER Pr. | 3.4     | 0.0     | 0.0 k/ft  | -            | -3.42        | -11         | 0           |
| P. S. WATER Pr. | -0.6    | 0.0     | 0.0 k/ft  | -            | -1.42        | 1           | 0           |

|             | X    | Y   | Z     | Mxx | Myy   | Mzz   |
|-------------|------|-----|-------|-----|-------|-------|
| TOTALS      | 3.3  | 0.0 | 7.2   | 0   | -2    | 0     |
| MONO. TOTAL | 98.7 | 0.0 | 217.2 | 0   | -51   | 0     |
| VERTICAL    |      |     | 217   |     | -1.35 |       |
| HORIZ       |      |     | 99    |     |       | -3.49 |

WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 2 RAILROAD GATE MONOLITH  
CASE 3 - CANAL AT TOP OF WALL

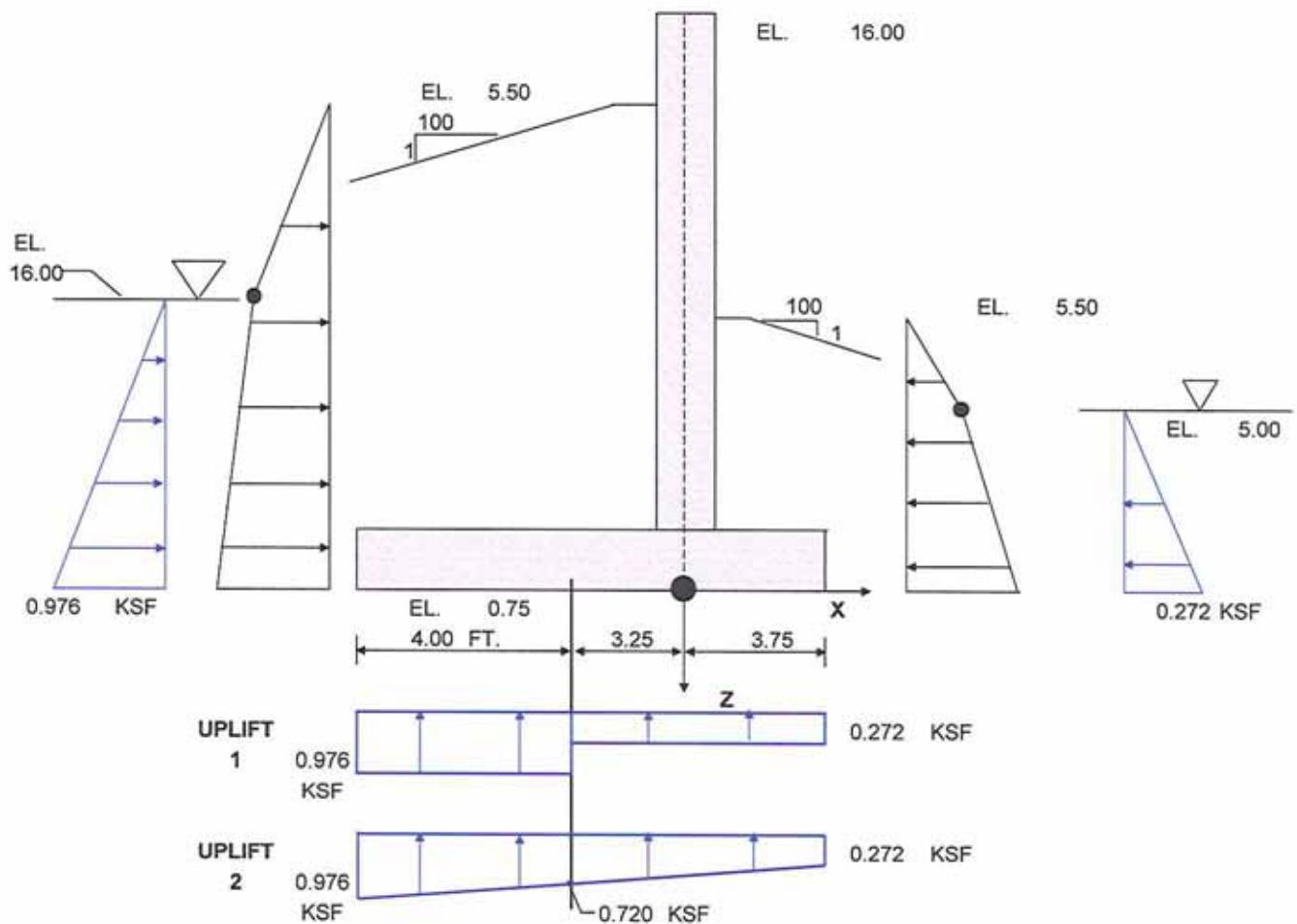


FLOODWALL APPLIED GRAVITY LOADING - CASE 3

| ITEM                 | FORCE Z<br>(WEIGHT) | X CENT.<br>FEET | Y CENT.<br>FEET | M <sub>yy</sub><br>FT.-K | M <sub>zz</sub><br>FT.-K |
|----------------------|---------------------|-----------------|-----------------|--------------------------|--------------------------|
| CONCRETE SLAB        | 7.01                | -1.75           | 0.00            | 12                       | 0                        |
| CONCRETE WALL        | 2.48                | 0.00            | 0.00            | 0                        | 0                        |
| FLOODSIDE FILL1      | 0.00                | -3.75           | 0.00            | 0                        | 0                        |
| FLOODSIDE FILL2      | 0.00                | -6.92           | 0.00            | 0                        | 0                        |
| FLOODSIDE FILL3      | 0.39                | -4.00           | 0.00            | 2                        | 0                        |
| PROTECTED SIDE FILL4 | 0.18                | 2.25            | 0.00            | 0                        | 0                        |
| PROTECTED SIDE FILL5 | 0.00                | 3.74            | 0.00            | 0                        | 0                        |
| FLOODSIDE WATER      | 0.00                | -7.08           | 0.00            | 0                        | 0                        |
| FLOODSIDE WATER      | 4.37                | -4.00           | 0.00            | 17                       | 0                        |

|                     |       |       |       |       |
|---------------------|-------|-------|-------|-------|
| TOTALS              | 14.43 | -2.14 | 30.90 | 0     |
| CONCRETE            | 9.49  | -1.29 | 12.27 | 0     |
| FLOODSIDE FILL 1-3  | 0.39  | -4.00 | 1.56  | 0     |
| PROT. SIDE FILL 4-5 | 0.18  | 2.25  | -0.40 | 0     |
| FLOODSIDE WATER     | 4.37  | -4.00 | 17.47 | 0     |
|                     | KIPS  |       | FT.-K | FT.-K |

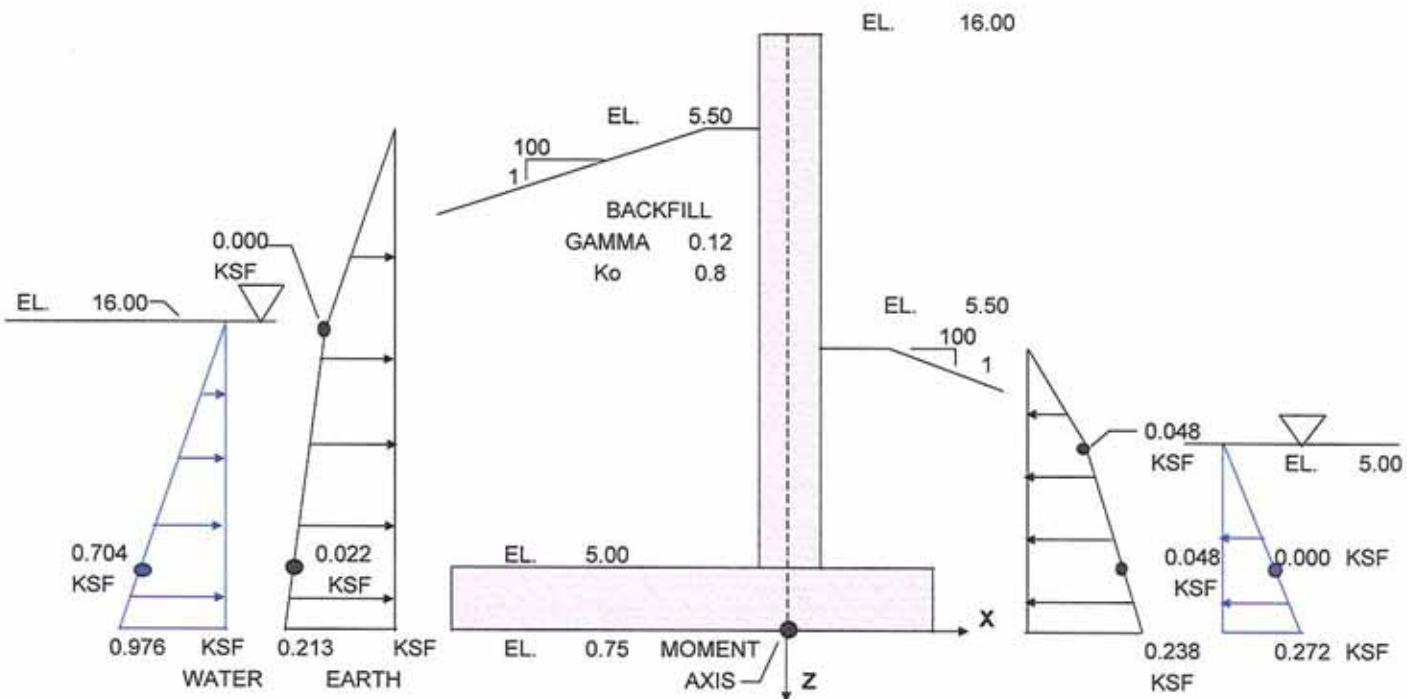
**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 RAILROAD GATE MONOLITH**  
**CASE 3 - CANAL AT TOP OF WALL**



| ITEM            | WIDTH | PRESS | FORCE Z | X CENT. FEET | Y CENT. FEET | Myy FT.-K | Mzz FT.-K |
|-----------------|-------|-------|---------|--------------|--------------|-----------|-----------|
| FLOODSIDE:      |       |       |         |              |              |           |           |
| UPLIFT 1        | 4.00  | 0.98  | -3.90   | -5.25        | 0.00         | -20       | 0         |
| PROTECTED SIDE: |       |       |         |              |              |           |           |
| UPLIFT 1        | 7.00  | 0.27  | -1.90   | 0.25         | 0.00         | 0         | 0         |
| TOTALS          |       |       | -5.81   | -3.45        |              | -20       | 0         |
| FLD.SIDE        |       |       | -3.90   | -5.25        |              | -20.50    | 0         |
| PROT. SIDE      |       |       | -1.90   | 0.25         |              | 0.48      | 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 (UNIF) | 4.00  | 0.720 | -2.88   | -5.25        | 0.00         | -15.12    | 0.00      |
| UPLIFT 2 (TRI)  | 4.00  | 0.256 | -0.51   | -5.92        | 0.00         | -3.03     | 0.00      |
| PROTECTED SIDE: |       |       |         |              |              |           |           |
| UPLIFT 2 (UNIF) | 7.00  | 0.272 | -1.90   | 0.25         | 0.00         | 0.48      | 0.00      |
| UPLIFT 2 (TRI)  | 7.00  | 0.448 | -1.57   | -0.92        | 0.00         | -1.44     | 0.00      |
| TOTALS          |       |       | -6.86   | -2.78        |              | -19.11    | 0.00      |
| FLOOD SIDE      |       |       | -3.39   | -5.35        |              | -18.15    | 0.00      |
| PROT. SIDE      |       |       | -3.47   | -0.28        |              | -0.96     | 0.00      |
|                 |       |       | KIPS    |              |              | FT.-K     | FT.-K     |

WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 2 RAILROAD GATE MONOLITH  
CASE 3 - CANAL AT TOP OF WALL

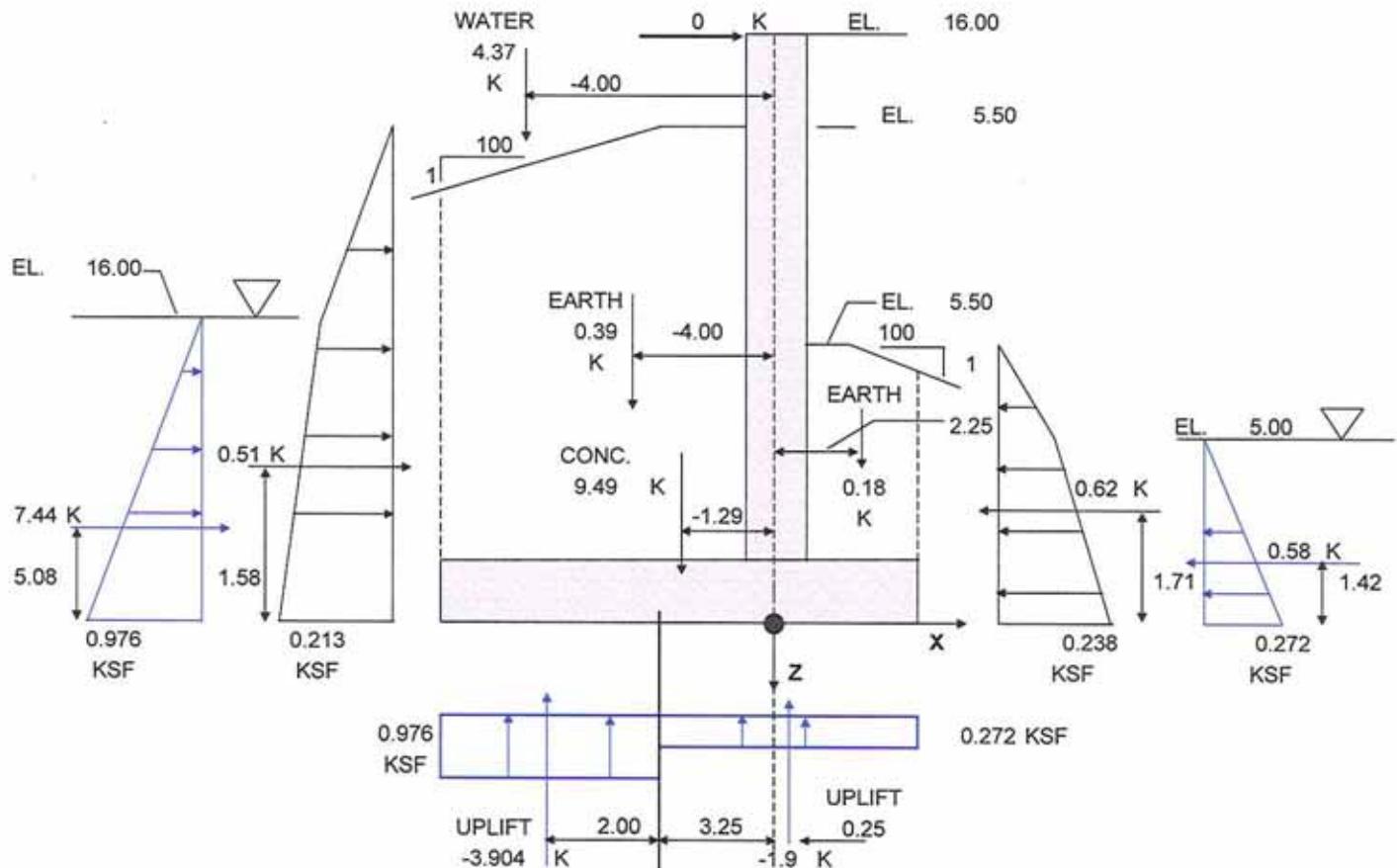


FLOODWALL HORIZONTAL LOADING - CASE 3

| ITEM       | HEIGHT | PRESS | FORCE X |      | Y CENT.<br>FEET | Z CENT.<br>FEET | Mzz<br>FT-K/FT | Myy<br>FT-K/FT |
|------------|--------|-------|---------|------|-----------------|-----------------|----------------|----------------|
| FLOODSIDE: |        |       |         |      |                 |                 |                |                |
| EARTH 1    | 0.00   | 0.000 | 0.00    | k/ft | 0.00            | 0.00            | 0              | 0.0            |
| EARTH 2    | 4.75   | 0.000 | 0.00    | k/ft | 0.00            | 0.00            | 0              | 0.0            |
| EARTH 3    | 4.75   | 0.213 | 0.51    | k/ft | 0.00            | -1.58           | 0              | -0.8           |
| GRND WATER | 15.25  | 0.976 | 7.44    | k/ft | 0.00            | -5.08           | 0              | -37.8          |
| PROTECTED: |        |       |         |      |                 |                 |                |                |
| EARTH 4    | 0.50   | 0.048 | -0.01   | k/ft | 0.00            | -4.42           | 0              | 0.1            |
| EARTH 5    | 4.25   | 0.048 | -0.20   | k/ft | 0.00            | -2.13           | 0              | 0.4            |
| EARTH 6    | 4.25   | 0.238 | -0.40   | k/ft | 0.00            | -1.42           | 0              | 0.6            |
| GRND WATER | 4.25   | 0.272 | -0.58   | k/ft | 0.00            | -1.42           | 0              | 0.8            |

|                        | FORCE X | Y CENT.<br>FEET | Z CENT.<br>FEET | Mzz<br>FT-K/FT. | Myy<br>FT-K/FT. |
|------------------------|---------|-----------------|-----------------|-----------------|-----------------|
| FLOODSIDE EARTH FORCE  | 0.51    | 0.00            | -1.58           |                 | -0.80022        |
| FLOODSIDE WATER FORCE  | 7.44    | 0.00            | -5.08           |                 | -37.8302        |
| TOTAL FLOODSIDE FORCE  | 7.95    | k/ft            | 0.00            | -4.86           | 0.0             |
|                        |         |                 |                 |                 | -38.6           |
| PROT. SIDE EARTH FORCE | -0.62   | 0.00            | -1.71           |                 | 1.1             |
| PROT. SIDE WATER FORCE | -0.58   | 0.00            | -1.42           |                 | 0.8             |
| TOTAL PROT. SIDE FORCE | -1.20   | k/ft            | 0.00            | -1.57           | 0.0             |
|                        |         |                 |                 |                 | 1.9             |
| TOTAL NET HORIZ. FORCE | 6.75    | k/ft            | 0.00            | -5.45           | 0.0             |
|                        |         |                 |                 |                 | -36.8           |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 RAILROAD GATE MONOLITH**  
**CASE 3 - CANAL AT TOP OF WALL**

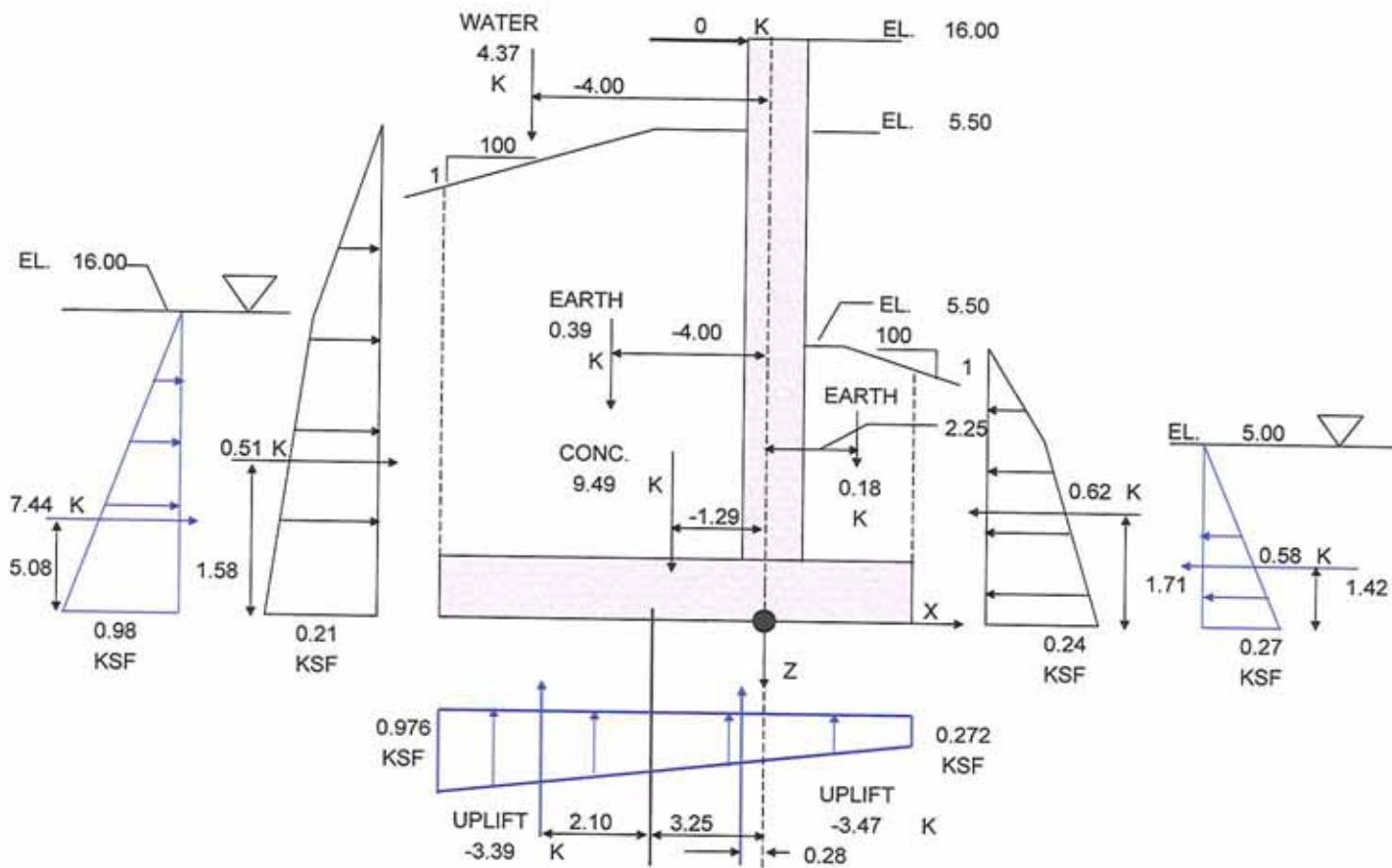


**LOADING SUMMARY - CASE 3 WITH MINIMUM UPLIFT**

| 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     | 9.5 k/ft  |  | -1.29        | 0.00         | 12          | 0           |              |
| FLDSIDE FILL    | 0.0     | 0.0     | 0.4 k/ft  |  | -4.00        | 0.00         | 2           | 0           | SUM M 10.88  |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.2 k/ft  |  | 2.25         | 0.00         | 0           | 0           |              |
| F.SIDE WATER    | 0.0     | 0.0     | 4.4 k/ft  |  | -4.00        | 0.00         | 17          | 0           |              |
| F. SIDE UPLIFT  | 0.0     | 0.0     | -3.9 k/ft |  | -5.25        | 0.00         | -20         | 0           |              |
| P. SIDE UPLIFT  | 0.0     | 0.0     | -1.9 k/ft |  | 0.25         | 0.00         | 0           | 0           |              |
| F. S. EARTH Pr. | 0.5     | 0.0     | 0.0 k/ft  |  | -            | -1.58        | -1          | 0           | SUM M -37.81 |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0 k/ft  |  | -            | -1.71        | 0           | 0           |              |
| F. S. WATER Pr. | 7.4     | 0.0     | 0.0 k/ft  |  | -            | -5.08        | -38         | 0           |              |
| P. S. WATER Pr. | -0.6    | 0.0     | 0.0 k/ft  |  | -            | -1.42        | 1           | 0           |              |

|                 | X     | Y   | Z     |  | Mxx | Myy    | Mzz |
|-----------------|-------|-----|-------|--|-----|--------|-----|
| TOTALS          | 7.4   | 0.0 | 8.6   |  | 0   | -27    | 0   |
| MONO. TOTAL     | 221.1 | 0.0 | 258.5 |  | 0   | -808   | 0   |
| IMPACT (CASE 9) | 0.0   |     |       |  |     | 0      |     |
| TOTAL CASE 9    | 221.1 | 0.0 | 258.5 |  | 0.0 | -808.0 | 0.0 |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 RAILROAD GATE MONOLITH**  
**CASE 3 - CANAL AT TOP OF WALL**



**LOADING SUMMARY - CASE 3 WITH MAXIMUM UPLIFT**

| 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     | 9.5     | k/ft | -1.29        | 0.00         | 12          | 0           |
| FLDSIDE FILL    | 0.0     | 0.0     | 0.4     | k/ft | -4.00        | 0.00         | 2           | 0           |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.2     | k/ft | 2.25         | 0.00         | 0           | 0           |
| F.SIDE WATER    | 0.0     | 0.0     | 4.4     | k/ft | -4.00        | 0.00         | 17          | 0           |
| F. SIDE UPLIFT  | 0.0     | 0.0     | -3.4    | k/ft | -5.35        | 0.00         | -18         | 0           |
| P. SIDE UPLIFT  | 0.0     | 0.0     | -3.5    | k/ft | -0.28        | 0.00         | -1          | 0           |
| F. S. EARTH Pr. | 0.5     | 0.0     | 0.0     | k/ft | -            | -1.58        | -1          | 0           |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -1.71        | 0           | 0           |
| F. S. WATER Pr. | 7.4     | 0.0     | 0.0     | k/ft | -            | -5.08        | -38         | 0           |
| P. S. WATER Pr. | -0.6    | 0.0     | 0.0     | k/ft | -            | -1.42        | 1           | 0           |

SUM M  
11.79

SUM M  
-37.81

|                  | X     | Y   | Z     | Mxx | Myy    | Mzz   |
|------------------|-------|-----|-------|-----|--------|-------|
| TOTALS           | 7.4   | 0.0 | 7.6   | 0   | -26    | 0     |
| MONO. TOTAL      | 221.1 | 0.0 | 226.8 | 0   | -781   | 0     |
| IMPACT (CASE 10) | 0.0   |     |       |     | 0.0    |       |
| TOTAL CASE 10    | 221.1 | 0.0 | 226.8 | 0.0 | -780.7 | 0.0   |
| VERTICAL         |       |     | 227   |     | -1.56  |       |
| HORIZ            |       |     | 221   |     |        | -5.13 |

**WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 2 RAILROAD GATE MONOLITH**

| LOAD CASE | LOAD CONDITION                                                             | FDN OVERSTR ALLOWED | FOUNDATION LOADS |          |     |     |      |   |
|-----------|----------------------------------------------------------------------------|---------------------|------------------|----------|-----|-----|------|---|
|           |                                                                            |                     | 30 FOOT          | MONOLITH | Mxx | Myy | Mzz  |   |
| 1         | CONSTRUCTION W / WIND                                                      | 1.166               | 55               | 0        | 301 | 0   | 175  | 0 |
| 1a        | CONST. W/ DRAG & SURCHARGE LDS                                             | 1.166               | 32               | 0        | 346 | 0   | 553  | 0 |
| 2a        | CANAL @ STILLWATER (EL. 11.0)<br>MINIMUM UPLIFT                            | 1.000               | 99               | 0        | 235 | 0   | -66  | 0 |
| 2b        | CANAL @ STILLWATER (EL. 11.0)<br>MAXIMUM UPLIFT                            | 1.000               | 99               | 0        | 217 | 0   | -51  | 0 |
| Not Used  | CANAL @ STILLWATER (EL. 11.0)<br>MIN. UPLIFT, UNBAL. LOAD                  | 1.000               | 99               | 0        | 235 | 0   | -66  | 0 |
| Not Used  | CANAL @ STILLWATER (EL. 11.0)<br>MAX. UPLIFT, UNBAL. LOAD                  | 1.000               | 99               | 0        | 217 | 0   | -51  | 0 |
| 2c        | CANAL @ STILLWATER (EL. 11.0)<br>MIN. UPLIFT, UNBAL. LOAD; IMPACT          | 1.333               | 99               | 0        | 235 | 0   | -66  | 0 |
| 2d        | CANAL @ STILLWATER (EL. 11.0)<br>MAX. UPLIFT, UNBAL. LOAD; IMPACT          | 1.333               | 99               | 0        | 217 | 0   | -51  | 0 |
| 3a        | CANAL @ STILLWATER (EL. 11.0)<br>MIN. UPLIFT, UNBAL. & WAVE LOADS          | 1.333               | 156              | 0        | 235 | 0   | -631 | 0 |
| 3b        | CANAL @ STILLWATER (EL. 11.0)<br>MAX. UPLIFT, UNBAL. & WAVE LOADS          | 1.333               | 156              | 0        | 217 | 0   | -616 | 0 |
| 4a        | CANAL @ STILLWATER (EL. 11.0)<br>MIN. UL - UNBAL. LD., WAVE & IMPACT       | 1.500               | 156              | 0        | 235 | 0   | -631 | 0 |
| 4b        | CANAL @ STILLWATER (EL. 11.0)<br>MAX. UL - UNBAL. LD., WAVE & IMPACT       | 1.500               | 156              | 0        | 217 | 0   | -616 | 0 |
| (DC A) 5a | CANAL @ TOP OF WALL (EL. 16.0)<br>MINIMUM UPLIFT                           | 1.333               | 221              | 0        | 259 | 0   | -808 | 0 |
| (DC B) 5b | CANAL @ TOP OF WALL (EL. 16.0)<br>MAXIMUM UPLIFT                           | 1.333               | 221              | 0        | 227 | 0   | -781 | 0 |
| Not Used  | CANAL @ TOP OF WALL (EL. 16.0)<br>MIN. UPLIFT, UNBAL. LOAD                 | N/A                 | 221              | 0        | 259 | 0   | -808 | 0 |
| Not Used  | CANAL @ TOP OF WALL (EL. 16.0)<br>MAX. UPLIFT, UNBAL. LOAD                 | N/A                 | 221              | 0        | 227 | 0   | -781 | 0 |
| (DC C) 6a | MIN. UPLIFT - W / WO UNBAL. LD. + IMPACT                                   | 1.666               | 221              | 0        | 259 | 0   | -808 | 0 |
| (DC D) 6b | CANAL @ TOP OF WALL (EL. 16.0)<br>MAX. UPLIFT - W / WO UNBAL. LD. + IMPACT | 1.666               | 221              | 0        | 227 | 0   | -781 | 0 |

FILE: AL2RR.IN

1000 ALGIERS CANAL WEST - REACH 2 RAILROAD GATE  
1010 14" CONCRETE PILE FDN. CAPACITIES AT -70.0  
1020 PRO 4075 3199 3199 196 1.8 0 ALL  
1040 SOIL ES 0.040 L 70 0 ALL  
1060 PIN ALL  
1070 DLS S 80 62 736.9 202 193.9 1558 1186 H 14 ALL  
1080 ASC S 196 457 0.816 0.95 2.00 0 ALL  
1100 PILE 1 -5.25 -12.50 0.  
1110 ROW Y 6 1 5 AT 5.0  
1150 PILE 7 1.5 -12.50 0.  
1155 ROW Y 6 7 5 AT 5.0  
1215 BATTER 2.5 1 2 5 6  
1216 BATTER 2.5 7 8 11 12  
1230 ANGLE 180 1 TO 6  
1240 ANGLE 0 7 TO 12  
1340 LOA 1 55 0 300 0 180 0  
1345 LOA 2 35 0 350 0 550 0  
1350 LOA 3 100 0 220 0 -70 0  
1355 LOA 4 100 0 235 0 -50 0  
1357 LOA 5 155 0 220 0 -630 0  
1359 LOA 6 155 0 235 0 -620 0  
1380 LOA 11 220 0 260 0 -810 0  
1385 LOA 12 220 0 230 0 -780 0  
1400 LOA 20 55 0 460 0 180 0  
1500 TOUT 1 2 4 5  
1510 FOUT 1 2 4 5 ALGRR2.OUT  
1530 PFO 1 6 7 12 13 18

\*\*\*\*\*  
\* CORPS PROGRAM # X0080 \* CPGA - CASE PILE GROUP ANALYSIS PROGRAM  
\* VERSION NUMBER # 1993/03/29 \* RUN DATE 10-JUN-2008 RUN TIME 10.14.15  
\*\*\*\*\*

ALGIERS CANAL WEST = BEACH 2 RAILROAD GATE

THERE ARE 12 PILES AND  
9 LOAD CASES IN THIS RUN.

ALL PILE COORDINATES ARE CONTAINED WITHIN A BOX

WITH DIAGONAL COORDINATES = ( -5.25 , -12.50 , .00 )  
                                  ( 1.50 , 12.50 , .00 )

## FILE PROPERTIES AS INPUT

|            |             |             |            |            |            |
|------------|-------------|-------------|------------|------------|------------|
| E<br>KSI   | I1<br>IN**4 | I2<br>IN**4 | A<br>IN**2 | C33        | B66        |
| .40750E+04 | .31990E+04  | .31990E+04  | .19600E+03 | .18000E+01 | .00000E+00 |

THESE PILE PROPERTIES APPLY TO THE FOLLOWING PILES -

ALL

## SOIL DESCRIPTIONS AS INPUT

| ES | ESOIL<br>K/IN**2 | LENGTH<br>·40000E-01 | L<br>L | LU<br>FT<br>·70000E+02 | ·00000E+00 |
|----|------------------|----------------------|--------|------------------------|------------|
|----|------------------|----------------------|--------|------------------------|------------|

THIS SOIL DESCRIPTION APPLIES TO THE FOLLOWING FILES -

ALL

#### PILE GEOMETRY AS INPUT AND/OR GENERATED

\*\*\*\*\*  
APPLIED LOADS

| LOAD<br>CASE | PX<br>K | PY<br>K              | PZ<br>K | MX<br>FT-K                   | MY<br>FT-K | MZ<br>FT-K |
|--------------|---------|----------------------|---------|------------------------------|------------|------------|
| 1            | 55.0    | .0                   | 300.0   | .0                           | 180.0      | .0         |
| 2            | 35.0    | .0                   | 350.0   | .0                           | 550.0      | .0         |
| 3            | 100.0   | .0                   | 220.0   | .0                           | -70.0      | .0         |
| 4            | 100.0   | .0                   | 235.0   | .0                           | -50.0      | .0         |
| 5            | 155.0   | .0                   | 220.0   | .0                           | -630.0     | .0         |
| 6            | 155.0   | .0                   | 235.0   | .0                           | -620.0     | .0         |
| 11           | 220.0   | .0                   | 260.0   | .0                           | -810.0     | .0         |
| 12           | 220.0   | .0                   | 230.0   | .0                           | -780.0     | .0         |
| 20           | 55.0    | .0                   | 460.0   | .0                           | 180.0      | .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 = | 6.         |            |
| LOAD CASE    | 4.      | NUMBER OF FAILURES = | 0.      | NUMBER OF PILES IN TENSION = | 6.         |            |
| LOAD CASE    | 5.      | NUMBER OF FAILURES = | 0.      | NUMBER OF PILES IN TENSION = | 4.         |            |
| LOAD CASE    | 6.      | NUMBER OF FAILURES = | 0.      | NUMBER OF PILES IN TENSION = | 4.         |            |
| LOAD CASE    | 11.     | NUMBER OF FAILURES = | 4.      | NUMBER OF PILES IN TENSION = | 6.         |            |
| LOAD CASE    | 12.     | NUMBER OF FAILURES = | 4.      | NUMBER OF PILES IN TENSION = | 6.         |            |
| LOAD CASE    | 20.     | NUMBER OF FAILURES = | 0.      | NUMBER OF PILES IN TENSION = | 0.         |            |

\*\*\*\*\*  
PILE CAP DISPLACEMENTS

| LOAD<br>CASE | DX<br>IN  | DY<br>IN   | DZ<br>IN   | RX<br>RAD  | RY<br>RAD  | RZ<br>RAD  |
|--------------|-----------|------------|------------|------------|------------|------------|
| 1            | .3563E-01 | .2143E-07  | .1446E-01  | -.2432E-20 | .7219E-04  | -.1349E-11 |
| 2            | .3654E-01 | .5270E-07  | .1457E-01  | -.2735E-20 | .1862E-03  | -.3317E-11 |
| 3            | .8632E-01 | -.3877E-07 | .3941E-02  | -.1484E-20 | .3490E-03  | .2440E-11  |
| 4            | .8550E-01 | -.3518E-07 | .4932E-02  | -.1618E-20 | .3407E-03  | .2214E-11  |
| 5            | .1040E+00 | -.9064E-07 | .6401E-02  | -.1595E-20 | .2397E-03  | .5705E-11  |
| 6            | .1022E+00 | -.8709E-07 | .7622E-02  | -.1739E-20 | .2212E-03  | .5482E-11  |
| 11           | .1660E+00 | -.1405E-06 | .2092E-02  | -.1638E-20 | .5265E-03  | .8842E-11  |
| 12           | .1748E+00 | -.1473E-06 | -.1500E-02 | -.1298E-20 | .6147E-03  | .9275E-11  |
| 20           | .5309E-02 | .5878E-07  | .2994E-01  | -.4079E-20 | -.2346E-03 | -.3700E-11 |

\*\*\*\*\*

## PILE FORCES IN LOCAL GEOMETRY

M1 &amp; 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 | CBF | ASC  | AST  |   |
|             | K   | K  | K    | IN-K | IN-K | IN-K |     |     | KSI  | KSI  |   |
| 1           | -.2 | .0 | 7.6  | .0   | 9.3  | .0   | .09 | .23 | 1.01 | .83  | # |
| 6           | -.2 | .0 | 7.6  | .0   | 9.3  | .0   | .09 | .23 | 1.01 | .83  | # |
| 7           | .1  | .0 | 43.6 | .0   | -6.6 | .0   | .54 | .20 | 1.19 | 1.02 | # |
| 12          | .1  | .0 | 43.6 | .0   | -6.6 | .0   | .54 | .20 | 1.19 | 1.02 | # |

| LOAD CASE - |     | 2  |      |      |      |      |     |     |      |      |   |
|-------------|-----|----|------|------|------|------|-----|-----|------|------|---|
| PILE        | F1  | F2 | F3   | M1   | M2   | M3   | ALF | CBF | ASC  | AST  |   |
|             | K   | K  | K    | IN-K | IN-K | IN-K |     |     | KSI  | KSI  |   |
| 1           | -.2 | .0 | 18.6 | .0   | 10.2 | .0   | .23 | .22 | 1.07 | .89  | # |
| 6           | -.2 | .0 | 18.6 | .0   | 10.2 | .0   | .23 | .22 | 1.07 | .89  | # |
| 7           | .1  | .0 | 41.1 | .0   | -6.9 | .0   | .51 | .20 | 1.17 | 1.01 | # |
| 12          | .1  | .0 | 41.1 | .0   | -6.9 | .0   | .51 | .20 | 1.17 | 1.01 | # |

| LOAD CASE - |     | 3  |       |      |       |      |     |     |      |      |   |
|-------------|-----|----|-------|------|-------|------|-----|-----|------|------|---|
| PILE        | F1  | F2 | F3    | M1   | M2    | M3   | ALF | CBF | ASC  | AST  |   |
|             | K   | K  | K     | IN-K | IN-K  | IN-K |     |     | KSI  | KSI  |   |
| 1           | -.3 | .0 | -13.7 | .0   | 20.9  | .0   | .22 | .23 | .93  | .70  |   |
| 6           | -.3 | .0 | -13.7 | .0   | 20.9  | .0   | .22 | .23 | .93  | .70  |   |
| 7           | .3  | .0 | 51.1  | .0   | -18.8 | .0   | .64 | .19 | 1.25 | 1.04 | # |
| 12          | .3  | .0 | 51.1  | .0   | -18.8 | .0   | .64 | .19 | 1.25 | 1.04 | # |

| LOAD CASE - |     | 4  |       |      |       |      |     |     |      |      |   |
|-------------|-----|----|-------|------|-------|------|-----|-----|------|------|---|
| PILE        | F1  | F2 | F3    | M1   | M2    | M3   | ALF | CBF | ASC  | AST  |   |
|             | K   | K  | K     | IN-K | IN-K  | IN-K |     |     | KSI  | KSI  |   |
| 1           | -.3 | .0 | -12.4 | .0   | 20.7  | .0   | .20 | .21 | .93  | .71  |   |
| 6           | -.3 | .0 | -12.4 | .0   | 20.7  | .0   | .20 | .21 | .93  | .71  |   |
| 7           | .3  | .0 | 52.4  | .0   | -18.6 | .0   | .66 | .19 | 1.26 | 1.04 | # |
| 12          | .3  | .0 | 52.4  | .0   | -18.6 | .0   | .66 | .19 | 1.26 | 1.04 | # |

| LOAD CASE - |     | 5  |       |      |       |      |     |     |      |      |   |
|-------------|-----|----|-------|------|-------|------|-----|-----|------|------|---|
| PILE        | F1  | F2 | F3    | M1   | M2    | M3   | ALF | CBF | ASC  | AST  |   |
|             | K   | K  | K     | IN-K | IN-K  | IN-K |     |     | KSI  | KSI  |   |
| 1           | -.4 | .0 | -31.9 | .0   | 24.3  | .0   | .52 | .48 | .84  | .60  |   |
| 6           | -.4 | .0 | -31.9 | .0   | 24.3  | .0   | .52 | .48 | .84  | .60  |   |
| 7           | .4  | .0 | 69.4  | .0   | -22.3 | .0   | .87 | .18 | 1.35 | 1.12 | # |
| 12          | .4  | .0 | 69.4  | .0   | -22.3 | .0   | .87 | .18 | 1.35 | 1.12 | # |

| LOAD CASE - 6 |         |         |         |            |            |            |     |     |            |            |
|---------------|---------|---------|---------|------------|------------|------------|-----|-----|------------|------------|
| PILE          | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF | CBF | ASC<br>KSI | AST<br>KSI |
| 1             | -.4     | .0      | -30.7   | .0         | 23.9       | .0         | .50 | .46 | .85        | .61        |
| 6             | -.4     | .0      | -30.7   | .0         | 23.9       | .0         | .50 | .46 | .85        | .61        |
| 7             | .4      | .0      | 70.7    | .0         | -21.7      | .0         | .88 | .18 | 1.36       | 1.13 #     |
| 12            | .4      | .0      | 70.7    | .0         | -21.7      | .0         | .88 | .18 | 1.36       | 1.13 #     |

| LOAD CASE - 11 |         |         |         |            |            |            |      |     |            |            |
|----------------|---------|---------|---------|------------|------------|------------|------|-----|------------|------------|
| PILE           | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF  | CBF | ASC<br>KSI | AST<br>KSI |
| 1              | -.6     | .0      | -49.5   | .0         | 38.9       | .0         | .80  | .75 | .78        | .48        |
| 6              | -.6     | .0      | -49.5   | .0         | 38.9       | .0         | .80  | .75 | .78        | .48        |
| 7              | .6      | .0      | 93.8    | .0         | -36.5      | .0         | 1.17 | .34 | 1.51       | 1.21*#     |
| 12             | .6      | .0      | 93.8    | .0         | -36.5      | .0         | 1.17 | .34 | 1.51       | 1.21*#     |

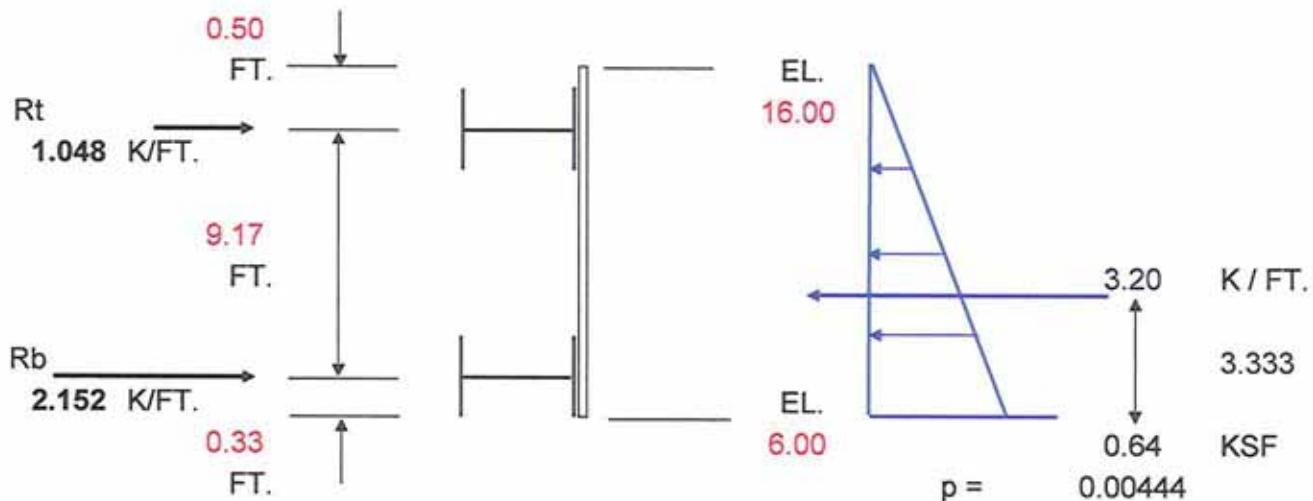
| LOAD CASE - 12 |         |         |         |            |            |            |      |     |            |            |
|----------------|---------|---------|---------|------------|------------|------------|------|-----|------------|------------|
| PILE           | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF  | CBF | ASC<br>KSI | AST<br>KSI |
| 1              | -.7     | .0      | -51.9   | .0         | 40.9       | .0         | .84  | .79 | .77        | .46        |
| 6              | -.7     | .0      | -51.9   | .0         | 40.9       | .0         | .84  | .79 | .77        | .46        |
| 7              | .6      | .0      | 91.1    | .0         | -38.8      | .0         | 1.14 | .32 | 1.50       | 1.20*#     |
| 12             | .6      | .0      | 91.1    | .0         | -38.8      | .0         | 1.14 | .32 | 1.50       | 1.20*#     |

| LOAD CASE - 20 |         |         |         |            |            |            |     |     |            |            |
|----------------|---------|---------|---------|------------|------------|------------|-----|-----|------------|------------|
| PILE           | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF | CBF | ASC<br>KSI | AST<br>KSI |
| 1              | .0      | .0      | 20.7    | .0         | 2.5        | .0         | .26 | .22 | 1.06       | .92 #      |
| 6              | .0      | .0      | 20.7    | .0         | 2.5        | .0         | .26 | .22 | 1.06       | .92 #      |
| 7              | .0      | .0      | 57.7    | .0         | 1.8        | .0         | .72 | .19 | 1.25       | 1.11 #     |
| 12             | .0      | .0      | 57.7    | .0         | 1.8        | .0         | .72 | .19 | 1.25       | 1.11 #     |

**ALGIERS CANAL FLOOD PROTECTION**  
**RAILROAD SWING GATE DESIGN**  
**GATE GEOMETRY AND LOADING**

**GATE OPENING: 20.00 FEET**



**GATE DESIGN**

| MEMBER        | DESIGN SPAN (FEET) | UNIF. LOAD (K/FT.) | MAX. SHEAR (KIPS) | MAX. MOMENT (FT.-K) | REQ'D S            |                    |                |
|---------------|--------------------|--------------------|-------------------|---------------------|--------------------|--------------------|----------------|
|               | 21.333             | 1.048              | 11.179            | 59.6                | 39.75              |                    |                |
| TOP GIRDER    | SIZE               | AREA (SQ. IN)      | S (IN^3)          | I (IN^4)            | SHEAR STRESS (KSI) | BEND. STRESS (KSI) | DELTA (INCHES) |
|               | 16 X 36            | 10.6               | 56.5              | 448.0               | 1.05               | 12.66              | 0.38           |
|               |                    |                    |                   |                     |                    |                    |                |
|               | DESIGN SPAN (FEET) | UNIF. LOAD (K/FT.) | MAX. SHEAR (KIPS) | MAX. MOMENT (FT.-K) | REQ'D S            |                    |                |
|               | 21.33              | 2.152              | 22.954            | 122.4               | 81.62              |                    |                |
| BOTTOM GIRDER | SIZE               | AREA (SQ. IN)      | S (IN^3)          | I (IN^4)            | SHEAR STRESS (KSI) | BEND. STRESS (KSI) | DELTA (INCHES) |
|               | 16 X 50            | 10.6               | 81                | 659.0               | 2.17               | 18.14              | 0.52           |
|               |                    |                    |                   |                     |                    |                    |                |

**ALGIERS CANAL FLOOD PROTECTION**  
**RAILROAD SWING GATE DESIGN**  
**GATE GEOMETRY AND LOADING**

**SKINPLATE DESIGN**

|                         | DESIGN<br>SPAN<br>VERT.<br>(FEET)  | MAX.<br>UNIF.<br>LOAD<br>(K/FT.) | MAX.<br>SHEAR<br>(KIPS) | MAX.<br>MOMENT<br>(FT.-K) | REQ'D<br>S | REQ'D<br>t                      |             |
|-------------------------|------------------------------------|----------------------------------|-------------------------|---------------------------|------------|---------------------------------|-------------|
|                         | 9.2                                | 0.640                            | 2.93                    | 6.73                      | 4.485      | 1.497                           | NG          |
| NUMBER OF<br>STIFFENERS | DESIGN<br>SPAN<br>HORIZ.<br>(FEET) | MAX.<br>UNIF.<br>LOAD<br>(K/FT.) | MAX.<br>SHEAR<br>(KIPS) | MAX.<br>MOMENT<br>(FT.-K) | REQ'D<br>S | REQ'D<br>t<br>$(pB^2/2Fb)^{.5}$ | USE<br>5/16 |
|                         |                                    |                                  |                         |                           |            | 0.329                           | 0.313       |
| 7                       | 2.67                               | 0.578                            | 0.85                    | 0.46                      | 0.304      | 0.390                           | OK          |
| NUMBER OF<br>STIFFENERS | DESIGN<br>SPAN<br>HORIZ.<br>(FEET) | MAX.<br>UNIF.<br>LOAD<br>(K/FT.) | MAX.<br>SHEAR<br>(KIPS) | MAX.<br>MOMENT<br>(FT.-K) | REQ'D<br>S | REQ'D<br>t<br>0.293             |             |
|                         | 8                                  | 2.4                              | 0.578                   | 0.75                      |            | 0.240                           | 0.347 | OK |
| NUMBER OF<br>STIFFENERS | DESIGN<br>SPAN<br>HORIZ.<br>(FEET) | MAX.<br>UNIF.<br>LOAD<br>(K/FT.) | 1.1WL / 2               | WL^2 / 9                  | REQ'D<br>S | REQ'D<br>t                      |             |
|                         |                                    |                                  | MAX.<br>SHEAR<br>(KIPS) | MAX.<br>MOMENT<br>(FT.-K) |            |                                 |             |
| 9                       | 2.1                                | 0.578                            | 0.68                    | 0.29                      | 0.195      | 0.312                           | OK          |

**STIFFENER DESIGN**

| DESIGN<br>SPAN<br>VERT.<br>(FEET) | MAX.<br>UNIF.<br>LOAD<br>(K/FT.) | MAX.<br>SHEAR<br>(KIPS) | MAX.<br>MOMENT<br>(FT.-K) | REQ'D<br>S | REQ'D<br>d | d (IN.) | BEND.<br>STRESS<br>(KSI) |
|-----------------------------------|----------------------------------|-------------------------|---------------------------|------------|------------|---------|--------------------------|
|                                   |                                  |                         |                           |            |            | 8       |                          |
| 9.170                             | 0.678                            | 3.11                    | 6.33                      | 4.221      | 9.002      | 3.333   | 22.791                   |

USE WT 8 x 18

S = 5.05

15.04

KSI

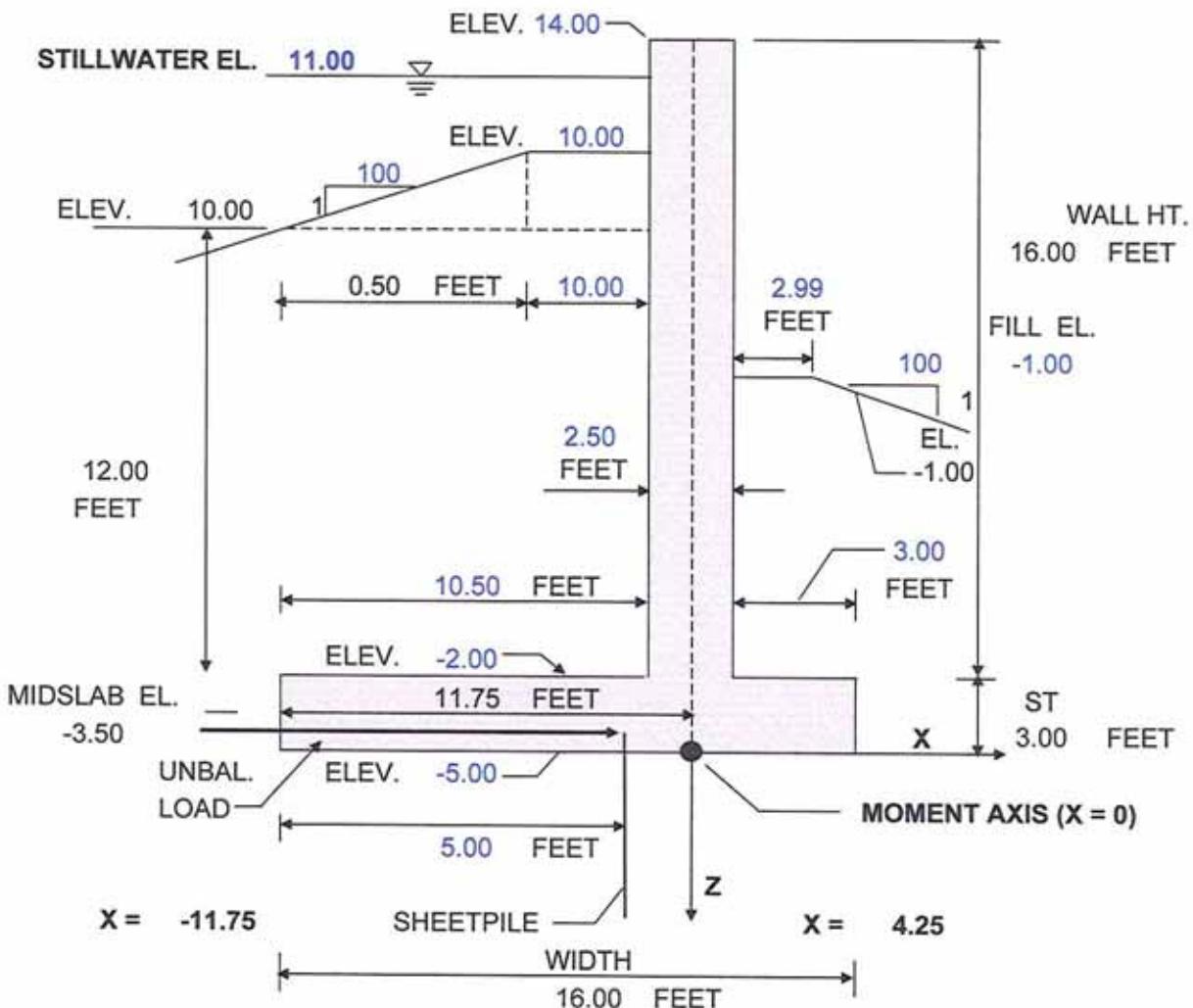
**WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 2 T - WALL ALTERNATIVE  
BASIC T-WALL GEOMETRY**

DATE: 6/18/2008

BY: RWY CHKD:

|                      |        |
|----------------------|--------|
| CONCRETE STRENGTH    | 4,000  |
| REINFORCING STRENGTH | 60,000 |
| WALL INTERVAL        | 0.66   |
| SLAB INTERVAL        | 1      |
| MONOLITH LENGTH      | 60     |
| BACKFILL WEIGHT      | 120.0  |
| Ko                   | 0.8    |

**UNBALANCED SOILS LOADING:**  
0.0 K / FT. STILLWATER  
0.0 K / FT. TOP OF WALL  
IMPACT  
**100** K



## DESIGN CRITERIA

**CONCRETE:** EM1110-2-2104 "STRENGTH DESIGN FOR REINFORCED HYDRAULIC STRUCTURES"  
**HYDRAULIC FACTOR (Hf) = 1.3**  
**DL & LL LOAD FACTORS = 1.7**  
**MAX. REINFORCING = 0.375 RHO<sub>BAL</sub>**

REINFORCING PER EQS. D-3 & D-4, AXIAL LOADS IGNORED

**ALLOWABLE SHEAR PER ACI 318, EQ. 11-3**

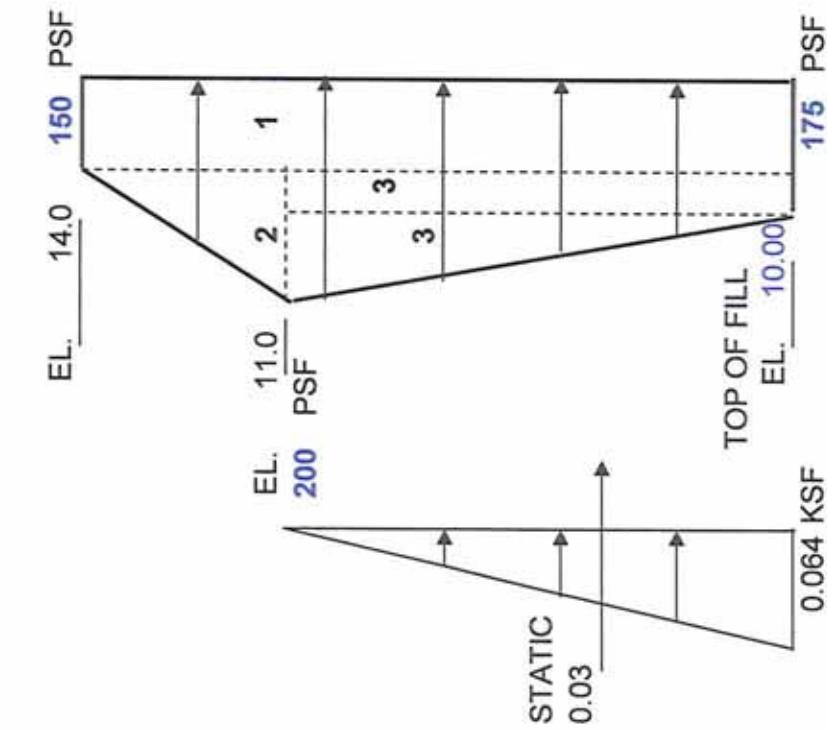
**CLEAR COVER:**

**4** INCHES IN WALL AND TOP OF SLAB (ARCHITECTURAL WALLS - 5")  
**9** INCHES IN BOTTOM OF SLAB TO ALLOW FOR PILES

**WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 2 T - WALL ALTERNATIVE**

DATE: 6/18/2008

BY: RWY CHKD:



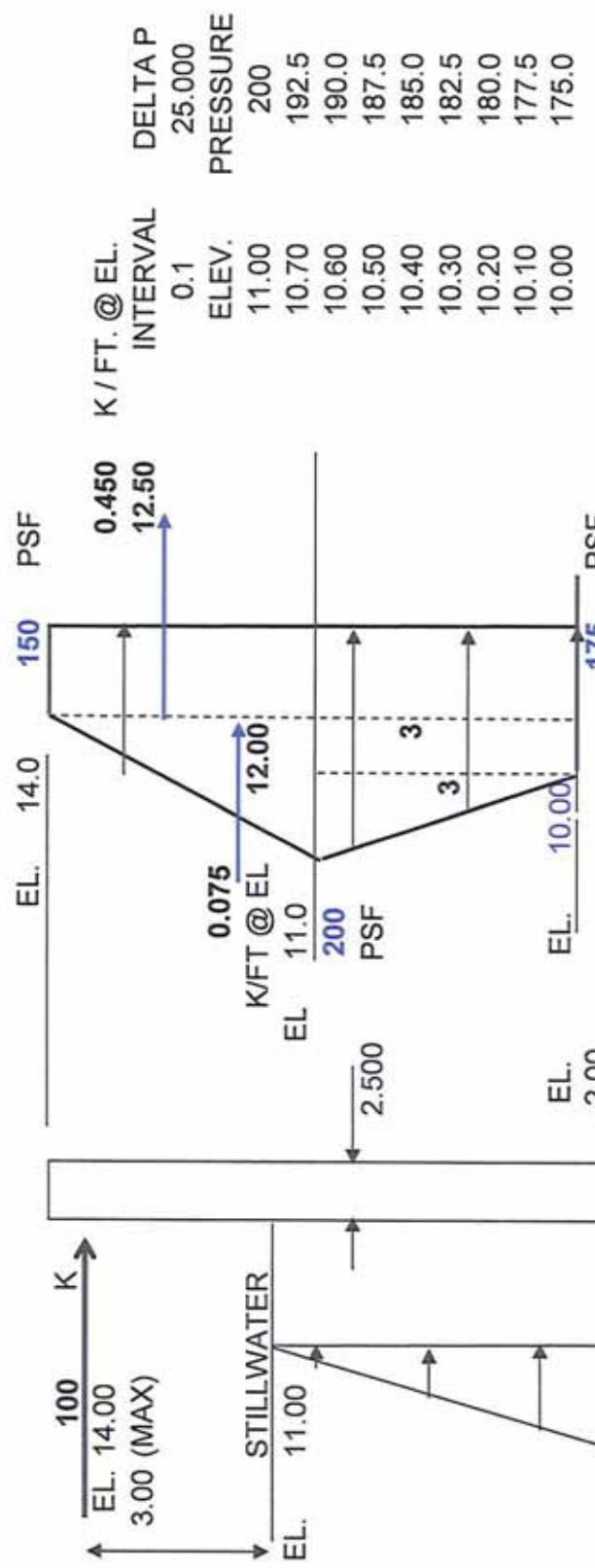
| WAVE PRESSURES               |                 |                    |                   |              |             |
|------------------------------|-----------------|--------------------|-------------------|--------------|-------------|
| P1                           | P2              | P3                 |                   |              |             |
| 200                          | 150             | 175                |                   |              |             |
| PSF                          | PSF             | PSF                |                   |              |             |
| <b>Stillwater</b>            | <b>Top Wall</b> | <b>Top of Fill</b> |                   |              |             |
| <u>WAVE FORCES</u>           |                 |                    |                   |              |             |
| PRESS                        | HEIGHT          | FORCE              | LEVER ARM         | BASE         | MOMENT      |
| UNIFORM                      | 150             | 4                  | 0.600             | K            | 2.00        |
| TRIANG.                      | 50              | 3                  | 0.075             | K            | 2.00        |
| UNIFORM                      | 25              | 1                  | 0.025             | K            | 0.50        |
| TRIANG.                      | 25              | 1                  | 0.013             | K            | 0.67        |
| <b>WAVE TOTAL</b>            |                 | <b>0.713</b>       | <b>K</b>          |              |             |
|                              |                 |                    |                   | <b>1.371</b> |             |
|                              |                 |                    | <b>RESULTANT</b>  | <b>1.92</b>  | FT.         |
|                              |                 |                    | ABOVE TOP OF FILL |              |             |
|                              |                 |                    | EL.               | <b>11.92</b> |             |
| <b>FORCE (STATIC + WAVE)</b> |                 |                    |                   |              |             |
| <u>0.745</u>                 | K/FT.           | HT. TO BASE        |                   | 15.00        | FT.         |
| <b>BASE MOMENT / FT.</b>     |                 |                    |                   |              |             |
| <b>WIDTH</b>                 |                 |                    |                   | <b>12.06</b> | FT.-K / FT. |
| 60                           |                 |                    |                   | HORIZ.       | MOMENT      |
| <b>TOTAL LOADS</b>           |                 |                    |                   | <b>43</b>    | -724        |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 T - WALL ALTERNATIVE**

DATE: 6/18/2008

CHKD:

BY: RWY



| STILLWATER ELEV. PRESS. | FORCES V M (K) (FT-K) | IMPACT FORCES ABOVE STILLWATER |        |           |        | WAVE FORCES BELOW STILLWATER |        |           |        |
|-------------------------|-----------------------|--------------------------------|--------|-----------|--------|------------------------------|--------|-----------|--------|
|                         |                       | V M                            | (K/FT) | (FT-K/FT) | (K/FT) | V M                          | (K/FT) | (FT-K/FT) | (K/FT) |
| 11.00                   | 0.00 0.00             | 9.09                           | 27.3   | 0.525     | 0.75   | 0.000                        | 0.000  | 0.000     | 0.0    |
| 10.70                   | 0.02 0.00             | 8.62                           | 28.4   | 0.525     | 0.91   | 0.059                        | 0.059  | 0.059     | 0.0    |
| 10.60                   | 0.03 0.01             | 8.47                           | 28.8   | 0.525     | 0.96   | 0.078                        | 0.078  | 0.078     | 0.0    |
| 10.50                   | 0.03 0.01             | 8.33                           | 29.2   | 0.525     | 1.01   | 0.097                        | 0.097  | 0.097     | 0.0    |
| 10.40                   | 0.04 0.01             | 8.20                           | 29.5   | 0.525     | 1.07   | 0.116                        | 0.116  | 0.116     | 0.0    |
| 10.30                   | 0.04 0.02             | 8.06                           | 29.8   | 0.525     | 1.12   | 0.134                        | 0.134  | 0.134     | 0.0    |
| 10.20                   | 0.05 0.02             | 7.94                           | 30.2   | 0.525     | 1.17   | 0.152                        | 0.152  | 0.152     | 0.1    |
| 10.10                   | 0.06 0.03             | 7.81                           | 30.5   | 0.525     | 1.22   | 0.170                        | 0.170  | 0.170     | 0.1    |
| 10.00                   | 0.06 0.03             | 7.69                           | 30.8   | 0.525     | 1.28   | 0.188                        | 0.188  | 0.188     | 0.1    |
| -2.00                   | 0.83 5.41             | 2.70                           | 43.2   | 0.525     | 7.58   | 0.188                        | 0.188  | 0.188     | 2.3    |

WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 2 T - WALL ALTERNATIVE

DATE: 6/18/2008

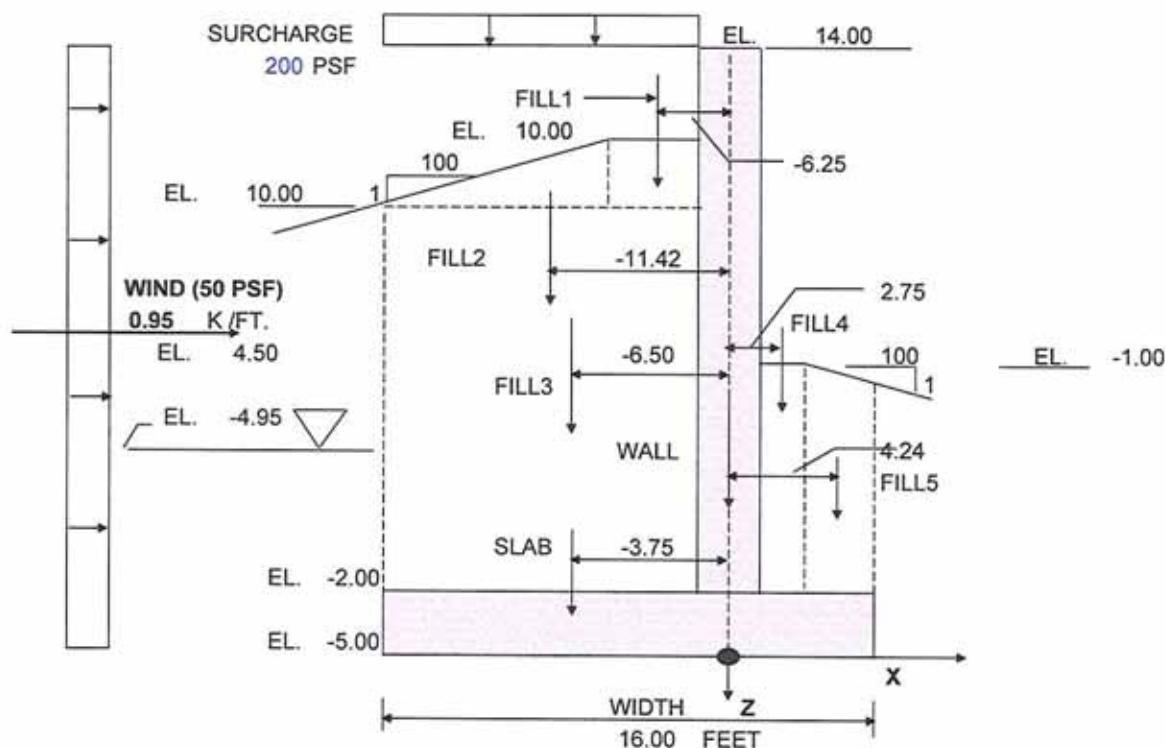
BY: RWY CHKD:

TOTAL FORCES - STILLWATER PLUS WAVE PLUS IMPACT

| ELEV. | V<br>(K) | M<br>(FT-K) | TOTAL          |                | t    | d<br>(t-4.5) | SHEAR<br>CAP.<br>(KIPS) | SIMPLE        | OVERSTRESS | DETAILED      |
|-------|----------|-------------|----------------|----------------|------|--------------|-------------------------|---------------|------------|---------------|
|       |          |             | V <sub>U</sub> | M <sub>U</sub> |      |              |                         | As<br>(Mu/4d) | %          | As<br>(no OS) |
| 11.00 | 9.62     | 28.02       | 21.25          | 61.9           | 30.0 | 25.50        | 54.9                    | 0.61          | 0.364      | 0.326         |
| 10.70 | 9.21     | 29.36       | 20.35          | 64.9           | 30.0 | 25.50        | 54.9                    | 0.64          | 0.381      | 0.342         |
| 10.60 | 9.08     | 29.79       | 20.07          | 65.8           | 30.0 | 25.50        | 54.9                    | 0.65          | 0.386      | 0.347         |
| 10.50 | 8.96     | 30.20       | 19.81          | 66.8           | 30.0 | 25.50        | 54.9                    | 0.65          | 0.392      | 0.352         |
| 10.40 | 8.85     | 30.61       | 19.56          | 67.6           | 30.0 | 25.50        | 54.9                    | 0.66          | 0.397      | 0.357         |
| 10.30 | 8.74     | 31.01       | 19.31          | 68.5           | 30.0 | 25.50        | 54.9                    | 0.67          | 0.402      | 0.361         |
| 10.20 | 8.63     | 31.40       | 19.08          | 69.4           | 30.0 | 25.50        | 54.9                    | 0.68          | 0.407      | 0.366         |
| 10.10 | 8.53     | 31.78       | 18.86          | 70.2           | 30.0 | 25.50        | 54.9                    | 0.69          | 0.412      | 0.370         |
| 10.00 | 8.44     | 32.15       | 18.65          | 71.1           | 30.0 | 25.50        | 54.9                    | 0.70          | 0.417      | 0.375         |
| -2.00 | 8.82     | 76.60       | 19.50          | 169.3          | 30.0 | 25.50        | 54.9                    | 1.66          | 0.994      | 0.907         |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 T - WALL ALTERNATIVE**  
**CASE 1 - CONSTRUCTION**

FLOODSIDE WATER ELEV. -4.95  
 UPLIFT - PROT. SIDE -4.95  
 ALLOWABLE OVERSTRESS 16.66 %

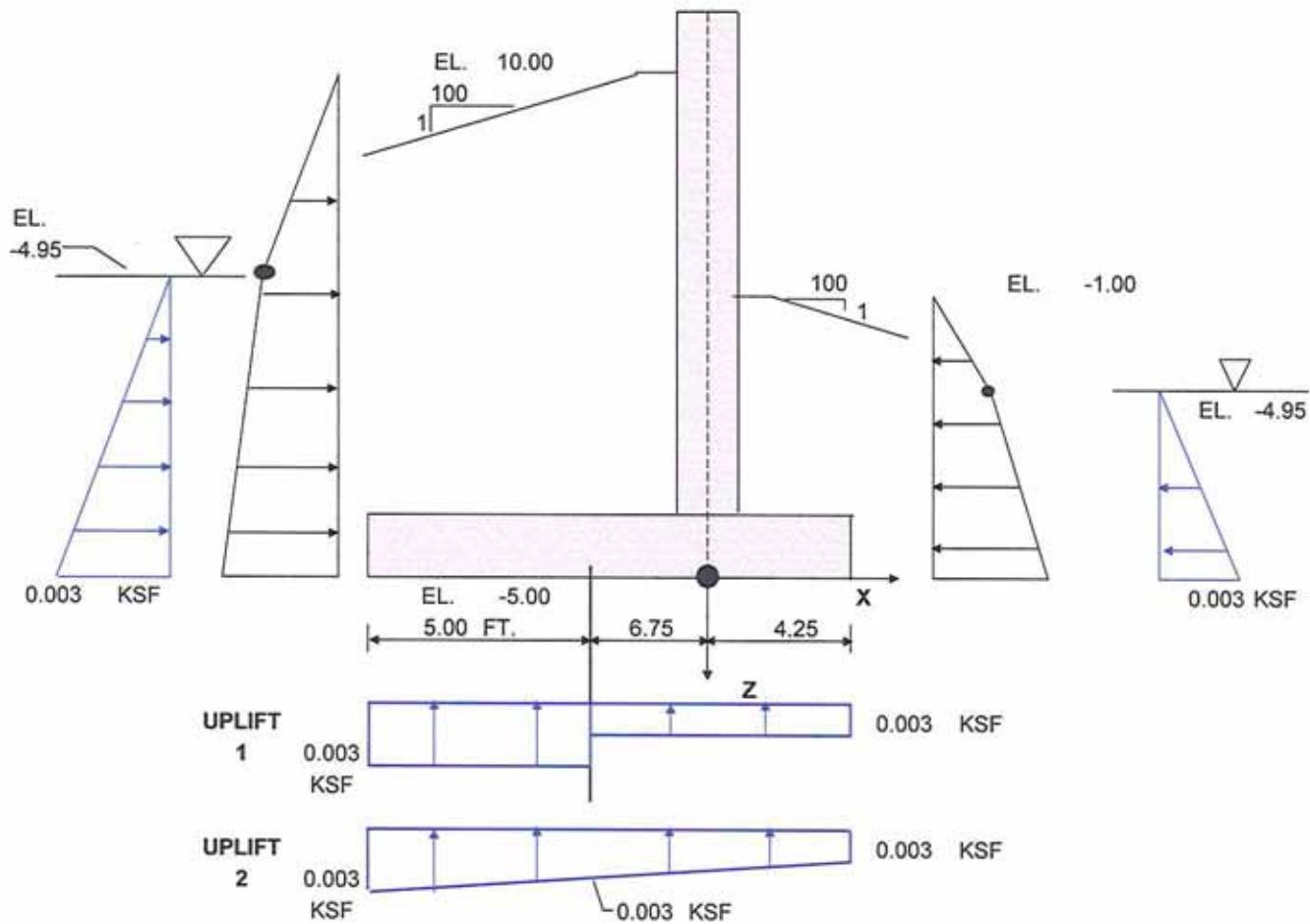


**FLOODWALL APPLIED GRAVITY LOADING - CASE 1**

| ITEM                 | FORCE Z<br>(WEIGHT) | X CENT.<br>FEET | Y CENT.<br>FEET | Myy<br>FT.-K | Mzz<br>FT.-K |
|----------------------|---------------------|-----------------|-----------------|--------------|--------------|
| CONCRETE SLAB        | 7.20                | -3.75           | 0.00            | 27.0         | 0            |
| CONCRETE WALL        | 6.00                | 0.00            | 0.00            | 0.0          | 0            |
| FLOODSIDE FILL1      | 0.01                | -6.25           | 0.00            | 0.0          | 0            |
| FLOODSIDE FILL2      | 0.00                | -11.42          | 0.00            | 0.0          | 0            |
| FLOODSIDE FILL3      | 15.11               | -6.50           | 0.00            | 98.2         | 0            |
| PROTECTED SIDE FILL4 | 0.36                | 2.75            | 0.00            | -1.0         | 0            |
| PROTECTED SIDE FILL5 | 0.00                | 4.24            | 0.00            | 0.0          | 0            |
| FLOODSIDE WATER      | 0.00                | -31.68          | 0.00            | 0.0          | 0            |
| FLOODSIDE WATER      | 0.00                | 0.00            | 0.00            | 0.0          | 0            |

|                     |       |       |        |       |
|---------------------|-------|-------|--------|-------|
| TOTALS              | 28.68 | -4.33 | 124.29 | 0     |
| CONCRETE            | 13.20 | -2.05 | 27.00  | 0     |
| FLOODSIDE FILL 1-3  | 15.12 | -6.50 | 98.28  | 0     |
| PROT. SIDE FILL 4-5 | 0.36  | 2.75  | -0.99  | 0     |
| FLOODSIDE WATER     | 0.00  | -     | 0.00   | 0     |
|                     | KIPS  |       | FT.-K  | FT.-K |

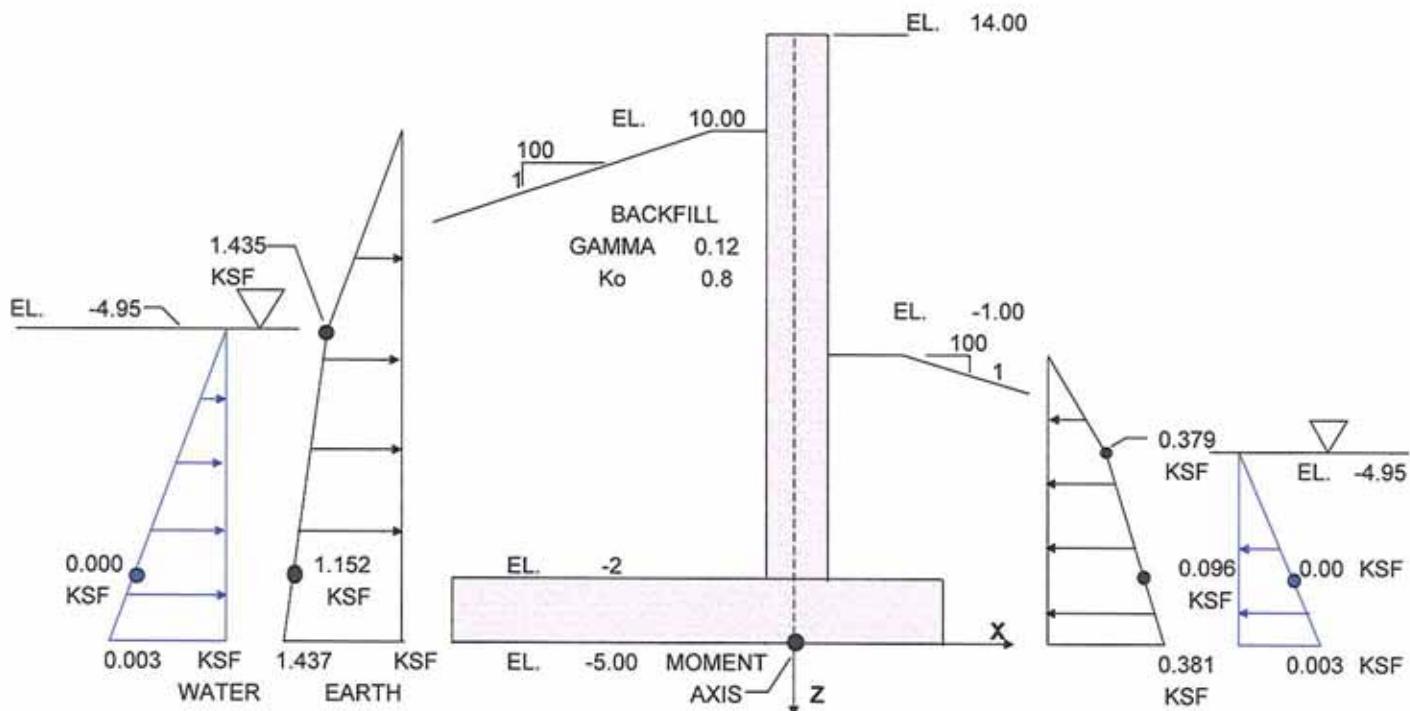
**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 T - WALL ALTERNATIVE**  
**CASE 1 - CONSTRUCTION**



| ITEM            | WIDTH | PRESS | FORCE Z | X CENT. FEET | Y CENT. FEET | Myy FT.-K | Mzz FT.-K |
|-----------------|-------|-------|---------|--------------|--------------|-----------|-----------|
| FLOODSIDE:      |       |       |         |              |              |           |           |
| UPLIFT 1        | 5.00  | 0.00  | -0.02   | -9.25        | 0.00         | 0         | 0         |
| PROTECTED SIDE: |       |       |         |              |              |           |           |
| UPLIFT 1        | 11.00 | 0.00  | -0.04   | -1.25        | 0.00         | 0         | 0         |
| TOTALS          |       |       | -0.05   | -3.75        |              | -0.19     | 0         |
| FLD.SIDE        |       |       | -0.02   | -9.25        |              | -0.15     | 0         |
| PROT. SIDE      |       |       | -0.04   | -1.25        |              | -0.04     | 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 (UNIF) | 5.00  | 0.003 | -0.02   | -9.25        | 0.00         | -0.15     | 0.00      |
| UPLIFT 2 (TRI)  | 5.00  | 0.000 | 0.00    | -10.08       | 0.00         | 0.00      | 0.00      |
| PROTECTED SIDE: |       |       |         |              |              |           |           |
| UPLIFT 2 (UNIF) | 11.00 | 0.003 | -0.04   | -1.25        | 0.00         | -0.04     | 0.00      |
| UPLIFT 2 (TRI)  | 11.00 | 0.000 | 0.00    | -3.08        | 0.00         | 0.00      | 0.00      |
| TOTALS          |       |       | -0.05   | -3.75        |              | -0.19     | 0.00      |
| FLOOD SIDE      |       |       | -0.02   | -9.25        |              | -0.15     | 0.00      |
| PROT. SIDE      |       |       | -0.04   | -1.25        |              | -0.04     | 0.00      |
|                 |       |       | KIPS    |              |              | FT.-K     | FT.-K     |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 T - WALL ALTERNATIVE**  
**CASE 1 - CONSTRUCTION**

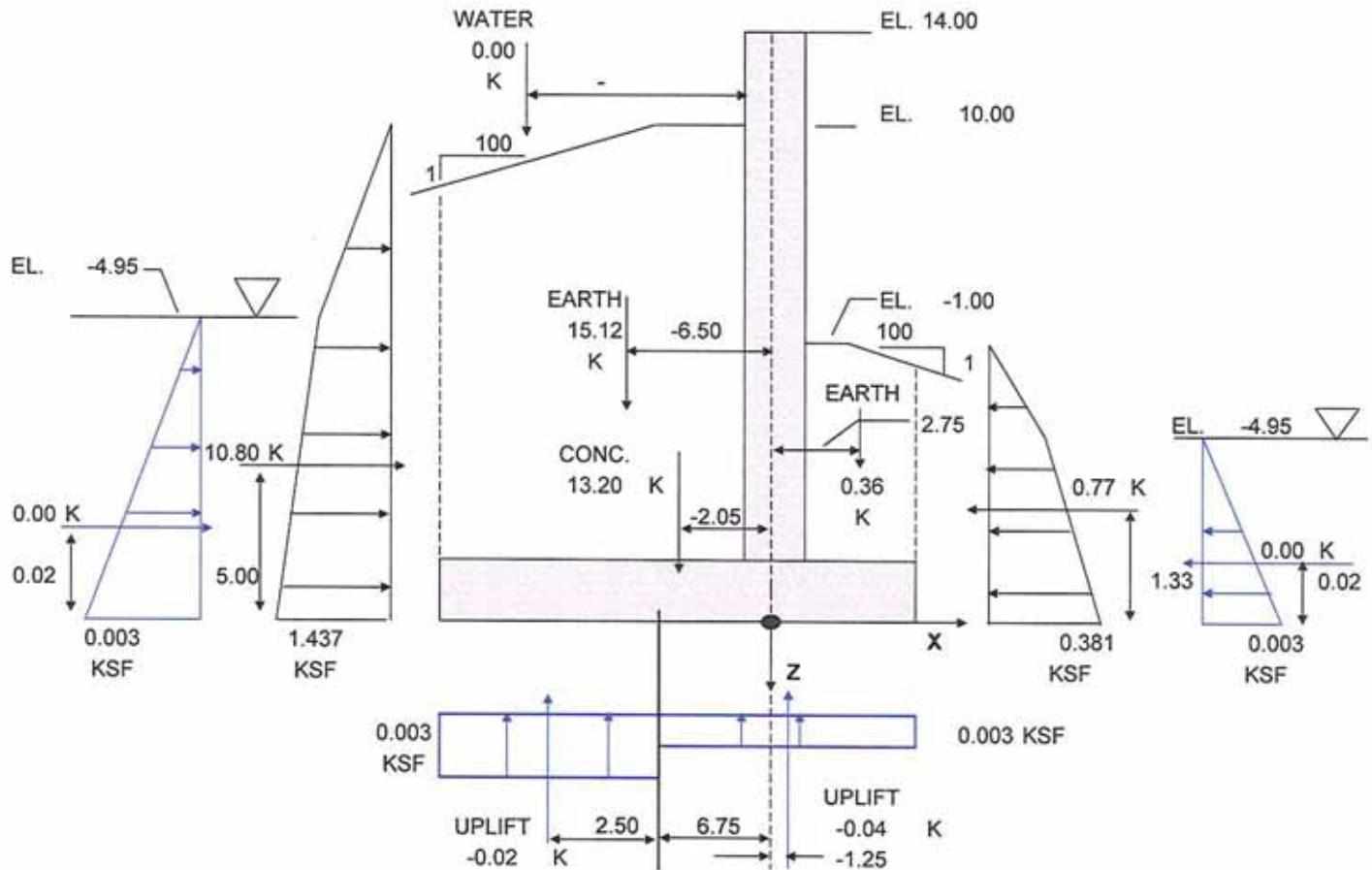


FLOODWALL HORIZONTAL LOADING - CASE 1

| ITEM       | HEIGHT | PRESS | FORCE X |      | Y CENT. FEET | Z CENT. FEET | Mzz FT-K/FT | Myy FT-K/FT |
|------------|--------|-------|---------|------|--------------|--------------|-------------|-------------|
| FLOODSIDE: |        |       |         |      |              |              |             |             |
| EARTH 1    | 14.95  | 1.435 | 10.73   | k/ft | 0.00         | -5.03        | 0           | -54.0       |
| EARTH 2    | 0.05   | 1.435 | 0.07    | k/ft | 0.00         | -0.02        | 0           | 0.0         |
| EARTH 3    | 0.05   | 0.002 | 0.00    | k/ft | 0.00         | -0.02        | 0           | 0.0         |
| GRND WATER | 0.05   | 0.003 | 0.00    | k/ft | 0.00         | -0.02        | 0           | 0.0         |
| PROTECTED: |        |       |         |      |              |              |             |             |
| EARTH 4    | 3.95   | 0.379 | -0.75   | k/ft | 0.00         | -1.37        | 0           | 1.0         |
| EARTH 5    | 0.05   | 0.379 | -0.02   | k/ft | 0.00         | -0.02        | 0           | 0.0         |
| EARTH 6    | 0.05   | 0.381 | 0.0     | k/ft | 0.00         | -0.02        | 0           | 0.0         |
| GRND WATER | 0.05   | 0.003 | 0.0     | k/ft | 0.00         | -0.02        | 0           | 0.0         |

|                        | FORCE X    | Y CENT. FEET | Z CENT. FEET | Mzz FT-K/FT. | Myy FT-K/FT. |
|------------------------|------------|--------------|--------------|--------------|--------------|
| FLOODSIDE EARTH FORCE  | 10.80      | 0.00         | -5.00        |              | -54.00       |
| FLOODSIDE WATER FORCE  | 0.00       | 0.00         | -0.02        |              | 0.00         |
| TOTAL FLOODSIDE FORCE  | 10.80 k/ft | 0.00         | -5.00        | 0.0          | -54.0        |
| PROT. SIDE EARTH FORCE | -0.77      | 0.00         | -1.33        |              | 1.0          |
| PROT. SIDE WATER FORCE | 0.00       | 0.00         | -0.02        |              | 0.0          |
| TOTAL PROT. SIDE FORCE | -0.77 k/ft | 0.00         | -1.33        | 0.0          | 1.0          |
| TOTAL NET HORIZ. FORCE | 10.03 k/ft | 0.00         | -5.28        | 0.0          | -53.0        |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 T - WALL ALTERNATIVE**  
**CASE 1 - CONSTRUCTION**



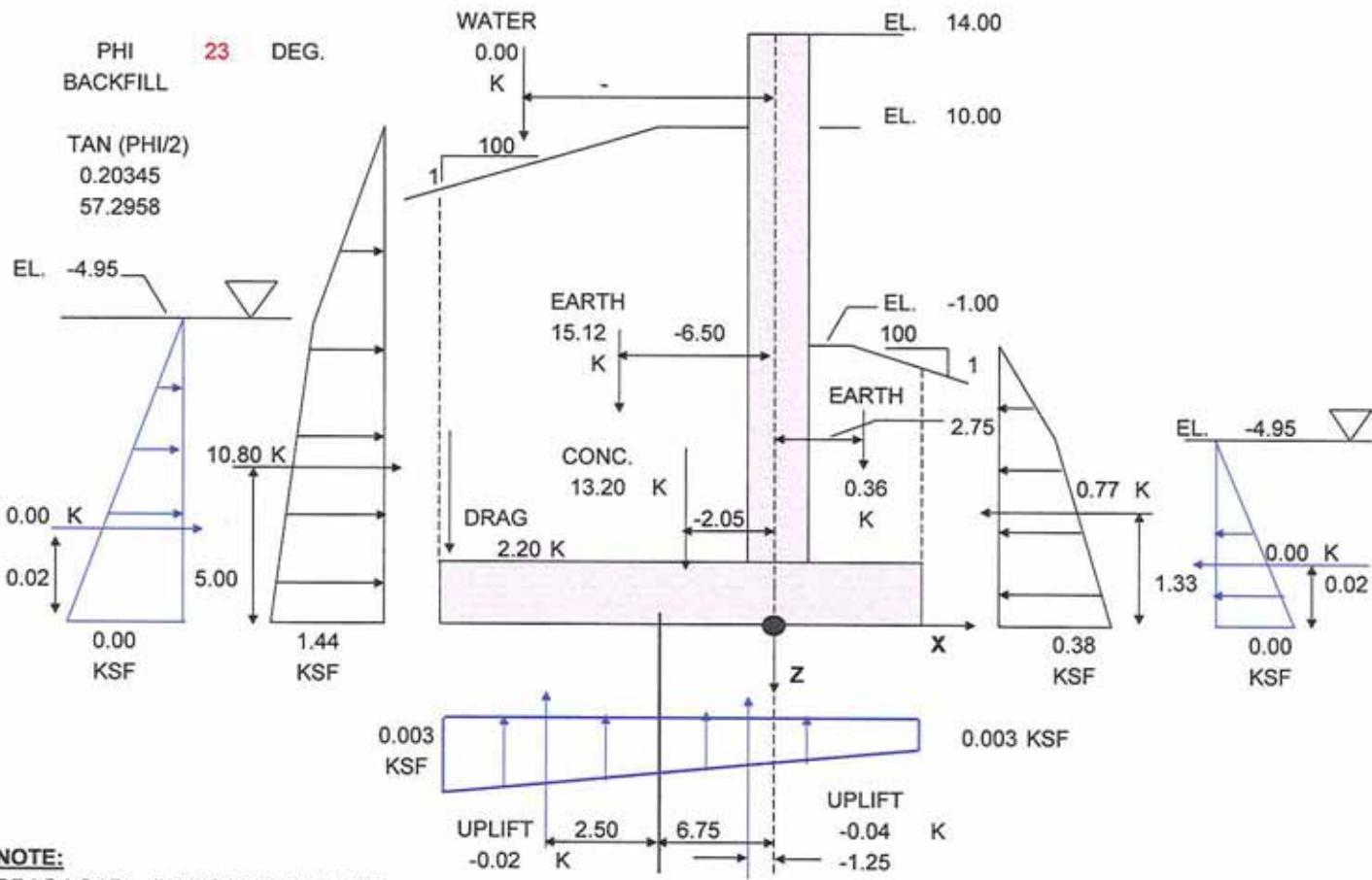
LOADING SUMMARY - CASE 1 WITH MINIMUM UPLIFT

| 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     | 13.2    | k/ft         | -2.05        | 0.00        | 27.000      | 0 |
| FLDSIDE FILL    | 0.0     | 0.0     | 15.1    | k/ft         | -6.50        | 0.00        | 98.278      | 0 |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.4     | k/ft         | 2.75         | 0.00        | -0.990      | 0 |
| F. SIDE UPLIFT  | 0.0     | 0.0     | 0.0     | k/ft         | -9.25        | 0.00        | -0.148      | 0 |
| P. SIDE UPLIFT  | 0.0     | 0.0     | 0.0     | k/ft         | -1.25        | 0.00        | -0.044      | 0 |
| F. S. EARTH Pr. | 10.8    | 0.0     | 0.0     | k/ft         | -            | -5.00       | -54.000     | 0 |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0     | k/ft         | -            | -1.33       | 0.000       | 0 |
| F. S. WATER Pr. | 0.0     | 0.0     | 0.0     | k/ft         | -            | -0.02       | 0.000       | 0 |
| P. S. WATER Pr. | 0.0     | 0.0     | 0.0     | k/ft         | -            | -0.02       | 0.000       | 0 |

|             | X     | Y   | Z      | Mxx | Myy  | Mzz |
|-------------|-------|-----|--------|-----|------|-----|
| TOTALS      | 10.8  | 0.0 | 28.6   | 0   | 70   | 0   |
| MONO. TOTAL | 648.0 | 0.0 | 1717.7 | 0   | 4206 | 0   |

IGNORE

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 T - WALL ALTERNATIVE**  
**CASE 1 - CONSTRUCTION**



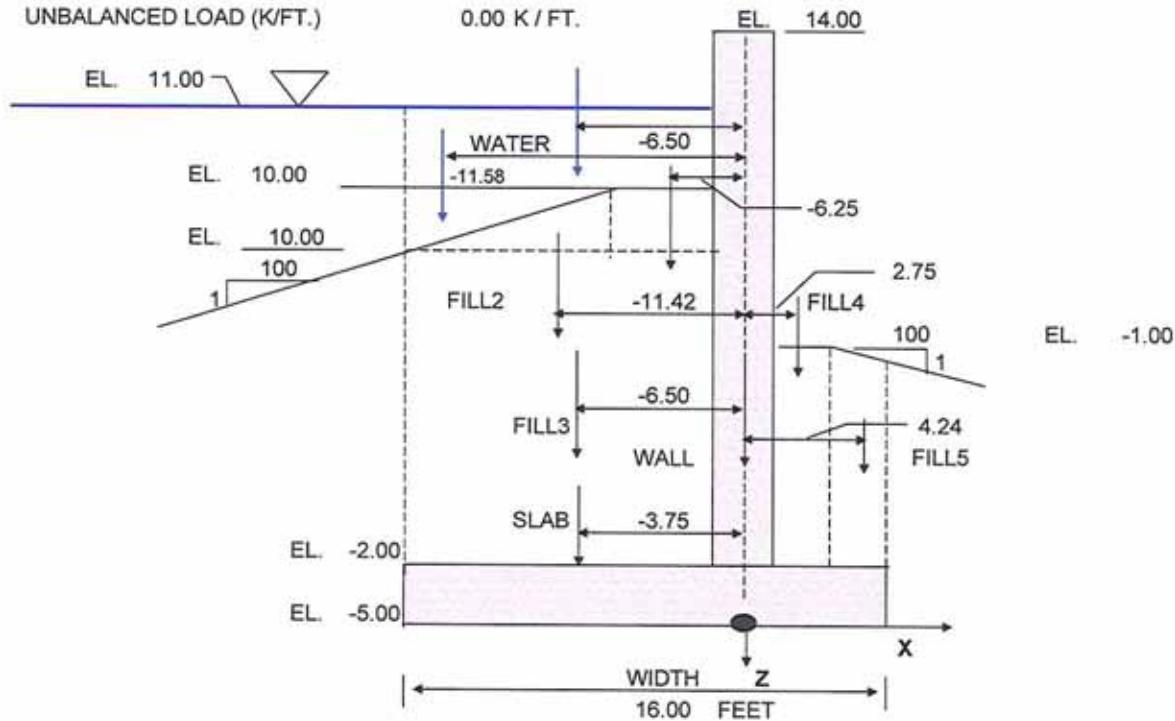
LOADING SUMMARY - CASE 1 WITH DRAG LOAD

| 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     | 13.2    | k/ft | -2.05        | 0.00         | 27          | 0           |
| FLDSIDE FILL    | 0.0     | 0.0     | 15.1    | k/ft | -6.50        | 0.00         | 98          | 0           |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.4     | k/ft | 2.75         | 0.00         | -1          | 0           |
| DRAG LOAD       | 0.0     | 0.0     | 2.2     | k/ft | -11.75       | 0.00         | 26          | 0           |
| SURCHARGE       | 0.0     | 0.0     | 2.1     | k/ft | -6.50        | 0.00         | 14          | 0           |
| F. SIDE UPLIFT  | 0.0     | 0.0     | 0.0     | k/ft | -9.25        | 0.00         | 0           | 0           |
| P. SIDE UPLIFT  | 0.0     | 0.0     | 0.0     | k/ft | -1.25        | 0.00         | 0           | 0           |
| F. S. EARTH Pr. | 10.8    | 0.0     | 0.0     | k/ft | -            | -5.00        | -54         | 0           |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -1.33        | 0           | 0           |
| F. S. WATER Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -0.02        | 0           | 0           |
| P. S. WATER Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -0.02        | 0           | 0           |

|             | X     | Y   | Z      | Mxx   | Myy      | Mzz   |
|-------------|-------|-----|--------|-------|----------|-------|
| TOTALS      | 10.8  | 0.0 | 32.9   | 0     | 110      | 0     |
| MONO. TOTAL | 648.0 | 0.0 | 1975.6 | 0     | 6573.852 | 0     |
|             |       |     |        | X     | Y        | Z     |
| VERTICAL    |       |     | 1976   | -4.97 |          |       |
| HORIZ       |       |     | 648    |       |          | -5.00 |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 T - WALL ALTERNATIVE**  
**CASE 2 - CANAL AT STILLWATER**

FLOODSIDE WATER ELEV.                   **11.00**  
 UPLIFT - PROT. SIDE                   -2.00  
 ALLOWABLE OVERSTRESS                   0  
 UNBALANCED LOAD (K/FT.)              0.00 K / FT.

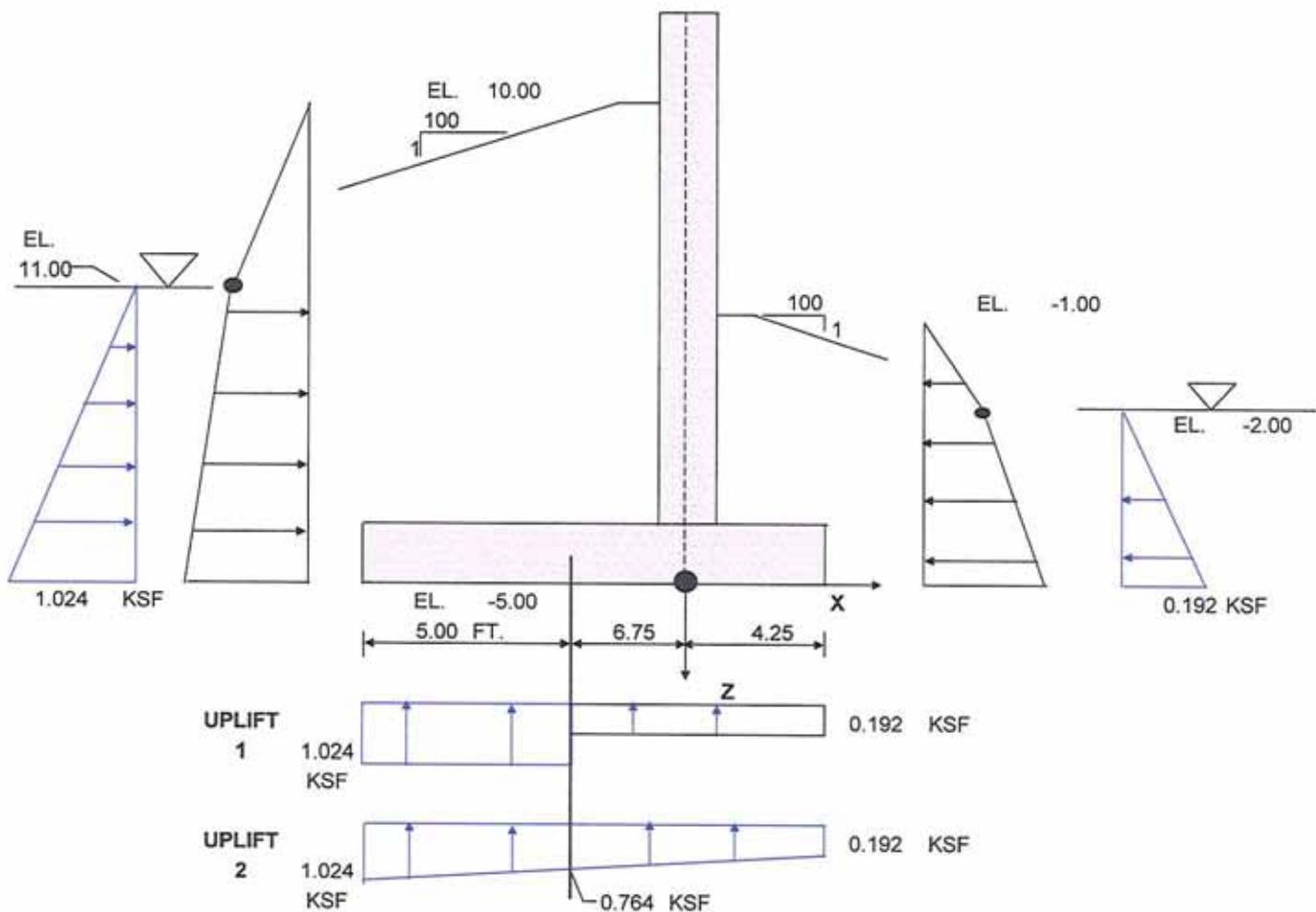


**FLOODWALL APPLIED GRAVITY LOADING - CASE 2**

| ITEM                 | FORCE Z<br>(WEIGHT) | X CENT.<br>FEET | Y CENT.<br>FEET | Myy<br>FT.-K  | Mzz<br>FT.-K |
|----------------------|---------------------|-----------------|-----------------|---------------|--------------|
| CONCRETE SLAB        | 7.20                | -3.75           | 0.00            | 27            | 0            |
| CONCRETE WALL        | 6.00                | 0.00            | 0.00            | 0             | 0            |
| FLOODSIDE FILL1      | 0.01                | -6.25           | 0.00            | 0             | 0            |
| FLOODSIDE FILL2      | 0.00                | -11.42          | 0.00            | 0             | 0            |
| FLOODSIDE FILL3      | 15.11               | -6.50           | 0.00            | 98            | 0            |
| PROTECTED SIDE FILL4 | 0.36                | 2.75            | 0.00            | -1            | 0            |
| PROTECTED SIDE FILL5 | 0.00                | 4.24            | 0.00            | 0             | 0            |
| FLOODSIDE WATER      | 0.00                | -11.58          | 0.00            | 0             | 0            |
| FLOODSIDE WATER      | 0.67                | -6.50           | 0.00            | 4             | 0            |
| <b>TOTALS</b>        | <b>29.35</b>        | <b>-4.38</b>    |                 | <b>128.66</b> | <b>0</b>     |
| CONCRETE             | 13.20               | -2.05           |                 | 27.00         | 0            |
| FLOODSIDE FILL 1-3   | 15.12               | -6.50           |                 | 98.28         | 0            |
| PROT. SIDE FILL 4-5  | 0.36                | 2.75            |                 | -0.99         | 0            |
| FLOODSIDE WATER      | 0.67                | -6.50           |                 | 4.37          | 0            |
|                      |                     |                 |                 | FT.-K         | FT.-K        |

|                     |       |       |        |       |
|---------------------|-------|-------|--------|-------|
| TOTALS              | 29.35 | -4.38 | 128.66 | 0     |
| CONCRETE            | 13.20 | -2.05 | 27.00  | 0     |
| FLOODSIDE FILL 1-3  | 15.12 | -6.50 | 98.28  | 0     |
| PROT. SIDE FILL 4-5 | 0.36  | 2.75  | -0.99  | 0     |
| FLOODSIDE WATER     | 0.67  | -6.50 | 4.37   | 0     |
|                     |       |       | FT.-K  | FT.-K |

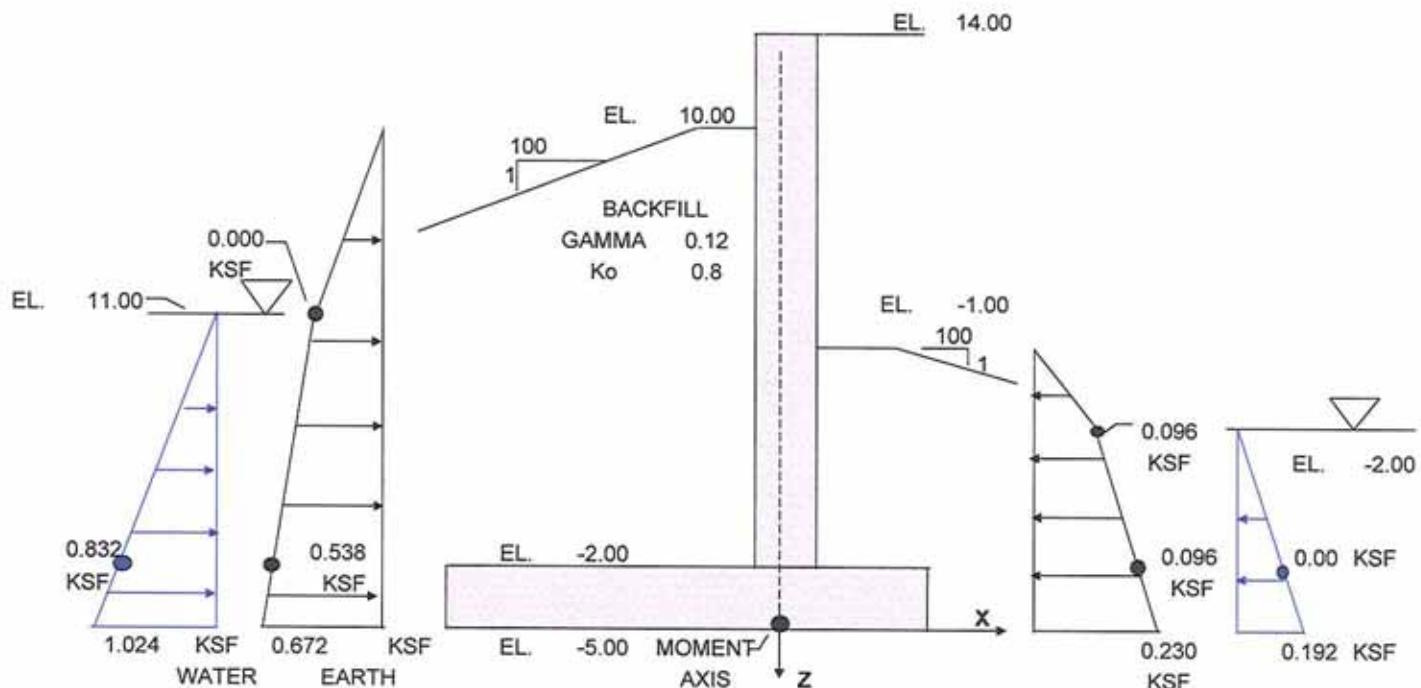
**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 T - WALL ALTERNATIVE**  
**CASE 2 - CANAL AT STILLWATER**



| ITEM            | WIDTH | PRESS | FORCE Z | X CENT. FEET | Y CENT. FEET | Myy FT.-K  | Mzz FT.-K |
|-----------------|-------|-------|---------|--------------|--------------|------------|-----------|
| FLOODSIDE:      |       |       |         |              |              |            |           |
| UPLIFT 1        | 5.00  | 1.02  | -5.12   | -9.25        | 0.00         | -47        | 0         |
| PROTECTED SIDE: |       |       |         |              |              |            |           |
| UPLIFT 1        | 11.00 | 0.19  | -2.11   | -1.25        | 0.00         | -3         | 0         |
| <b>TOTALS</b>   |       |       |         | <b>-7.23</b> | <b>-6.91</b> | <b>-50</b> | <b>0</b>  |
| FLD.SIDE        |       |       |         | -5.12        | -9.25        | -47.36     | 0         |
| PROT. SIDE      |       |       |         | -2.11        | -1.25        | -2.64      | 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 (UNIF) | 5.00  | 0.764 | -3.82   | -9.25        | 0.00         | -35.34        | 0.00        |
| UPLIFT 2 (TRI)  | 5.00  | 0.260 | -0.65   | -10.08       | 0.00         | -6.55         | 0.00        |
| PROTECTED SIDE: |       |       |         |              |              |               |             |
| UPLIFT 2 (UNIF) | 11.00 | 0.192 | -2.11   | -1.25        | 0.00         | -2.64         | 0.00        |
| UPLIFT 2 (TRI)  | 11.00 | 0.572 | -3.15   | -3.08        | 0.00         | -9.70         | 0.00        |
| <b>TOTALS</b>   |       |       |         | <b>-9.73</b> | <b>-5.57</b> | <b>-54.23</b> | <b>0.00</b> |
| FLOOD SIDE      |       |       |         | -4.47        | -9.37        | -41.89        | 0.00        |
| PROT. SIDE      |       |       |         | -5.26        | -2.35        | -12.34        | 0.00        |
|                 |       |       |         | KIPS         |              | FT.-K         | FT.-K       |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 T - WALL ALTERNATIVE**  
**CASE 2 - CANAL AT STILLWATER**



2.688

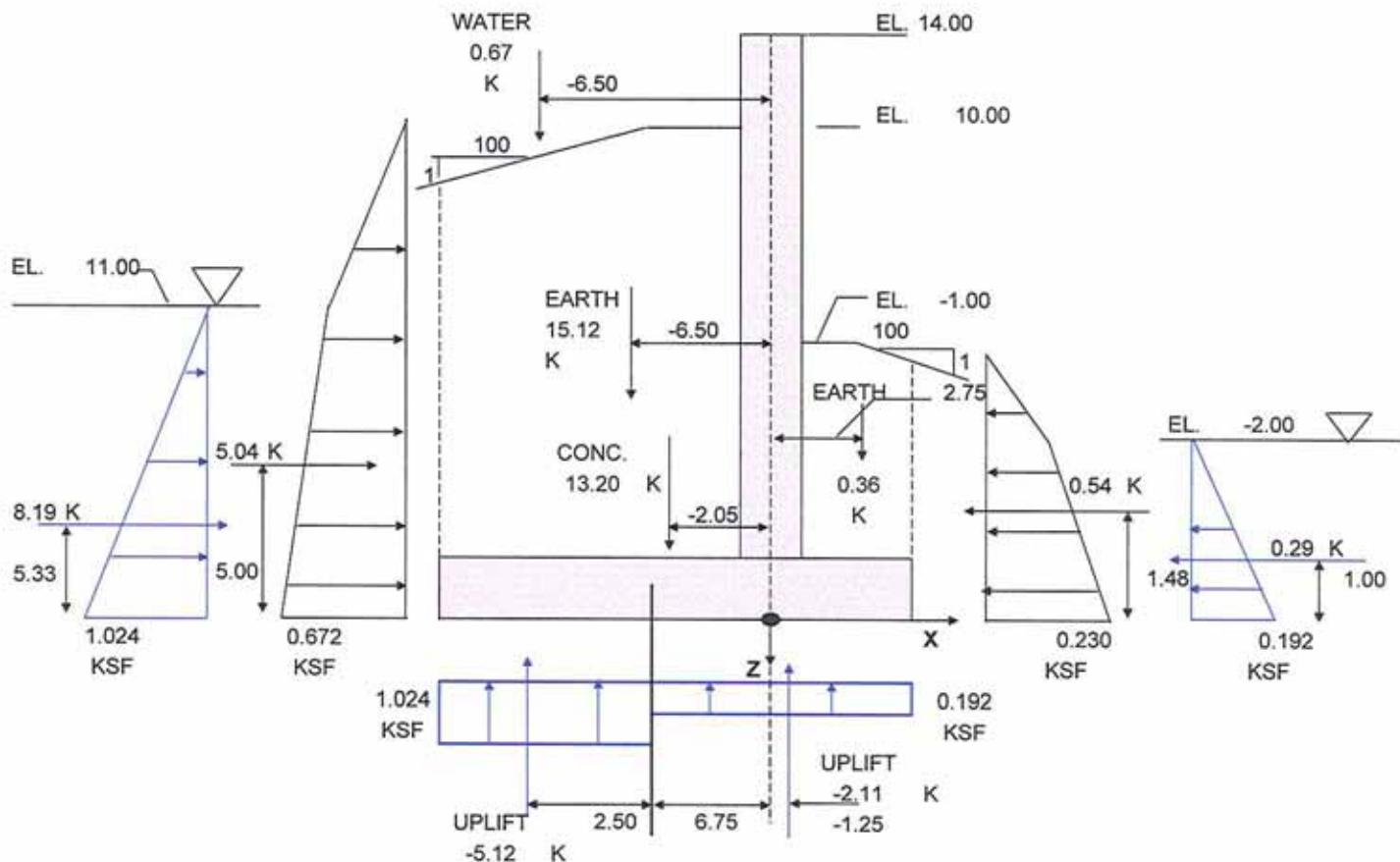
7.168

**FLOODWALL HORIZONTAL LOADING - CASE 2**

| 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    | 15.00  | 0.000 | 0.00    | k/ft | 0.00         | 0.00         | 0           | 0.0         |
| EARTH 3    | 15.00  | 0.672 | 5.04    | k/ft | 0.00         | -5.00        | 0           | -25.2       |
| GRND WATER | 16.00  | 1.024 | 8.19    | k/ft | 0.00         | -5.33        | 0           | -43.7       |
| PROTECTED: |        |       |         |      |              |              |             |             |
| EARTH 4    | 1.00   | 0.096 | -0.05   | k/ft | 0.00         | -3.33        | 0           | 0.2         |
| EARTH 5    | 3.00   | 0.096 | -0.29   | k/ft | 0.00         | -1.50        | 0           | 0.4         |
| EARTH 6    | 3.00   | 0.230 | -0.20   | k/ft | 0.00         | -1.00        | 0           | 0.2         |
| GRND WATER | 3.00   | 0.192 | -0.29   | k/ft | 0.00         | -1.00        | 0           | 0.3         |

|                        | FORCE X    | Y CENT. FEET | Z CENT. FEET | Mzz FT-K/FT. | Myy FT-K/FT. |
|------------------------|------------|--------------|--------------|--------------|--------------|
| FLOODSIDE EARTH FORCE  | 5.04       | 0.00         | -5.00        | -25.2        |              |
| FLOODSIDE WATER FORCE  | 8.19       | 0.00         | -5.33        | -43.6907     |              |
| TOTAL FLOODSIDE FORCE  | 13.23 k/ft | 0.00         | -5.21        | 0.0          | -68.9        |
| PROT. SIDE EARTH FORCE | -0.54      | 0.00         | -1.48        | 0.8          |              |
| PROT. SIDE WATER FORCE | -0.29      | 0.00         | -1.00        | 0.3          |              |
| TOTAL PROT. SIDE FORCE | -0.83 k/ft | 0.00         | -1.31        | 0.0          | 1.1          |
| TOTAL NET HORIZ. FORCE | 12.41 k/ft | 0.00         | -5.47        | 0.0          | -67.8        |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 T - WALL ALTERNATIVE**  
**CASE 2 - CANAL AT STILLWATER**

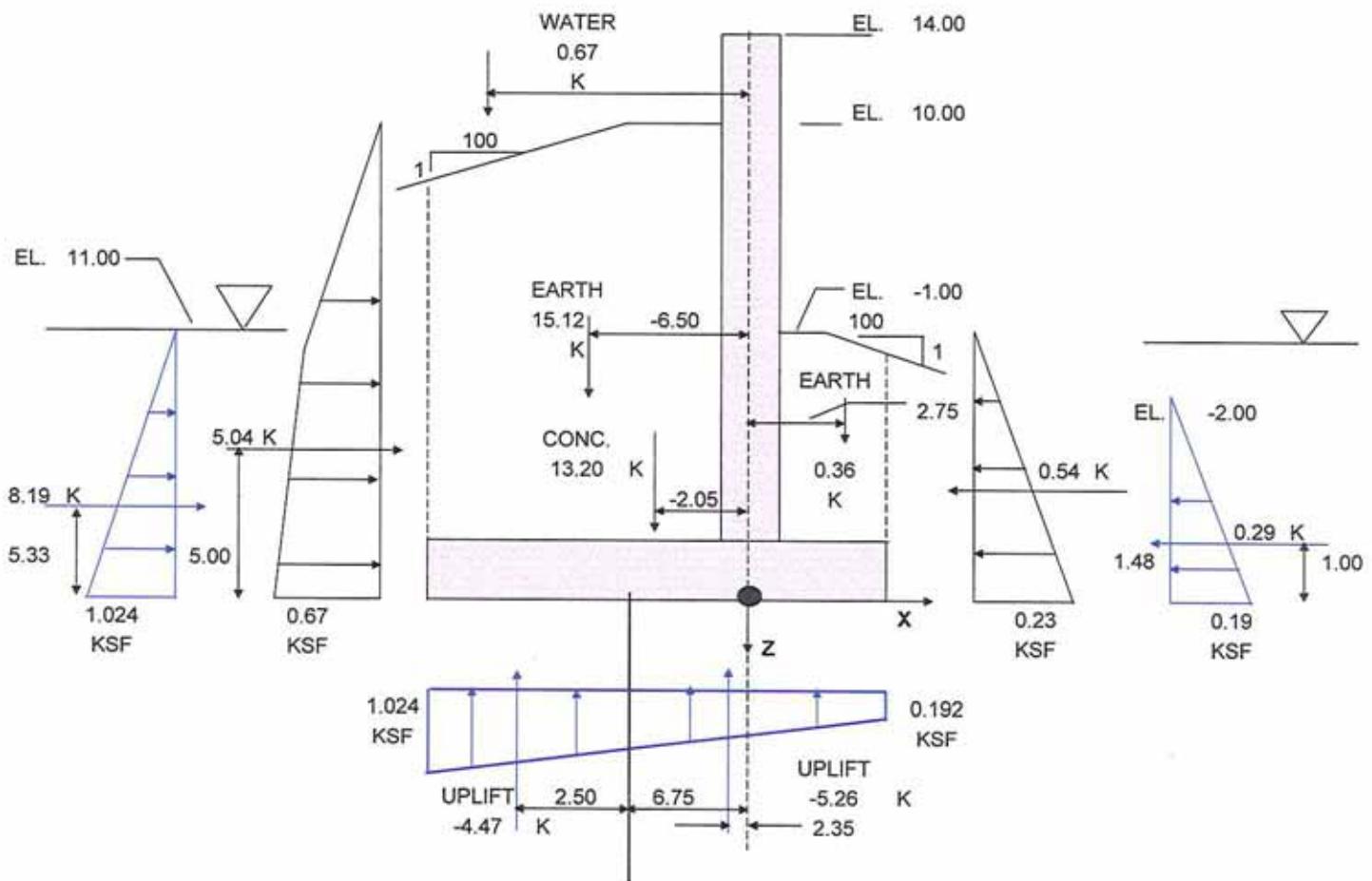


**LOADING SUMMARY - CASE 2 WITH MINIMUM UPLIFT**

| ITEM            | FORCE<br>X | FORCE<br>Y | FORCE<br>Z |      | X CENT.<br>FEET | Z CENT.<br>FEET | Myy<br>FT-K/FT | Mzz<br>FT-K/FT |
|-----------------|------------|------------|------------|------|-----------------|-----------------|----------------|----------------|
| CONCRETE        | 0.0        | 0.0        | 13.2       | k/ft | -2.05           | 0.00            | 27             | 0              |
| FLDSIDE FILL    | 0.0        | 0.0        | 15.1       | k/ft | -6.50           | 0.00            | 98             | 0              |
| PROTSIDE FILL   | 0.0        | 0.0        | 0.4        | k/ft | 2.75            | 0.00            | -1             | 0              |
| F.SIDE WATER    | 0.0        | 0.0        | 0.7        | k/ft | -6.50           | 0.00            | 4              | 0              |
| F. SIDE UPLIFT  | 0.0        | 0.0        | -5.1       | k/ft | -9.25           | 0.00            | -47            | 0              |
| P. SIDE UPLIFT  | 0.0        | 0.0        | -2.1       | k/ft | -1.25           | 0.00            | -3             | 0              |
| F. S. EARTH Pr. | 5.0        | 0.0        | 0.0        | k/ft | -               | -5.00           | -25            | 0              |
| P. S. EARTH Pr. | 0.0        | 0.0        | 0.0        | k/ft | -               | -1.48           | 0              | 0              |
| F. S. WATER Pr. | 8.2        | 0.0        | 0.0        | k/ft | -               | -5.33           | -44            | 0              |
| P. S. WATER Pr. | -0.3       | 0.0        | 0.0        | k/ft | -               | -1.00           | 0              | 0              |

|             | X     | Y   | Z      | Mxx | Myy    | Mzz |
|-------------|-------|-----|--------|-----|--------|-----|
| TOTALS      | 12.9  | 0.0 | 22.1   | 0   | 10.055 | 0   |
| MONO. TOTAL | 776.6 | 0.0 | 1327.2 | 0   | 603    | 0   |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 T - WALL ALTERNATIVE**  
**CASE 2 - CANAL AT STILLWATER**



LOADING SUMMARY - CASE 2 WITH MAXIMUM UPLIFT

| 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     | 13.2    | k/ft         | -2.05        | 0.00        | 27          | 0 |
| FLDSIDE FILL    | 0.0     | 0.0     | 15.1    | k/ft         | -6.50        | 0.00        | 98          | 0 |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.4     | k/ft         | 2.75         | 0.00        | -1          | 0 |
| F. SIDE WATER   | 0.0     | 0.0     | 0.7     | k/ft         | -6.50        | 0.00        | 4           | 0 |
| F. SIDE UPLIFT  | 0.0     | 0.0     | -4.5    | k/ft         | -9.37        | 0.00        | -42         | 0 |
| P. SIDE UPLIFT  | 0.0     | 0.0     | -5.3    | k/ft         | -2.35        | 0.00        | -12         | 0 |
| F. S. EARTH Pr. | 5.0     | 0.0     | 0.0     | k/ft         | -            | -5.00       | -25         | 0 |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0     | k/ft         | -            | -1.48       | 0           | 0 |
| F. S. WATER Pr. | 8.2     | 0.0     | 0.0     | k/ft         | -            | -5.33       | -44         | 0 |
| P. S. WATER Pr. | -0.3    | 0.0     | 0.0     | k/ft         | -            | -1.00       | 0           | 0 |

|             | X     | Y   | Z      | Mxx | Myy   | Mzz   |
|-------------|-------|-----|--------|-----|-------|-------|
| TOTALS      | 12.9  | 0.0 | 19.6   | 0   | 6     | 0     |
| MONO. TOTAL | 776.6 | 0.0 | 1177.4 | 0   | 350   | 0     |
| VERTICAL    |       |     | 1177   |     | -3.79 |       |
| HORIZ       |       |     | 777    |     |       | -5.30 |

WEST BANK & VICINITY - ALGIERS CANAL WEST

REACH 2 T - WALL ALTERNATIVE

CASE 3 - CANAL AT TOP OF WALL

FLOODSIDE WATER ELEV.

14.00

UPLIFT - PROT. SIDE

-2.00

ALLOWABLE OVERSTRESS

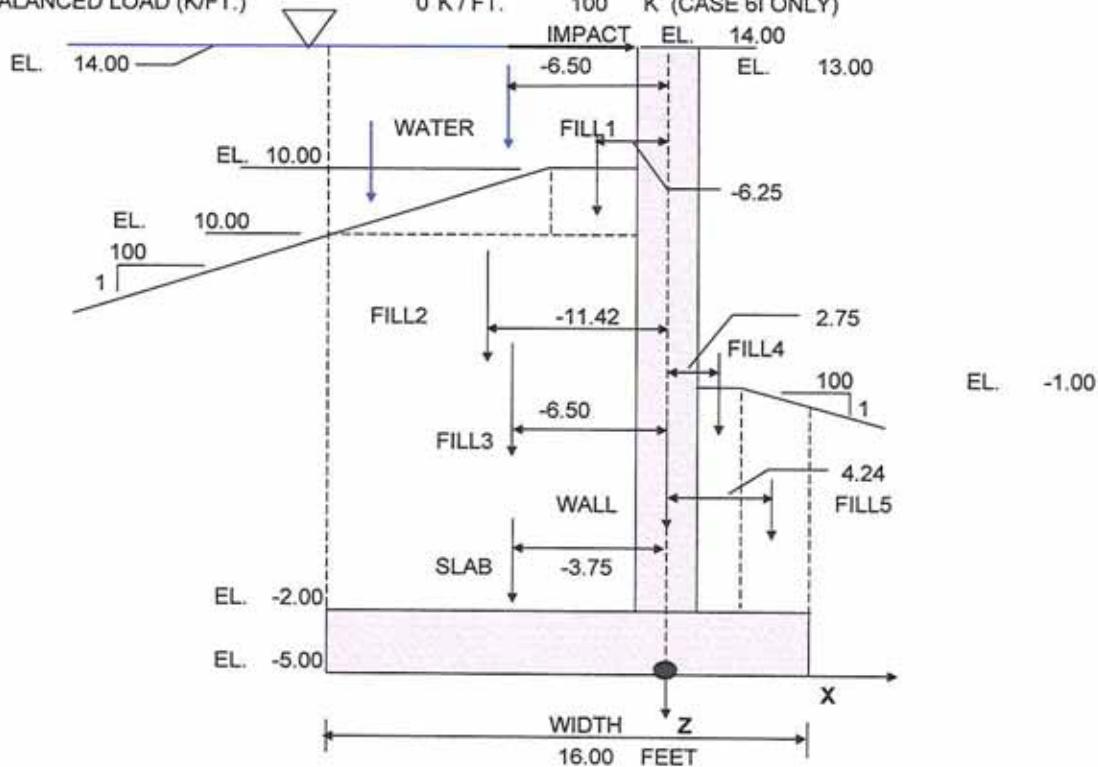
50.0 %

UNBALANCED LOAD (K/FT.)

0 K / FT.

100

K (CASE 6I ONLY)

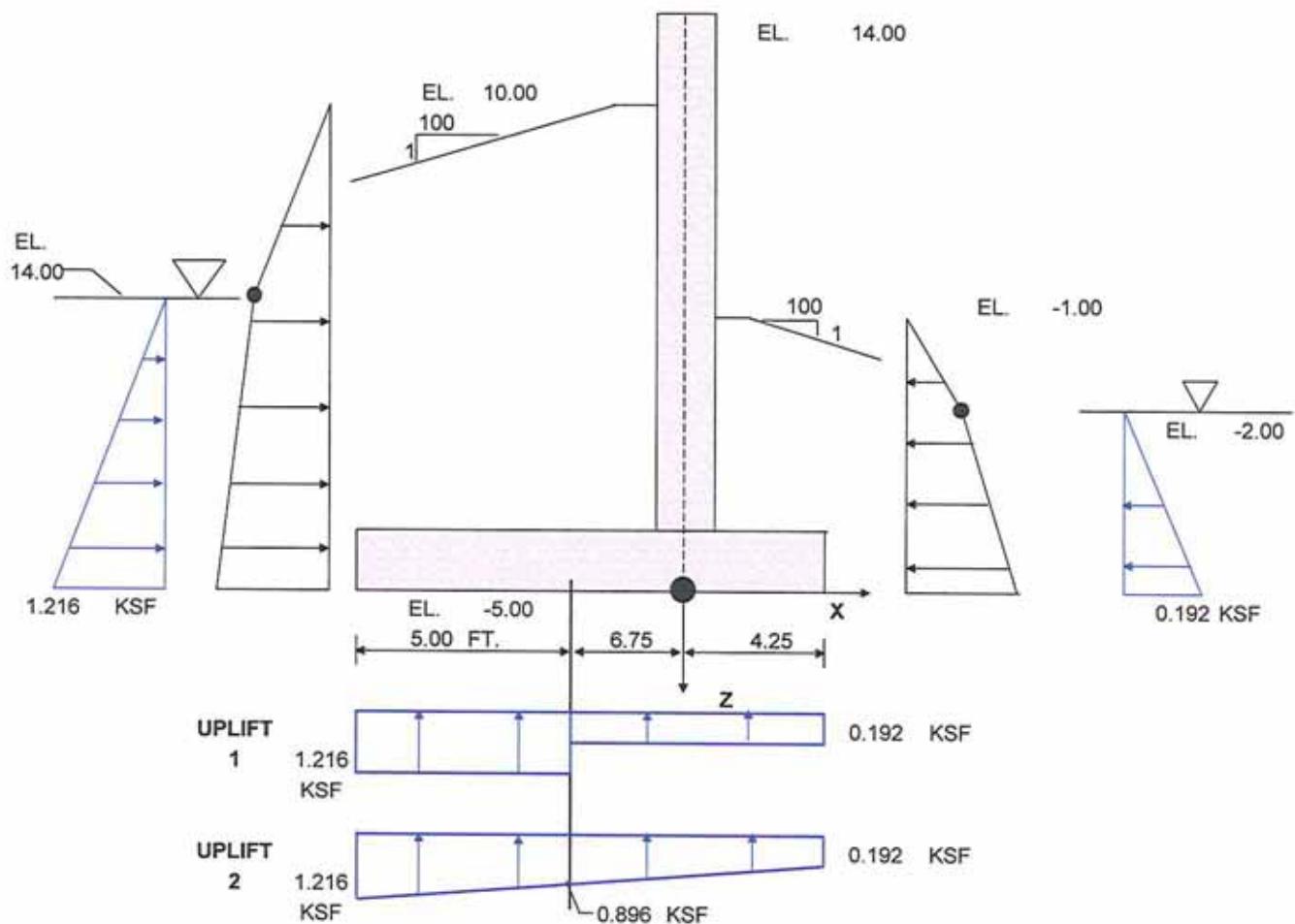


FLOODWALL APPLIED GRAVITY LOADING - CASE 3

| ITEM                 | FORCE Z<br>(WEIGHT) | X CENT.<br>FEET | Y CENT.<br>FEET | Myy<br>FT.-K | Mzz<br>FT.-K |
|----------------------|---------------------|-----------------|-----------------|--------------|--------------|
| CONCRETE SLAB        | 7.20                | -3.75           | 0.00            | 27           | 0            |
| CONCRETE WALL        | 6.00                | 0.00            | 0.00            | 0            | 0            |
| FLOODSIDE FILL1      | 0.01                | -6.25           | 0.00            | 0            | 0            |
| FLOODSIDE FILL2      | 0.00                | -11.42          | 0.00            | 0            | 0            |
| FLOODSIDE FILL3      | 15.11               | -6.50           | 0.00            | 98           | 0            |
| PROTECTED SIDE FILL4 | 0.36                | 2.75            | 0.00            | -1           | 0            |
| PROTECTED SIDE FILL5 | 0.00                | 4.24            | 0.00            | 0            | 0            |
| FLOODSIDE WATER      | 0.00                | -11.58          | 0.00            | 0            | 0            |
| FLOODSIDE WATER      | 2.69                | -6.50           | 0.00            | 17           | 0            |

|                     |       |       |        |       |
|---------------------|-------|-------|--------|-------|
| TOTALS              | 31.37 | -4.52 | 141.76 | 0     |
| CONCRETE            | 13.20 | -2.05 | 27.00  | 0     |
| FLOODSIDE FILL 1-3  | 15.12 | -6.50 | 98.28  | 0     |
| PROT. SIDE FILL 4-5 | 0.36  | 2.75  | -0.99  | 0     |
| FLOODSIDE WATER     | 2.69  | -6.50 | 17.47  | 0     |
|                     | KIPS  |       | FT.-K  | FT.-K |

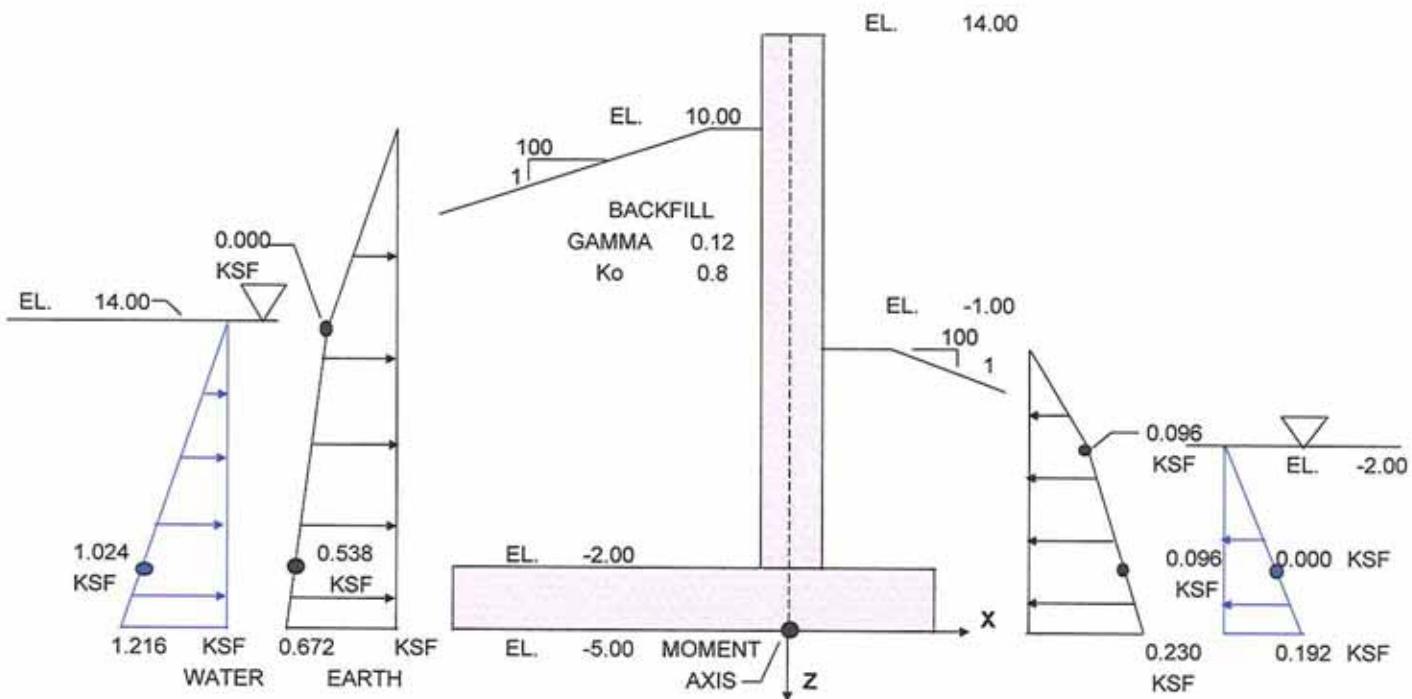
**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 T - WALL ALTERNATIVE**  
**CASE 3 - CANAL AT TOP OF WALL**



| ITEM            | WIDTH | PRESS | FORCE Z | X CENT. FEET | Y CENT. FEET | Myy FT.-K | Mzz FT.-K |
|-----------------|-------|-------|---------|--------------|--------------|-----------|-----------|
| FLOODSIDE:      |       |       |         |              |              |           |           |
| UPLIFT 1        | 5.00  | 1.22  | -6.08   | -9.25        | 0.00         | -56       | 0         |
| PROTECTED SIDE: |       |       |         |              |              |           |           |
| UPLIFT 1        | 11.00 | 0.19  | -2.11   | -1.25        | 0.00         | -3        | 0         |
| TOTALS          |       |       | -8.19   | -7.19        |              | -59       | 0         |
| FLD.SIDE        |       |       | -6.08   | -9.25        |              | -56.24    | 0         |
| PROT. SIDE      |       |       | -2.11   | -1.25        |              | -2.64     | 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 (UNIF) | 5.00  | 0.896 | -4.48   | -9.25        | 0.00         | -41.44    | 0.00      |
| UPLIFT 2 (TRI)  | 5.00  | 0.320 | -0.80   | -10.08       | 0.00         | -8.07     | 0.00      |
| PROTECTED SIDE: |       |       |         |              |              |           |           |
| UPLIFT 2 (UNIF) | 11.00 | 0.192 | -2.11   | -1.25        | 0.00         | -2.64     | 0.00      |
| UPLIFT 2 (TRI)  | 11.00 | 0.704 | -3.87   | -3.08        | 0.00         | -11.94    | 0.00      |
| TOTALS          |       |       | -11.26  | -5.69        |              | -64.09    | 0.00      |
| FLOOD SIDE      |       |       | -5.28   | -9.38        |              | -49.51    | 0.00      |
| PROT. SIDE      |       |       | -5.98   | -2.44        |              | -14.58    | 0.00      |
|                 |       |       | KIPS    |              |              | FT.-K     | FT.-K     |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 T - WALL ALTERNATIVE**  
**CASE 3 - CANAL AT TOP OF WALL**

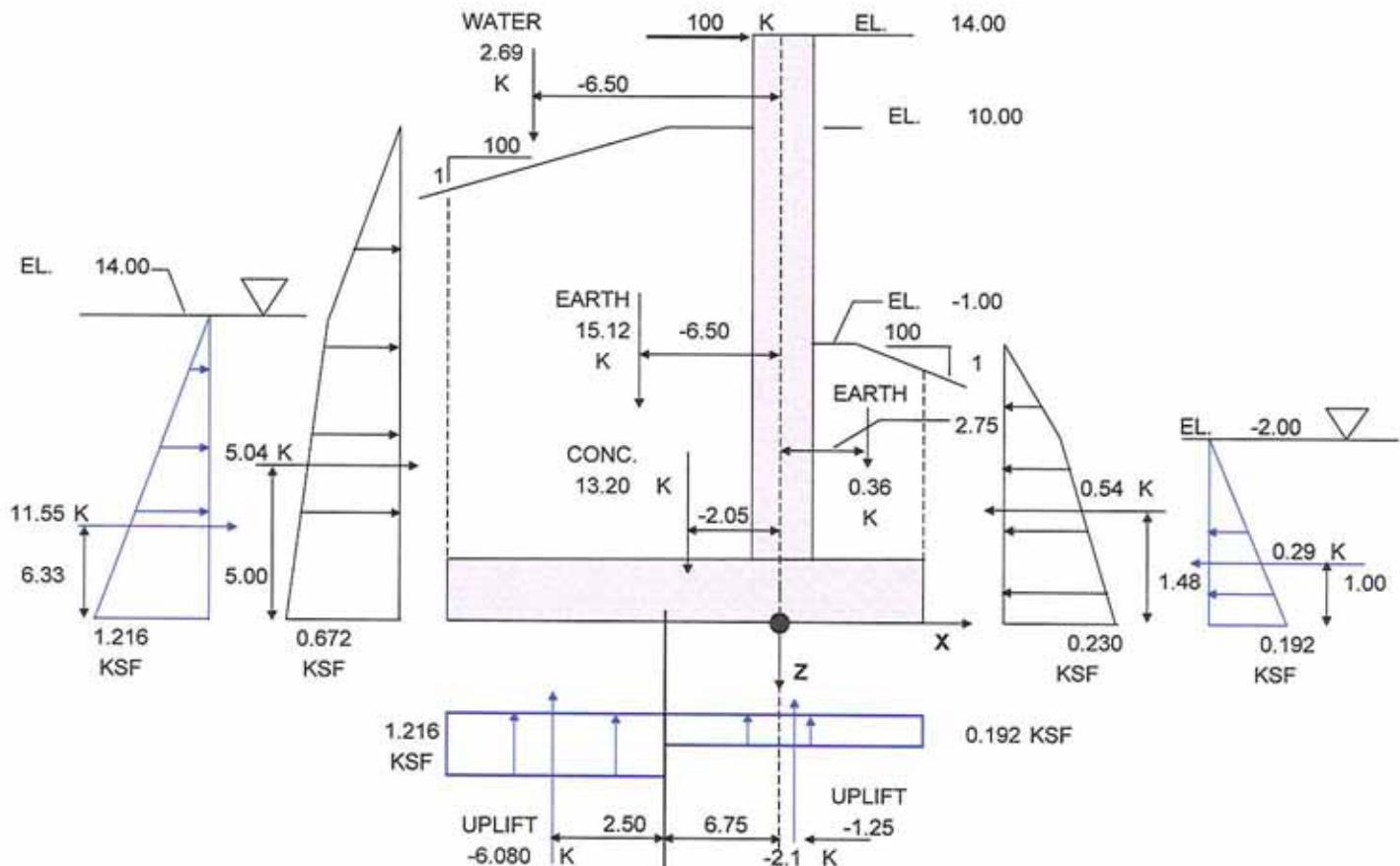


**FLOODWALL HORIZONTAL LOADING - CASE 3**

| ITEM       | HEIGHT | PRESS | FORCE X |      | Y CENT.<br>FEET | Z CENT.<br>FEET | Mzz<br>FT-K/FT | Myy<br>FT-K/FT |
|------------|--------|-------|---------|------|-----------------|-----------------|----------------|----------------|
| FLOODSIDE: |        |       |         |      |                 |                 |                |                |
| EARTH 1    | 0.00   | 0.000 | 0.00    | k/ft | 0.00            | 0.00            | 0              | 0.0            |
| EARTH 2    | 15.00  | 0.000 | 0.00    | k/ft | 0.00            | 0.00            | 0              | 0.0            |
| EARTH 3    | 15.00  | 0.672 | 5.04    | k/ft | 0.00            | -5.00           | 0              | -25.2          |
| GRND WATER | 19.00  | 1.216 | 11.55   | k/ft | 0.00            | -6.33           | 0              | -73.2          |
| PROTECTED: |        |       |         |      |                 |                 |                |                |
| EARTH 4    | 1.00   | 0.096 | -0.05   | k/ft | 0.00            | -3.33           | 0              | 0.2            |
| EARTH 5    | 3.00   | 0.096 | -0.29   | k/ft | 0.00            | -1.50           | 0              | 0.4            |
| EARTH 6    | 3.00   | 0.230 | -0.20   | k/ft | 0.00            | -1.00           | 0              | 0.2            |
| GRND WATER | 3.00   | 0.192 | -0.29   | k/ft | 0.00            | -1.00           | 0              | 0.3            |

|                        | FORCE X | Y CENT.<br>FEET | Z CENT.<br>FEET | Mzz<br>FT-K/FT. | Myy<br>FT-K/FT. |
|------------------------|---------|-----------------|-----------------|-----------------|-----------------|
| FLOODSIDE EARTH FORCE  | 5.04    | 0.00            | -5.00           | -               | -25.2           |
| FLOODSIDE WATER FORCE  | 11.55   | 0.00            | -6.33           | -               | -73.1627        |
| TOTAL FLOODSIDE FORCE  | 16.59   | k/ft            | 0.00            | -5.93           | 0.0             |
| PROT. SIDE EARTH FORCE | -0.54   | 0.00            | -1.48           | 0.8             |                 |
| PROT. SIDE WATER FORCE | -0.29   | 0.00            | -1.00           | 0.3             |                 |
| TOTAL PROT. SIDE FORCE | -0.83   | k/ft            | 0.00            | -1.31           | 0.0             |
| TOTAL NET HORIZ. FORCE | 15.77   | k/ft            | 0.00            | -6.17           | 0.0             |
|                        |         |                 |                 |                 | -97.3           |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 T - WALL ALTERNATIVE**  
**CASE 3 - CANAL AT TOP OF WALL**

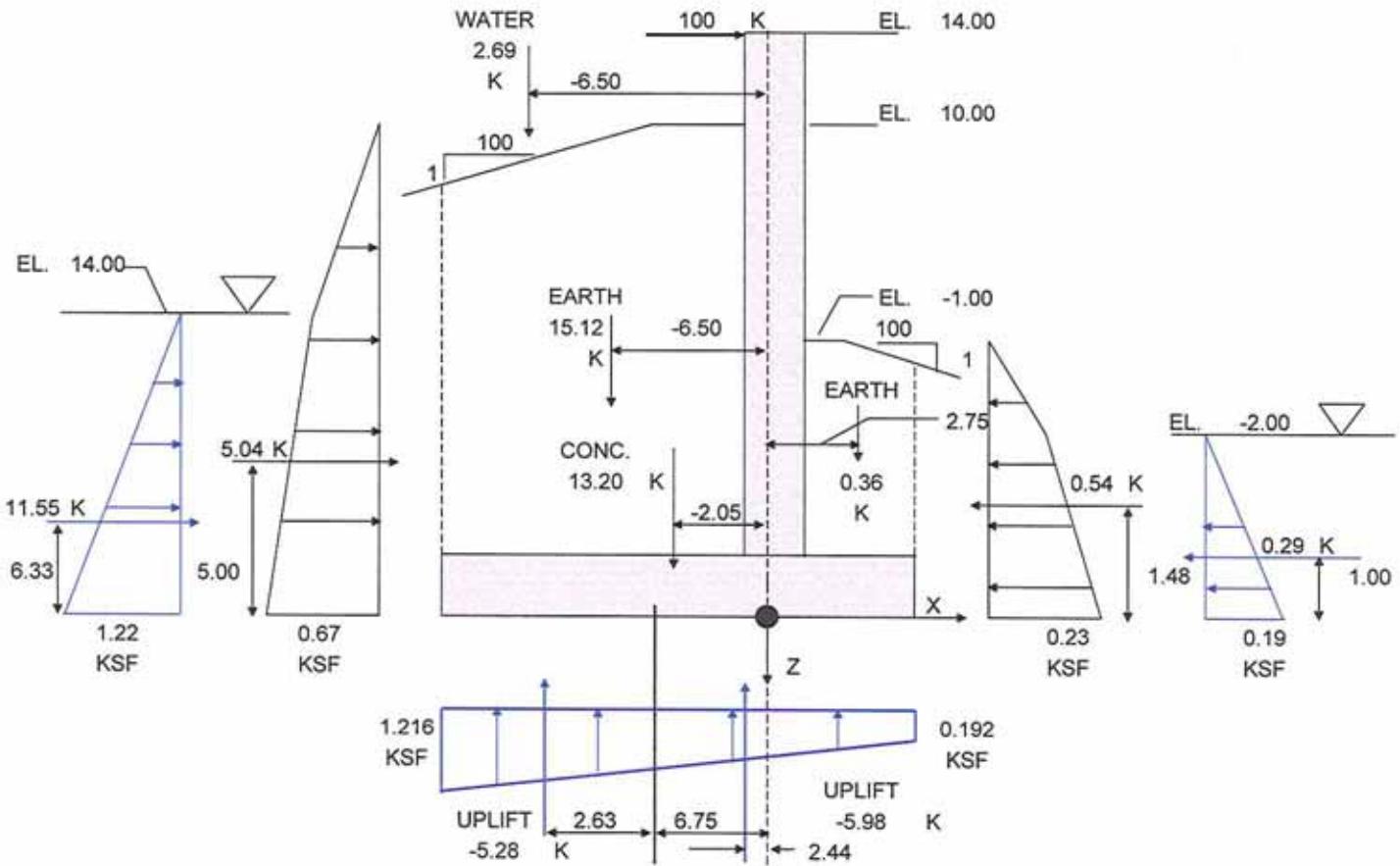


**LOADING SUMMARY - CASE 3 WITH MINIMUM UPLIFT**

| 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     | 13.2    | k/ft | -2.05        | 0.00         | 27          | 0           |        |
| FLDSIDE FILL    | 0.0     | 0.0     | 15.1    | k/ft | -6.50        | 0.00         | 98          | 0           | SUM M  |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.4     | k/ft | 2.75         | 0.00         | -1          | 0           |        |
| F. SIDE WATER   | 0.0     | 0.0     | 2.7     | k/ft | -6.50        | 0.00         | 17          | 0           |        |
| F. SIDE UPLIFT  | 0.0     | 0.0     | -6.1    | k/ft | -9.25        | 0.00         | -56         | 0           |        |
| P. SIDE UPLIFT  | 0.0     | 0.0     | -2.1    | k/ft | -1.25        | 0.00         | -3          | 0           |        |
| F. S. EARTH Pr. | 5.0     | 0.0     | 0.0     | k/ft | -            | -5.00        | -25         | 0           | SUM M  |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -1.48        | 0           | 0           |        |
| F. S. WATER Pr. | 11.6    | 0.0     | 0.0     | k/ft | -            | -6.33        | -73         | 0           |        |
| P. S. WATER Pr. | -0.3    | 0.0     | 0.0     | k/ft | -            | -1.00        | 0           | 0           | -98.07 |

|                 | X      | Y   | Z      |  | Mxx | Myy     | Mzz |
|-----------------|--------|-----|--------|--|-----|---------|-----|
| TOTALS          | 16.3   | 0.0 | 23.2   |  | 0   | -15     | 0   |
| MONO. TOTAL     | 978.2  | 0.0 | 1390.6 |  | 0   | -912    | 0   |
| IMPACT (CASE 9) | 100.0  |     |        |  |     | -1900   |     |
| TOTAL CASE 9    | 1078.2 | 0.0 | 1390.6 |  | 0.0 | -2811.6 | 0.0 |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 T - WALL ALTERNATIVE**  
**CASE 3 - CANAL AT TOP OF WALL**



**LOADING SUMMARY - CASE 3 WITH MAXIMUM UPLIFT**

| 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     | 13.2    | k/ft | -2.05        | 0.00         | 27          | 0           |
| FLDSIDE FILL    | 0.0     | 0.0     | 15.1    | k/ft | -6.50        | 0.00         | 98          | 0           |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.4     | k/ft | 2.75         | 0.00         | -1          | 0           |
| F.SIDE WATER    | 0.0     | 0.0     | 2.7     | k/ft | -6.50        | 0.00         | 17          | 0           |
| F. SIDE UPLIFT  | 0.0     | 0.0     | -5.3    | k/ft | -9.38        | 0.00         | -50         | 0           |
| P. SIDE UPLIFT  | 0.0     | 0.0     | -6.0    | k/ft | -2.44        | 0.00         | -15         | 0           |
| F. S. EARTH Pr. | 5.0     | 0.0     | 0.0     | k/ft | -            | -5.00        | -25         | 0           |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -1.48        | 0           | 0           |
| F. S. WATER Pr. | 11.6    | 0.0     | 0.0     | k/ft | -            | -6.33        | -73         | 0           |
| P. S. WATER Pr. | -0.3    | 0.0     | 0.0     | k/ft | -            | -1.00        | 0           | 0           |

SUM M  
77.68

SUM M  
-98.07

|                  | X      | Y   | Z      | Mxx | Myy     | Mzz   |
|------------------|--------|-----|--------|-----|---------|-------|
| TOTALS           | 16.3   | 0.0 | 20.1   | 0   | -20     | 0     |
| MONO. TOTAL      | 978.2  | 0.0 | 1206.2 | 0   | -1224   | 0     |
| IMPACT (CASE 10) | 100.0  |     |        |     | -1900.0 |       |
| TOTAL CASE 10    | 1078.2 | 0.0 | 1206.2 | 0.0 | -3123.9 | 0.0   |
| VERTICAL         |        |     | 1206   |     | -3.86   |       |
| HORIZ            |        |     | 978    |     |         | -6.02 |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 2 T - WALL ALTERNATIVE**

| LOAD CASE | LOAD CONDITION                                                           | FDN OVERSTR ALLOWED | FOUNDATION LOADS |        |          |     |          |     |
|-----------|--------------------------------------------------------------------------|---------------------|------------------|--------|----------|-----|----------|-----|
|           |                                                                          |                     | 60 X             | FOOT Y | Z        | Mxx | Myy      | Mzz |
| 1         | CONSTRUCTION W/WIND                                                      | 1.166               | 705              | 0      | 1,718    | 0   | 3,664    | 0   |
| 1a        | CONST. W/ DRAG & SURCHARGE LDS                                           | 1.166               | 648              | 0      | 1,976    | 0   | 6,574    | 0   |
| 2a        | CANAL @ STILLWATER (EL. 11.6)<br>MINIMUM UPLIFT                          | 1.000               | 777              | 0      | 1,327    | 0   | 603      | 0   |
| 2b        | CANAL @ STILLWATER (EL. 11.6)<br>MAXIMUM UPLIFT                          | 1.000               | 777              | 0      | 1,177    | 0   | 350      | 0   |
| Not Used  | CANAL @ STILLWATER (EL. 11.6)<br>MIN. UPLIFT, UNBAL. LOAD                | 1.000               | 777              | 0      | 1,327    | 0   | 603      | 0   |
| Not Used  | CANAL @ STILLWATER (EL. 11.6)<br>MAX. UPLIFT, UNBAL. LOAD                | 1.000               | 777              | 0      | 1,177    | 0   | 350      | 0   |
| 2c        | CANAL @ STILLWATER (EL. 11.6)<br>MIN. UPLIFT, UNBAL. LOAD; IMPACT        | 1.333               | NOT USED         | 0      | NOT USED | 0   | NOT USED | 0   |
| 2d        | CANAL @ STILLWATER (EL. 11.6)<br>MAX. UPLIFT, UNBAL. LOAD; IMPACT        | 1.333               | NOT USED         | 0      | NOT USED | 0   | NOT USED | 0   |
| 3a        | CANAL @ STILLWATER (EL. 11.6)<br>MIN. UPLIFT, UNBAL. & WAVE LOADS        | 1.333               | 819              | 0      | 1,327    | 0   | -120     | 0   |
| 3b        | CANAL @ STILLWATER (EL. 11.6)<br>MAX. UPLIFT, UNBAL. & WAVE LOADS        | 1.333               | 819              | 0      | 1,177    | 0   | -374     | 0   |
| 4a        | CANAL @ STILLWATER (EL. 11.6)<br>MIN. UL - UNBAL. LD., WAVE & IMPACT     | 1.500               | NOT USED         | 0      | NOT USED | 0   | NOT USED | 0   |
| 4b        | CANAL @ TOP OF WALL (EL. 14.0)<br>MAX. UL - UNBAL. LD., WAVE & IMPACT    | 1.500               | NOT USED         | 0      | NOT USED | 0   | NOT USED | 0   |
| (DC A) 5a | CANAL @ TOP OF WALL (EL. 14.0)<br>MINIMUM UPLIFT                         | 1.333               | 978              | 0      | 1,391    | 0   | -912     | 0   |
| (DC B) 5b | CANAL @ TOP OF WALL (EL. 14.0)<br>MAXIMUM UPLIFT                         | 1.333               | 978              | 0      | 1,206    | 0   | -1,224   | 0   |
| Not Used  | CANAL @ TOP OF WALL (EL. 14.0)<br>MAX. UPLIFT, UNBAL. LOAD               | N/A                 | 978              | 0      | 1,391    | 0   | -912     | 0   |
| Not Used  | CANAL @ TOP OF WALL (EL. 14.0)                                           | N/A                 | 978              | 0      | 1,206    | 0   | -1,224   | 0   |
| (DC C) 6a | MIN. UPLIFT - W/WO UNBAL. LD. + IMPACT                                   | 1.666               | 1,078            | 0      | 1,391    | 0   | -2,812   | 0   |
| (DC D) 6b | CANAL @ TOP OF WALL (EL. 14.0)<br>MAX. UPLIFT - W/WO UNBAL. LD. + IMPACT | 1.666               | 1,078            | 0      | 1,206    | 0   | -3,124   | 0   |

**WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 2 T - WALL ALTERNATIVE  
Structural Quantity Data**

| <b>Item No.</b>  | <b>Description</b>          | <b>Unit</b> | <b>Quantity Per Foot</b> | <b>Unit Price</b> | <b>Estimated Amount</b> |
|------------------|-----------------------------|-------------|--------------------------|-------------------|-------------------------|
| 1                | Pile Load Tests             | Lump Sum    | 1                        | LS                | \$100,000               |
| 2                | 14 x 73 Steel H-Piles       | LF          | 45.1                     | \$ 85.00          | \$3,833                 |
| 3                | Tension Anchors             | LF          | 0.45                     | \$1,000.00        | \$450                   |
| 4                | Sheetpile Cutoffs           | LF          | 30.00                    | \$ 40.00          | \$1,200                 |
| 5                | Stabilization Concrete (6") | LF          | 0.315                    | \$ 200.00         | \$63                    |
| 6                | Concrete in Base Slab       | LF          | 1.778                    | \$ 550.00         | \$978                   |
| 7                | Concrete in Walls           | LF          | 1.481                    | \$ 850.00         | \$1,259                 |
| 8                |                             |             |                          |                   |                         |
| <b>Sub Total</b> |                             |             |                          |                   | <b>\$7,783</b>          |

File: ALGIERS2.in

1000 ALGIERS CANAL WEST - REACH 2 TWALL  
1030 PROP 29000 326 904 26.1 2.0 0.0 ALL  
1040 SOIL ES 0.025 L 90. 0 1 TO 18  
1050 SOIL ES 0.050 L 90. 0 19 TO 27  
1060 ALLOW H 100 65 469.8 469.8 797.4 2358 1 TO 30  
1070 PIN ALL  
1100 PILE 1 -9.25 -27.0 0.  
1110 ROW Y 9 1 8 AT 6.75  
1150 PILE 10 -4.0 -27.0 0.  
1155 ROW Y 9 10 8 AT 6.75  
1160 PILE 19 1.5 -27.0 0.  
1165 ROW Y 9 19 8 AT 6.75  
1215 BATTER 2.5 1 TO 9  
1216 BATTER 2.0 10 TO 27  
1230 ANGLE 180 1 TO 9  
1240 ANGLE 0 10 TO 27  
1340 LOA 1 705 0 1720 0 3660 0  
1345 LOA 2 650 0 1975 0 6570 0  
1350 LOA 3 780 0 1330 0 600 0  
1355 LOA 4 780 0 1180 0 350 0  
1357 LOA 5 820 0 1330 0 -120 0  
1359 LOA 6 820 0 1180 0 -380 0  
1380 LOA 11 980 0 1390 0 -910 0  
1385 LOA 12 980 0 1210 0 -1220 0  
1390 LOA 13 1080 0 1390 0 -2810 0  
1395 LOA 14 1080 0 1210 0 -3120 0  
1500 TOUT 1 2 4 5  
1510 FOUT 1 2 4 5 ALGT2R.OUT  
1530 PFO 1 9 10 18 19 27

\*\*\*\*\*  
\* CORPS PROGRAM # X0080 \* CPGA - CASE PILE GROUP ANALYSIS PROGRAM  
\* VERSION NUMBER # 1993/03/29 \* RUN DATE 18-JUN-2008 RUN TIME 07.49.27  
\*\*\*\*\*

FILE: **ALGT2R.OUT**  
ALGIERS CANAL WEST - REACH 2 TWALL

THERE ARE 27 PILES AND  
10 LOAD CASES IN THIS RUN.

ALL PILE COORDINATES ARE CONTAINED WITHIN A BOX

|                               | X        | Y        | Z     |
|-------------------------------|----------|----------|-------|
|                               | -----    | -----    | ----- |
| WITH DIAGONAL COORDINATES = ( | -9.25 ,  | -27.00 , | .00 ) |
|                               | ( 1.50 , | 27.00 ,  | .00 ) |

\*\*\*\*\*

PILE PROPERTIES AS INPUT

|            |            |            |            |            |            |
|------------|------------|------------|------------|------------|------------|
| E          | I1         | I2         | A          | C33        | B66        |
| KSI        | IN**4      | IN**4      | IN**2      |            |            |
| .29000E+05 | .32600E+03 | .90400E+03 | .26100E+02 | .20000E+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 |
| .25000E-01 | L       | .90000E+02 | .00000E+00 |    |

THIS SOIL DESCRIPTION APPLIES TO THE FOLLOWING PILES -

|    |    |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
|----|----|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| 1  | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 |   |   |   |   |   |   |   |    |    |    |    |    |    |    |

|            |         |            |            |    |
|------------|---------|------------|------------|----|
| ES         | ESOIL   | LENGTH     | L          | LU |
|            | K/IN**2 |            | FT         | FT |
| .50000E-01 | L       | .90000E+02 | .00000E+00 |    |

THIS SOIL DESCRIPTION APPLIES TO THE FOLLOWING PILES -

|    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|
| 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
|----|----|----|----|----|----|----|----|----|

\*\*\*\*\*

FILE: **ALGT2R.OUT**

## PILE GEOMETRY AS INPUT AND/OR GENERATED

| NUM     | X<br>FT | Y<br>FT | Z<br>FT | BATTER | ANGLE  | LENGTH<br>FT | FIXITY |
|---------|---------|---------|---------|--------|--------|--------------|--------|
| 1       | -9.25   | -27.00  | .00     | 2.50   | 180.00 | 90.00        | P      |
| 2       | -9.25   | -20.25  | .00     | 2.50   | 180.00 | 90.00        | P      |
| 3       | -9.25   | -13.50  | .00     | 2.50   | 180.00 | 90.00        | P      |
| 4       | -9.25   | -6.75   | .00     | 2.50   | 180.00 | 90.00        | P      |
| 5       | -9.25   | .00     | .00     | 2.50   | 180.00 | 90.00        | P      |
| 6       | -9.25   | 6.75    | .00     | 2.50   | 180.00 | 90.00        | P      |
| 7       | -9.25   | 13.50   | .00     | 2.50   | 180.00 | 90.00        | P      |
| 8       | -9.25   | 20.25   | .00     | 2.50   | 180.00 | 90.00        | P      |
| 9       | -9.25   | 27.00   | .00     | 2.50   | 180.00 | 90.00        | P      |
| 10      | -4.00   | -27.00  | .00     | 2.00   | .00    | 90.00        | P      |
| 11      | -4.00   | -20.25  | .00     | 2.00   | .00    | 90.00        | P      |
| 12      | -4.00   | -13.50  | .00     | 2.00   | .00    | 90.00        | P      |
| 13      | -4.00   | -6.75   | .00     | 2.00   | .00    | 90.00        | P      |
| 14      | -4.00   | .00     | .00     | 2.00   | .00    | 90.00        | P      |
| 15      | -4.00   | 6.75    | .00     | 2.00   | .00    | 90.00        | P      |
| 16      | -4.00   | 13.50   | .00     | 2.00   | .00    | 90.00        | P      |
| 17      | -4.00   | 20.25   | .00     | 2.00   | .00    | 90.00        | P      |
| 18      | -4.00   | 27.00   | .00     | 2.00   | .00    | 90.00        | P      |
| 19      | 1.50    | -27.00  | .00     | 2.00   | .00    | 90.00        | P      |
| 20      | 1.50    | -20.25  | .00     | 2.00   | .00    | 90.00        | P      |
| 21      | 1.50    | -13.50  | .00     | 2.00   | .00    | 90.00        | P      |
| 22      | 1.50    | -6.75   | .00     | 2.00   | .00    | 90.00        | P      |
| 23      | 1.50    | .00     | .00     | 2.00   | .00    | 90.00        | P      |
| 24      | 1.50    | 6.75    | .00     | 2.00   | .00    | 90.00        | P      |
| 25      | 1.50    | 13.50   | .00     | 2.00   | .00    | 90.00        | P      |
| 26      | 1.50    | 20.25   | .00     | 2.00   | .00    | 90.00        | P      |
| 27      | 1.50    | 27.00   | .00     | 2.00   | .00    | 90.00        | P      |
| <hr/>   |         |         |         |        |        |              |        |
| 2430.00 |         |         |         |        |        |              |        |

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## APPLIED LOADS

| LOAD<br>CASE | PX<br>K | PY<br>K | PZ<br>K | MX<br>FT-K | MY<br>FT-K | MZ<br>FT-K |
|--------------|---------|---------|---------|------------|------------|------------|
| 1            | 705.0   | .0      | 1720.0  | .0         | 3660.0     | .0         |
| 2            | 650.0   | .0      | 1975.0  | .0         | 6570.0     | .0         |
| 3            | 780.0   | .0      | 1330.0  | .0         | 600.0      | .0         |
| 4            | 780.0   | .0      | 1180.0  | .0         | 350.0      | .0         |
| 5            | 820.0   | .0      | 1330.0  | .0         | -120.0     | .0         |
| 6            | 820.0   | .0      | 1180.0  | .0         | -380.0     | .0         |
| 11           | 980.0   | .0      | 1390.0  | .0         | -910.0     | .0         |
| 12           | 980.0   | .0      | 1210.0  | .0         | -1220.0    | .0         |
| 13           | 1080.0  | .0      | 1390.0  | .0         | -2810.0    | .0         |
| 14           | 1080.0  | .0      | 1210.0  | .0         | -3120.0    | .0         |

FILE: **ALGT2R.OUT**

|           |     |                      |     |                              |    |
|-----------|-----|----------------------|-----|------------------------------|----|
| LOAD CASE | 1.  | NUMBER OF FAILURES = | 0.  | NUMBER OF PILES IN TENSION = | 0. |
| LOAD CASE | 2.  | NUMBER OF FAILURES = | 9.  | NUMBER OF PILES IN TENSION = | 0. |
| LOAD CASE | 3.  | NUMBER OF FAILURES = | 0.  | NUMBER OF PILES IN TENSION = | 9. |
| LOAD CASE | 4.  | NUMBER OF FAILURES = | 0.  | NUMBER OF PILES IN TENSION = | 9. |
| LOAD CASE | 5.  | NUMBER OF FAILURES = | 9.  | NUMBER OF PILES IN TENSION = | 9. |
| LOAD CASE | 6.  | NUMBER OF FAILURES = | 0.  | NUMBER OF PILES IN TENSION = | 9. |
| LOAD CASE | 11. | NUMBER OF FAILURES = | 18. | NUMBER OF PILES IN TENSION = | 9. |
| LOAD CASE | 12. | NUMBER OF FAILURES = | 9.  | NUMBER OF PILES IN TENSION = | 9. |
| LOAD CASE | 13. | NUMBER OF FAILURES = | 9.  | NUMBER OF PILES IN TENSION = | 9. |
| LOAD CASE | 14. | NUMBER OF FAILURES = | 9.  | NUMBER OF PILES IN TENSION = | 9. |

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PILE CAP DISPLACEMENTS

| LOAD<br>CASE | DX<br>IN  | DY<br>IN   | DZ<br>IN   | RX<br>RAD  | RY<br>RAD  | RZ<br>RAD  |
|--------------|-----------|------------|------------|------------|------------|------------|
| 1            | .7096E-01 | .7569E-07  | .4032E-01  | -.3400E-12 | .4034E-04  | -.1847E-11 |
| 2            | .1062E+00 | .1641E-06  | .1751E-01  | -.7370E-12 | .5450E-03  | -.4004E-11 |
| 3            | .8546E-01 | -.5166E-07 | .3009E-01  | .2321E-12  | -.6225E-04 | .1261E-11  |
| 4            | .1221E+00 | -.8533E-07 | .3670E-02  | .3833E-12  | .2431E-03  | .2082E-11  |
| 5            | .7251E-01 | -.7136E-07 | .4168E-01  | .3205E-12  | -.2518E-03 | .1741E-11  |
| 6            | .1087E+00 | -.1050E-06 | .1561E-01  | .4719E-12  | .4843E-04  | .2563E-11  |
| 11           | .1123E+00 | -.1312E-06 | .2971E-01  | .5895E-12  | -.1164E-03 | .3202E-11  |
| 12           | .1558E+00 | -.1717E-06 | -.1642E-02 | .7711E-12  | .2449E-03  | .4189E-11  |
| 13           | .7455E-01 | -.1807E-06 | .6217E-01  | .8119E-12  | -.6413E-03 | .4410E-11  |
| 14           | .1180E+00 | -.2212E-06 | .3081E-01  | .9935E-12  | -.2800E-03 | .5397E-11  |

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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<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF | CBF |
|------|---------|---------|---------|------------|------------|------------|-----|-----|
| 1    | -.3     | .0      | 21.4    | .0         | 21.5       | .0         | .21 | .05 |
| 9    | -.3     | .0      | 21.4    | .0         | 21.5       | .0         | .21 | .05 |
| 10   | .1      | .0      | 97.5    | .0         | -11.6      | .0         | .97 | .21 |
| 18   | .1      | .0      | 97.5    | .0         | -11.6      | .0         | .97 | .21 |
| 19   | .2      | .0      | 94.1    | .0         | -16.9      | .0         | .94 | .21 |
| 27   | .2      | .0      | 94.1    | .0         | -16.9      | .0         | .94 | .21 |

FILE: ALGT2R.OUT

| LOAD CASE - |     | 2  |       |      |       |      |      |     |  |
|-------------|-----|----|-------|------|-------|------|------|-----|--|
| PILE        | F1  | F2 | F3    | M1   | M2    | M3   | ALF  | CBF |  |
|             | K   | K  | K     | IN-K | IN-K  | IN-K |      |     |  |
| 1           | -.4 | .0 | 46.2  | .0   | 33.3  | .0   | .46  | .11 |  |
| 9           | -.4 | .0 | 46.2  | .0   | 33.3  | .0   | .46  | .11 |  |
| 10          | .2  | .0 | 121.3 | .0   | -19.7 | .0   | 1.21 | .27 |  |
| 18          | .2  | .0 | 121.3 | .0   | -19.7 | .0   | 1.21 | .27 |  |
| 19          | .5  | .0 | 76.2  | .0   | -33.8 | .0   | .76  | .18 |  |
| 27          | .5  | .0 | 76.2  | .0   | -33.8 | .0   | .76  | .18 |  |
| LOAD CASE - |     | 3  |       |      |       |      |      |     |  |
| PILE        | F1  | F2 | F3    | M1   | M2    | M3   | ALF  | CBF |  |
|             | K   | K  | K     | IN-K | IN-K  | IN-K |      |     |  |
| 1           | -.3 | .0 | -14.3 | .0   | 22.9  | .0   | .22  | .04 |  |
| 9           | -.3 | .0 | -14.3 | .0   | 22.9  | .0   | .22  | .04 |  |
| 10          | .2  | .0 | 87.5  | .0   | -16.8 | .0   | .88  | .19 |  |
| 18          | .2  | .0 | 87.5  | .0   | -16.8 | .0   | .88  | .19 |  |
| 19          | .3  | .0 | 92.7  | .0   | -23.0 | .0   | .93  | .21 |  |
| 27          | .3  | .0 | 92.7  | .0   | -23.0 | .0   | .93  | .21 |  |
| LOAD CASE - |     | 4  |       |      |       |      |      |     |  |
| PILE        | F1  | F2 | F3    | M1   | M2    | M3   | ALF  | CBF |  |
|             | K   | K  | K     | IN-K | IN-K  | IN-K |      |     |  |
| 1           | -.4 | .0 | -23.7 | .0   | 32.5  | .0   | .36  | .06 |  |
| 9           | -.4 | .0 | -23.7 | .0   | 32.5  | .0   | .36  | .06 |  |
| 10          | .3  | .0 | 95.8  | .0   | -26.7 | .0   | .96  | .22 |  |
| 18          | .3  | .0 | 95.8  | .0   | -26.7 | .0   | .96  | .22 |  |
| 19          | .6  | .0 | 75.7  | .0   | -40.4 | .0   | .76  | .18 |  |
| 27          | .6  | .0 | 75.7  | .0   | -40.4 | .0   | .76  | .18 |  |
| LOAD CASE - |     | 5  |       |      |       |      |      |     |  |
| PILE        | F1  | F2 | F3    | M1   | M2    | M3   | ALF  | CBF |  |
|             | K   | K  | K     | IN-K | IN-K  | IN-K |      |     |  |
| 1           | -.2 | .0 | -19.9 | .0   | 18.9  | .0   | .31  | .05 |  |
| 9           | -.2 | .0 | -19.9 | .0   | 18.9  | .0   | .31  | .05 |  |
| 10          | .2  | .0 | 82.6  | .0   | -13.5 | .0   | .83  | .18 |  |
| 18          | .2  | .0 | 82.6  | .0   | -13.5 | .0   | .83  | .18 |  |
| 19          | .2  | .0 | 103.4 | .0   | -16.3 | .0   | 1.03 | .23 |  |
| 27          | .2  | .0 | 103.4 | .0   | -16.3 | .0   | 1.03 | .23 |  |
| LOAD CASE - |     | 6  |       |      |       |      |      |     |  |
| PILE        | F1  | F2 | F3    | M1   | M2    | M3   | ALF  | CBF |  |
|             | K   | K  | K     | IN-K | IN-K  | IN-K |      |     |  |
| 1           | -.3 | .0 | -29.2 | .0   | 28.3  | .0   | .45  | .07 |  |
| 9           | -.3 | .0 | -29.2 | .0   | 28.3  | .0   | .45  | .07 |  |
| 10          | .3  | .0 | 90.6  | .0   | -23.2 | .0   | .91  | .20 |  |
| 18          | .3  | .0 | 90.6  | .0   | -23.2 | .0   | .91  | .20 |  |
| 19          | .5  | .0 | 86.6  | .0   | -33.4 | .0   | .87  | .20 |  |
| 27          | .5  | .0 | 86.6  | .0   | -33.4 | .0   | .87  | .20 |  |

FILE: ALGT2R.OUT

LOAD CASE - 11

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF  | CBF |   |
|------|---------|---------|---------|------------|------------|------------|------|-----|---|
| 1    | -.4     | .0      | -36.6   | .0         | 28.8       | .0         | .56  | .09 |   |
| 9    | -.4     | .0      | -36.6   | .0         | 28.8       | .0         | .56  | .09 |   |
| 10   | .3      | .0      | 100.6   | .0         | -23.4      | .0         | 1.01 | .22 | * |
| 18   | .3      | .0      | 100.6   | .0         | -23.4      | .0         | 1.01 | .22 | * |
| 19   | .5      | .0      | 110.3   | .0         | -31.8      | .0         | 1.10 | .25 | * |
| 27   | .5      | .0      | 110.3   | .0         | -31.8      | .0         | 1.10 | .25 | * |

LOAD CASE - 12

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF  | CBF |   |
|------|---------|---------|---------|------------|------------|------------|------|-----|---|
| 1    | -.5     | .0      | -47.8   | .0         | 40.2       | .0         | .74  | .12 |   |
| 9    | -.5     | .0      | -47.8   | .0         | 40.2       | .0         | .74  | .12 |   |
| 10   | .4      | .0      | 110.3   | .0         | -35.1      | .0         | 1.10 | .25 | * |
| 18   | .4      | .0      | 110.3   | .0         | -35.1      | .0         | 1.10 | .25 | * |
| 19   | .8      | .0      | 90.0    | .0         | -52.4      | .0         | .90  | .21 |   |
| 27   | .8      | .0      | 90.0    | .0         | -52.4      | .0         | .90  | .21 |   |

LOAD CASE - 13

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF  | CBF |   |
|------|---------|---------|---------|------------|------------|------------|------|-----|---|
| 1    | -.2     | .0      | -50.5   | .0         | 17.2       | .0         | .78  | .11 |   |
| 9    | -.2     | .0      | -50.5   | .0         | 17.2       | .0         | .78  | .11 |   |
| 10   | .2      | .0      | 86.1    | .0         | -13.7      | .0         | .86  | .19 |   |
| 18   | .2      | .0      | 86.1    | .0         | -13.7      | .0         | .86  | .19 |   |
| 19   | .2      | .0      | 139.1   | .0         | -12.4      | .0         | 1.39 | .30 | * |
| 27   | .2      | .0      | 139.1   | .0         | -12.4      | .0         | 1.39 | .30 | * |

LOAD CASE - 14

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF  | CBF |   |
|------|---------|---------|---------|------------|------------|------------|------|-----|---|
| 1    | -.3     | .0      | -61.8   | .0         | 28.5       | .0         | .95  | .14 |   |
| 9    | -.3     | .0      | -61.8   | .0         | 28.5       | .0         | .95  | .14 |   |
| 10   | .3      | .0      | 95.8    | .0         | -25.5      | .0         | .96  | .21 |   |
| 18   | .3      | .0      | 95.8    | .0         | -25.5      | .0         | .96  | .21 |   |
| 19   | .5      | .0      | 118.9   | .0         | -33.0      | .0         | 1.19 | .27 | * |
| 27   | .5      | .0      | 118.9   | .0         | -33.0      | .0         | 1.19 | .27 | * |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 3 T - WALL ALTERNATIVE - FINAL**  
**BASIC T-WALL GEOMETRY**

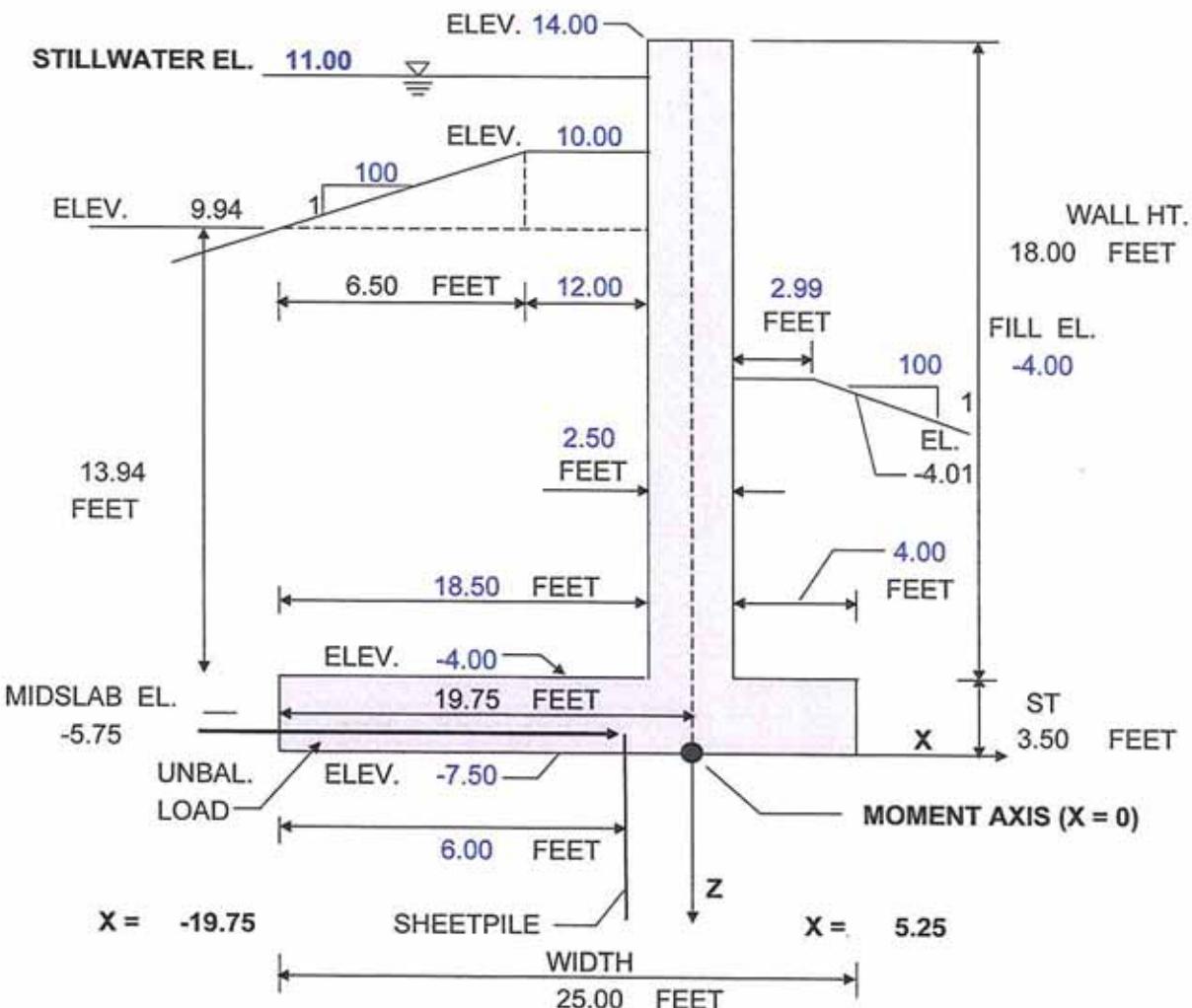
DATE: 7/26/2008

BY: RWY CHKD:

|                       |                  |
|-----------------------|------------------|
| CONCRETE STRENGTH     | 4,000            |
| REINFORCING STRENGTH  | 60,000           |
| WALL INTERVAL         | 0.66             |
| SLAB INTERVAL         | 1                |
| MONOLITH LENGTH       | 60               |
| BACKFILL WEIGHT<br>Ko | 120.0 PCF<br>0.8 |

**UNBALANCED SOILS LOADING:**

|           |             |
|-----------|-------------|
| 5.6 K/FT. | STILLWATER  |
| 9.6 K/FT. | TOP OF WALL |
| IMPACT    |             |
| 100 K     |             |



#### DESIGN CRITERIA

**CONCRETE:** EM1110-2-2104 "STRENGTH DESIGN FOR REINFORCED HYDRAULIC STRUCTURES"  
 HYDRAULIC FACTOR ( $H_f$ ) = 1.3  
 DL & LL LOAD FACTORS = 1.7  
 MAX. REINFORCING = 0.375 RHO<sub>bal</sub>

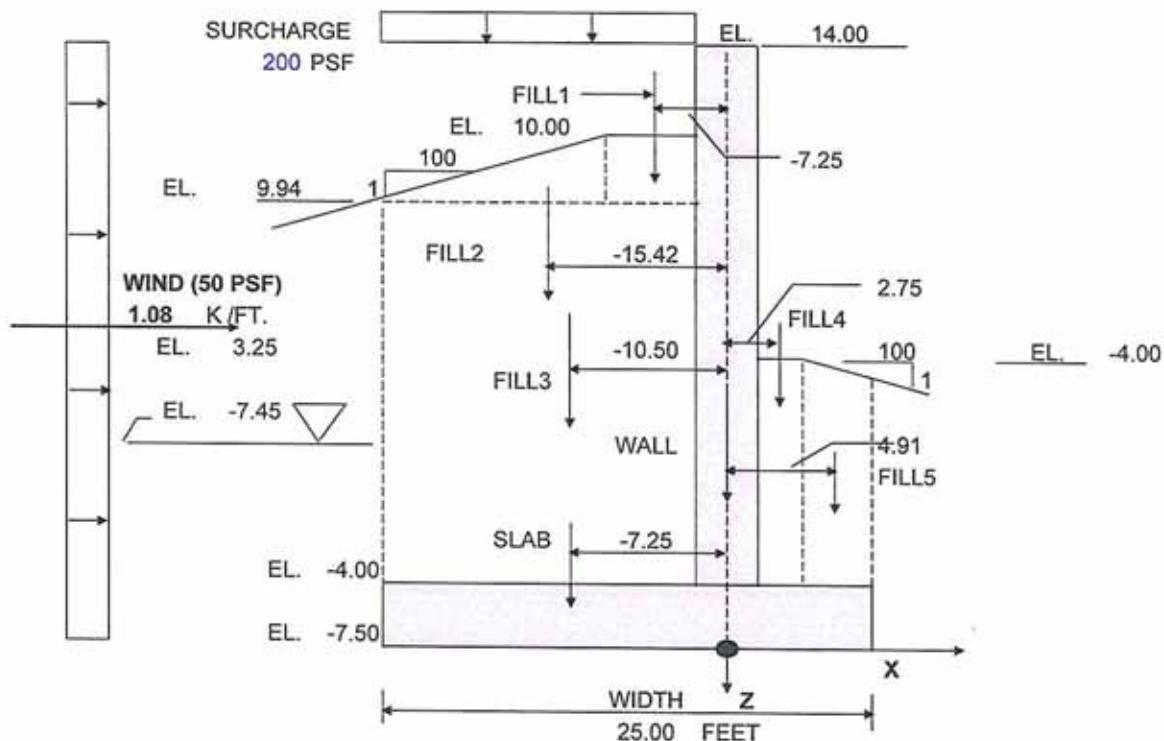
REINFORCING PER EQS. D-3 & D-4, AXIAL LOADS IGNORED

ALLOWABLE SHEAR PER ACI 318, EQ. 11-3

CLEAR COVER:      **4**    INCHES IN WALL AND TOP OF SLAB (ARCHITECTURAL WALLS - 5")  
**9**    INCHES IN BOTTOM OF SLAB TO ALLOW FOR PILES

**WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 3 T - WALL ALTERNATIVE - FINAL  
CASE 1 - CONSTRUCTION**

|                       |         |
|-----------------------|---------|
| FLOODSIDE WATER ELEV. | -7.45   |
| UPLIFT - PROT. SIDE   | -7.45   |
| ALLOWABLE OVERSTRESS  | 16.66 % |

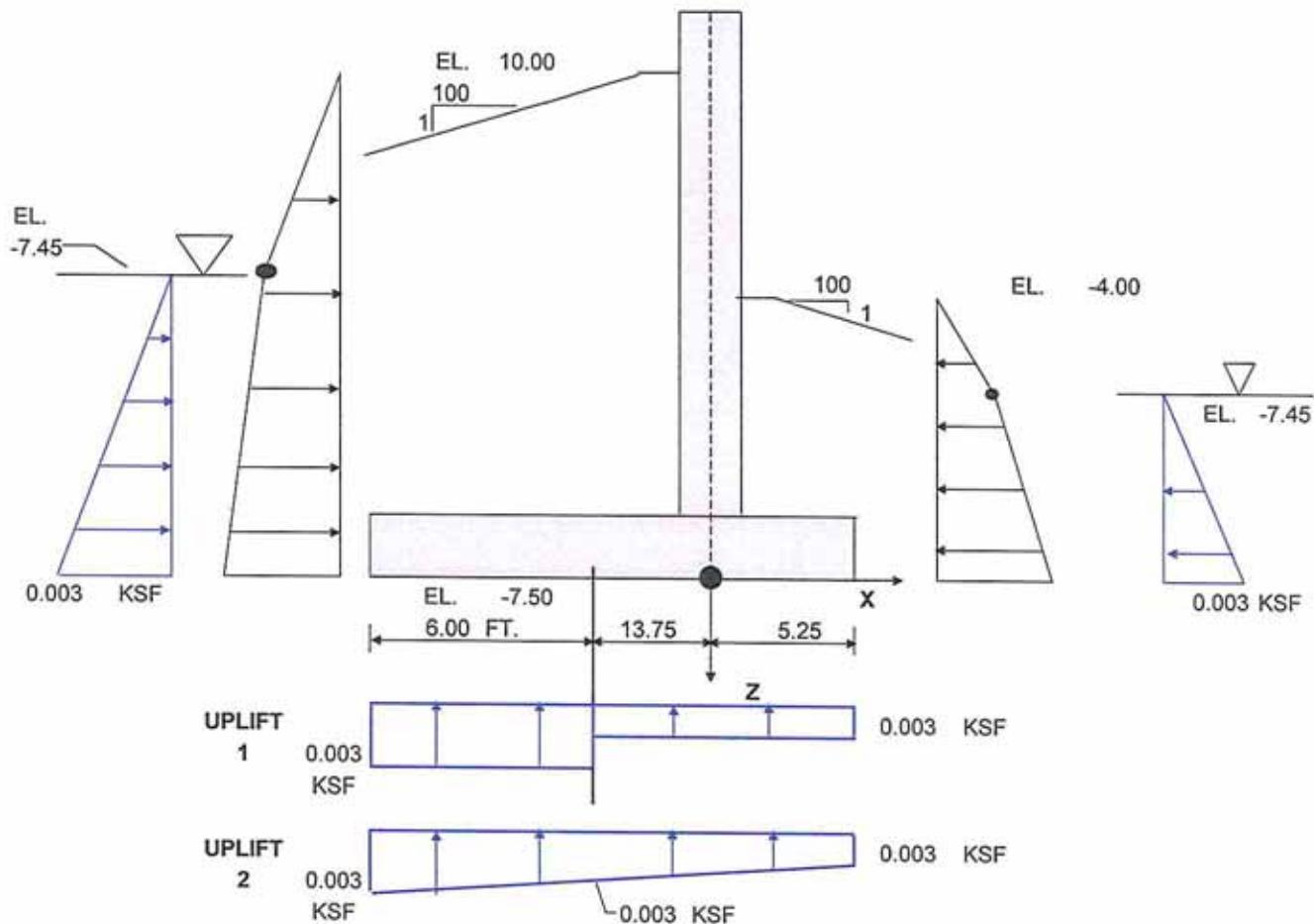


**FLOODWALL APPLIED GRAVITY LOADING - CASE 1**

| ITEM                 | FORCE Z<br>(WEIGHT) | X CENT.<br>FEET | Y CENT.<br>FEET | Myy<br>FT.-K | Mzz<br>FT.-K |
|----------------------|---------------------|-----------------|-----------------|--------------|--------------|
| CONCRETE SLAB        | 13.13               | -7.25           | 0.00            | 95.2         | 0            |
| CONCRETE WALL        | 6.75                | 0.00            | 0.00            | 0.0          | 0            |
| FLOODSIDE FILL1      | 0.09                | -7.25           | 0.00            | 0.7          | 0            |
| FLOODSIDE FILL2      | 0.03                | -15.42          | 0.00            | 0.4          | 0            |
| FLOODSIDE FILL3      | 30.94               | -10.50          | 0.00            | 324.8        | 0            |
| PROTECTED SIDE FILL4 | 0.00                | 2.75            | 0.00            | 0.0          | 0            |
| PROTECTED SIDE FILL5 | 0.00                | 4.91            | 0.00            | 0.0          | 0            |
| FLOODSIDE WATER      | 0.00                | -42.93          | 0.00            | 0.0          | 0            |
| FLOODSIDE WATER      | 0.00                | 0.00            | 0.00            | 0.0          | 0            |

|                     |       |        |        |       |
|---------------------|-------|--------|--------|-------|
| TOTALS              | 50.93 | -8.27  | 421.05 | 0     |
| CONCRETE            | 19.88 | -4.79  | 95.16  | 0     |
| FLOODSIDE FILL 1-3  | 31.05 | -10.49 | 325.89 | 0     |
| PROT. SIDE FILL 4-5 | 0.00  | 4.91   | 0.00   | 0     |
| FLOODSIDE WATER     | 0.00  | -      | 0.00   | 0     |
|                     | KIPS  |        | FT.-K  | FT.-K |

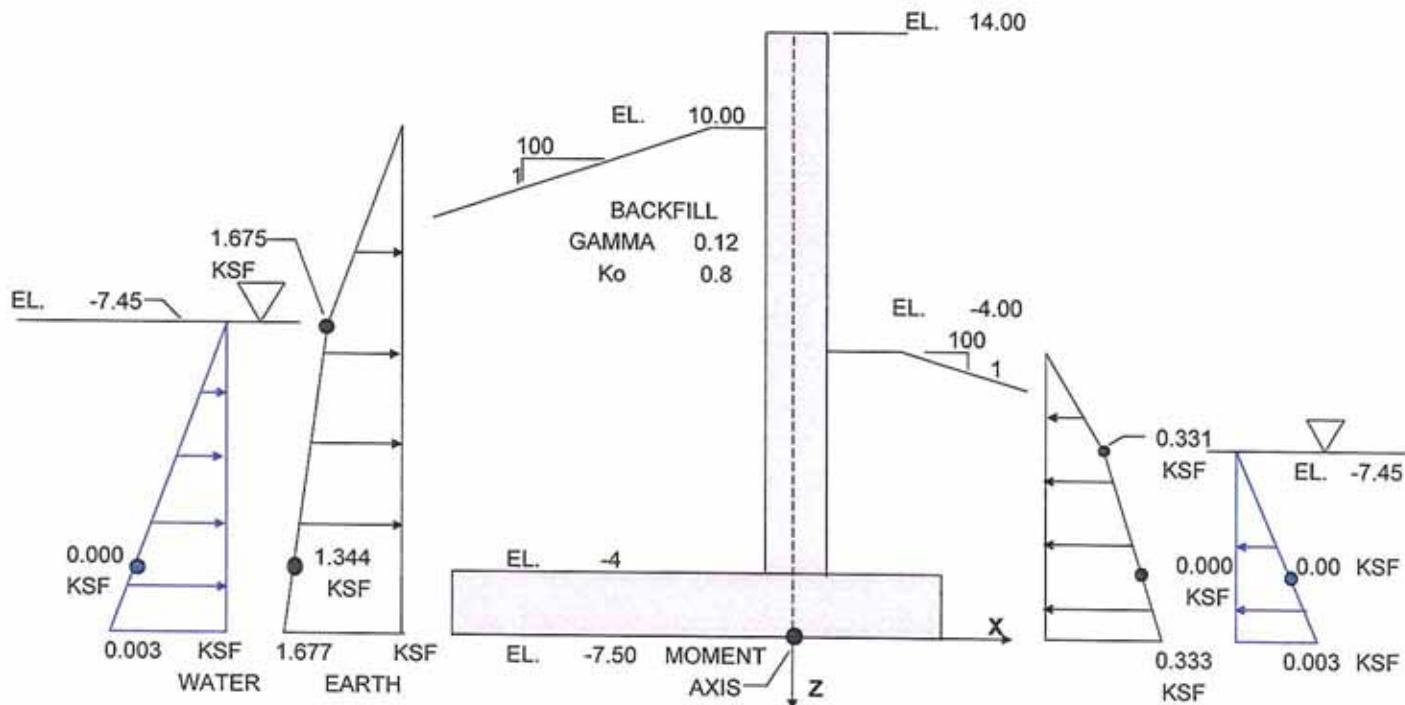
**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 3 T - WALL ALTERNATIVE - FINAL**  
**CASE 1 - CONSTRUCTION**



| ITEM            | WIDTH | PRESS | FORCE Z | X CENT. FEET | Y CENT. FEET | Myy FT.-K | Mzz FT.-K |
|-----------------|-------|-------|---------|--------------|--------------|-----------|-----------|
| FLOODSIDE:      |       |       |         |              |              |           |           |
| UPLIFT 1        | 6.00  | 0.00  | -0.02   | -16.75       | 0.00         | 0         | 0         |
| PROTECTED SIDE: |       |       |         |              |              |           |           |
| UPLIFT 1        | 19.00 | 0.00  | -0.06   | -4.25        | 0.00         | 0         | 0         |
| TOTALS          |       |       | -0.08   | -7.25        | -0.58        | 0         |           |
| FLD.SIDE        |       |       | -0.02   | -16.75       | -0.32        | 0         |           |
| PROT. SIDE      |       |       | -0.06   | -4.25        | -0.26        | 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 (UNIF) | 6.00  | 0.003 | -0.02   | -16.75       | 0.00         | -0.32     | 0.00      |
| UPLIFT 2 (TRI)  | 6.00  | 0.000 | 0.00    | -17.75       | 0.00         | 0.00      | 0.00      |
| PROTECTED SIDE: |       |       |         |              |              |           |           |
| UPLIFT 2 (UNIF) | 19.00 | 0.003 | -0.06   | -4.25        | 0.00         | -0.26     | 0.00      |
| UPLIFT 2 (TRI)  | 19.00 | 0.000 | 0.00    | -7.42        | 0.00         | 0.00      | 0.00      |
| TOTALS          |       |       | -0.08   | -7.25        | -0.58        | 0.00      |           |
| FLOOD SIDE      |       |       | -0.02   | -16.75       | -0.32        | 0.00      |           |
| PROT. SIDE      |       |       | -0.06   | -4.25        | -0.26        | 0.00      |           |
|                 |       |       | KIPS    |              | FT.-K        | FT.-K     |           |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 3 T - WALL ALTERNATIVE - FINAL**  
**CASE 1 - CONSTRUCTION**

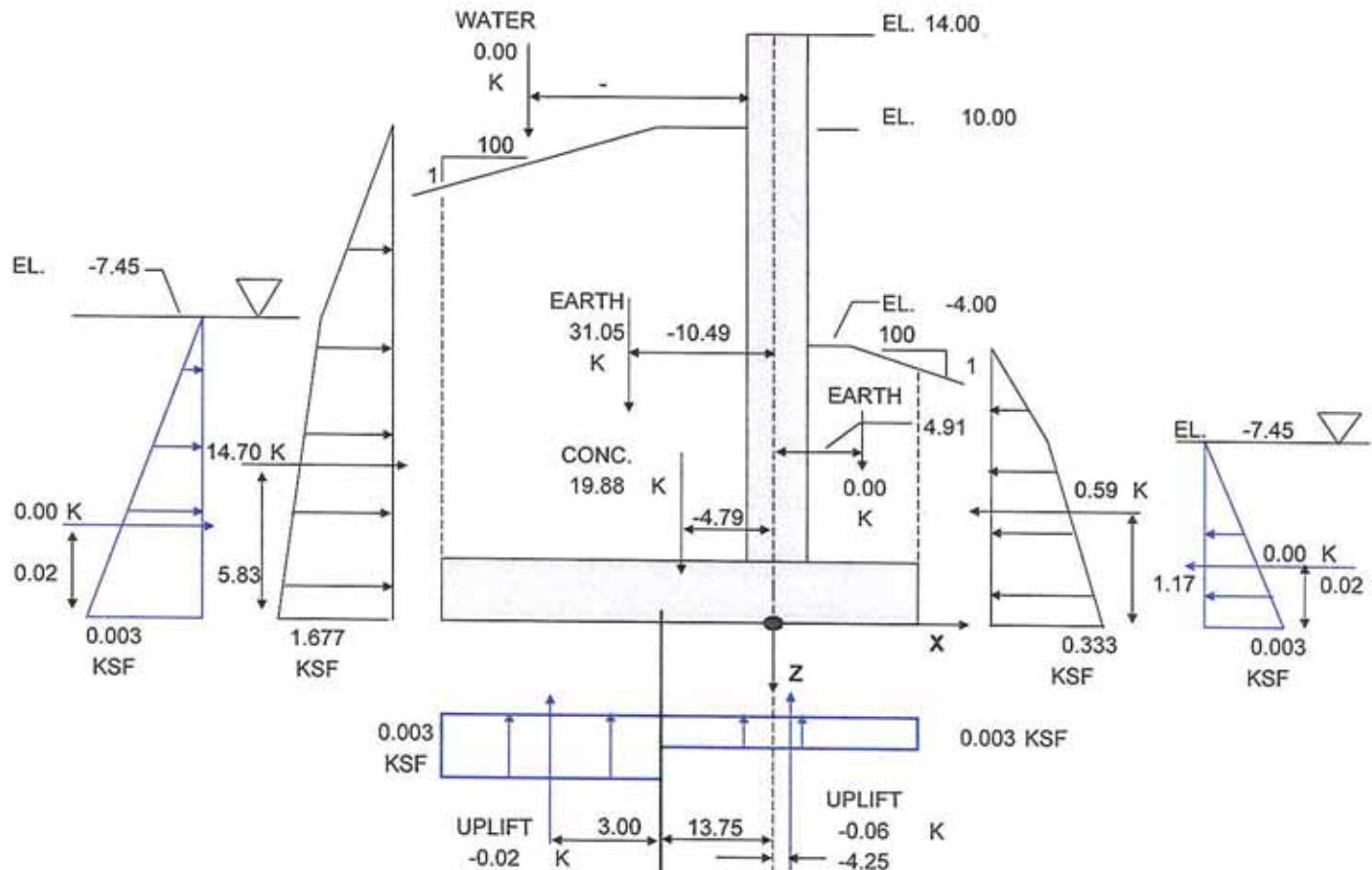


**FLOODWALL HORIZONTAL LOADING - CASE 1**

| ITEM       | HEIGHT | PRESS | FORCE X |      | Y CENT.<br>FEET | Z CENT.<br>FEET | Mzz<br>FT-K/FT | Myy<br>FT-K/FT |
|------------|--------|-------|---------|------|-----------------|-----------------|----------------|----------------|
| FLOODSIDE: |        |       |         |      |                 |                 |                |                |
| EARTH 1    | 17.45  | 1.675 | 14.62   | k/ft | 0.00            | -5.87           | 0              | -85.7          |
| EARTH 2    | 0.05   | 1.675 | 0.08    | k/ft | 0.00            | -0.02           | 0              | 0.0            |
| EARTH 3    | 0.05   | 0.002 | 0.00    | k/ft | 0.00            | -0.02           | 0              | 0.0            |
| GRND WATER | 0.05   | 0.003 | 0.00    | k/ft | 0.00            | -0.02           | 0              | 0.0            |
| PROTECTED: |        |       |         |      |                 |                 |                |                |
| EARTH 4    | 3.45   | 0.331 | -0.57   | k/ft | 0.00            | -1.20           | 0              | 0.7            |
| EARTH 5    | 0.05   | 0.331 | -0.02   | k/ft | 0.00            | -0.02           | 0              | 0.0            |
| EARTH 6    | 0.05   | 0.333 | 0.0     | k/ft | 0.00            | -0.02           | 0              | 0.0            |
| GRND WATER | 0.05   | 0.003 | 0.0     | k/ft | 0.00            | -0.02           | 0              | 0.0            |

| FLOODSIDE EARTH FORCE  | 14.70 | k/ft | FORCE | Y CENT. | Z CENT. | Mzz      | Myy      |
|------------------------|-------|------|-------|---------|---------|----------|----------|
|                        |       |      | X     | FEET    | FEET    | FT-K/FT. | FT-K/FT. |
| FLOODSIDE WATER FORCE  | 0.00  |      |       | 0.00    | -5.83   | -85.75   |          |
| TOTAL FLOODSIDE FORCE  | 14.70 | k/ft |       | 0.00    | -0.02   | 0.00     |          |
| PROT. SIDE EARTH FORCE | -0.59 |      |       | 0.00    | -1.17   | 0.7      |          |
| PROT. SIDE WATER FORCE | 0.00  |      |       | 0.00    | -0.02   | 0.0      |          |
| TOTAL PROT. SIDE FORCE | -0.59 | k/ft |       | 0.00    | -1.17   | 0.0      | 0.7      |
| TOTAL NET HORIZ. FORCE | 14.11 | k/ft |       | 0.00    | -6.03   | 0.0      | -85.1    |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 3 T - WALL ALTERNATIVE - FINAL**  
**CASE 1 - CONSTRUCTION**



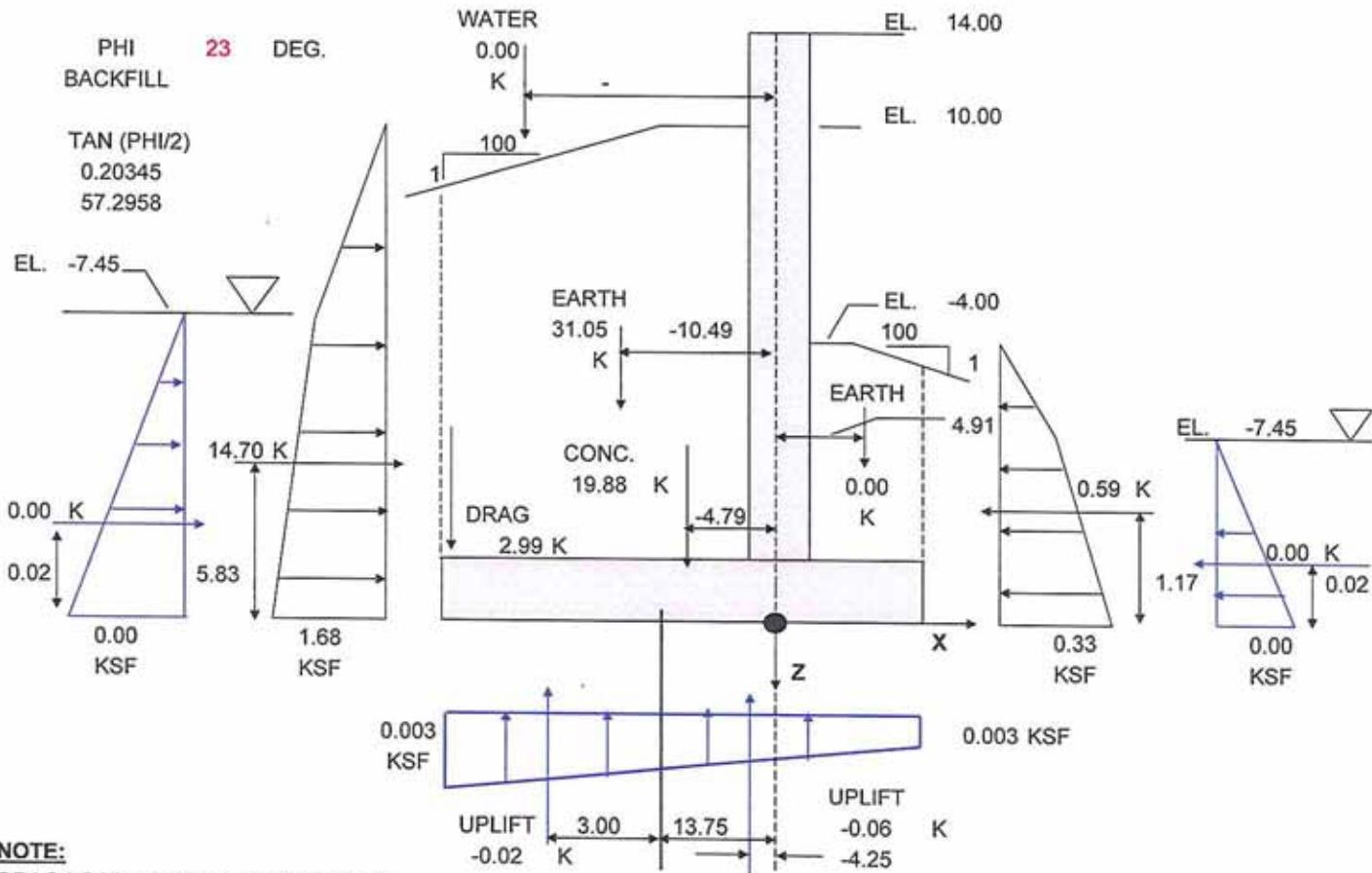
LOADING SUMMARY - CASE 1 WITH MINIMUM UPLIFT

| 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     | 19.9 k/ft | -4.79        | 0.00         | 95.156      | 0           |
| FLDSIDE FILL    | 0.0     | 0.0     | 31.1 k/ft | -10.49       | 0.00         | 325.894     | 0           |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.0 k/ft  | 4.91         | 0.00         | 0.003       | 0           |
| F. SIDE UPLIFT  | 0.0     | 0.0     | 0.0 k/ft  | -16.75       | 0.00         | -0.322      | 0           |
| P. SIDE UPLIFT  | 0.0     | 0.0     | -0.1 k/ft | -4.25        | 0.00         | -0.258      | 0           |
| F. S. EARTH Pr. | 14.7    | 0.0     | 0.0 k/ft  | -            | -5.83        | -85.750     | 0           |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0 k/ft  | -            | -1.17        | 0.000       | 0           |
| F. S. WATER Pr. | 0.0     | 0.0     | 0.0 k/ft  | -            | -0.02        | 0.000       | 0           |
| P. S. WATER Pr. | 0.0     | 0.0     | 0.0 k/ft  | -            | -0.02        | 0.000       | 0           |

|             | X     | Y   | Z      | Mxx | Myy   | Mzz |
|-------------|-------|-----|--------|-----|-------|-----|
| TOTALS      | 14.7  | 0.0 | 50.8   | 0   | 335   | 0   |
| MONO. TOTAL | 882.0 | 0.0 | 3050.9 | 0   | 20083 | 0   |

IGNORE

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 3 T - WALL ALTERNATIVE - FINAL**  
**CASE 1 - CONSTRUCTION**



**NOTE:**

$$\text{DRAG LOAD} = (\text{EARTH P}) * \text{TAN}(\text{PHI}/2)$$

LOADING SUMMARY - CASE 1 WITH DRAG LOAD

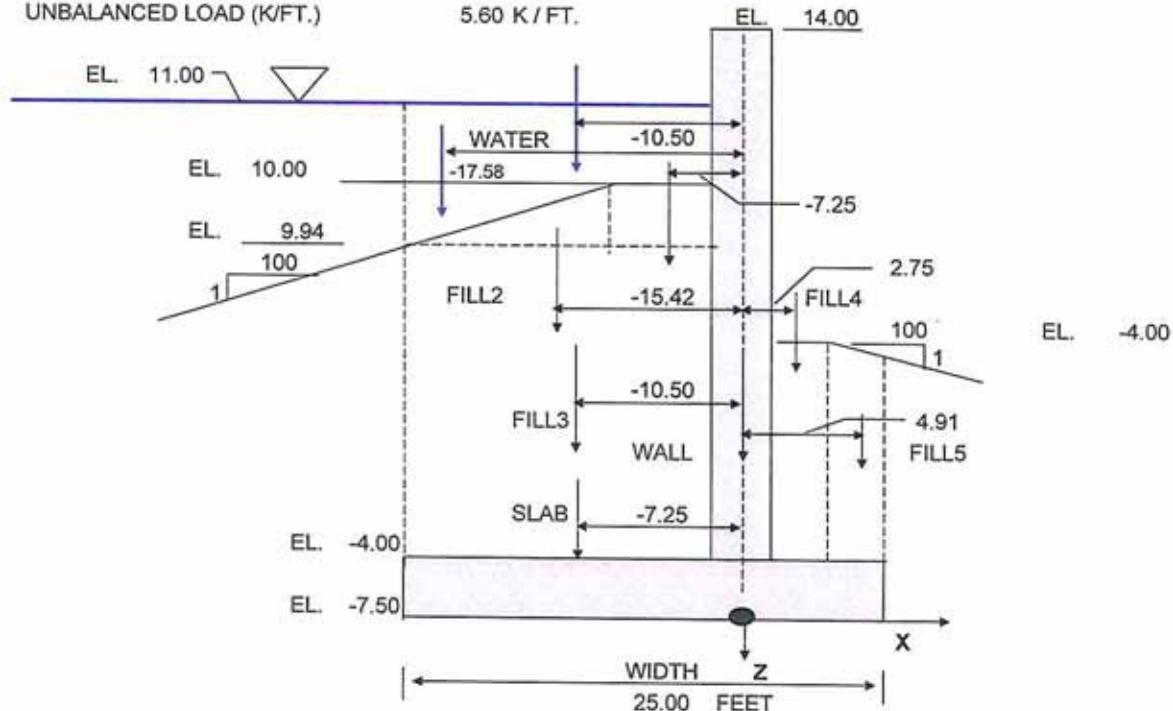
| ITEM            | FORCE X | FORCE Y | FORCE Z |      | X CENT. FEET | Z CENT. FEET | Myy FT-K/FT | Mzz FT-K/FT |
|-----------------|---------|---------|---------|------|--------------|--------------|-------------|-------------|
| CONCRETE        | 0.0     | 0.0     | 19.9    | k/ft | -4.79        | 0.00         | 95          | 0           |
| FLDSIDE FILL    | 0.0     | 0.0     | 31.1    | k/ft | -10.49       | 0.00         | 326         | 0           |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.0     | k/ft | 4.91         | 0.00         | 0           | 0           |
| DRAG LOAD       | 0.0     | 0.0     | 3.0     | k/ft | -19.75       | 0.00         | 59          | 0           |
| SURCHARGE       | 0.0     | 0.0     | 3.7     | k/ft | -10.50       | 0.00         | 39          | 0           |
| F. SIDE UPLIFT  | 0.0     | 0.0     | 0.0     | k/ft | -16.75       | 0.00         | 0           | 0           |
| P. SIDE UPLIFT  | 0.0     | 0.0     | -0.1    | k/ft | -4.25        | 0.00         | 0           | 0           |
| F. S. EARTH Pr. | 14.7    | 0.0     | 0.0     | k/ft | -            | -5.83        | -86         | 0           |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -1.17        | 0           | 0           |
| F. S. WATER Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -0.02        | 0           | 0           |
| P. S. WATER Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -0.02        | 0           | 0           |

|             | X     | Y   | Z      | Mxx   | Myy   | Mzz   |
|-------------|-------|-----|--------|-------|-------|-------|
| TOTALS      | 14.7  | 0.0 | 57.5   | 0     | 433   | 0     |
| MONO. TOTAL | 882.0 | 0.0 | 3452.4 | 0     | ##### | 0     |
|             |       |     |        | X     | Y     | Z     |
| VERTICAL    |       |     | 3452   | -9.01 |       |       |
| HORIZ       |       |     | 882    |       |       | -5.83 |

-0.4

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 3 T - WALL ALTERNATIVE - FINAL**  
**CASE 2 - CANAL AT STILLWATER**

FLOODSIDE WATER ELEV. **11.00**  
 UPLIFT - PROT. SIDE -4.00  
 ALLOWABLE OVERSTRESS 0  
 UNBALANCED LOAD (K/FT.) 5.60 K / FT.

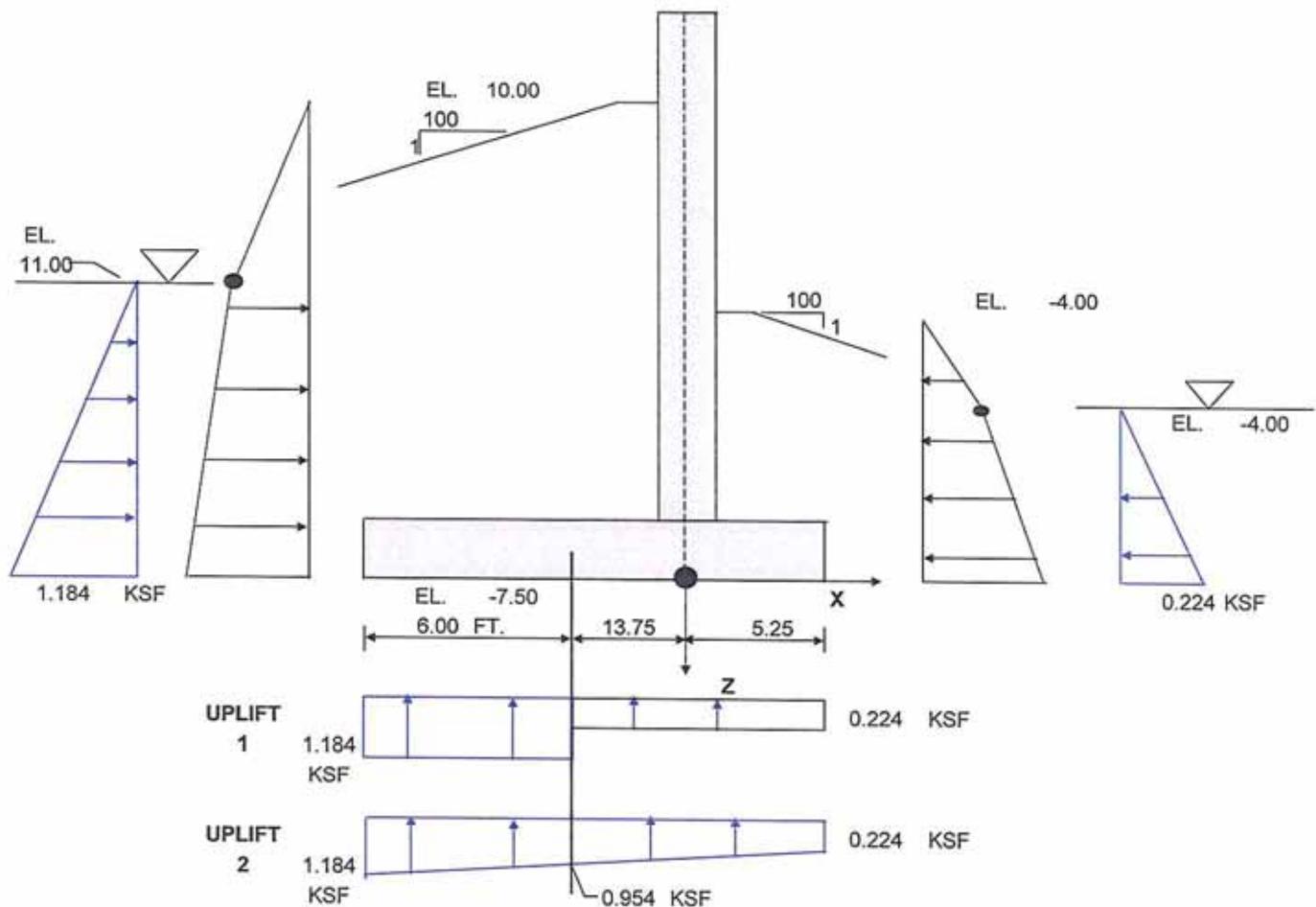


**FLOODWALL APPLIED GRAVITY LOADING - CASE 2**

| ITEM                 | FORCE Z<br>(WEIGHT) | X CENT.<br>FEET | Y CENT.<br>FEET | Myy<br>FT.-K | Mzz<br>FT.-K |
|----------------------|---------------------|-----------------|-----------------|--------------|--------------|
| CONCRETE SLAB        | 13.13               | -7.25           | 0.00            | 95           | 0            |
| CONCRETE WALL        | 6.75                | 0.00            | 0.00            | 0            | 0            |
| FLOODSIDE FILL1      | 0.09                | -7.25           | 0.00            | 1            | 0            |
| FLOODSIDE FILL2      | 0.03                | -15.42          | 0.00            | 0            | 0            |
| FLOODSIDE FILL3      | 30.94               | -10.50          | 0.00            | 325          | 0            |
| PROTECTED SIDE FILL4 | 0.00                | 2.75            | 0.00            | 0            | 0            |
| PROTECTED SIDE FILL5 | 0.00                | 4.91            | 0.00            | 0            | 0            |
| FLOODSIDE WATER      | 0.01                | -17.58          | 0.00            | 0            | 0            |
| FLOODSIDE WATER      | 1.18                | -10.50          | 0.00            | 12           | 0            |

|                            |       |        |        |       |
|----------------------------|-------|--------|--------|-------|
| <b>TOTALS</b>              | 52.13 | -8.32  | 433.72 | 0     |
| <b>CONCRETE</b>            | 19.88 | -4.79  | 95.16  | 0     |
| <b>FLOODSIDE FILL 1-3</b>  | 31.05 | -10.49 | 325.89 | 0     |
| <b>PROT. SIDE FILL 4-5</b> | 0.00  | 4.91   | 0.00   | 0     |
| <b>FLOODSIDE WATER</b>     | 1.20  | -10.58 | 12.67  | 0     |
|                            | KIPS  |        | FT.-K  | FT.-K |

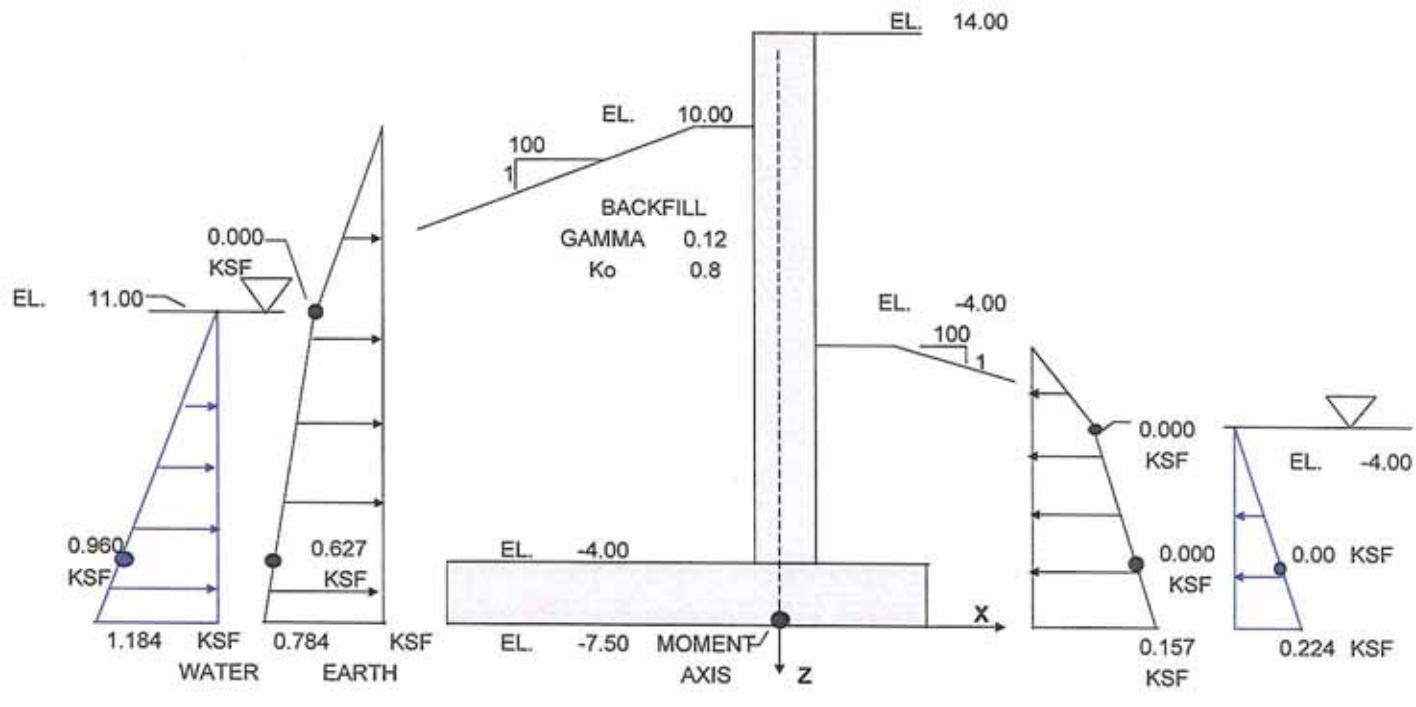
WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 3 T - WALL ALTERNATIVE - FINAL  
CASE 2 - CANAL AT STILLWATER



| ITEM            | WIDTH | PRESS | FORCE Z | X CENT. FEET | Y CENT. FEET | Myy FT.-K | Mzz FT.-K |
|-----------------|-------|-------|---------|--------------|--------------|-----------|-----------|
| FLOODSIDE:      |       |       |         |              |              |           |           |
| UPLIFT 1        | 6.00  | 1.18  | -7.10   | -16.75       | 0.00         | -119      | 0         |
| PROTECTED SIDE: |       |       |         |              |              |           |           |
| UPLIFT 1        | 19.00 | 0.22  | -4.26   | -4.25        | 0.00         | -18       | 0         |
| TOTALS          |       |       | -11.36  | -12.07       |              | -137      | 0         |
| FLD.SIDE        |       |       | -7.10   | -16.75       |              | -118.99   | 0         |
| PROT. SIDE      |       |       | -4.26   | -4.25        |              | -18.09    | 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 (UNIF) | 6.00  | 0.954 | -5.72   | -16.75       | 0.00         | -95.84    | 0.00      |
| UPLIFT 2 (TRI)  | 6.00  | 0.230 | -0.69   | -17.75       | 0.00         | -12.27    | 0.00      |
| PROTECTED SIDE: |       |       |         |              |              |           |           |
| UPLIFT 2 (UNIF) | 19.00 | 0.224 | -4.26   | -4.25        | 0.00         | -18.09    | 0.00      |
| UPLIFT 2 (TRI)  | 19.00 | 0.730 | -6.93   | -7.42        | 0.00         | -51.41    | 0.00      |
| TOTALS          |       |       | -17.60  | -10.09       |              | -177.60   | 0.00      |
| FLOOD SIDE      |       |       | -6.41   | -16.86       |              | -108.11   | 0.00      |
| PROT. SIDE      |       |       | -11.19  | -6.21        |              | -69.49    | 0.00      |
|                 |       |       | KIPS    |              |              | FT.-K     | FT.-K     |

WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 3 T - WALL ALTERNATIVE - FINAL  
CASE 2 - CANAL AT STILLWATER



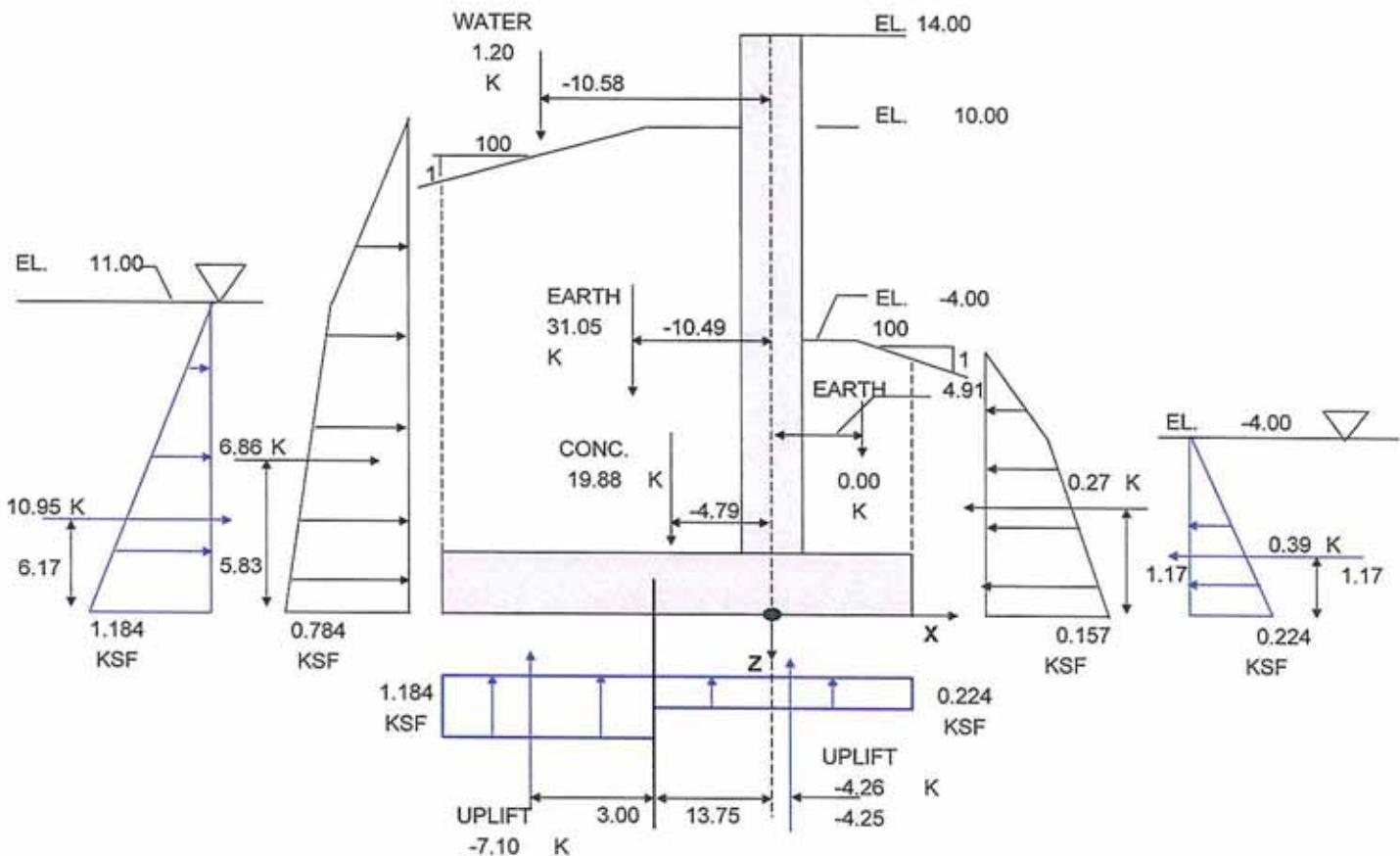
8.288  
3.136

FLOODWALL HORIZONTAL LOADING - CASE 2

| ITEM       | HEIGHT | PRESS | FORCE X |      | Y CENT.<br>FEET | Z CENT.<br>FEET | Mzz<br>FT-K/FT | Myy<br>FT-K/FT |
|------------|--------|-------|---------|------|-----------------|-----------------|----------------|----------------|
| FLOODSIDE: |        |       |         |      |                 |                 |                |                |
| EARTH 1    | 0.00   | 0.000 | 0.00    | k/ft | 0.00            | 0.00            | 0              | 0.0            |
| EARTH 2    | 17.50  | 0.000 | 0.00    | k/ft | 0.00            | 0.00            | 0              | 0.0            |
| EARTH 3    | 17.50  | 0.784 | 6.86    | k/ft | 0.00            | -5.83           | 0              | -40.0          |
| GRND WATER | 18.50  | 1.184 | 10.95   | k/ft | 0.00            | -6.17           | 0              | -67.5          |
| PROTECTED: |        |       |         |      |                 |                 |                |                |
| EARTH 4    | 0.00   | 0.000 | 0.00    | k/ft | 0.00            | -3.50           | 0              | 0.0            |
| EARTH 5    | 3.50   | 0.000 | 0.00    | k/ft | 0.00            | -1.75           | 0              | 0.0            |
| EARTH 6    | 3.50   | 0.157 | -0.27   | k/ft | 0.00            | -1.17           | 0              | 0.3            |
| GRND WATER | 3.50   | 0.224 | -0.39   | k/ft | 0.00            | -1.17           | 0              | 0.5            |

| ITEM                   | HEIGHT | PRESS | FORCE X |      | Y CENT. | Z CENT. | Mzz     | Myy      |
|------------------------|--------|-------|---------|------|---------|---------|---------|----------|
|                        |        |       |         |      | FEET    | FEET    | FT-K/FT | FT-K/FT  |
| FLOODSIDE EARTH FORCE  |        |       | 6.86    |      | 0.00    | -5.83   |         | -40.0167 |
| FLOODSIDE WATER FORCE  |        |       | 10.95   |      | 0.00    | -6.17   |         | -67.5373 |
| TOTAL FLOODSIDE FORCE  |        |       | 17.81   | k/ft | 0.00    | -6.04   | 0.0     | -107.6   |
| PROT. SIDE EARTH FORCE |        |       | -0.27   |      | 0.00    | -1.17   |         | 0.3      |
| PROT. SIDE WATER FORCE |        |       | -0.39   |      | 0.00    | -1.17   |         | 0.5      |
| TOTAL PROT. SIDE FORCE |        |       | -0.67   | k/ft | 0.00    | -1.17   | 0.0     | 0.8      |
| TOTAL NET HORIZ. FORCE |        |       | 17.15   | k/ft | 0.00    | -6.23   | 0.0     | -106.8   |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 3 T - WALL ALTERNATIVE - FINAL**  
**CASE 2 - CANAL AT STILLWATER**



**LOADING SUMMARY - CASE 2 WITH MINIMUM UPLIFT**

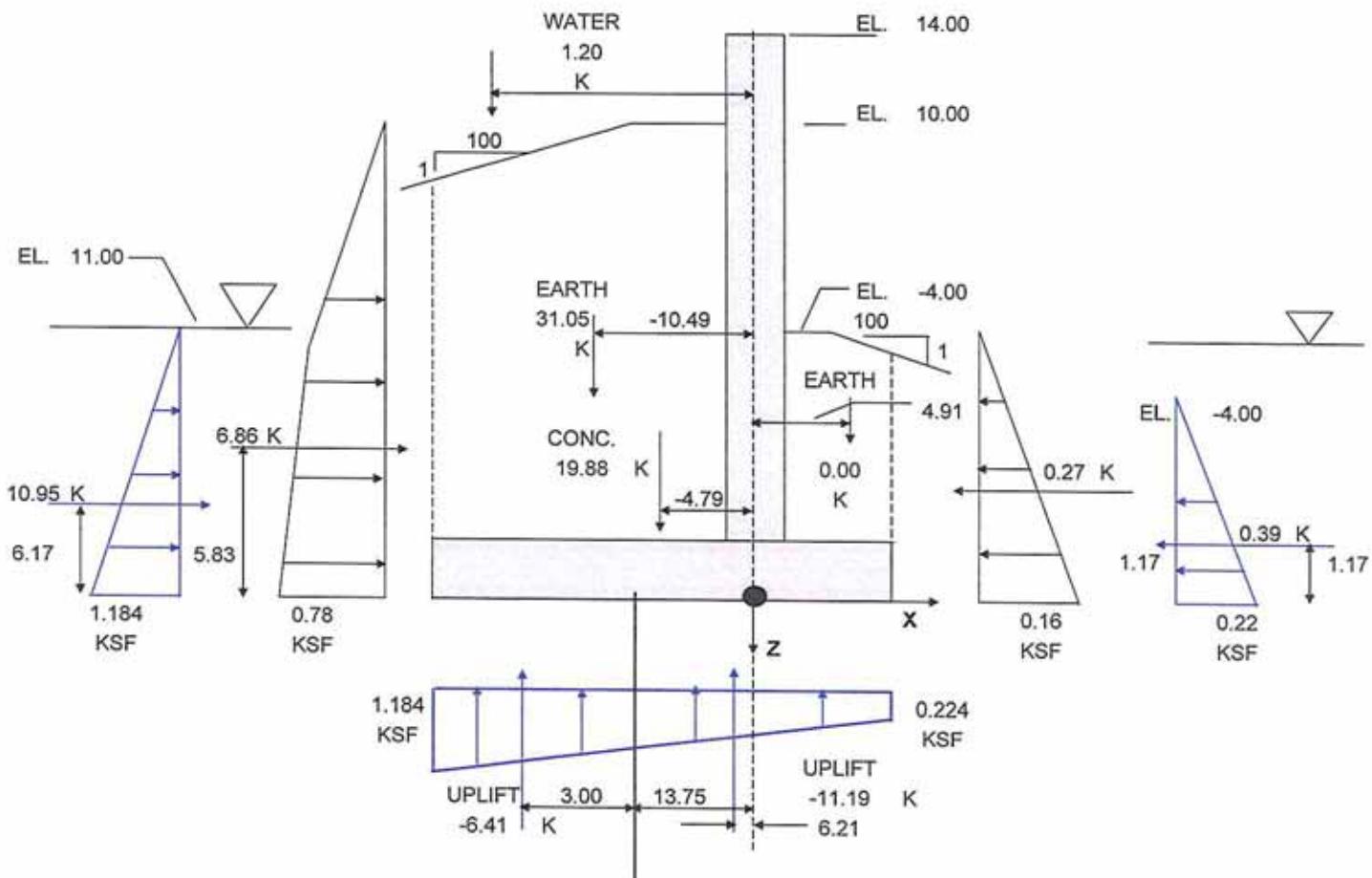
| ITEM            | FORCE X | FORCE Y | FORCE Z |      | X CENT. FEET | Z CENT. FEET | Myy FT-K/FT | Mzz FT-K/FT |
|-----------------|---------|---------|---------|------|--------------|--------------|-------------|-------------|
| CONCRETE        | 0.0     | 0.0     | 19.9    | k/ft | -4.79        | 0.00         | 95          | 0           |
| FLDSIDE FILL    | 0.0     | 0.0     | 31.1    | k/ft | -10.49       | 0.00         | 326         | 0           |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.0     | k/ft | 4.91         | 0.00         | 0           | 0           |
| F.SIDE WATER    | 0.0     | 0.0     | 1.2     | k/ft | -10.58       | 0.00         | 13          | 0           |
| F. SIDE UPLIFT  | 0.0     | 0.0     | -7.1    | k/ft | -16.75       | 0.00         | -119        | 0           |
| P. SIDE UPLIFT  | 0.0     | 0.0     | -4.3    | k/ft | -4.25        | 0.00         | -18         | 0           |
| F. S. EARTH Pr. | 6.9     | 0.0     | 0.0     | k/ft | -            | -5.83        | -40         | 0           |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -1.17        | 0           | 0           |
| F. S. WATER Pr. | 11.0    | 0.0     | 0.0     | k/ft | -            | -6.17        | -68         | 0           |
| P. S. WATER Pr. | -0.4    | 0.0     | 0.0     | k/ft | -            | -1.17        | 0           | 0           |

|             | X      | Y   | Z      | Mxx | Myy     | Mzz |
|-------------|--------|-----|--------|-----|---------|-----|
| TOTALS      | 17.4   | 0.0 | 40.8   | 0   | 189.547 | 0   |
| MONO. TOTAL | 1045.2 | 0.0 | 2446.0 | 0   | 11373   | 0   |

314.73

-107.10

WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 3 T - WALL ALTERNATIVE - FINAL  
CASE 2 - CANAL AT STILLWATER

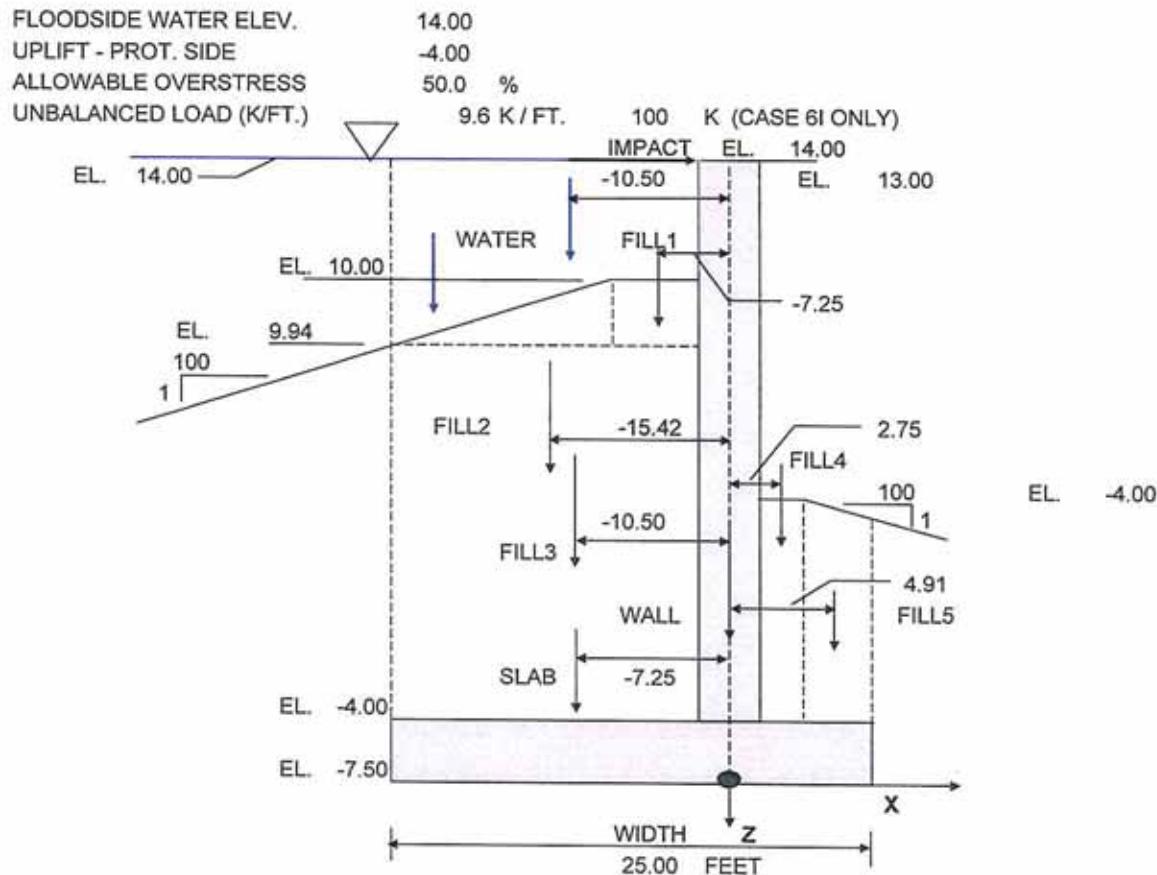


LOADING SUMMARY - CASE 2 WITH MAXIMUM UPLIFT

| 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     | 19.9 k/ft  | -4.79        | 0.00         | 95          | 0           |
| FLDSIDE FILL    | 0.0     | 0.0     | 31.1 k/ft  | -10.49       | 0.00         | 326         | 0           |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.0 k/ft   | 4.91         | 0.00         | 0           | 0           |
| F. SIDE WATER   | 0.0     | 0.0     | 1.2 k/ft   | -10.58       | 0.00         | 13          | 0           |
| F. SIDE UPLIFT  | 0.0     | 0.0     | -6.4 k/ft  | -16.86       | 0.00         | -108        | 0           |
| P. SIDE UPLIFT  | 0.0     | 0.0     | -11.2 k/ft | -6.21        | 0.00         | -69         | 0           |
| F. S. EARTH Pr. | 6.9     | 0.0     | 0.0 k/ft   | -            | -5.83        | -40         | 0           |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0 k/ft   | -            | -1.17        | 0           | 0           |
| F. S. WATER Pr. | 11.0    | 0.0     | 0.0 k/ft   | -            | -6.17        | -68         | 0           |
| P. S. WATER Pr. | -0.4    | 0.0     | 0.0 k/ft   | -            | -1.17        | 0           | 0           |

|             | X      | Y   | Z      | Mxx | Myy   | Mzz   |
|-------------|--------|-----|--------|-----|-------|-------|
| TOTALS      | 17.4   | 0.0 | 34.5   | 0   | 149   | 0     |
| MONO. TOTAL | 1045.2 | 0.0 | 2071.6 | 0   | 8942  | 0     |
| VERTICAL    |        |     | 2072   |     | -7.42 |       |
| HORIZ       |        |     | 1045   |     |       | -6.15 |

WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 3 T - WALL ALTERNATIVE - FINAL  
CASE 3 - CANAL AT TOP OF WALL

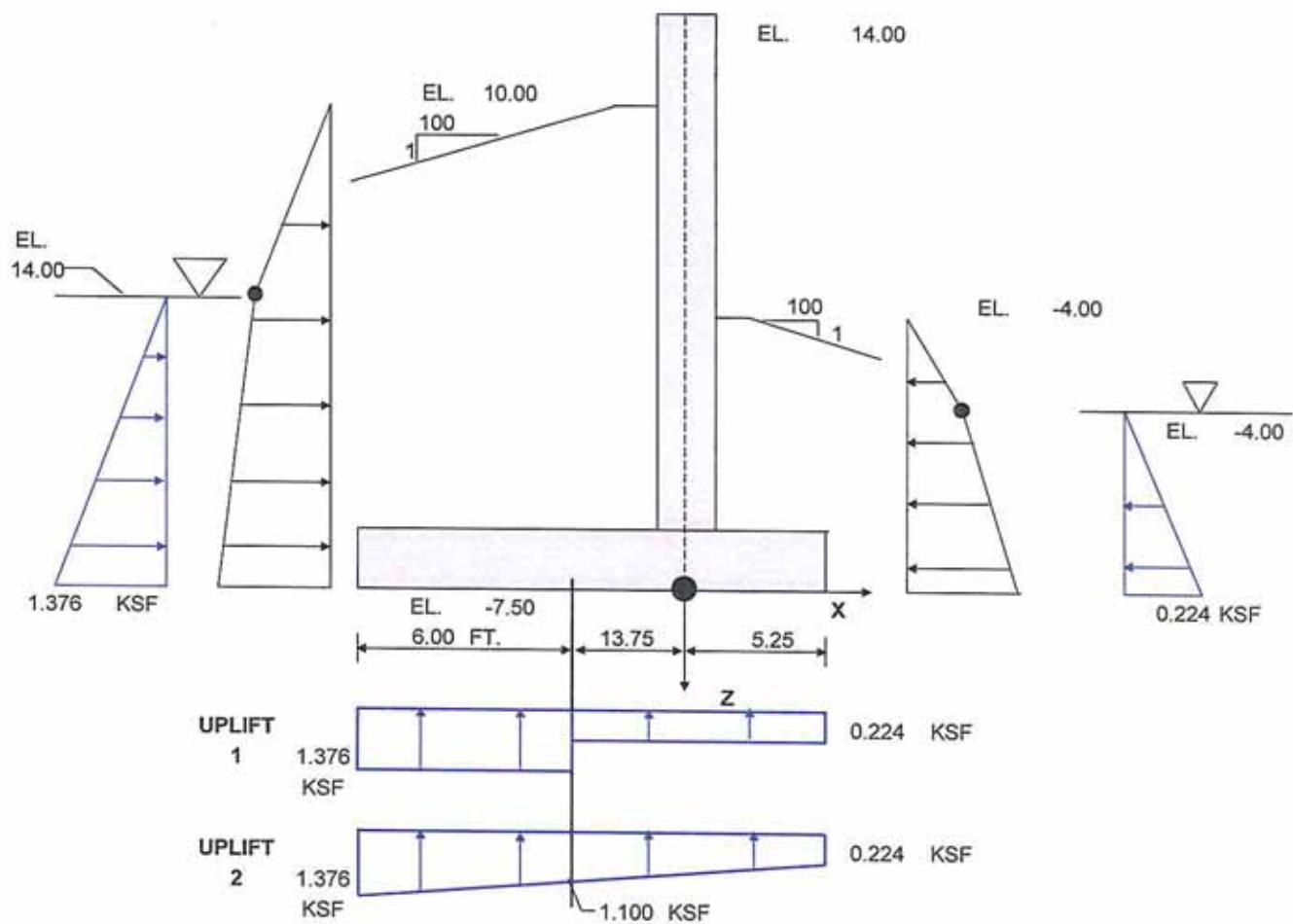


FLOODWALL APPLIED GRAVITY LOADING - CASE 3

| ITEM                 | FORCE Z<br>(WEIGHT) | X CENT.<br>FEET | Y CENT.<br>FEET | Myy<br>FT.-K | Mzz<br>FT.-K |
|----------------------|---------------------|-----------------|-----------------|--------------|--------------|
| CONCRETE SLAB        | 13.13               | -7.25           | 0.00            | 95           | 0            |
| CONCRETE WALL        | 6.75                | 0.00            | 0.00            | 0            | 0            |
| FLOODSIDE FILL1      | 0.09                | -7.25           | 0.00            | 1            | 0            |
| FLOODSIDE FILL2      | 0.03                | -15.42          | 0.00            | 0            | 0            |
| FLOODSIDE FILL3      | 30.94               | -10.50          | 0.00            | 325          | 0            |
| PROTECTED SIDE FILL4 | 0.00                | 2.75            | 0.00            | 0            | 0            |
| PROTECTED SIDE FILL5 | 0.00                | 4.91            | 0.00            | 0            | 0            |
| FLOODSIDE WATER      | 0.01                | -17.58          | 0.00            | 0            | 0            |
| FLOODSIDE WATER      | 4.74                | -10.50          | 0.00            | 50           | 0            |

|                     |       |        |        |       |
|---------------------|-------|--------|--------|-------|
| TOTALS              | 55.68 | -8.46  | 471.02 | 0     |
| CONCRETE            | 19.88 | -4.79  | 95.16  | 0     |
| FLOODSIDE FILL 1-3  | 31.05 | -10.49 | 325.89 | 0     |
| PROT. SIDE FILL 4-5 | 0.00  | 4.91   | 0.00   | 0     |
| FLOODSIDE WATER     | 4.75  | -10.52 | 49.97  | 0     |
|                     | KIPS  |        | FT.-K  | FT.-K |

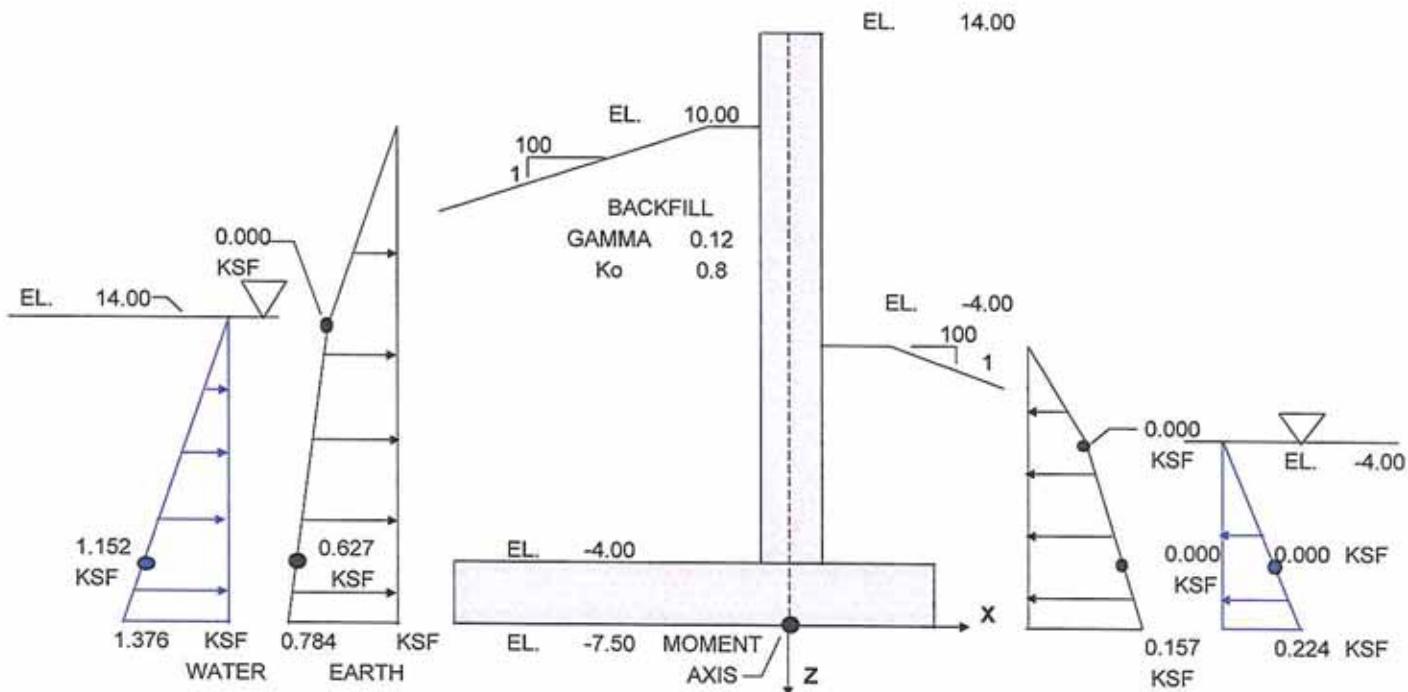
WEST BANK & VICINITY - ALGIERS CANAL WEST  
 REACH 3 T - WALL ALTERNATIVE - FINAL  
 CASE 3 - CANAL AT TOP OF WALL



| ITEM                   | WIDTH | PRESS | FORCE Z       | X CENT.<br>FEET | Y CENT.<br>FEET | Myy<br>FT.-K | Mzz<br>FT.-K |
|------------------------|-------|-------|---------------|-----------------|-----------------|--------------|--------------|
| <b>FLOODSIDE:</b>      |       |       |               |                 |                 |              |              |
| UPLIFT 1               | 6.00  | 1.38  | -8.26         | -16.75          | 0.00            | -138         | 0            |
| <b>PROTECTED SIDE:</b> |       |       |               |                 |                 |              |              |
| UPLIFT 1               | 19.00 | 0.22  | -4.26         | -4.25           | 0.00            | -18          | 0            |
| <b>TOTALS</b>          |       |       | <b>-12.51</b> | <b>-12.50</b>   |                 | <b>-156</b>  | <b>0</b>     |
| FLD.SIDE               |       |       | -8.26         | -16.75          |                 | -138.29      | 0            |
| PROT. SIDE             |       |       | -4.26         | -4.25           |                 | -18.09       | 0            |
|                        |       |       | KIPS          |                 |                 | FT.-K        | FT.-K        |

| ITEM                   | WIDTH | PRESS | FORCE Z       | X CENT.<br>FEET | Y CENT.<br>FEET | Myy<br>FT.-K   | Mzz<br>FT.-K |
|------------------------|-------|-------|---------------|-----------------|-----------------|----------------|--------------|
| <b>FLOODSIDE:</b>      |       |       |               |                 |                 |                |              |
| UPLIFT 2 (UNIF)        | 6.00  | 1.100 | -6.60         | -16.75          | 0.00            | -110.50        | 0.00         |
| UPLIFT 2 (TRI)         | 6.00  | 0.276 | -0.83         | -17.75          | 0.00            | -14.72         | 0.00         |
| <b>PROTECTED SIDE:</b> |       |       |               |                 |                 |                |              |
| UPLIFT 2 (UNIF)        | 19.00 | 0.224 | -4.26         | -4.25           | 0.00            | -18.09         | 0.00         |
| UPLIFT 2 (TRI)         | 19.00 | 0.876 | -8.32         | -7.42           | 0.00            | -61.69         | 0.00         |
| <b>TOTALS</b>          |       |       | <b>-20.00</b> | <b>-10.25</b>   |                 | <b>-205.00</b> | <b>0.00</b>  |
| FLOOD SIDE             |       |       | -7.43         | -16.86          |                 | -125.22        | 0.00         |
| PROT. SIDE             |       |       | -12.57        | -6.34           |                 | -79.78         | 0.00         |
|                        |       |       | KIPS          |                 |                 | FT.-K          | FT.-K        |

WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 3 T - WALL ALTERNATIVE - FINAL  
CASE 3 - CANAL AT TOP OF WALL

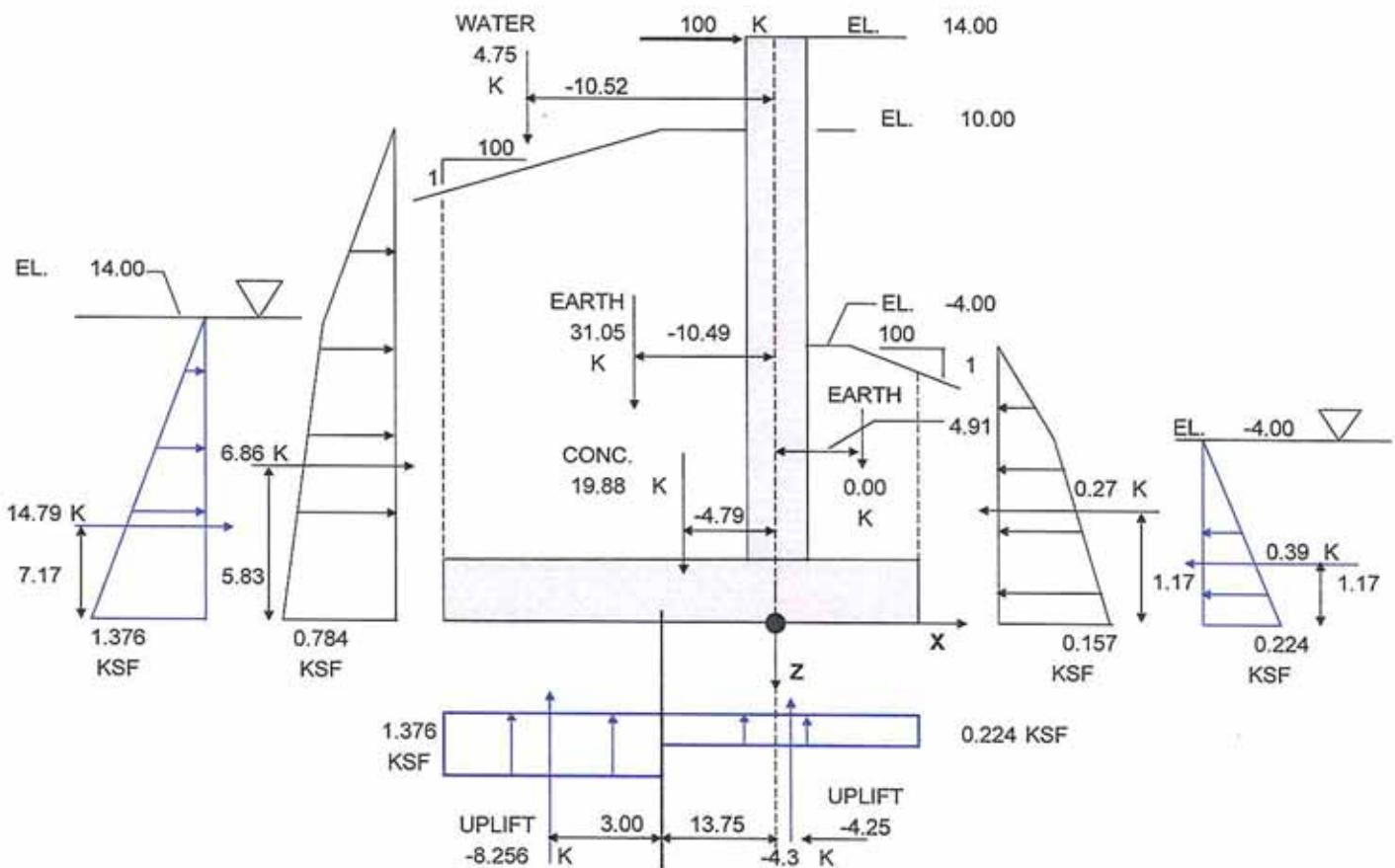


FLOODWALL HORIZONTAL LOADING - CASE 3

| ITEM              | HEIGHT | PRESS | FORCE X |      | Y CENT. FEET | Z CENT. FEET | Mzz FT-K/FT | Myy FT-K/FT |
|-------------------|--------|-------|---------|------|--------------|--------------|-------------|-------------|
| <b>FLOODSIDE:</b> |        |       |         |      |              |              |             |             |
| EARTH 1           | 0.00   | 0.000 | 0.00    | k/ft | 0.00         | 0.00         | 0           | 0.0         |
| EARTH 2           | 17.50  | 0.000 | 0.00    | k/ft | 0.00         | 0.00         | 0           | 0.0         |
| EARTH 3           | 17.50  | 0.784 | 6.86    | k/ft | 0.00         | -5.83        | 0           | -40.0       |
| GRND WATER        | 21.50  | 1.376 | 14.79   | k/ft | 0.00         | -7.17        | 0           | -106.0      |
| <b>PROTECTED:</b> |        |       |         |      |              |              |             |             |
| EARTH 4           | 0.00   | 0.000 | 0.00    | k/ft | 0.00         | -3.50        | 0           | 0.0         |
| EARTH 5           | 3.50   | 0.000 | 0.00    | k/ft | 0.00         | -1.75        | 0           | 0.0         |
| EARTH 6           | 3.50   | 0.157 | -0.27   | k/ft | 0.00         | -1.17        | 0           | 0.3         |
| GRND WATER        | 3.50   | 0.224 | -0.39   | k/ft | 0.00         | -1.17        | 0           | 0.5         |

|                        | FORCE X | Y CENT. FEET | Z CENT. FEET | Mzz FT-K/FT. | Myy FT-K/FT. |
|------------------------|---------|--------------|--------------|--------------|--------------|
| FLOODSIDE EARTH FORCE  | 6.86    | 0.00         | -5.83        |              | -40.0167     |
| FLOODSIDE WATER FORCE  | 14.79   | 0.00         | -7.17        |              | -106.009     |
| TOTAL FLOODSIDE FORCE  | 21.65   | k/ft         | 0.00         | -6.74        | 0.0          |
|                        |         |              |              |              | -146.0       |
| PROT. SIDE EARTH FORCE | -0.27   | 0.00         | -1.17        |              | 0.3          |
| PROT. SIDE WATER FORCE | -0.39   | 0.00         | -1.17        |              | 0.5          |
| TOTAL PROT. SIDE FORCE | -0.67   | k/ft         | 0.00         | -1.17        | 0.0          |
|                        |         |              |              |              | 0.8          |
| TOTAL NET HORIZ. FORCE | 20.99   | k/ft         | 0.00         | -6.92        | 0.0          |
|                        |         |              |              |              | -145.2       |

**WEST BANK & VICINITY - ALGIERS CANAL WEST**  
**REACH 3 T - WALL ALTERNATIVE - FINAL**  
**CASE 3 - CANAL AT TOP OF WALL**



LOADING SUMMARY - CASE 3 WITH MINIMUM UPLIFT

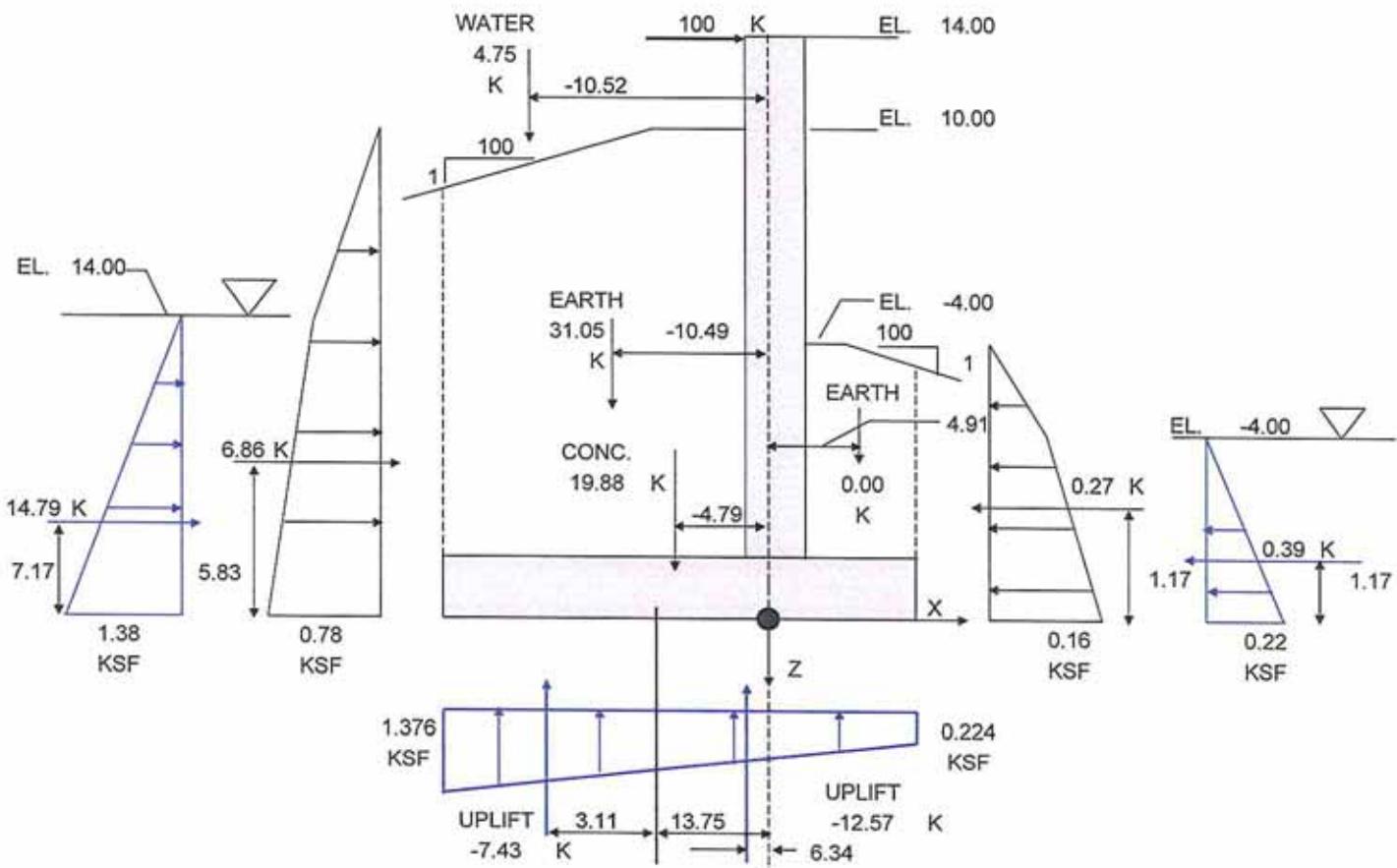
| ITEM            | FORCE X | FORCE Y | FORCE Z   | X CENT. FEET | Z CENT. FEET | Myy FT-K/FT | Mzz FT-K/FT |
|-----------------|---------|---------|-----------|--------------|--------------|-------------|-------------|
| CONCRETE        | 0.0     | 0.0     | 19.9 k/ft | -4.79        | 0.00         | 95          | 0           |
| FLDSIDE FILL    | 0.0     | 0.0     | 31.1 k/ft | -10.49       | 0.00         | 326         | 0           |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.0 k/ft  | 4.91         | 0.00         | 0           | 0           |
| F.SIDE WATER    | 0.0     | 0.0     | 4.7 k/ft  | -10.52       | 0.00         | 50          | 0           |
| F. SIDE UPLIFT  | 0.0     | 0.0     | -8.3 k/ft | -16.75       | 0.00         | -138        | 0           |
| P. SIDE UPLIFT  | 0.0     | 0.0     | -4.3 k/ft | -4.25        | 0.00         | -18         | 0           |
| F. S. EARTH Pr. | 6.9     | 0.0     | 0.0 k/ft  | -            | -5.83        | -40         | 0           |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0 k/ft  | -            | -1.17        | 0           | 0           |
| F. S. WATER Pr. | 14.8    | 0.0     | 0.0 k/ft  | -            | -7.17        | -106        | 0           |
| P. S. WATER Pr. | -0.4    | 0.0     | 0.0 k/ft  | -            | -1.17        | 0           | 0           |

SUM M  
314.64

SUM M  
-145.57

|                 | X      | Y   | Z      | Mxx | Myy    | Mzz |
|-----------------|--------|-----|--------|-----|--------|-----|
| TOTALS          | 21.3   | 0.0 | 43.2   | 0   | 169    | 0   |
| MONO. TOTAL     | 1275.6 | 0.0 | 2590.0 | 0   | 10144  | 0   |
| IMPACT (CASE 9) | 100.0  |     |        |     | -2150  |     |
| TOTAL CASE 9    | 1375.6 | 0.0 | 2590.0 | 0.0 | 7994.5 | 0.0 |

WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 3 T - WALL ALTERNATIVE - FINAL  
CASE 3 - CANAL AT TOP OF WALL



LOADING SUMMARY - CASE 3 WITH MAXIMUM UPLIFT

| 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     | 19.9    | k/ft | -4.79        | 0.00         | 95          | 0           |
| FLDSIDE FILL    | 0.0     | 0.0     | 31.1    | k/ft | -10.49       | 0.00         | 326         | 0           |
| PROTSIDE FILL   | 0.0     | 0.0     | 0.0     | k/ft | 4.91         | 0.00         | 0           | 0           |
| F.SIDE WATER    | 0.0     | 0.0     | 4.7     | k/ft | -10.52       | 0.00         | 50          | 0           |
| F. SIDE UPLIFT  | 0.0     | 0.0     | -7.4    | k/ft | -16.86       | 0.00         | -125        | 0           |
| P. SIDE UPLIFT  | 0.0     | 0.0     | -12.6   | k/ft | -6.34        | 0.00         | -80         | 0           |
| F. S. EARTH Pr. | 6.9     | 0.0     | 0.0     | k/ft | -            | -5.83        | -40         | 0           |
| P. S. EARTH Pr. | 0.0     | 0.0     | 0.0     | k/ft | -            | -1.17        | 0           | 0           |
| F. S. WATER Pr. | 14.8    | 0.0     | 0.0     | k/ft | -            | -7.17        | -106        | 0           |
| P. S. WATER Pr. | -0.4    | 0.0     | 0.0     | k/ft | -            | -1.17        | 0           | 0           |

SUM M  
266.02

SUM M  
-145.57

|                  | X      | Y   | Z      | Mxx | Myy     | Mzz   |
|------------------|--------|-----|--------|-----|---------|-------|
| TOTALS           | 21.3   | 0.0 | 35.7   | 0   | 120     | 0     |
| MONO. TOTAL      | 1275.6 | 0.0 | 2140.7 | 0   | 7227    | 0     |
| IMPACT (CASE 10) | 100.0  |     |        |     | -2150.0 |       |
| TOTAL CASE 10    | 1375.6 | 0.0 | 2140.7 | 0.0 | 5077.0  | 0.0   |
| VERTICAL         |        |     | 2141   |     | -7.46   |       |
| HORIZ            |        |     | 1276   |     |         | -6.85 |

**WEST BANK & VICINITY - ALGIERS CANAL WEST  
REACH 3 T - WALL ALTERNATIVE - FINAL**

| LOAD CASE | LOAD CONDITION                           | FDN OVERSTR ALLOWED | FOUNDATION LOADS |   |       | Myy | Mzz    |
|-----------|------------------------------------------|---------------------|------------------|---|-------|-----|--------|
|           |                                          |                     | X                | Y | Z     |     |        |
| 1         | CONSTRUCTION W / WIND                    | 1.166               | 946              | 0 | 3,051 | 0   | 19,390 |
| 1a        | CONST. W/ DRAG & SURCHARGE LDS           | 1.166               | 882              | 0 | 3,452 | 0   | 25,958 |
| Not Used  | CANAL @ STILLWATER ( EL. 11.6 )          | 1.000               | 1,045            | 0 | 2,446 | 0   | 11,373 |
|           | MINIMUM UPLIFT                           | 1.000               | 1,045            | 0 | 2,072 | 0   | 8,942  |
| Not Used  | MAXIMUM UPLIFT                           | 1.000               | 1,381            | 0 | 2,446 | 0   | 11,373 |
|           | CANAL @ STILLWATER ( EL. 11.6 )          | 1.000               | 1,381            | 0 | 2,446 | 0   | 11,373 |
| 2a        | MIN. UPLIFT, UNBAL. LOAD                 | 1.000               | 1,381            | 0 | 2,072 | 0   | 8,942  |
|           | CANAL @ STILLWATER ( EL. 11.6 )          | 1.000               | 1,381            | 0 | 2,446 | 0   | 9,223  |
| 2b        | MAX. UPLIFT, UNBAL. LOAD                 | 1.000               | 1,381            | 0 | 2,072 | 0   | 8,942  |
|           | CANAL @ STILLWATER ( EL. 11.6 )          | 1.333               | 1,481            | 0 | 2,446 | 0   | 9,223  |
| 2c        | MIN. UPLIFT, UNBAL. LOAD; IMPACT         | 1.333               | 1,481            | 0 | 2,072 | 0   | 6,792  |
|           | CANAL @ STILLWATER ( EL. 11.6 )          | 1.333               | 1,424            | 0 | 2,446 | 0   | 10,542 |
| 2d        | MAX. UPLIFT, UNBAL. LOAD; IMPACT         | 1.333               | 1,424            | 0 | 2,072 | 0   | 8,111  |
|           | CANAL @ STILLWATER ( EL. 11.6 )          | 1.333               | 1,424            | 0 | 2,446 | 0   | 8,392  |
| 3a        | MIN. UPLIFT, UNBAL. & WAVE LOADS         | 1.500               | 1,524            | 0 | 2,446 | 0   | 8,392  |
|           | CANAL @ STILLWATER ( EL. 11.6 )          | 1.500               | 1,524            | 0 | 2,072 | 0   | 5,961  |
| 3b        | MAX. UPLIFT, UNBAL. & WAVE LOADS         | 1.500               | 1,524            | 0 | 2,446 | 0   | 10,144 |
|           | CANAL @ STILLWATER ( EL. 11.6 )          | 1.500               | 1,524            | 0 | 2,072 | 0   | 0      |
| 4a        | MIN. UL - UNBAL. LD., WAVE & IMPACT      | 1.500               | 1,524            | 0 | 2,446 | 0   | 8,392  |
|           | CANAL @ STILLWATER ( EL. 11.6 )          | 1.500               | 1,524            | 0 | 2,072 | 0   | 0      |
| 4b        | MAX. UL - UNBAL. LD., WAVE & IMPACT      | 1.500               | 1,524            | 0 | 2,446 | 0   | 8,392  |
|           | CANAL @ TOP OF WALL ( EL. 14.0 )         | N/A                 | 1,276            | 0 | 2,590 | 0   | 0      |
| Not Used  | MINIMUM UPLIFT                           | N/A                 | 1,276            | 0 | 2,590 | 0   | 10,144 |
|           | CANAL @ TOP OF WALL ( EL. 14.0 )         | N/A                 | 1,276            | 0 | 2,141 | 0   | 7,227  |
| (DC A)    | MAXIMUM UPLIFT                           | N/A                 | 1,276            | 0 | 2,141 | 0   | 0      |
|           | CANAL @ TOP OF WALL ( EL. 14.0 )         | 1.500               | 1,852            | 0 | 2,590 | 0   | 10,144 |
| (DC B)    | MIN. UPLIFT, UNBAL. LOAD                 | 1.500               | 1,852            | 0 | 2,141 | 0   | 7,227  |
|           | CANAL @ TOP OF WALL ( EL. 14.0 )         | 1.500               | 1,852            | 0 | 2,590 | 0   | 0      |
| (DC C)    | MAX. UPLIFT, UNBAL. LOAD                 | 1.500               | 1,852            | 0 | 2,141 | 0   | 7,227  |
|           | CANAL @ TOP OF WALL ( EL. 14.0 )         | 1.666               | 1,952            | 0 | 2,590 | 0   | 7,994  |
| (DC D)    | MIN. UPLIFT - W / WO UNBAL. LD. + IMPACT | 1.666               | 1,952            | 0 | 2,141 | 0   | 0      |
|           | CANAL @ TOP OF WALL ( EL. 14.0 )         | 1.666               | 1,952            | 0 | 2,072 | 0   | 5,077  |

SHEETPILE ANCHOR FORCE ANALYSIS  
 (PER URS MATHCAD SPREADSHEET)  
 ALGIERS TWALL REACH 3

|                                                        |                                  |                                                |                              |
|--------------------------------------------------------|----------------------------------|------------------------------------------------|------------------------------|
| GROUND SURFACE ELEVATION                               | 10.0                             |                                                |                              |
| TWALL BASE EL. (BASE)                                  | -7.5                             |                                                |                              |
| COHESION - C                                           | 300                              | PSF                                            |                              |
| EFF. GRADE (EG) FOR NO UNBALANCED LDS.                 | -61.5                            |                                                |                              |
| CURRENT FAILURE SURFACE EL. (CFS)                      | -52.5                            |                                                |                              |
| COMPUTED UNBALANCED LOAD                               | 22,000                           | #/FT                                           |                              |
| (BASE - CFS)                                           | 45                               |                                                |                              |
| PRESSURE FROM UNBALANCED LD. (P)                       | 352.0                            | PSF                                            |                              |
| P*(BASE-CFS)                                           | 15840.0                          |                                                |                              |
| TR1 = 4C/1.5                                           | 800.0                            | PSF                                            |                              |
| TR2 = 4C/1.0                                           | 1,200                            | PSF                                            |                              |
| A = TR2                                                | 1,200                            |                                                |                              |
| B = -2*TR2*BASE                                        | 18,000                           |                                                |                              |
| C                                                      | C1<br>1,107,000<br>2*TR2*EG*BASE | C2<br>-4,538,700<br>P*(BASE-CFS)^2<br>TR2*EG^2 | C3<br>-712,800<br>-4,144,500 |
| (B^2-4AC)^0.5                                          | 142,189                          |                                                |                              |
| TE2 (REQ'D RESIST PRESSURE DEPTH)                      | -66.75                           |                                                |                              |
| Required Anchor Force<br>(P*(BASE-CFS) - TR2*(EG-TE2)) | <u>9545.70</u>                   | #                                              |                              |

1000 ALGIERS CANAL WEST - REACH 3 - ANCH=9.6 PIPE PILES  
1010 PROP 29000 2549 2549 36.9 1.8 0 ALL  
1030 SOIL ES 0.025 L 100.0 0 1 TO 27  
1035 SOIL ES 0.040 L 100.0 0 28 TO 36  
1060 ALLOW R 120. 74. 831. 831. 5311. 5311. ALL  
1070 PIN ALL  
1100 PILE 1 -16.75 -27.0 0.  
1110 ROW Y 9 1 8 AT 6.75  
1150 PILE 10 -11.75 -27.0 0.  
1155 ROW Y 9 10 8 AT 6.75  
1160 PILE 19 -5.25 -27.0 0.  
1165 ROW Y 9 19 8 AT 6.75  
1170 PILE 28 2.0 -27.0 0.  
1175 ROW Y 9 28 8 AT 6.75  
1215 BATTER 2.0 1 TO 9  
1216 BATTER 2.0 10 TO 36  
1230 ANGLE 180 1 TO 9  
1240 ANGLE 0 10 TO 36  
1340 LOA 1 950 0 3050 0 19400 0  
1345 LOA 2 880 0 3450 0 25960 0  
1350 LOA 3 1380 0 2450 0 11380 0  
1355 LOA 4 1380 0 2070 0 8950 0  
1357 LOA 7 1425 0 2450 0 10550 0  
1359 LOA 8 1425 0 2070 0 8110 0  
1380 LOA 11 1850 0 2590 0 10140 0  
1385 LOA 12 1850 0 2140 0 7230 0  
1390 LOA 13 1950 0 2590 0 8000 0  
1395 LOA 14 1950 0 2140 0 5080 0  
1500 TOUT 1 2 4 5  
1510 FOUT 1 2 4 5 A3FINAL.OUT  
1530 PFO 1 9 10 18 19 27 28 36

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\* CORPS PROGRAM # X0080 \* CPGA - CASE PILE GROUP ANALYSIS PROGRAM  
\* VERSION NUMBER # 1993/03/29 \* RUN DATE 26-JUL-2008 RUN TIME 12.21.54  
\*\*\*\*\*

ALGIERS CANAL WEST - REACH 3 - ANCH=9.6 PIPE PILES

FILE: A3FINAL.OUT

THERE ARE 36 PILES AND  
10 LOAD CASES IN THIS RUN.

ALL PILE COORDINATES ARE CONTAINED WITHIN A BOX

|                               | X        | Y        | Z     |
|-------------------------------|----------|----------|-------|
| WITH DIAGONAL COORDINATES = ( | -16.75 , | -27.00 , | .00 ) |
|                               | ( 2.00 , | 27.00 ,  | .00 ) |

\*\*\*\*\*

PILE PROPERTIES AS INPUT

|            |            |            |            |            |            |
|------------|------------|------------|------------|------------|------------|
| E          | I1         | I2         | A          | C33        | B66        |
| KSI        | IN**4      | IN**4      | IN**2      |            |            |
| .29000E+05 | .25490E+04 | .25490E+04 | .36900E+02 | .18000E+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 |  |
| .25000E-01 | L       | .10000E+03 | .00000E+00 |    |  |

THIS SOIL DESCRIPTION APPLIES TO THE FOLLOWING PILES -

|    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |    |    |    |    |    |

|            |         |            |            |    |  |
|------------|---------|------------|------------|----|--|
| ES         | ESOIL   | LENGTH     | L          | LU |  |
|            | K/IN**2 |            | FT         | FT |  |
| .40000E-01 | L       | .10000E+03 | .00000E+00 |    |  |

THIS SOIL DESCRIPTION APPLIES TO THE FOLLOWING PILES -

|    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|
| 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
|----|----|----|----|----|----|----|----|----|

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PILE GEOMETRY AS INPUT AND/OR GENERATED

| NUM | X<br>FT | Y<br>FT | Z<br>FT | BATTER | ANGLE  | LENGTH<br>FT | FIXITY |
|-----|---------|---------|---------|--------|--------|--------------|--------|
| 1   | -16.75  | -27.00  | .00     | 2.00   | 180.00 | 100.00       | P      |
| 2   | -16.75  | -20.25  | .00     | 2.00   | 180.00 | 100.00       | P      |
| 3   | -16.75  | -13.50  | .00     | 2.00   | 180.00 | 100.00       | P      |
| 4   | -16.75  | -6.75   | .00     | 2.00   | 180.00 | 100.00       | P      |
| 5   | -16.75  | .00     | .00     | 2.00   | 180.00 | 100.00       | P      |
| 6   | -16.75  | 6.75    | .00     | 2.00   | 180.00 | 100.00       | P      |
| 7   | -16.75  | 13.50   | .00     | 2.00   | 180.00 | 100.00       | P      |
| 8   | -16.75  | 20.25   | .00     | 2.00   | 180.00 | 100.00       | P      |
| 9   | -16.75  | 27.00   | .00     | 2.00   | 180.00 | 100.00       | P      |
| 10  | -11.75  | -27.00  | .00     | 2.00   | .00    | 100.00       | P      |
| 11  | -11.75  | -20.25  | .00     | 2.00   | .00    | 100.00       | P      |
| 12  | -11.75  | -13.50  | .00     | 2.00   | .00    | 100.00       | P      |
| 13  | -11.75  | -6.75   | .00     | 2.00   | .00    | 100.00       | P      |
| 14  | -11.75  | .00     | .00     | 2.00   | .00    | 100.00       | P      |
| 15  | -11.75  | 6.75    | .00     | 2.00   | .00    | 100.00       | P      |
| 16  | -11.75  | 13.50   | .00     | 2.00   | .00    | 100.00       | P      |
| 17  | -11.75  | 20.25   | .00     | 2.00   | .00    | 100.00       | P      |
| 18  | -11.75  | 27.00   | .00     | 2.00   | .00    | 100.00       | P      |
| 19  | -5.25   | -27.00  | .00     | 2.00   | .00    | 100.00       | P      |
| 20  | -5.25   | -20.25  | .00     | 2.00   | .00    | 100.00       | P      |
| 21  | -5.25   | -13.50  | .00     | 2.00   | .00    | 100.00       | P      |
| 22  | -5.25   | -6.75   | .00     | 2.00   | .00    | 100.00       | P      |
| 23  | -5.25   | .00     | .00     | 2.00   | .00    | 100.00       | P      |
| 24  | -5.25   | 6.75    | .00     | 2.00   | .00    | 100.00       | P      |
| 25  | -5.25   | 13.50   | .00     | 2.00   | .00    | 100.00       | P      |
| 26  | -5.25   | 20.25   | .00     | 2.00   | .00    | 100.00       | P      |
| 27  | -5.25   | 27.00   | .00     | 2.00   | .00    | 100.00       | P      |
| 28  | 2.00    | -27.00  | .00     | 2.00   | .00    | 100.00       | P      |
| 29  | 2.00    | -20.25  | .00     | 2.00   | .00    | 100.00       | P      |
| 30  | 2.00    | -13.50  | .00     | 2.00   | .00    | 100.00       | P      |
| 31  | 2.00    | -6.75   | .00     | 2.00   | .00    | 100.00       | P      |
| 32  | 2.00    | .00     | .00     | 2.00   | .00    | 100.00       | P      |
| 33  | 2.00    | 6.75    | .00     | 2.00   | .00    | 100.00       | P      |
| 34  | 2.00    | 13.50   | .00     | 2.00   | .00    | 100.00       | P      |
| 35  | 2.00    | 20.25   | .00     | 2.00   | .00    | 100.00       | P      |
| 36  | 2.00    | 27.00   | .00     | 2.00   | .00    | 100.00       | P      |
|     |         |         |         |        |        | -----        |        |
|     |         |         |         |        |        | 3600.00      |        |

\*\*\*\*\*  
APPLIED LOADS

| LOAD<br>CASE | PX<br>K | PY<br>K | PZ<br>K | MX<br>FT-K | MY<br>FT-K | MZ<br>FT-K |
|--------------|---------|---------|---------|------------|------------|------------|
| 1            | 950.0   | .0      | 3050.0  | .0         | 19400.0    | .0         |
| 2            | 880.0   | .0      | 3450.0  | .0         | 25960.0    | .0         |
| 3            | 1380.0  | .0      | 2450.0  | .0         | 11380.0    | .0         |
| 4            | 1380.0  | .0      | 2070.0  | .0         | 8950.0     | .0         |
| 7            | 1425.0  | .0      | 2450.0  | .0         | 10550.0    | .0         |
| 8            | 1425.0  | .0      | 2070.0  | .0         | 8110.0     | .0         |
| 11           | 1850.0  | .0      | 2590.0  | .0         | 10140.0    | .0         |
| 12           | 1850.0  | .0      | 2140.0  | .0         | 7230.0     | .0         |
| 13           | 1950.0  | .0      | 2590.0  | .0         | 8000.0     | .0         |
| 14           | 1950.0  | .0      | 2140.0  | .0         | 5080.0     | .0         |

|           |                          |                                  |    |
|-----------|--------------------------|----------------------------------|----|
| LOAD CASE | 1. NUMBER OF FAILURES =  | 9. 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 =  | 9. |
| LOAD CASE | 4. NUMBER OF FAILURES =  | 9. NUMBER OF PILES IN TENSION =  | 9. |
| LOAD CASE | 7. NUMBER OF FAILURES =  | 0. NUMBER OF PILES IN TENSION =  | 9. |
| LOAD CASE | 8. NUMBER OF FAILURES =  | 0. NUMBER OF PILES IN TENSION =  | 9. |
| LOAD CASE | 11. NUMBER OF FAILURES = | 18. NUMBER OF PILES IN TENSION = | 9. |
| LOAD CASE | 12. NUMBER OF FAILURES = | 27. NUMBER OF PILES IN TENSION = | 9. |
| LOAD CASE | 13. NUMBER OF FAILURES = | 27. NUMBER OF PILES IN TENSION = | 9. |
| LOAD CASE | 14. NUMBER OF FAILURES = | 27. NUMBER OF PILES IN TENSION = | 9. |

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#### PILE CAP DISPLACEMENTS

| LOAD<br>CASE | DX<br>IN   | DY<br>IN   | DZ<br>IN   | RX<br>RAD  | RY<br>RAD  | RZ<br>RAD  |
|--------------|------------|------------|------------|------------|------------|------------|
| 1            | -.5206E-02 | .1508E-06  | .8570E-01  | -.1873E-11 | -.1940E-03 | -.7521E-11 |
| 2            | -.9759E-02 | .2221E-06  | .8536E-01  | -.2758E-11 | -.8772E-04 | -.1107E-10 |
| 3            | .9545E-01  | -.3759E-07 | .2356E-01  | .4669E-12  | .5906E-04  | .1875E-11  |
| 4            | .1233E+00  | -.8642E-07 | -.3433E-02 | .1073E-11  | .1833E-03  | .4310E-11  |
| 7            | .9736E-01  | -.4944E-07 | .2529E-01  | .6141E-12  | .3592E-04  | .2466E-11  |
| 8            | .1251E+00  | -.9827E-07 | -.1607E-02 | .1221E-11  | .1594E-03  | .4901E-11  |
| 11           | .1720E+00  | -.1400E-06 | -.1125E-01 | .1739E-11  | .2562E-03  | .6981E-11  |
| 12           | .2047E+00  | -.1978E-06 | -.4291E-01 | .2457E-11  | .4009E-03  | .9866E-11  |
| 13           | .1732E+00  | -.1665E-06 | -.4568E-02 | .2068E-11  | .1828E-03  | .8302E-11  |
| 14           | .2058E+00  | -.2243E-06 | -.3613E-01 | .2786E-11  | .3268E-03  | .1119E-10  |

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#### 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 CONSTRUCTION WITH WIND

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF  | CBF |
|------|---------|---------|---------|------------|------------|------------|------|-----|
| 1    | -.1     | .0      | 70.8    | .0         | 7.1        | .0         | .59  | .09 |
| 9    | -.1     | .0      | 70.8    | .0         | 7.1        | .0         | .59  | .09 |
| 10   | -.1     | .0      | 80.0    | .0         | 13.5       | .0         | .67  | .10 |
| 18   | -.1     | .0      | 80.0    | .0         | 13.5       | .0         | .67  | .10 |
| 19   | -.2     | .0      | 101.8   | .0         | 16.4       | .0         | .85  | .13 |
| 27   | -.2     | .0      | 101.8   | .0         | 16.4       | .0         | .85  | .13 |
| 28   | -.3     | .0      | 126.0   | .0         | 25.0       | .0         | 1.05 | .16 |
| 36   | -.3     | .0      | 126.0   | .0         | 25.0       | .0         | 1.05 | .16 |

## LOAD CASE - 2 CONSTRUCTION WITH SURCHARGE

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF | CBF |
|------|---------|---------|---------|------------|------------|------------|-----|-----|
| 1    | -.1     | .0      | 104.2   | .0         | 9.4        | .0         | .87 | .13 |
| 9    | -.1     | .0      | 104.2   | .0         | 9.4        | .0         | .87 | .13 |
| 10   | -.2     | .0      | 97.8    | .0         | 18.1       | .0         | .81 | .12 |
| 18   | -.2     | .0      | 97.8    | .0         | 18.1       | .0         | .81 | .12 |
| 19   | -.2     | .0      | 107.6   | .0         | 19.4       | .0         | .90 | .13 |
| 27   | -.2     | .0      | 107.6   | .0         | 19.4       | .0         | .90 | .13 |
| 28   | -.3     | .0      | 118.6   | .0         | 26.5       | .0         | .99 | .15 |
| 36   | -.3     | .0      | 118.6   | .0         | 26.5       | .0         | .99 | .15 |

## LOAD CASE - 3 STILLWATER WITH UNBALANCED - NO SEEPAGE

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF | CBF |
|------|---------|---------|---------|------------|------------|------------|-----|-----|
| 1    | -.4     | .0      | -17.6   | .0         | 44.3       | .0         | .24 | .03 |
| 9    | -.4     | .0      | -17.6   | .0         | 44.3       | .0         | .24 | .03 |
| 10   | .3      | .0      | 114.3   | .0         | -31.1      | .0         | .95 | .14 |
| 18   | .3      | .0      | 114.3   | .0         | -31.1      | .0         | .95 | .14 |
| 19   | .3      | .0      | 107.7   | .0         | -32.0      | .0         | .90 | .14 |
| 27   | .3      | .0      | 107.7   | .0         | -32.0      | .0         | .90 | .14 |
| 28   | .4      | .0      | 100.3   | .0         | -41.8      | .0         | .84 | .13 |
| 36   | .4      | .0      | 100.3   | .0         | -41.8      | .0         | .84 | .13 |

## LOAD CASE - 4 STILLWATER WITH UNBALANCED - SEEPAGE

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF  | CBF |
|------|---------|---------|---------|------------|------------|------------|------|-----|
| 1    | -.5     | .0      | -40.6   | .0         | 54.8       | .0         | .55  | .06 |
| 9    | -.5     | .0      | -40.6   | .0         | 54.8       | .0         | .55  | .06 |
| 10   | .4      | .0      | 120.7   | .0         | -43.9      | .0         | 1.01 | .15 |
| 18   | .4      | .0      | 120.7   | .0         | -43.9      | .0         | 1.01 | .15 |
| 19   | .4      | .0      | 100.2   | .0         | -46.7      | .0         | .83  | .13 |
| 27   | .4      | .0      | 100.2   | .0         | -46.7      | .0         | .83  | .13 |
| 28   | .7      | .0      | 77.3    | .0         | -63.0      | .0         | .64  | .10 |
| 36   | .7      | .0      | 77.3    | .0         | -63.0      | .0         | .64  | .10 |

## LOAD CASE - 7 STILLWATER WITH WAVE &amp; UNBALANCED - NO SEEPAGE

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF | CBF |
|------|---------|---------|---------|------------|------------|------------|-----|-----|
| 1    | -.4     | .0      | -23.2   | .0         | 44.5       | .0         | .31 | .04 |
| 9    | -.4     | .0      | -23.2   | .0         | 44.5       | .0         | .31 | .04 |
| 10   | .3      | .0      | 113.5   | .0         | -32.2      | .0         | .95 | .14 |
| 18   | .3      | .0      | 113.5   | .0         | -32.2      | .0         | .95 | .14 |
| 19   | .3      | .0      | 109.4   | .0         | -32.7      | .0         | .91 | .14 |
| 27   | .3      | .0      | 109.4   | .0         | -32.7      | .0         | .91 | .14 |
| 28   | .4      | .0      | 105.0   | .0         | -42.2      | .0         | .87 | .13 |
| 36   | .4      | .0      | 105.0   | .0         | -42.2      | .0         | .87 | .13 |

## LOAD CASE - 8 STILLWATER WITH WAVE &amp; UNBALANCED - SEEPAGE

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF  | CBF |
|------|---------|---------|---------|------------|------------|------------|------|-----|
| 1    | -.5     | .0      | -46.1   | .0         | 55.0       | .0         | .62  | .07 |
| 9    | -.5     | .0      | -46.1   | .0         | 55.0       | .0         | .62  | .07 |
| 10   | .4      | .0      | 119.8   | .0         | -44.9      | .0         | 1.00 | .15 |
| 18   | .4      | .0      | 119.8   | .0         | -44.9      | .0         | 1.00 | .15 |
| 19   | .4      | .0      | 102.0   | .0         | -47.3      | .0         | .85  | .13 |
| 27   | .4      | .0      | 102.0   | .0         | -47.3      | .0         | .85  | .13 |
| 28   | .7      | .0      | 82.0    | .0         | -63.3      | .0         | .68  | .11 |
| 36   | .7      | .0      | 82.0    | .0         | -63.3      | .0         | .68  | .11 |

## LOAD CASE - 11 TOW WITH UNBALANCED - NO SEEPAGE

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF  | CBF |
|------|---------|---------|---------|------------|------------|------------|------|-----|
| 1    | -.7     | .0      | -65.7   | .0         | 75.2       | .0         | .89  | .09 |
| 9    | -.7     | .0      | -65.7   | .0         | 75.2       | .0         | .89  | .09 |
| 10   | .6      | .0      | 159.2   | .0         | -62.5      | .0         | 1.33 | .20 |
| 18   | .6      | .0      | 159.2   | .0         | -62.5      | .0         | 1.33 | .20 |
| 19   | .6      | .0      | 130.5   | .0         | -66.4      | .0         | 1.09 | .17 |
| 27   | .6      | .0      | 130.5   | .0         | -66.4      | .0         | 1.09 | .17 |
| 28   | .9      | .0      | 98.5    | .0         | -89.5      | .0         | .82  | .14 |
| 36   | .9      | .0      | 98.5    | .0         | -89.5      | .0         | .82  | .14 |

## LOAD CASE - 12 TOW WITH UNBALANCED - SEEPAGE

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF  | CBF |
|------|---------|---------|---------|------------|------------|------------|------|-----|
| 1    | -.8     | .0      | -92.9   | .0         | 87.5       | .0         | 1.25 | .13 |
| 9    | -.8     | .0      | -92.9   | .0         | 87.5       | .0         | 1.25 | .13 |
| 10   | .7      | .0      | 166.5   | .0         | -77.5      | .0         | 1.39 | .21 |
| 18   | .7      | .0      | 166.5   | .0         | -77.5      | .0         | 1.39 | .21 |
| 19   | .8      | .0      | 121.6   | .0         | -83.6      | .0         | 1.01 | .16 |
| 27   | .8      | .0      | 121.6   | .0         | -83.6      | .0         | 1.01 | .16 |
| 28   | 1.2     | .0      | 71.5    | .0         | -114.4     | .0         | .60  | .11 |
| 36   | 1.2     | .0      | 71.5    | .0         | -114.4     | .0         | .60  | .11 |

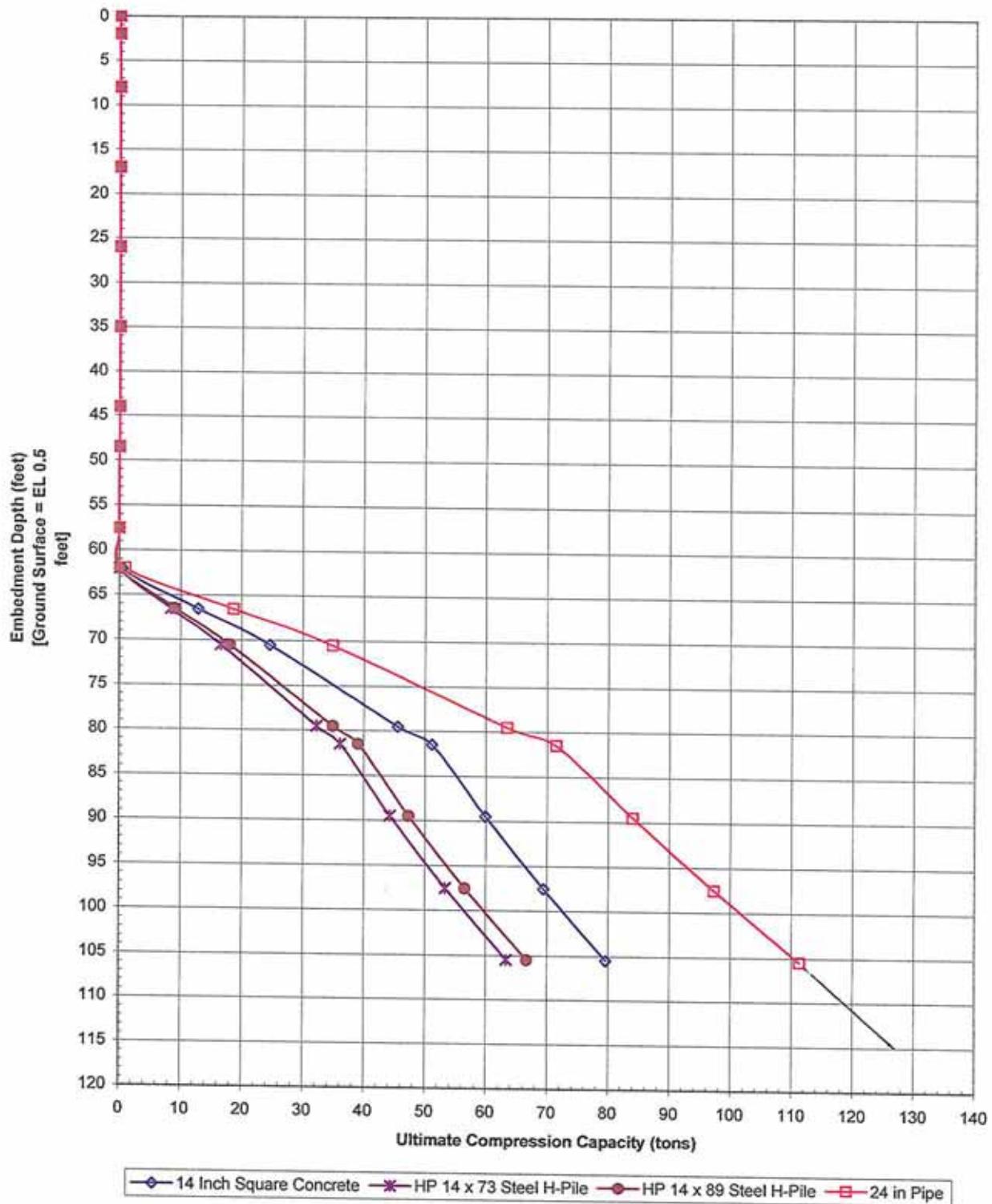
## LOAD CASE - 13 TOW WITH IMPACT &amp; UNBALANCED - NO SEEPAGE

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF  | CBF |   |
|------|---------|---------|---------|------------|------------|------------|------|-----|---|
| 1    | -.7     | .0      | -78.1   | .0         | 74.1       | .0         | 1.06 | .11 | * |
| 9    | -.7     | .0      | -78.1   | .0         | 74.1       | .0         | 1.06 | .11 | * |
| 10   | .6      | .0      | 154.8   | .0         | -63.7      | .0         | 1.29 | .20 | * |
| 18   | .6      | .0      | 154.8   | .0         | -63.7      | .0         | 1.29 | .20 | * |
| 19   | .6      | .0      | 134.3   | .0         | -66.5      | .0         | 1.12 | .17 | * |
| 27   | .6      | .0      | 134.3   | .0         | -66.5      | .0         | 1.12 | .17 | * |
| 28   | .9      | .0      | 111.5   | .0         | -88.0      | .0         | .93  | .15 |   |
| 36   | .9      | .0      | 111.5   | .0         | -88.0      | .0         | .93  | .15 |   |

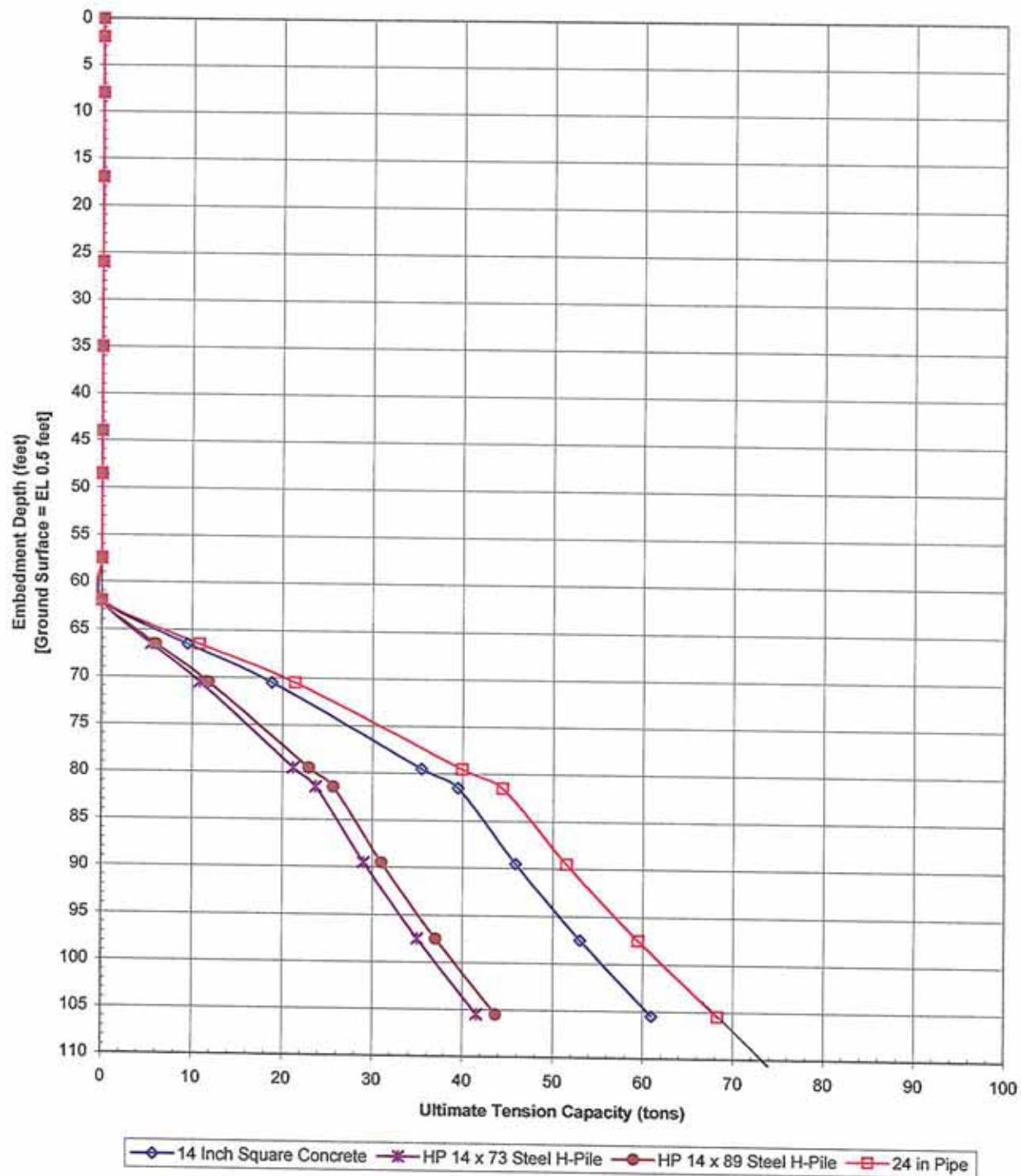
## LOAD CASE - 14 TOW WITH IMPACT &amp; UNBALANCED - SEEPAGE

| PILE | F1<br>K | F2<br>K | F3<br>K | M1<br>IN-K | M2<br>IN-K | M3<br>IN-K | ALF  | CBF |   |
|------|---------|---------|---------|------------|------------|------------|------|-----|---|
| 1    | -.8     | .0      | -105.3  | .0         | 86.4       | .0         | 1.42 | .14 | * |
| 9    | -.8     | .0      | -105.3  | .0         | 86.4       | .0         | 1.42 | .14 | * |
| 10   | .7      | .0      | 162.0   | .0         | -78.6      | .0         | 1.35 | .21 | * |
| 18   | .7      | .0      | 162.0   | .0         | -78.6      | .0         | 1.35 | .21 | * |
| 19   | .8      | .0      | 125.4   | .0         | -83.6      | .0         | 1.05 | .17 | * |
| 27   | .8      | .0      | 125.4   | .0         | -83.6      | .0         | 1.05 | .17 | * |
| 28   | 1.2     | .0      | 84.6    | .0         | -112.8     | .0         | .71  | .12 |   |
| 36   | 1.2     | .0      | 84.6    | .0         | -112.8     | .0         | .71  | .12 |   |

Algiers West - Reach 3 Ultimate Compression Capacity (Q Condition)  
Considering Critical Slope Failure Surface = EL -61.5 feet

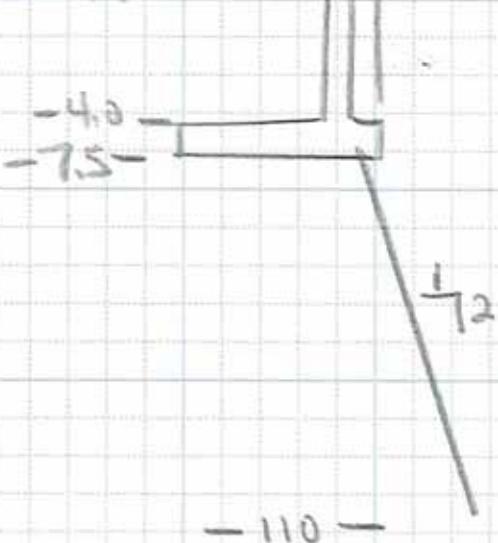


Algiers East - Reach 3 Ultimate Tension Capacity (Q Condition)  
Considering Critical Slope Failure Surface = EL -61.5 feet



Type 1 T-WALL

CALCULATE EASEMENT NEEDED DUE TO BATTER PILES.  
 +14.0 ← 5.25'



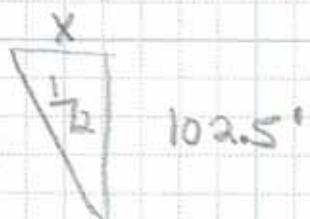
DIST From C/L WALL TO EDGE = 5.25'

DIST FROM EDGE TO C/L OF PIPE = 3.25'

PILE TIP = -110.0

Bottom of SLAB = -7.5

$$\Delta = 102.5'$$



$$X = 51.25'$$

o. DIST From C/L WALL To Farthest edge of batterpile,

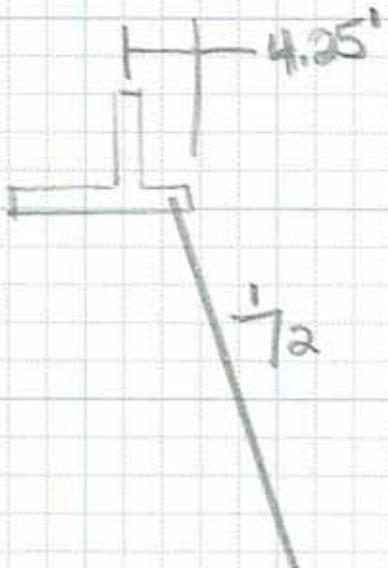
$$5.25' - 3.25' + 51.25' + \frac{2' \text{diameter}}{2}$$

$$= \underline{\underline{54.25'}}$$

Allow 10' for inaccuracies during construction

or say 65'-0",

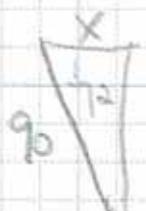
Type 2 T-wall



DIST From C/L WALL TO EDGE = 4.25'

DIST From EDGE To C/L of Pile = 2.75'

Pile Length 90'



$$X = 40.25$$

So DIST From C/L WALL TO FRESHEST  
edge of batter pile

(1/2 pile height)

$$4.25' - 2.75' + 40.25' + 0.58'$$

$$= \underline{\underline{42.33'}}$$

Allow 10' for inaccuracies during construction

or say 53'-0"

T-Wall

CROSS SECTION COORDINATES

Algiers West

| STATION | FILL<br>AREA | CUT<br>AREA | FILL<br>VOLUME | CUT<br>VOLUME |
|---------|--------------|-------------|----------------|---------------|
|         |              | -1          | -1             | -1            |
| 77110   | 36.432       | 0           | 0              | 0             |
| 77200   | 0            | 0           | 60.721         | 0             |
| 77400   | 364.015      | 0           | 1348.205       | 0             |
| 77600   | 457.269      | 0           | 3041.795       | 0             |
| 77800   | 465.71       | 0           | 3418.443       | 0             |
| 78000   | 472.943      | -145.592    | 3476.495       | -539.23       |
| 78200   | 471.894      | 0           | 3499.4         | -539.23       |
| 78400   | 500.467      | -140.621    | 3601.337       | -520.817      |
| 78600   | 449.065      | 0           | 3516.785       | -520.817      |
| 78800   | 515.281      | 0           | 3571.653       | 0             |
| 79000   | 533.823      | 0           | 3885.571       | 0             |
| 79200   | 561.164      | 0           | 4055.508       | 0             |
| 79400   | 625.913      | -123.521    | 4396.579       | -457.484      |
| 79600   | 433.657      | -98.773     | 3924.333       | -823.312      |
| 79800   | 433.556      | -75.804     | 3211.9         | -646.583      |
| 80000   | 536.002      | 0           | 3590.955       | -280.756      |
| 80200   | 557.518      | -135.31     | 4050.074       | -501.149      |
| 80400   | 551.052      | 0           | 4105.815       | -501.149      |
| 80600   | 560.723      | 0           | 4117.685       | 0             |
| 80800   | 491.335      | 0           | 3896.51        | 0             |
| 81000   | 473.156      | 0           | 3572.191       | 0             |
| 81200   | 486.948      | -105.818    | 3555.941       | -391.917      |
| 81400   | 512.744      | -117.353    | 3702.56        | -826.558      |
| 81600   | 544.189      | -122.221    | 3914.565       | -887.311      |
| 81800   | 529.815      | -126.508    | 3977.793       | -921.22       |
| 82000   | 524.738      | 0           | 3905.754       | -468.55       |
| 82200   | 554.977      | 0           | 3998.947       | 0             |
| 82400   | 493.658      | 0           | 3883.834       | 0             |
| 82600   | 527.168      | -127.571    | 3780.838       | -472.484      |
| 82800   | 541.528      | -128.161    | 3958.136       | -947.152      |
| 83000   | 535.028      | -127.178    | 3987.245       | -945.699      |
| 83200   | 528.162      | -117.69     | 3937.739       | -906.919      |
| 83400   | 527.253      | -113.84     | 3908.945       | -857.52       |
| 83600   | 536.703      | -122.785    | 3940.578       | -876.388      |

|       |         |          |          |          |
|-------|---------|----------|----------|----------|
| 83800 | 522.062 | -123.638 | 3921.352 | -912.676 |
| 84000 | 517.88  | -132.135 | 3851.639 | -947.306 |
| 84200 | 553.364 | -117.723 | 3967.572 | -925.398 |
| 84400 | 469.369 | -97.43   | 3787.903 | -796.864 |
| 84600 | 511.443 | -108.392 | 3632.637 | -762.303 |
| 84800 | 568.801 | -124.018 | 4000.903 | -860.777 |
| 85000 | 536.969 | -118.572 | 4095.447 | -898.481 |
| 85200 | 546.264 | -125.296 | 4011.974 | -903.212 |
| 85400 | 561.038 | -139.821 | 4101.118 | -981.915 |
| 85600 | 551.635 | -137.254 | 4121.014 | -1026.21 |
| 85800 | 550.654 | -129.727 | 4082.553 | -988.816 |
| 86000 | 542.269 | -130.423 | 4047.863 | -963.516 |
| 86200 | 539.299 | 0        | 4005.809 | -483.048 |
| 86400 | 586.827 | -115.901 | 4170.84  | -429.263 |
| 86600 | 611.376 | -113.251 | 4437.79  | -848.711 |
| 86800 | 611.402 | -130.5   | 4528.806 | -902.782 |
| 87000 | 420.937 | 0        | 3823.475 | -483.335 |
| 87200 | 526.933 | -143.243 | 3510.629 | -530.53  |
| 87400 | 539.133 | -123.272 | 3948.391 | -987.093 |
| 87600 | 0       | 0        | 1996.787 | -456.564 |
| 87800 | 0       | 0        | 0        | 0        |
| 88000 | 0       | 0        | 0        | 0        |
| 88200 | 588.663 | 0        | 2180.235 | 0        |
| 88400 | 439.09  | 0        | 3806.492 | 0        |
| 88600 | 520.531 | -144.926 | 3554.151 | -536.762 |
| 88800 | 543.26  | -139.578 | 3939.967 | -1053.72 |
| 89000 | 556.894 | -134.56  | 4074.645 | -1015.32 |
| 89200 | 560.091 | 0        | 4136.982 | -498.369 |
| 89400 | 562.276 | 0        | 4156.914 | 0        |
| 89600 | 563.482 | -134.073 | 4169.473 | -496.568 |
| 89800 | 568.615 | -129.964 | 4192.951 | -977.918 |
| 90000 | 553.748 | -133.756 | 4156.899 | -976.741 |
| 90200 | 548.034 | 0        | 4080.675 | -495.391 |
| 90400 | 568.912 | -138.514 | 4136.839 | -513.013 |
| 90600 | 542.513 | -139.564 | 4116.388 | -1029.92 |
| 90800 | 554.987 | -136.72  | 4064.812 | -1023.27 |
| 91000 | 532.582 | 0        | 4028.032 | -506.369 |
| 91200 | 536.297 | 0        | 3958.81  | 0        |
| 91400 | 545.907 | -137.339 | 4008.162 | -508.663 |
| 91600 | 530.788 | 0        | 3987.761 | -508.663 |
| 91800 | 534.243 | -145.372 | 3944.56  | -538.414 |
| 92000 | 531.669 | 0        | 3947.821 | -538.414 |

|       |         |        |          |        |
|-------|---------|--------|----------|--------|
| 92200 | 510.131 | 0      | 3858.519 | 0      |
| 92400 | 412.189 | 0      | 3415.999 | 0      |
| 92600 | 0       | 0      | 1526.624 | 0      |
| 92800 | 0       | 0      | 0        | 0      |
| 93000 | 0       | 0      | 0        | 0      |
| 93200 | 0       | 0      | 0        | 0      |
| 93400 | 0       | 0      | 0        | 0      |
| 93600 | 306.181 | 0      | 1134.004 | 0      |
| 93800 | 259.474 | 0      | 2095.018 | 0      |
| 94000 | 230.348 | 0      | 1814.155 | 0      |
| 94200 | 218.569 | 0      | 1662.657 | 0      |
| 94400 | 223.131 | 0      | 1635.927 | 0      |
| 94600 | 229.675 | 0      | 1677.059 | 0      |
| 94800 | 232.926 | 0      | 1713.338 | 0      |
| 95000 | 204.271 | 0      | 1619.249 | 0      |
| 95200 | 223.412 | 0      | 1584.013 | 0      |
| 95400 | 256.046 | 0      | 1775.772 | 0      |
| 95600 | 274.808 | -0.014 | 1966.127 | -0.053 |
| 95800 | 289.591 | 0      | 2090.367 | -0.053 |
| 96000 | 302.458 | 0      | 2192.774 | 0      |
| 96200 | 288.455 | 0      | 2188.565 | 0      |
| 96400 | 292.716 | 0      | 2152.482 | 0      |
| 96600 | 307.369 | 0      | 2222.537 | 0      |
| 96800 | 146.108 | 0      | 1679.544 | 0      |
| 97000 | 292.927 | 0      | 1626.052 | 0      |
| 97200 | 316.939 | 0      | 2258.762 | 0      |
| 97400 | 305.401 | 0      | 2304.963 | 0      |
| 97560 | 0       | 0      | 904.891  | 0      |

Total

322581.3 -41138.7

T-Wall

CROSS SECTION COORDINATES

Algiers West

NAVD88

|      | STATION | DIST   | ELEV NOTE  | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 771. | + 10.00 | -294.6 | .80 WW     | -288.6 | -16.70 SND | -271.8 | -17.40 SND | -251.7 | -18.20 SND |
| 771. | + 10.00 | -231.6 | -19.33 SND | -211.9 | -20.28 SND | -191.6 | -23.61 SND | -171.8 | -23.50 SND |
| 771. | + 10.00 | -151.9 | -17.57 SND | -131.9 | -14.56 SND | -111.9 | -7.59 SND  | -96.1  | 1.64 WE    |
| 771. | + 10.00 | -86.5  | 2.01 NG    | -80.4  | 2.67 FL    | -47.6  | 3.65 NG    | -31.4  | 4.66 FL    |
| 771. | + 10.00 | .9     | 7.55 BL    | 26.0   | 7.13 NG    | 53.3   | 8.96 NG    | 86.8   | 5.70 EOA   |
| 771. | + 10.00 | 157.6  | 4.35 EOA   | 197.3  | 3.10 NG    | 260.9  | 3.48 NG    | 327.5  | 3.00 NG    |
| 771. | + 10.00 | 383.4  | 2.92 EOA   | 399.0  | 2.71 EOA   | 436.1  | 1.88 NG    | 484.3  | 1.98 NG    |
| 771. | + 10.00 | 517.7  | 2.02 FL    | 531.9  | 1.99 FL    | 545.1  | 1.54 EW    |        |            |
| 772. | + .00   | -396.4 | .80 WW     | -383.7 | -16.90 SND | -371.9 | -17.30 SND | -352.0 | -17.57 SND |
| 772. | + .00   | -331.9 | -15.94 SND | -311.8 | -15.65 SND | -291.8 | -14.02 SND | -272.0 | -15.19 SND |
| 772. | + .00   | -251.9 | -14.70 SND | -231.8 | -15.60 SND | -211.5 | -17.60 SND | -191.7 | -19.20 SND |
| 772. | + .00   | -171.9 | -19.80 SND | -151.8 | -18.50 SND | -131.8 | -14.90 SND | -111.8 | -10.70 SND |
| 772. | + .00   | -91.8  | -5.70 SND  | -75.9  | -3.15 SND  | -60.0  | -.60 SND   | -51.7  | .70 WE     |
| 772. | + .00   | -45.8  | 3.62 RP    | -37.8  | 1.58 EOR   | -18.7  | 2.54 FL    | -4.8   | 2.23 NG    |
| 772. | + .00   | .3     | 2.24 BL    | 18.5   | 2.26 NG    | 31.8   | 2.58 FS    | 35.6   | 3.41 FL    |
| 772. | + .00   | 40.7   | 5.19 SLP   | 52.3   | 8.77 FS    | 57.5   | 8.65 CL    | 63.7   | 8.27 PSC   |
| 772. | + .00   | 77.0   | 3.96 SLP   | 86.4   | .87 PST    | 116.5  | .29 NG     | 164.3  | .21 NG     |
| 772. | + .00   | 174.8  | .69 NG     | 184.5  | 2.42 NG    | 194.4  | 3.72 EOA   | 230.4  | 3.62 EOA   |
| 772. | + .00   | 265.2  | 2.93 NG    | 310.3  | 2.17 NG    | 340.5  | 2.81 EOA   | 358.7  | 2.90 EOA   |
| 772. | + .00   | 403.3  | 1.75 NG    | 447.7  | 1.60 NG    | 479.7  | 1.87 FL    | 498.7  | 1.88 FL    |
| 774. | + .00   | -141.9 | .24 WE     | -131.6 | 3.42 RP    | -120.7 | 1.47 EOR   | -89.4  | 1.37 NG    |
| 774. | + .00   | -63.6  | 1.99 NG    | -37.7  | 2.13 NG    | -17.3  | 2.89 FS    | -5.2   | 6.00 SLP   |
| 774. | + .00   | .2     | 7.77 BL    | 3.5    | 8.65 FS    | 8.2    | 8.78 CL    | 13.0   | 8.34 PSC   |
| 774. | + .00   | 24.5   | 4.77 SLP   | 36.8   | .88 PST    | 59.0   | .11 NG     | 81.8   | .02 NG     |
| 774. | + .00   | 99.2   | -.12 EW    | 129.2  | -1.28 NG   | 151.9  | .87 NG     |        |            |
| 776. | + .00   | -460.2 | -15.40 SND | -439.8 | -16.94 SND | -420.2 | -15.09 SND | -400.1 | -14.60 SND |
| 776. | + .00   | -380.2 | -13.50 SND | -360.1 | -13.60 SND | -340.3 | -13.50 SND | -320.1 | -12.15 SND |
| 776. | + .00   | -300.2 | -11.07 SND | -280.2 | -10.70 SND | -260.2 | -8.10 SND  | -240.3 | -6.12 SND  |
| 776. | + .00   | -220.3 | -2.84 SND  | -200.2 | -1.74 SND  | -180.8 | -1.32 SND  | -160.6 | -1.01 SND  |
| 776. | + .00   | -147.1 | -.84 WE    | -134.6 | 3.57 RP    | -128.4 | 1.30 EOR   | -101.6 | 1.41 NG    |
| 776. | + .00   | -73.3  | 1.25 NG    | -45.9  | 1.94 NG    | -24.9  | 2.75 FS    | -14.2  | 5.70 SLP   |
| 776. | + .00   | -3.9   | 8.87 FS    | -.4    | 8.83 BL    | 1.6    | 8.73 CL    | 5.5    | 8.56 PSC   |
| 776. | + .00   | 18.9   | 3.94 SLP   | 29.8   | .24 PST    | 52.1   | -1.32 EW   |        |            |
| 778. | + .00   | -100.6 | -.20 WE    | -86.3  | 3.38 RP    | -78.5  | 1.26 EOR   | -64.0  | 1.24 NG    |
| 778. | + .00   | -38.5  | 1.93 NG    | -22.7  | 3.02 FS    | -13.0  | 6.12 SLP   | -3.8   | 8.77 FS    |
| 778. | + .00   | -.2    | 8.75 BL    | .8     | 8.77 CL    | 5.7    | 8.37 PSC   | 12.4   | 6.18 SLP   |
| 778. | + .00   | 23.0   | 2.76 SLP   | 34.3   | -.44 PST   | 43.8   | -1.39 NG   | 59.1   | -1.58 EW   |

780. + .00 -92.6 -.55 WE -81.0 3.40 RP -66.2 1.12 EOR -46.7 1.29 NG  
780. + .00 -34.5 1.66 NG -25.4 2.37 FS -15.7 5.25 SLP -4.6 8.65 FS

□  
CROSS SECTION COORDINATES Algiers West

| STATION    | DIST | ELEV NOTE | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 780. + .00 | -.2  | 8.71 BL   | .8   | 8.66 CL   | 5.3  | 8.52 PSC  | 15.8 | 5.14 SLP  |
| 780. + .00 | 26.8 | 1.76 SLP  | 34.4 | -.58 PST  | 51.3 | -1.91 EW  |      |           |

|            |       |          |       |          |       |          |       |          |
|------------|-------|----------|-------|----------|-------|----------|-------|----------|
| 782. + .00 | -87.8 | -.42 WE  | -77.3 | 3.59 RP  | -69.8 | 1.24 EOR | -46.4 | 1.49 NG  |
| 782. + .00 | -25.7 | 2.37 FS  | -12.9 | 5.64 SLP | -4.2  | 8.65 FS  | -.4   | 8.66 BL  |
| 782. + .00 | .6    | 8.71 CL  | 5.5   | 8.43 PSC | 13.9  | 6.02 SLP | 25.2  | 2.17 SLP |
| 782. + .00 | 34.8  | -.71 PST | 48.5  | -1.79 EW |       |          |       |          |

|            |        |            |        |            |        |            |        |            |
|------------|--------|------------|--------|------------|--------|------------|--------|------------|
| 784. + .00 | -508.7 | -11.90 SND | -497.7 | -14.90 SND | -477.8 | -20.50 SND | -457.7 | -22.20 SND |
| 784. + .00 | -437.8 | -22.20 SND | -417.6 | -22.20 SND | -397.8 | -19.80 SND | -377.3 | -18.00 SND |
| 784. + .00 | -356.8 | -16.90 SND | -337.7 | -17.00 SND | -317.7 | -15.10 SND | -297.7 | -15.10 SND |
| 784. + .00 | -277.6 | -13.90 SND | -257.5 | -12.60 SND | -237.7 | -13.30 SND | -217.6 | -11.80 SND |
| 784. + .00 | -197.6 | -10.60 SND | -177.2 | -9.60 SND  | -157.8 | -8.30 SND  | -137.8 | -4.70 SND  |
| 784. + .00 | -117.8 | -3.30 SND  | -98.1  | -1.59 SND  | -83.3  | -.04 WE    | -71.8  | 3.25 RP    |
| 784. + .00 | -64.5  | 1.69 EOR   | -40.6  | 1.63 NG    | -24.0  | 2.46 FS    | -13.7  | 5.77 SLP   |
| 784. + .00 | -3.2   | 8.65 FS    | .3     | 8.59 BL    | 2.2    | 8.59 CL    | 6.2    | 8.25 PSC   |
| 784. + .00 | 15.5   | 5.30 SLP   | 25.6   | 2.11 SLP   | 40.2   | -2.04 PST  | 53.4   | -2.77 EW   |

|            |       |          |       |           |       |          |       |          |
|------------|-------|----------|-------|-----------|-------|----------|-------|----------|
| 786. + .00 | -75.4 | -.89 WE  | -61.8 | 3.71 RP   | -54.8 | 1.29 EOR | -40.7 | 1.67 NG  |
| 786. + .00 | -25.7 | 2.87 FS  | -15.9 | 6.24 SLP  | -6.2  | 10.23 FS | -1.2  | 10.31 CL |
| 786. + .00 | -.1   | 10.30 BL | 5.5   | 10.21 PSC | 16.4  | 6.16 SLP | 30.5  | 1.76 SLP |
| 786. + .00 | 43.6  | -.86 PST | 58.0  | -2.30 EW  | 74.3  | -2.99 NG |       |          |

|            |       |           |       |          |       |          |       |          |
|------------|-------|-----------|-------|----------|-------|----------|-------|----------|
| 788. + .00 | -59.4 | -5.25 WE  | -49.1 | 3.34 RP  | -43.7 | 2.23 EOR | -29.6 | 2.63 NG  |
| 788. + .00 | -20.0 | 3.44 FS   | -11.6 | 6.19 SLP | -3.5  | 8.72 FS  | .1    | 8.63 BL  |
| 788. + .00 | 2.6   | 8.60 CL   | 7.9   | 8.27 PSC | 17.9  | 5.04 SLP | 29.8  | 1.15 SLP |
| 788. + .00 | 38.7  | -1.55 PST | 51.1  | -3.66 EW |       |          |       |          |

|            |       |           |       |          |       |          |       |         |
|------------|-------|-----------|-------|----------|-------|----------|-------|---------|
| 790. + .00 | -63.9 | -.47 WE   | -54.8 | 2.74 RP  | -48.4 | 1.94 EOR | -33.6 | 2.31 NG |
| 790. + .00 | -22.5 | 2.92 FS   | -11.7 | 5.83 SLP | -1.7  | 8.71 FS  | .1    | 8.68 BL |
| 790. + .00 | 2.9   | 8.69 CL   | 7.4   | 8.34 PSC | 18.3  | 5.07 SLP | 32.4  | .53 SLP |
| 790. + .00 | 44.8  | -3.04 PST | 59.1  | -4.91 EW |       |          |       |         |

|            |        |            |        |            |        |            |        |            |
|------------|--------|------------|--------|------------|--------|------------|--------|------------|
| 792. + .00 | -516.9 | -12.00 SND | -497.1 | -13.96 SND | -477.3 | -16.50 SND | -457.3 | -18.20 SND |
| 792. + .00 | -437.3 | -18.40 SND | -417.5 | -19.40 SND | -397.6 | -19.10 SND | -377.6 | -18.20 SND |
| 792. + .00 | -357.4 | -17.70 SND | -337.4 | -17.20 SND | -317.4 | -17.00 SND | -297.3 | -16.60 SND |
| 792. + .00 | -277.4 | -16.90 SND | -257.5 | -17.30 SND | -237.4 | -17.00 SND | -217.3 | -17.40 SND |
| 792. + .00 | -197.4 | -17.40 SND | -177.5 | -15.50 SND | -157.3 | -14.00 SND | -137.3 | -12.30 SND |
| 792. + .00 | -117.3 | -13.80 SND | -97.5  | -10.08 SND | -77.4  | -5.69 SND  | -61.5  | -.59 WE    |
| 792. + .00 | -51.2  | 3.05 RP    | -46.7  | 1.88 EOR   | -30.8  | 2.40 NG    | -24.0  | 2.73 FS    |
| 792. + .00 | -14.3  | 4.89 SLP   | -3.5   | 8.45 FS    | -.4    | 8.51 BL    | 1.3    | 8.45 CL    |
| 792. + .00 | 5.6    | 8.35 PSC   | 20.1   | 4.10 SLP   | 32.7   | -.36 SLP   | 44.9   | -3.59 PST  |
| 792. + .00 | 56.6   | -5.17 EW   |        |            |        |            |        |            |

□  
CROSS SECTION COORDINATES      Algiers West

| STATION | DIST | ELEV NOTE | DIST | ELEV NOTE | DIST | ELEV NOTE | DIST   | ELEV NOTE  | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 794. + .00 | -57.7  | -.59 WE    | -47.9  | 3.46 RP    | -39.8  | 1.55 EOR   | -25.6  | 2.28 FS    |
| 794. + .00 | -14.1  | 4.73 SLP   | -2.6   | 8.20 FS    | .0     | 8.31 BL    | 1.9    | 8.30 CL    |
| 794. + .00 | 6.7    | 8.00 PSC   | 19.1   | 3.80 SLP   | 36.5   | -1.94 SLP  | 48.7   | -5.53 PST  |
| 794. + .00 | 61.3   | -7.74 EW   | 92.9   | -6.65 NG   | 118.2  | -6.89 NG   |        |            |
| 796. + .00 | -46.2  | -1.48 WE   | -38.1  | 3.36 RP    | -31.0  | 1.28 EOR   | -22.4  | 1.97 NG    |
| 796. + .00 | -11.2  | 2.83 FS    | -.1    | 5.56 BL    | 1.4    | 6.16 SLP   | 8.7    | 8.56 FS    |
| 796. + .00 | 13.0   | 8.68 CL    | 17.6   | 8.61 PSC   | 31.7   | 4.19 SLP   | 47.4   | -1.09 SLP  |
| 796. + .00 | 59.1   | -4.53 PST  | 68.9   | -5.31 EW   | 83.6   | -5.46 NG   | 115.4  | -4.51 NG   |
| 796. + .00 | 150.4  | -3.78 NG   |        |            |        |            |        |            |
| 798. + .00 | -55.3  | -.76 WE    | -44.1  | 3.36 RP    | -35.8  | 1.96 EOR   | -21.4  | 1.81 NG    |
| 798. + .00 | -10.2  | 2.42 FS    | -1.9   | 4.27 SLP   | -.3    | 4.78 BL    | 11.3   | 8.09 FS    |
| 798. + .00 | 15.2   | 8.07 CL    | 20.3   | 7.84 PSC   | 30.7   | 4.20 SLP   | 45.8   | -.92 SLP   |
| 798. + .00 | 57.9   | -4.04 PST  | 75.7   | -4.81 EW   | 101.3  | -5.53 NG   | 122.2  | -5.66 NG   |
| 800. + .00 | -445.0 | -12.20 SND | -431.8 | -13.60 SND | -411.6 | -16.30 SND | -392.0 | -17.70 SND |
| 800. + .00 | -371.9 | -18.20 SND | -352.0 | -19.20 SND | -331.6 | -19.10 SND | -311.8 | -19.00 SND |
| 800. + .00 | -291.6 | -18.80 SND | -271.8 | -19.80 SND | -251.9 | -19.60 SND | -231.7 | -20.10 SND |
| 800. + .00 | -212.0 | -18.10 SND | -191.9 | -18.10 SND | -171.8 | -17.90 SND | -152.1 | -16.21 SND |
| 800. + .00 | -131.7 | -13.88 SND | -112.0 | -13.10 SND | -92.0  | -13.50 SND | -76.0  | -7.40 SND  |
| 800. + .00 | -60.0  | -1.30 SND  | -52.3  | -1.19 WE   | -42.5  | 3.34 RP    | -34.2  | 2.29 EOR   |
| 800. + .00 | -18.4  | 3.05 FS    | -10.2  | 5.65 SLP   | -.1    | 8.78 FS    | .0     | 8.77 BL    |
| 800. + .00 | 4.3    | 8.68 CL    | 9.4    | 7.98 PSC   | 22.1   | 3.71 SLP   | 34.7   | -.48 SLP   |
| 800. + .00 | 46.8   | -3.60 PST  | 58.3   | -4.51 NG   | 77.3   | -4.91 EW   | 89.8   | -5.09 NG   |
| 800. + .00 | 119.1  | -5.82 NG   | 146.9  | -5.94 NG   |        |            |        |            |
| 802. + .00 | -64.9  | -.85 WE    | -57.8  | 2.81 RP    | -50.7  | 1.94 EOR   | -36.3  | 1.77 NG    |
| 802. + .00 | -24.6  | 2.30 FS    | -14.9  | 4.86 SLP   | -3.9   | 8.53 FS    | .2     | 8.78 BL    |

|           |       |           |      |          |      |          |       |          |
|-----------|-------|-----------|------|----------|------|----------|-------|----------|
| 802.+ .00 | 1.3   | 8.77 CL   | 5.5  | 8.48 PSC | 18.0 | 4.24 SLP | 32.2  | -.35 SLP |
| 802.+ .00 | 45.7  | -3.74 PST | 67.7 | -4.99 NG | 85.8 | -5.42 EW | 113.8 | -6.07 NG |
| 802.+ .00 | 138.4 | -6.15 NG  |      |          |      |          |       |          |

|           |       |           |       |          |       |          |       |          |
|-----------|-------|-----------|-------|----------|-------|----------|-------|----------|
| 804.+ .00 | -57.9 | -1.35 WE  | -51.7 | 3.01 RP  | -44.7 | 1.75 EOR | -31.9 | 2.06 NG  |
| 804.+ .00 | -23.6 | 2.67 FS   | -13.9 | 5.02 SLP | -2.6  | 8.73 FS  | .0    | 8.78 BL  |
| 804.+ .00 | 2.0   | 8.69 CL   | 6.0   | 8.47 PSC | 16.9  | 4.66 SLP | 31.9  | -.28 SLP |
| 804.+ .00 | 45.4  | -3.42 PST | 61.0  | -4.51 EW | 93.7  | -5.93 NG | 112.0 | -6.26 NG |
| 804.+ .00 | 126.8 | -6.30 NG  |       |          |       |          |       |          |

|           |       |           |       |          |       |          |       |          |
|-----------|-------|-----------|-------|----------|-------|----------|-------|----------|
| 806.+ .00 | -65.2 | -.93 WE   | -54.1 | 3.10 RP  | -49.2 | 1.26 EOR | -40.1 | 1.82 NG  |
| 806.+ .00 | -22.0 | 2.82 FS   | -11.7 | 5.49 SLP | -2.3  | 8.63 FS  | .2    | 8.53 BL  |
| 806.+ .00 | 3.0   | 8.61 CL   | 7.0   | 8.39 PSC | 17.7  | 4.95 SLP | 32.2  | -.36 SLP |
| 806.+ .00 | 46.8  | -4.03 PST | 57.3  | -4.90 EW | 90.4  | -5.77 NG | 120.5 | -5.81 NG |

□  
CROSS SECTION COORDINATES      Algiers West

| STATION | DIST | ELEV NOTE | DIST | ELEV NOTE | DIST | ELEV NOTE | DIST   | ELEV NOTE  | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 808.+ .00 | -458.2 | -11.50 SND | -453.3 | -11.60 SND | -433.3 | -13.50 SND | -413.1 | -15.50 SND |
| 808.+ .00 | -392.9 | -17.80 SND | -372.8 | -17.80 SND | -352.9 | -18.40 SND | -332.7 | -19.10 SND |
| 808.+ .00 | -313.2 | -19.46 SND | -293.2 | -19.40 SND | -272.9 | -19.90 SND | -253.3 | -19.50 SND |
| 808.+ .00 | -232.9 | -19.40 SND | -213.1 | -19.10 SND | -193.2 | -17.80 SND | -173.2 | -13.60 SND |
| 808.+ .00 | -153.3 | -13.70 SND | -133.3 | -12.50 SND | -113.1 | -12.90 SND | -93.3  | -10.70 SND |
| 808.+ .00 | -73.2  | -6.95 SND  | -56.6  | -4.23 SND  | -40.0  | -1.50 SND  | -35.9  | -.64 WE    |
| 808.+ .00 | -27.8  | 2.98 RP    | -21.1  | 2.69 EOR   | -16.4  | 2.75 FS    | -6.5   | 4.97 SLP   |
| 808.+ .00 | .2     | 7.04 BL    | 4.5    | 8.08 FS    | 8.3    | 8.21 CL    | 13.5   | 8.06 PSC   |
| 808.+ .00 | 25.9   | 3.97 SLP   | 38.8   | -.41 SLP   | 54.0   | -4.09 PST  | 69.9   | -4.85 EW   |
| 808.+ .00 | 95.0   | -5.51 NG   | 134.0  | -5.71 NG   |        |            |        |            |
| 810.+ .00 | -36.3  | -.31 WE    | -32.3  | 2.65 RP    | -28.9  | 3.59 RP    | -25.1  | 2.88 EOR   |
| 810.+ .00 | -18.1  | 2.93 NG    | -11.2  | 3.69 FS    | -3.7   | 5.72 SLP   | .1     | 7.02 BL    |
| 810.+ .00 | 5.4    | 8.44 FS    | 9.9    | 8.24 CL    | 14.4   | 8.12 PSC   | 24.0   | 4.90 SLP   |
| 810.+ .00 | 35.7   | .84 SLP    | 50.9   | -3.18 PST  | 64.9   | -4.34 NG   | 70.8   | -3.92 NG   |
| 810.+ .00 | 76.1   | -5.24 NG   | 82.0   | -5.65 NG   | 102.7  | -5.99 NG   | 106.3  | -5.69 NG   |
| 810.+ .00 | 108.7  | -4.47 NG   | 111.1  | -4.38 NG   | 113.9  | -5.62 NG   |        |            |
| 812.+ .00 | -58.9  | -.42 WE    | -53.9  | 3.04 RP    | -45.4  | 3.40 RP    | -41.0  | 1.77 EOR   |
| 812.+ .00 | -26.9  | 1.87 NG    | -14.6  | 2.76 FS    | -7.4   | 4.78 SLP   | .1     | 7.10 BL    |
| 812.+ .00 | 4.8    | 8.38 FS    | 9.6    | 8.22 CL    | 13.2   | 8.21 PSC   | 23.0   | 5.00 SLP   |
| 812.+ .00 | 38.9   | -.38 SLP   | 51.3   | -3.75 PST  | 58.3   | -4.16 NG   | 73.7   | -4.33 NG   |
| 812.+ .00 | 75.7   | -4.94 NG   | 108.8  | -5.10 NG   | 110.7  | -4.16 NG   | 112.8  | -4.24 NG   |
| 812.+ .00 | 114.2  | -4.88 NG   |        |            |        |            |        |            |

|           |       |          |       |           |       |          |       |          |
|-----------|-------|----------|-------|-----------|-------|----------|-------|----------|
| 814.+ .00 | -62.4 | -.29 WE  | -58.1 | 2.97 RP   | -51.2 | 3.12 RP  | -47.5 | 1.70 EOR |
| 814.+ .00 | -34.0 | 2.10 NG  | -19.3 | 2.61 FS   | -8.8  | 5.33 SLP | -.6   | 8.10 BL  |
| 814.+ .00 | .8    | 8.35 FS  | 5.5   | 8.39 CL   | 9.9   | 8.13 PSC | 19.9  | 4.76 SLP |
| 814.+ .00 | 35.1  | -.11 SLP | 45.2  | -2.64 PST | 49.9  | -3.28 EW | 63.4  | -4.37 NG |
| 814.+ .00 | 77.0  | -4.82 NG | 95.4  | -5.22 NG  |       |          |       |          |

|           |        |            |        |            |        |            |        |            |
|-----------|--------|------------|--------|------------|--------|------------|--------|------------|
| 816.+ .00 | -472.6 | -14.00 SND | -457.7 | -12.14 SND | -437.6 | -12.71 SND | -417.9 | -14.80 SND |
| 816.+ .00 | -397.8 | -16.50 SND | -377.7 | -18.40 SND | -357.6 | -19.30 SND | -337.7 | -20.21 SND |
| 816.+ .00 | -317.6 | -20.30 SND | -297.9 | -20.90 SND | -277.6 | -21.20 SND | -257.4 | -21.30 SND |
| 816.+ .00 | -237.8 | -19.50 SND | -217.9 | -19.20 SND | -197.7 | -18.10 SND | -177.8 | -15.40 SND |
| 816.+ .00 | -157.3 | -15.40 SND | -137.3 | -13.70 SND | -117.7 | -14.50 SND | -97.7  | -11.40 SND |
| 816.+ .00 | -78.9  | -5.55 SND  | -56.4  | -.26 WE    | -52.5  | 2.76 RP    | -46.5  | 2.87 RP    |
| 816.+ .00 | -44.9  | 2.05 EOR   | -34.1  | 1.98 NG    | -21.8  | 2.63 FS    | -13.3  | 5.11 SLP   |
| 816.+ .00 | -3.8   | 8.27 FS    | -.1    | 8.23 BL    | 1.7    | 8.23 CL    | 5.7    | 8.09 PSC   |
| 816.+ .00 | 13.6   | 5.42 SLP   | 26.8   | 1.26 SLP   | 44.1   | -3.35 PST  | 50.5   | -3.88 EW   |
| 816.+ .00 | 61.1   | -3.89 NG   | 74.9   | -4.08 NG   | 83.2   | -5.00 NG   | 117.9  | -5.45 NG   |

|           |       |         |       |         |       |         |       |          |
|-----------|-------|---------|-------|---------|-------|---------|-------|----------|
| 818.+ .00 | -70.7 | -.07 WE | -65.3 | 3.17 RP | -59.3 | 3.05 RP | -56.3 | 1.23 EOR |
| 818.+ .00 | -45.8 | 1.55 NG | -33.8 | 1.72 NG | -24.6 | 2.25 FS | -12.8 | 5.14 SLP |
| 818.+ .00 | -3.4  | 8.34 FS | .0    | 8.41 BL | 1.6   | 8.38 CL | 5.7   | 8.36 PSC |

□ CROSS SECTION COORDINATES      Algiers West

| STATION | DIST | ELEV NOTE | DIST | ELEV NOTE | DIST | ELEV NOTE | DIST   | ELEV NOTE  | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 818.+ .00 | 15.0   | 5.19 SLP   | 26.7   | 1.46 SLP   | 43.3   | -3.03 PST  | 52.0   | -3.54 FL   |
| 820.+ .00 | -89.4  | -.23 WE    | -83.7  | 4.14 RP    | -74.9  | 3.68 RP    | -71.1  | 1.32 EOR   |
| 820.+ .00 | -60.4  | 1.73 NG    | -40.0  | 1.86 NG    | -22.0  | 2.85 FS    | -13.0  | 5.38 SLP   |
| 820.+ .00 | -4.1   | 8.49 FS    | .2     | 8.69 BL    | 5.0    | 8.71 PSC   | 16.0   | 5.13 SLP   |
| 820.+ .00 | 27.9   | 1.36 SLP   | 41.5   | -2.48 PST  | 54.7   | -3.36 EW   | 67.7   | -4.16 NG   |
| 820.+ .00 | 85.5   | -4.15 NG   | 100.3  | -3.96 NG   | 109.3  | -3.99 NG   | 114.5  | -4.01 NG   |
| 822.+ .00 | -411.2 | -12.90 SND | -399.4 | -13.32 SND | -379.9 | -16.20 SND | -359.9 | -17.74 SND |
| 822.+ .00 | -339.8 | -18.80 SND | -319.9 | -18.92 SND | -299.7 | -19.50 SND | -280.0 | -19.28 SND |
| 822.+ .00 | -259.5 | -18.98 SND | -239.9 | -19.10 SND | -219.9 | -17.90 SND | -199.5 | -16.60 SND |
| 822.+ .00 | -179.8 | -12.60 SND | -159.7 | -10.58 SND | -139.6 | -6.10 SND  | -120.8 | -4.26 SND  |
| 822.+ .00 | -104.5 | -.35 WE    | -102.2 | 1.93 RP    | -92.5  | 2.78 RP    | -86.3  | .70 EOR    |
| 822.+ .00 | -70.9  | 1.69 NG    | -53.4  | 2.22 NG    | -40.4  | 3.11 FS    | -30.6  | 5.71 SLP   |
| 822.+ .00 | -22.3  | 8.52 FS    | -17.1  | 8.54 CL    | -11.5  | 7.83 PSC   | -2.7   | 5.13 SLP   |
| 822.+ .00 | .4     | 4.13 BL    | 7.4    | 1.77 SLP   | 17.9   | -44 PST    | 34.4   | -1.11 NG   |
| 822.+ .00 | 52.3   | -1.58 NG   | 74.9   | -2.11 NG   | 107.2  | -1.80 NG   | 117.8  | -1.22 NG   |

|            |       |          |       |          |       |          |       |          |
|------------|-------|----------|-------|----------|-------|----------|-------|----------|
| 824. + .00 | -92.7 | -.50 WE  | -88.1 | 2.23 RP  | -81.0 | 2.70 RP  | -74.4 | 1.88 EOR |
| 824. + .00 | -61.8 | 1.92 NG  | -43.5 | 2.30 NG  | -23.3 | 3.22 FS  | -14.6 | 5.60 SLP |
| 824. + .00 | -6.7  | 8.20 FS  | -.3   | 8.35 BL  | 5.1   | 8.35 PSC | 16.8  | 4.22 SLP |
| 824. + .00 | 26.1  | 1.47 SLP | 34.9  | -.95 PST | 46.2  | -1.66 NG | 70.0  | -2.80 NG |
| 824. + .00 | 93.9  | -3.55 NG | 107.5 | -3.49 NG | 128.0 | -3.27 NG |       |          |

|            |        |            |        |            |        |            |        |            |
|------------|--------|------------|--------|------------|--------|------------|--------|------------|
| 826. + .00 | -404.2 | -11.00 SND | -399.4 | -11.90 SND | -379.6 | -14.74 SND | -359.5 | -16.27 SND |
| 826. + .00 | -339.4 | -17.89 SND | -319.6 | -18.80 SND | -299.2 | -19.40 SND | -279.6 | -19.20 SND |
| 826. + .00 | -259.6 | -17.80 SND | -239.6 | -17.00 SND | -219.6 | -15.50 SND | -199.6 | -12.80 SND |
| 826. + .00 | -179.7 | -11.50 SND | -159.5 | -10.26 SND | -139.6 | -8.30 SND  | -119.5 | -3.20 SND  |
| 826. + .00 | -99.5  | -2.02 SND  | -79.4  | -.99 SND   | -64.1  | -.28 WE    | -59.3  | 2.61 RP    |
| 826. + .00 | -52.4  | 2.64 RP    | -48.5  | 2.10 EOR   | -37.1  | 1.77 NG    | -22.9  | 2.30 FS    |
| 826. + .00 | -13.6  | 4.61 SLP   | -1.7   | 8.55 FS    | .2     | 8.54 BL    | 3.3    | 8.51 CL    |
| 826. + .00 | 7.4    | 8.47 PSC   | 17.2   | 5.01 SLP   | 26.9   | 1.80 SLP   | 40.4   | -2.37 PST  |
| 826. + .00 | 55.5   | -3.90 NG   | 74.9   | -3.88 NG   | 88.9   | -4.32 NG   | 106.3  | -4.49 NG   |
| 826. + .00 | 120.4  | -4.30 NG   |        |            |        |            |        |            |

|            |       |          |       |           |       |          |       |          |
|------------|-------|----------|-------|-----------|-------|----------|-------|----------|
| 828. + .00 | -69.0 | -.16 WE  | -64.2 | 3.07 RP   | -54.9 | 3.00 RP  | -52.3 | 1.99 EOR |
| 828. + .00 | -40.0 | 1.84 NG  | -23.4 | 2.32 FS   | -12.3 | 5.19 SLP | -1.8  | 8.56 FS  |
| 828. + .00 | -.4   | 8.55 BL  | 2.5   | 8.58 CL   | 6.4   | 8.42 PSC | 16.1  | 5.27 SLP |
| 828. + .00 | 28.1  | 1.22 SLP | 46.2  | -3.69 PST | 65.7  | -4.54 NG | 81.1  | -4.31 NG |
| 828. + .00 | 104.5 | -4.34 NG | 161.2 | -5.09 NG  |       |          |       |          |

|            |       |          |       |         |       |         |       |          |
|------------|-------|----------|-------|---------|-------|---------|-------|----------|
| 830. + .00 | -67.7 | -.12 WE  | -64.4 | 2.73 RP | -59.3 | 3.10 FL | -55.6 | 3.16 RP  |
| 830. + .00 | -52.0 | 1.91 EOR | -41.0 | 1.98 NG | -22.9 | 2.40 FS | -15.0 | 4.33 SLP |
| 830. + .00 | -3.1  | 8.43 FS  | .0    | 8.49 BL | 1.9   | 8.48 CL | 6.1   | 8.40 PSC |

□ CROSS SECTION COORDINATES      Algiers West

| STATION    | DIST | ELEV NOTE | DIST | ELEV NOTE | DIST  | ELEV NOTE | DIST  | ELEV NOTE |
|------------|------|-----------|------|-----------|-------|-----------|-------|-----------|
| 830. + .00 | 14.6 | 5.65 SLP  | 27.0 | 1.43 SLP  | 43.2  | -3.04 PST | 56.8  | -3.80 NG  |
| 830. + .00 | 71.9 | -4.29 NG  | 87.2 | -4.31 NG  | 103.9 | -4.72 NG  | 118.9 | -4.39 NG  |

|            |       |          |       |           |       |          |       |          |
|------------|-------|----------|-------|-----------|-------|----------|-------|----------|
| 832. + .00 | -67.4 | -.28 WE  | -62.5 | 3.04 RP   | -55.9 | 3.19 RP  | -52.4 | 1.97 EOR |
| 832. + .00 | -39.4 | 1.72 NG  | -22.5 | 2.30 FS   | -12.3 | 4.79 SLP | -1.7  | 8.39 FS  |
| 832. + .00 | -.1   | 8.31 BL  | 2.2   | 8.33 CL   | 6.3   | 8.23 PSC | 19.0  | 4.11 SLP |
| 832. + .00 | 29.7  | .62 SLP  | 43.8  | -2.81 PST | 53.8  | -3.13 NG | 72.6  | -4.91 NG |
| 832. + .00 | 96.1  | -5.39 NG | 101.5 | -5.62 NG  | 111.7 | -4.74 NG |       |          |

|            |        |            |        |            |        |            |        |            |
|------------|--------|------------|--------|------------|--------|------------|--------|------------|
| 834. + .00 | -426.9 | -13.30 SND | -408.5 | -14.21 SND | -388.5 | -16.18 SND | -368.4 | -17.59 SND |
| 834. + .00 | -348.3 | -18.20 SND | -328.2 | -18.40 SND | -308.3 | -18.80 SND | -288.5 | -18.56 SND |
| 834. + .00 | -268.3 | -17.89 SND | -248.4 | -17.20 SND | -228.3 | -16.30 SND | -208.3 | -13.93 SND |
| 834. + .00 | -188.5 | -14.50 SND | -168.4 | -13.60 SND | -148.3 | -13.67 SND | -128.5 | -13.99 SND |
| 834. + .00 | -108.4 | -11.70 SND | -80.0  | -3.40 SND  | -66.1  | -.44 WE    | -61.4  | 3.01 RP    |

|            |       |          |       |          |       |          |       |           |
|------------|-------|----------|-------|----------|-------|----------|-------|-----------|
| 834. + .00 | -54.3 | 2.78 RP  | -52.6 | 1.60 EOR | -39.1 | 1.67 NG  | -23.6 | 2.13 FS   |
| 834. + .00 | -12.9 | 4.25 SLP | -1.1  | 8.28 FS  | .3    | 8.21 BL  | 3.0   | 8.25 CL   |
| 834. + .00 | 7.0   | 8.22 PSC | 18.5  | 4.47 SLP | 29.1  | .78 SLP  | 43.8  | -2.97 PST |
| 834. + .00 | 61.2  | -3.73 NG | 80.9  | -4.38 NG | 104.5 | -5.12 NG | 114.9 | -4.85 NG  |

|            |       |           |       |          |       |          |       |          |
|------------|-------|-----------|-------|----------|-------|----------|-------|----------|
| 836. + .00 | -63.1 | -.40 WE   | -60.1 | 2.57 RP  | -53.0 | 2.91 RP  | -50.5 | 1.77 EOR |
| 836. + .00 | -35.8 | 1.69 NG   | -24.6 | 2.03 FS  | -14.5 | 4.66 SLP | -3.7  | 8.19 FS  |
| 836. + .00 | .2    | 8.31 BL   | 5.0   | 8.27 PSC | 15.0  | 5.14 SLP | 28.2  | .75 SLP  |
| 836. + .00 | 40.8  | -2.59 PST | 57.9  | -3.72 NG | 77.7  | -4.12 NG | 98.3  | -5.13 NG |
| 836. + .00 | 108.2 | -5.89 NG  | 113.4 | -4.84 NG |       |          |       |          |

|            |       |          |       |           |       |          |       |          |
|------------|-------|----------|-------|-----------|-------|----------|-------|----------|
| 838. + .00 | -66.1 | -.35 WE  | -61.4 | 2.43 RP   | -56.1 | 2.83 RP  | -55.7 | 1.87 EOR |
| 838. + .00 | -35.7 | 1.73 NG  | -22.9 | 2.19 FS   | -13.6 | 4.72 SLP | -2.0  | 8.44 FS  |
| 838. + .00 | .0    | 8.44 BL  | 2.3   | 8.43 CL   | 6.3   | 8.39 PSC | 16.9  | 4.81 SLP |
| 838. + .00 | 27.4  | 1.46 SLP | 42.1  | -2.46 PST | 60.0  | -3.65 NG | 77.7  | -4.43 NG |
| 838. + .00 | 96.6  | -5.02 NG | 105.7 | -5.34 NG  | 113.3 | -4.61 NG |       |          |

|            |       |           |       |          |       |          |       |          |
|------------|-------|-----------|-------|----------|-------|----------|-------|----------|
| 840. + .00 | -61.5 | -.19 WE   | -58.1 | 2.88 RP  | -49.9 | 2.87 RP  | -47.0 | 1.98 EOR |
| 840. + .00 | -34.8 | 1.79 NG   | -24.7 | 2.18 FS  | -15.6 | 4.73 SLP | -3.2  | 8.54 FS  |
| 840. + .00 | .2    | 8.52 BL   | 4.8   | 8.42 PSC | 16.3  | 4.94 SLP | 26.5  | 1.34 SLP |
| 840. + .00 | 39.9  | -2.15 PST | 56.5  | -2.97 NG | 73.4  | -3.88 NG | 95.6  | -4.68 NG |
| 840. + .00 | 105.8 | -4.89 NG  | 113.8 | -3.98 NG |       |          |       |          |

|            |        |            |        |            |        |            |        |            |
|------------|--------|------------|--------|------------|--------|------------|--------|------------|
| 842. + .00 | -462.4 | -12.10 SND | -447.1 | -13.30 SND | -427.1 | -14.90 SND | -407.2 | -15.60 SND |
| 842. + .00 | -387.3 | -17.01 SND | -367.3 | -17.70 SND | -347.2 | -18.30 SND | -327.3 | -18.30 SND |
| 842. + .00 | -307.0 | -18.36 SND | -287.2 | -18.20 SND | -267.2 | -17.80 SND | -247.2 | -17.50 SND |
| 842. + .00 | -227.3 | -16.40 SND | -207.4 | -15.90 SND | -186.9 | -13.70 SND | -167.3 | -12.80 SND |
| 842. + .00 | -147.3 | -12.30 SND | -127.2 | -11.30 SND | -107.2 | -10.10 SND | -80.0  | -2.30 SND  |
| 842. + .00 | -62.7  | -.16 WE    | -58.8  | 2.63 RP    | -52.2  | 2.97 RP    | -49.2  | 1.17 EOR   |
| 842. + .00 | -35.3  | 1.66 NG    | -23.2  | 2.06 FS    | -15.2  | 4.36 SLP   | -2.7   | 8.36 FS    |

□

CROSS SECTION COORDINATES      Algiers West

| STATION | DIST | ELEV NOTE | DIST | ELEV NOTE | DIST | ELEV NOTE | DIST  | ELEV NOTE | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 842. + .00 | -.2   | 8.34 BL   | 1.3   | 8.31 CL   | 4.8   | 8.21 PSC  | 14.5  | 4.98 SLP  |
| 842. + .00 | 25.0  | 1.37 SLP  | 39.7  | -2.89 PST | 60.0  | -3.88 NG  | 78.7  | -4.66 NG  |
| 842. + .00 | 101.0 | -5.52 NG  | 106.7 | -6.00 NG  |       |           |       |           |
| 844. + .00 | -55.0 | -.14 WE   | -50.4 | 2.84 RP   | -40.7 | 3.22 RP   | -38.2 | 2.05 EOR  |
| 844. + .00 | -26.3 | 1.83 NG   | -14.9 | 2.26 FS   | -3.9  | 5.04 SLP  | -.2   | 6.36 BL   |
| 844. + .00 | 5.0   | 8.19 FS   | 9.6   | 8.37 CL   | 13.7  | 8.37 PSC  | 22.9  | 5.29 SLP  |
| 844. + .00 | 34.2  | 1.45 SLP  | 51.1  | -3.26 PST | 67.5  | -4.16 NG  | 87.2  | -4.86 NG  |
| 844. + .00 | 104.3 | -5.21 NG  | 116.3 | -4.66 NG  |       |           |       |           |

|            |       |          |       |           |       |          |       |          |
|------------|-------|----------|-------|-----------|-------|----------|-------|----------|
| 846. + .00 | -57.3 | -.03 WE  | -52.4 | 3.06 RP   | -44.5 | 3.20 RP  | -42.4 | 2.08 EOR |
| 846. + .00 | -33.5 | 1.68 NG  | -23.6 | 2.07 FS   | -13.1 | 4.93 SLP | -3.1  | 7.29 FS  |
| 846. + .00 | -.2   | 7.55 BL  | 2.1   | 7.63 CL   | 6.9   | 7.65 PSC | 17.7  | 4.31 SLP |
| 846. + .00 | 28.0  | 1.29 SLP | 44.1  | -2.40 PST | 62.4  | -3.40 NG | 84.2  | -4.68 NG |
| 846. + .00 | 103.7 | -4.76 NG | 110.0 | -5.01 NG  | 115.5 | -4.74 NG |       |          |

|            |       |           |       |          |       |          |       |          |
|------------|-------|-----------|-------|----------|-------|----------|-------|----------|
| 848. + .00 | -58.8 | -.07 WE   | -54.5 | 2.85 RP  | -46.2 | 3.28 RP  | -43.2 | 1.84 EOR |
| 848. + .00 | -35.2 | 2.02 NG   | -25.3 | 2.37 FS  | -15.9 | 4.88 SLP | -4.7  | 8.32 FS  |
| 848. + .00 | -.1   | 8.18 BL   | 4.7   | 7.90 PSC | 15.0  | 3.96 SLP | 27.8  | .36 SLP  |
| 848. + .00 | 45.9  | -3.67 PST | 70.7  | -4.87 NG | 94.7  | -5.15 NG | 108.3 | -5.59 NG |
| 848. + .00 | 113.9 | -4.90 NG  |       |          |       |          |       |          |

|            |        |            |        |            |        |            |        |            |
|------------|--------|------------|--------|------------|--------|------------|--------|------------|
| 850. + .00 | -420.8 | -13.70 SND | -417.4 | -14.00 SND | -397.5 | -15.30 SND | -377.1 | -16.56 SND |
| 850. + .00 | -357.3 | -17.45 SND | -337.2 | -18.00 SND | -316.8 | -18.20 SND | -297.3 | -17.80 SND |
| 850. + .00 | -277.4 | -17.80 SND | -257.4 | -17.50 SND | -237.3 | -16.90 SND | -217.2 | -16.30 SND |
| 850. + .00 | -197.4 | -16.30 SND | -177.5 | -14.50 SND | -157.4 | -13.40 SND | -137.1 | -11.90 SND |
| 850. + .00 | -117.2 | -11.80 SND | -97.4  | -10.00 SND | -78.7  | -4.80 SND  | -55.9  | .00 WE     |
| 850. + .00 | -51.9  | 2.78 RP    | -43.7  | 3.53 RP    | -41.0  | 2.13 EOR   | -30.3  | 2.09 NG    |
| 850. + .00 | -19.7  | 2.63 FS    | -11.7  | 4.66 SLP   | -.9    | 8.48 FS    | .1     | 8.44 BL    |
| 850. + .00 | 3.4    | 8.44 CL    | 7.2    | 8.44 PSC   | 19.3   | 4.55 SLP   | 31.4   | .57 SLP    |
| 850. + .00 | 48.5   | -3.89 PST  | 68.7   | -5.03 NG   | 90.4   | -5.74 NG   | 103.4  | -6.33 NG   |
| 850. + .00 | 113.0  | -5.05 NG   |        |            |        |            |        |            |

|            |       |           |       |          |       |          |       |          |
|------------|-------|-----------|-------|----------|-------|----------|-------|----------|
| 852. + .00 | -61.4 | -.20 WE   | -57.5 | 1.89 RP  | -51.4 | 2.99 RP  | -49.6 | 2.09 EOR |
| 852. + .00 | -36.2 | 2.06 NG   | -24.3 | 2.40 FS  | -13.0 | 4.92 SLP | -3.3  | 8.26 FS  |
| 852. + .00 | .4    | 8.38 BL   | 5.4   | 8.47 PSC | 17.2  | 4.56 SLP | 30.5  | .24 SLP  |
| 852. + .00 | 44.8  | -3.64 PST | 70.7  | -4.38 NG | 89.6  | -4.57 NG | 114.1 | -4.78 NG |

|            |       |           |       |          |       |          |       |          |
|------------|-------|-----------|-------|----------|-------|----------|-------|----------|
| 854. + .00 | -58.2 | -.10 WE   | -57.1 | 2.12 RP  | -48.2 | 3.07 RP  | -44.3 | 2.05 EOR |
| 854. + .00 | -33.1 | 2.06 NG   | -24.7 | 2.39 FS  | -15.0 | 5.41 SLP | -5.2  | 8.57 FS  |
| 854. + .00 | -.1   | 8.74 BL   | 4.6   | 8.55 PSC | 15.4  | 4.59 SLP | 28.9  | .41 SLP  |
| 854. + .00 | 45.0  | -3.59 PST | 55.2  | -4.37 EW | 70.5  | -4.67 NG | 80.4  | -4.98 NG |
| 854. + .00 | 105.8 | -5.06 NG  | 111.9 | -5.48 NG |       |          |       |          |

□  
CROSS SECTION COORDINATES      Algiers West

| STATION | DIST | ELEV NOTE | DIST | ELEV NOTE | DIST | ELEV NOTE | DIST  | ELEV NOTE | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 856. + .00 | -59.5 | .03 WE    | -56.4 | 2.30 RP   | -48.0 | 3.29 RP   | -45.0 | 1.83 EOR  |
| 856. + .00 | -32.9 | 1.96 NG   | -21.9 | 2.61 FS   | -12.1 | 5.80 SLP  | -3.7  | 8.50 FS   |
| 856. + .00 | .0    | 8.68 BL   | 1.5   | 8.73 CL   | 6.2   | 8.65 PSC  | 19.1  | 4.18 SLP  |
| 856. + .00 | 29.9  | .40 SLP   | 44.3  | -3.34 PST | 57.6  | -4.46 EW  | 71.4  | -5.07 NG  |

856. + .00 84.2 -5.37 NG 101.2 -5.32 NG

858. + .00 -397.4 -13.90 SND -396.4 -13.90 SND -376.4 -14.90 SND -356.3 -16.20 SND  
858. + .00 -336.4 -17.05 SND -316.4 -17.90 SND -296.1 -18.00 SND -276.2 -18.06 SND  
858. + .00 -256.1 -17.50 SND -236.4 -16.30 SND -216.3 -15.40 SND -196.2 -15.00 SND  
858. + .00 -176.3 -13.55 SND -156.4 -12.10 SND -136.4 -11.45 SND -116.4 -10.80 SND  
858. + .00 -96.4 -8.50 SND -76.4 -2.10 SND -54.4 .06 WE -48.7 3.00 RP  
858. + .00 -44.1 3.02 RP -41.9 1.96 EOR -28.9 2.30 NG -19.7 2.76 FS  
858. + .00 -11.6 5.36 SLP -2.0 8.61 FS .1 8.65 BL 2.4 8.72 CL  
858. + .00 6.3 8.72 PSC 19.7 4.33 SLP 33.8 -.37 SLP 47.3 -3.90 PST  
858. + .00 64.9 -5.33 EW 77.1 -5.26 NG 88.0 -5.33 NG 109.2 -5.25 NG

860. + .00 -55.4 -.07 WE -51.1 2.93 RP -43.0 3.82 RP -39.8 2.21 EOR  
860. + .00 -29.2 2.17 NG -21.5 2.46 FS -10.7 5.44 SLP -2.2 8.58 FS  
860. + .00 .0 8.71 BL 2.3 8.74 CL 7.2 8.64 PSC 20.3 4.19 SLP  
860. + .00 32.5 -.01 SLP 49.7 -4.08 PST 69.8 -5.17 EW 79.9 -5.39 NG  
860. + .00 91.9 -5.66 NG 105.0 -5.57 NG

862. + .00 -62.9 .20 WE -59.0 3.39 RP -52.8 3.10 RP -49.7 2.01 EOR  
862. + .00 -40.3 2.06 NG -31.0 2.15 NG -20.6 2.82 FS -11.7 5.61 SLP  
862. + .00 -2.6 8.76 FS .0 8.69 BL 2.5 8.75 CL 6.7 8.66 PSC  
862. + .00 18.3 4.71 SLP 32.1 .48 SLP 48.4 -3.77 PST 56.7 -4.69 EW  
862. + .00 77.3 -5.39 NG 91.5 -5.14 NG 101.7 -4.74 NG

864. + .00 -59.9 -.04 WE -57.1 2.66 RP -50.3 2.65 RP -48.6 1.37 EOR  
864. + .00 -39.2 1.85 NG -28.9 1.88 NG -22.3 2.13 FS -13.4 4.72 SLP  
864. + .00 -2.9 8.20 FS -.3 8.25 BL 1.7 8.30 CL 5.5 8.20 PSC  
864. + .00 17.0 4.20 SLP 31.8 -.60 SLP 46.9 -4.36 PST 52.4 -5.31 EW  
864. + .00 69.1 -5.42 NG 84.7 -4.94 NG 103.0 -6.68 NG

866. + .00 -398.7 -13.30 SND -379.6 -13.80 SND -359.4 -15.20 SND -339.5 -16.90 SND  
866. + .00 -319.0 -17.80 SND -299.5 -17.90 SND -279.5 -17.80 SND -259.6 -17.70 SND  
866. + .00 -239.3 -16.80 SND -219.5 -16.40 SND -199.4 -15.40 SND -179.6 -13.20 SND  
866. + .00 -159.5 -11.90 SND -139.1 -11.30 SND -119.6 -9.60 SND -99.5 -6.00 SND  
866. + .00 -79.9 -2.06 SND -57.2 -.03 WE -54.5 2.59 RP -47.9 2.63 RP  
866. + .00 -45.4 1.55 EOR -38.0 1.89 NG -28.7 1.90 NG -22.1 2.23 FS  
866. + .00 -14.5 4.30 SLP -3.2 8.08 FS -.1 8.15 BL 2.0 8.15 CL  
866. + .00 6.3 7.88 PSC 18.4 3.64 SLP 31.8 -.93 SLP 47.8 -5.20 PST  
866. + .00 51.9 -5.71 EW 62.3 -6.02 NG 71.6 -6.25 NG 82.5 -6.43 NG  
866. + .00 116.0 -6.79 NG



CROSS SECTION COORDINATES

Algiers West

| STATION | DIST | ELEV | NOTE | DIST | ELEV | NOTE | DIST | ELEV | NOTE | DIST   | ELEV   | NOTE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 868.+ .00 | -68.4  | -13    | WE   | -65.3  | 3.12   | RP   | -58.2  | 3.20   | RP   | -55.7  | 1.57   | EOR  |
| 868.+ .00 | -46.3  | 1.81   | NG   | -34.2  | 1.94   | NG   | -24.0  | 2.39   | FS   | -15.1  | 5.15   | SLP  |
| 868.+ .00 | -3.1   | 8.33   | FS   | -.1    | 8.44   | BL   | 1.4    | 8.44   | CL   | 5.1    | 8.37   | PSC  |
| 868.+ .00 | 14.8   | 4.97   | SLP  | 30.9   | -.37   | SLP  | 43.3   | -4.72  | PST  | 47.6   | -5.24  | EW   |
| 868.+ .00 | 65.3   | -6.16  | NG   | 75.4   | -6.29  | NG   | 107.9  | -6.47  | NG   |        |        |      |
| 870.+ .00 | -108.0 | -.01   | WE   | -104.7 | 2.81   | RP   | -92.0  | 2.98   | RP   | -89.7  | 2.03   | EOR  |
| 870.+ .00 | -72.2  | 2.13   | NG   | -51.9  | 2.07   | NG   | -38.5  | 2.72   | FS   | -25.1  | 5.63   | SLP  |
| 870.+ .00 | -10.7  | 8.87   | FS   | -.1    | 8.79   | BL   | 6.7    | 8.72   | PSC  | 25.9   | 4.51   | SLP  |
| 870.+ .00 | 50.5   | -1.19  | SLP  | 70.3   | -4.47  | PST  | 75.9   | -4.84  | EW   | 101.2  | -5.49  | NG   |
| 870.+ .00 | 120.2  | -5.45  | NG   | 140.7  | -5.42  | NG   |        |        |      |        |        |      |
| 872.+ .00 | -72.9  | -.35   | WE   | -70.4  | 2.52   | RP   | -62.7  | 2.14   | RP   | -61.0  | 1.39   | EOR  |
| 872.+ .00 | -51.9  | 1.59   | NG   | -38.1  | 1.67   | NG   | -24.8  | 2.39   | FS   | -13.9  | 5.10   | SLP  |
| 872.+ .00 | -2.7   | 8.74   | FS   | -.1    | 9.04   | BL   | 2.1    | 9.00   | CL   | 6.9    | 8.77   | PSC  |
| 872.+ .00 | 18.4   | 4.49   | SLP  | 28.3   | .90    | SLP  | 40.9   | -2.64  | PST  | 56.5   | -3.48  | EW   |
| 872.+ .00 | 76.8   | -3.73  | NG   | 100.6  | -3.88  | NG   | 120.9  | -4.37  | NG   |        |        |      |
| 874.+ .00 | -81.0  | -.40   | WE   | -78.3  | 2.50   | RP   | -72.0  | 2.70   | RP   | -69.1  | 1.26   | EOR  |
| 874.+ .00 | -51.7  | 1.57   | NG   | -37.5  | 1.66   | NG   | -24.5  | 2.06   | FS   | -13.2  | 4.93   | SLP  |
| 874.+ .00 | -4.2   | 8.19   | FS   | -.1    | 8.21   | BL   | 1.4    | 8.27   | CL   | 6.3    | 8.10   | PSC  |
| 874.+ .00 | 18.4   | 4.05   | SLP  | 30.6   | .16    | SLP  | 41.1   | -2.92  | PST  | 57.2   | -3.67  | EW   |
| 874.+ .00 | 79.3   | -4.31  | NG   | 106.2  | -4.85  | NG   | 126.8  | -5.34  | NG   |        |        |      |
| 876.+ .00 | -830.6 | -12.10 | SND  | -817.2 | -13.10 | SND  | -796.6 | -13.81 | SND  | -776.9 | -15.00 | SND  |
| 876.+ .00 | -757.0 | -16.20 | SND  | -737.2 | -17.08 | SND  | -717.0 | -17.34 | SND  | -697.1 | -17.10 | SND  |
| 876.+ .00 | -677.2 | -17.15 | SND  | -657.0 | -16.80 | SND  | -636.6 | -15.50 | SND  | -617.0 | -13.90 | SND  |
| 876.+ .00 | -597.0 | -13.10 | SND  | -577.0 | -11.40 | SND  | -556.8 | -10.80 | SND  | -537.3 | -9.88  | SND  |
| 876.+ .00 | -517.1 | -6.86  | SND  | -497.0 | -5.63  | SND  | -477.0 | -4.56  | SND  | -457.0 | -4.34  | SND  |
| 876.+ .00 | -437.1 | -4.20  | SND  | -417.0 | -4.13  | SND  | -397.0 | -3.90  | SND  | -377.1 | -3.90  | SND  |
| 876.+ .00 | -356.9 | -3.59  | SND  | -337.2 | -3.50  | SND  | -316.6 | -3.47  | SND  | -296.8 | -3.41  | SND  |
| 876.+ .00 | -277.0 | -3.14  | SND  | -256.8 | -2.75  | SND  | -237.0 | -2.43  | SND  | -217.0 | -2.18  | SND  |
| 876.+ .00 | -197.0 | -2.10  | SND  | -177.1 | -2.07  | SND  | -157.2 | -2.10  | SND  | -137.1 | -1.96  | SND  |
| 876.+ .00 | -116.9 | -1.77  | SND  | -96.9  | -1.74  | SND  | -77.1  | -1.69  | SND  | -57.2  | -1.58  | SND  |
| 876.+ .00 | -37.2  | -1.48  | SND  | -18.6  | -.54   | SND  | .0     | .40    | SND  |        |        |      |
| 878.+ .00 | -797.2 | -11.80 | SND  | -784.8 | -12.90 | SND  | -764.7 | -14.64 | SND  | -744.7 | -16.30 | SND  |
| 878.+ .00 | -724.9 | -16.70 | SND  | -705.0 | -17.48 | SND  | -685.0 | -17.32 | SND  | -664.9 | -17.20 | SND  |
| 878.+ .00 | -645.1 | -16.40 | SND  | -625.2 | -15.80 | SND  | -605.1 | -14.30 | SND  | -585.0 | -13.00 | SND  |
| 878.+ .00 | -565.1 | -11.00 | SND  | -545.0 | -10.40 | SND  | -525.2 | -8.50  | SND  | -505.1 | -6.80  | SND  |
| 878.+ .00 | -485.2 | -4.80  | SND  | -464.7 | -3.60  | SND  | -445.1 | -3.57  | SND  | -425.1 | -3.38  | SND  |
| 878.+ .00 | -405.0 | -3.22  | SND  | -384.9 | -3.20  | SND  | -364.9 | -3.40  | SND  | -345.2 | -3.50  | SND  |
| 878.+ .00 | -325.0 | -3.60  | SND  | -305.2 | -3.80  | SND  | -285.1 | -4.00  | SND  | -265.1 | -4.40  | SND  |
| 878.+ .00 | -244.9 | -4.70  | SND  | -225.1 | -5.20  | SND  | -205.1 | -5.83  | SND  | -185.0 | -6.31  | SND  |

878. + .00 -165.0 -6.62 SND -145.0 -7.13 SND -125.0 -7.81 SND -104.8 -8.77 SND

□  
CROSS SECTION COORDINATES      Algiers West

| STATION | DIST | ELEV NOTE | | | | | | |
|---|---|---|---|---|---|---|---|---|
|---------|------|-----------|------|-----------|------|-----------|------|-----------|

|            |       |            |       |            |       |            |       |            |
|------------|-------|------------|-------|------------|-------|------------|-------|------------|
| 878. + .00 | -85.0 | -10.20 SND | -64.9 | -12.13 SND | -45.1 | -12.19 SND | -25.1 | -12.26 SND |
| 878. + .00 | -5.2  | -12.27 SND |       |            |       |            |       |            |

|            |        |            |        |            |        |            |        |            |
|------------|--------|------------|--------|------------|--------|------------|--------|------------|
| 880. + .00 | -762.0 | -12.40 SND | -743.3 | -14.20 SND | -723.6 | -15.22 SND | -703.7 | -16.50 SND |
| 880. + .00 | -683.7 | -16.99 SND | -663.8 | -17.00 SND | -643.7 | -16.62 SND | -623.7 | -16.26 SND |
| 880. + .00 | -603.8 | -15.20 SND | -583.7 | -13.70 SND | -563.7 | -12.50 SND | -543.6 | -10.80 SND |
| 880. + .00 | -523.7 | -9.80 SND  | -503.6 | -7.10 SND  | -483.7 | -5.50 SND  | -463.8 | -4.42 SND  |
| 880. + .00 | -443.6 | -3.70 SND  | -423.7 | -3.59 SND  | -403.6 | -3.23 SND  | -383.7 | -3.09 SND  |
| 880. + .00 | -363.6 | -2.70 SND  | -343.8 | -2.72 SND  | -323.8 | -2.80 SND  | -303.5 | -2.74 SND  |
| 880. + .00 | -283.5 | -2.58 SND  | -263.4 | -2.38 SND  | -243.7 | -2.28 SND  | -223.5 | -2.19 SND  |
| 880. + .00 | -203.3 | -2.23 SND  | -183.8 | -2.12 SND  | -163.5 | -2.03 SND  | -143.4 | -1.79 SND  |
| 880. + .00 | -123.6 | -1.62 SND  | -103.7 | -1.45 SND  | -83.7  | -1.34 SND  | -63.8  | -1.41 SND  |
| 880. + .00 | -43.2  | -1.28 SND  | -20.0  | -1.00 SND  |        |            |        |            |

|            |       |          |       |           |       |          |       |          |
|------------|-------|----------|-------|-----------|-------|----------|-------|----------|
| 882. + .00 | -68.9 | -0.07 WE | -65.8 | 2.07 RP   | -59.2 | 2.75 RP  | -56.9 | 1.58 EOR |
| 882. + .00 | -42.0 | 1.64 NG  | -29.4 | 2.08 FS   | -19.6 | 4.62 SLP | -8.8  | 8.37 FS  |
| 882. + .00 | -4.2  | 8.35 CL  | -.2   | 8.30 BL   | 1.5   | 8.24 PSC | 12.1  | 4.44 SLP |
| 882. + .00 | 23.3  | .82 SLP  | 36.8  | -3.04 PST | 59.7  | -4.32 NG | 79.7  | -3.78 FL |

|            |        |          |        |          |        |           |        |          |
|------------|--------|----------|--------|----------|--------|-----------|--------|----------|
| 884. + .00 | -118.7 | -.08 WE  | -114.7 | 3.27 RP  | -107.1 | 3.12 RP   | -103.7 | 1.39 EOR |
| 884. + .00 | -89.9  | 1.89 NG  | -65.4  | 1.90 NG  | -48.3  | 2.23 FS   | -32.6  | 5.29 SLP |
| 884. + .00 | -20.7  | 8.16 FS  | -10.4  | 8.48 CL  | -2.7   | 8.46 PSC  | .3     | 8.12 BL  |
| 884. + .00 | 20.2   | 4.27 SLP | 38.8   | .51 SLP  | 51.5   | -1.54 PST | 71.7   | -2.74 NG |
| 884. + .00 | 90.3   | -3.05 NG | 122.8  | -3.44 FL |        |           |        |          |

|            |        |            |        |            |        |            |        |            |
|------------|--------|------------|--------|------------|--------|------------|--------|------------|
| 886. + .00 | -367.7 | -14.20 SND | -351.8 | -15.40 SND | -332.0 | -16.10 SND | -312.0 | -16.90 SND |
| 886. + .00 | -291.9 | -16.80 SND | -272.0 | -16.50 SND | -251.9 | -16.50 SND | -231.7 | -15.30 SND |
| 886. + .00 | -211.7 | -14.40 SND | -191.5 | -12.40 SND | -172.0 | -11.30 SND | -151.7 | -9.70 SND  |
| 886. + .00 | -131.8 | -7.20 SND  | -112.0 | -5.90 SND  | -96.0  | -3.15 SND  | -80.0  | -.40 SND   |
| 886. + .00 | -71.6  | -.07 WE    | -68.5  | 2.98 RP    | -60.8  | 3.44 RP    | -58.0  | 2.27 EOR   |
| 886. + .00 | -38.8  | 1.74 NG    | -23.7  | 2.55 FS    | -15.7  | 5.00 SLP   | -4.6   | 8.74 FS    |
| 886. + .00 | .1     | 8.68 BL    | 5.7    | 8.71 PSC   | 16.5   | 4.97 SLP   | 28.4   | .99 SLP    |
| 886. + .00 | 40.1   | -2.51 PST  | 57.9   | -3.28 NG   | 73.8   | -3.30 NG   | 81.6   | -2.32 NG   |
| 886. + .00 | 100.3  | -2.43 FL   | 112.0  | -2.21 NG   |        |            |        |            |

|            |       |           |       |          |       |          |       |          |
|------------|-------|-----------|-------|----------|-------|----------|-------|----------|
| 888. + .00 | -71.3 | -.41 WE   | -68.5 | 2.91 RP  | -61.9 | 3.31 RP  | -56.0 | 1.73 EOR |
| 888. + .00 | -41.0 | 1.66 NG   | -25.1 | 2.24 FS  | -14.7 | 4.97 SLP | -3.9  | 8.72 FS  |
| 888. + .00 | .2    | 8.73 BL   | 5.3   | 8.69 PSC | 17.1  | 4.75 SLP | 29.4  | .77 SLP  |
| 888. + .00 | 42.1  | -3.28 PST | 57.9  | -4.07 NG | 74.0  | -4.21 NG | 91.3  | -4.42 NG |

888.+ .00 108.0 -3.99 FL

890.+ .00 -71.6 .20 WE -69.9 2.58 RP -61.2 2.85 RP -57.9 2.01 EOR  
890.+ .00 -41.1 1.71 NG -24.3 2.51 FS -14.1 5.12 SLP -3.6 8.52 FS  
890.+ .00 .5 8.56 BL 5.1 8.57 PSC 16.2 4.89 SLP 26.9 1.17 SLP

□  
CROSS SECTION COORDINATES Algiers West

| STATION   | DIST  | ELEV NOTE | DIST | ELEV NOTE | DIST | ELEV NOTE | DIST | ELEV NOTE |
|-----------|-------|-----------|------|-----------|------|-----------|------|-----------|
| 890.+ .00 | 41.2  | -3.30 PST | 52.4 | -4.08 NG  | 70.3 | -4.44 NG  | 90.4 | -4.80 NG  |
| 890.+ .00 | 115.6 | -4.36 FL  |      |           |      |           |      |           |

892.+ .00 -71.9 .15 WE -69.5 2.40 RP -62.4 2.86 RP -59.4 1.85 EOR  
892.+ .00 -41.0 2.00 NG -25.7 2.46 FS -15.8 5.07 SLP -4.9 8.57 FS  
892.+ .00 .0 8.64 BL 6.9 8.56 PSC 19.9 3.94 SLP 33.2 -.37 SLP  
892.+ .00 45.2 -4.00 PST 57.6 -4.77 EW 72.4 -5.30 NG 90.1 -4.65 NG  
892.+ .00 108.4 -4.19 NG 114.2 -4.23 NG

894.+ .00 -392.2 -12.80 SND -374.5 -14.80 SND -354.7 -15.85 SND -334.8 -16.68 SND  
894.+ .00 -314.7 -17.30 SND -294.8 -17.06 SND -274.8 -17.01 SND -254.4 -16.70 SND  
894.+ .00 -234.8 -15.60 SND -214.7 -14.50 SND -194.6 -13.00 SND -174.7 -10.60 SND  
894.+ .00 -155.0 -9.50 SND -134.7 -8.50 SND -114.9 -7.00 SND -97.5 -3.75 SND  
894.+ .00 -80.0 -.50 SND -73.8 -.23 WE -71.6 2.45 RP -64.8 2.73 RP  
894.+ .00 -63.0 1.71 EOR -41.3 1.81 NG -24.7 2.62 FS -14.0 5.21 SLP  
894.+ .00 -3.5 8.75 FS .0 8.75 BL 1.5 8.74 CL 5.7 8.75 PSC  
894.+ .00 16.7 5.11 SLP 30.3 .71 SLP 46.2 -4.39 PST 56.9 -5.05 EW  
894.+ .00 75.1 -5.10 NG 96.3 -5.16 NG 117.1 -4.60 NG 131.9 -4.42 NG

896.+ .00 -66.0 .08 WE -62.3 2.82 RP -55.4 2.27 RP -53.6 1.43 EOR  
896.+ .00 -35.7 1.90 NG -23.4 2.43 FS -14.6 4.80 SLP -3.9 8.50 FS  
896.+ .00 -.1 8.48 BL 1.9 8.47 CL 6.0 8.47 PSC 17.0 4.97 SLP  
896.+ .00 30.9 .33 SLP 44.7 -3.93 PST 55.6 -4.83 EW 69.0 -5.33 NG  
896.+ .00 85.9 -5.66 NG 101.2 -5.80 NG 120.6 -4.92 NG

898.+ .00 -58.3 .23 WE -57.7 2.30 RP -48.0 2.40 RP -46.2 1.63 EOR  
898.+ .00 -32.9 1.90 NG -24.7 2.16 FS -12.8 5.17 SLP -2.9 8.35 FS  
898.+ .00 .0 8.25 BL 2.4 8.30 CL 7.4 8.33 PSC 18.0 4.59 SLP  
898.+ .00 31.3 .01 SLP 45.6 -4.21 PST 59.7 -5.20 EW 73.6 -5.15 NG  
898.+ .00 87.6 -5.23 NG 102.3 -6.18 NG 109.2 -5.56 NG

900.+ .00 -64.1 .01 WE -62.3 2.02 RP -51.7 2.63 RP -50.0 1.98 EOR  
900.+ .00 -33.5 2.04 NG -22.1 2.57 FS -10.6 5.83 SLP -1.8 8.56 FS

|            |      |          |       |           |       |          |      |          |
|------------|------|----------|-------|-----------|-------|----------|------|----------|
| 900. + .00 | .1   | 8.48 BL  | 3.4   | 8.52 CL   | 7.8   | 8.52 PSC | 21.6 | 3.77 SLP |
| 900. + .00 | 35.1 | -.62 SLP | 49.1  | -4.60 PST | 66.4  | -5.33 EW | 80.7 | -5.34 NG |
| 900. + .00 | 90.1 | -5.79 NG | 102.2 | -6.70 NG  | 111.1 | -5.86 NG |      |          |

|            |        |            |        |            |        |            |        |            |
|------------|--------|------------|--------|------------|--------|------------|--------|------------|
| 902. + .00 | -444.3 | -11.20 SND | -428.4 | -11.78 SND | -408.5 | -13.88 SND | -388.4 | -13.38 SND |
| 902. + .00 | -368.1 | -14.62 SND | -348.5 | -15.60 SND | -328.3 | -16.70 SND | -308.6 | -17.30 SND |
| 902. + .00 | -288.3 | -17.40 SND | -268.1 | -17.00 SND | -248.3 | -16.00 SND | -228.3 | -15.40 SND |
| 902. + .00 | -208.5 | -14.60 SND | -188.4 | -12.00 SND | -168.3 | -11.20 SND | -148.6 | -9.69 SND  |
| 902. + .00 | -128.5 | -7.92 SND  | -108.5 | -5.91 SND  | -80.0  | -1.30 SND  | -68.7  | .27 WE     |
| 902. + .00 | -66.5  | 2.46 RP    | -58.6  | 2.75 RP    | -56.0  | 1.67 EOR   | -37.3  | 2.18 NG    |
| 902. + .00 | -20.8  | 3.00 FS    | -11.4  | 5.76 SLP   | -2.2   | 9.02 FS    | .1     | 8.93 BL    |

□ CROSS SECTION COORDINATES      Algiers West

| STATION    | DIST | ELEV NOTE | DIST  | ELEV NOTE | DIST | ELEV NOTE | DIST | ELEV NOTE |
|------------|------|-----------|-------|-----------|------|-----------|------|-----------|
| 902. + .00 | 2.7  | 8.98 CL   | 7.0   | 8.96 PSC  | 17.6 | 5.30 SLP  | 29.9 | 1.24 SLP  |
| 902. + .00 | 44.6 | -3.66 PST | 65.4  | -5.41 EW  | 76.6 | -5.41 NG  | 87.4 | -5.42 NG  |
| 902. + .00 | 98.1 | -5.25 NG  | 115.8 | -5.31 NG  |      |           |      |           |

|            |       |          |       |           |       |          |       |          |
|------------|-------|----------|-------|-----------|-------|----------|-------|----------|
| 904. + .00 | -69.1 | .29 WE   | -67.5 | 2.00 RP   | -57.7 | 3.10 RP  | -55.0 | 2.07 EOR |
| 904. + .00 | -37.7 | 1.92 NG  | -22.3 | 2.60 FS   | -12.4 | 5.23 SLP | -2.6  | 8.76 FS  |
| 904. + .00 | .0    | 8.73 BL  | 2.0   | 8.73 CL   | 7.2   | 8.72 PSC | 21.1  | 4.09 SLP |
| 904. + .00 | 32.1  | -.02 SLP | 48.3  | -4.91 PST | 71.8  | -5.88 EW | 89.1  | -6.11 NG |
| 904. + .00 | 106.5 | -5.56 NG | 122.7 | -5.52 NG  |       |          |       |          |

|            |       |          |       |           |       |          |       |          |
|------------|-------|----------|-------|-----------|-------|----------|-------|----------|
| 906. + .00 | -66.9 | .41 WE   | -64.2 | 3.27 RP   | -55.4 | 3.44 RP  | -52.6 | 2.09 EOR |
| 906. + .00 | -33.8 | 2.23 NG  | -22.3 | 2.52 FS   | -11.7 | 5.58 SLP | -2.2  | 8.80 FS  |
| 906. + .00 | .0    | 8.72 BL  | 3.1   | 8.82 CL   | 7.2   | 8.72 PSC | 22.1  | 3.84 SLP |
| 906. + .00 | 33.1  | .25 SLP  | 46.8  | -4.15 PST | 63.8  | -4.89 NG | 74.8  | -5.25 EW |
| 906. + .00 | 92.2  | -6.01 NG | 113.1 | -5.72 NG  |       |          |       |          |

|            |       |          |       |          |       |           |       |          |
|------------|-------|----------|-------|----------|-------|-----------|-------|----------|
| 908. + .00 | -65.3 | .45 WE   | -61.7 | 3.14 RP  | -56.0 | 2.73 RP   | -54.7 | 2.13 EOR |
| 908. + .00 | -44.0 | 2.03 NG  | -31.3 | 2.17 NG  | -21.6 | 2.52 FS   | -11.8 | 5.39 SLP |
| 908. + .00 | -1.7  | 8.82 FS  | .2    | 8.75 BL  | 2.6   | 8.79 CL   | 7.4   | 8.74 PSC |
| 908. + .00 | 19.5  | 4.67 SLP | 33.6  | -.04 SLP | 47.6  | -4.52 PST | 63.3  | -5.38 NG |
| 908. + .00 | 77.2  | -5.48 NG | 97.9  | -5.48 EW | 121.3 | -5.44 NG  | 142.0 | -5.37 NG |
| 908. + .00 | 166.5 | -5.12 NG |       |          |       |           |       |          |

|            |        |            |        |            |        |            |        |            |
|------------|--------|------------|--------|------------|--------|------------|--------|------------|
| 910. + .00 | -417.7 | -11.60 SND | -404.5 | -12.83 SND | -384.3 | -13.90 SND | -364.4 | -15.10 SND |
| 910. + .00 | -344.5 | -16.50 SND | -324.3 | -17.40 SND | -304.4 | -17.34 SND | -284.3 | -17.40 SND |
| 910. + .00 | -264.3 | -16.90 SND | -244.4 | -15.90 SND | -224.1 | -14.70 SND | -204.4 | -13.30 SND |
| 910. + .00 | -184.6 | -12.30 SND | -164.4 | -11.50 SND | -144.6 | -11.80 SND | -124.6 | -9.00 SND  |
| 910. + .00 | -104.4 | -6.25 SND  | -80.0  | -2.90 SND  | -60.5  | .30 WE     | -58.9  | 3.10 RP    |
| 910. + .00 | -51.6  | 3.27 RP    | -48.9  | 1.91 EOR   | -38.5  | 2.22 NG    | -29.0  | 2.32 NG    |

|           |       |           |       |          |      |          |       |          |
|-----------|-------|-----------|-------|----------|------|----------|-------|----------|
| 910.+ .00 | -21.8 | 2.68 FS   | -12.2 | 5.37 SLP | -1.6 | 8.80 FS  | .4    | 8.74 BL  |
| 910.+ .00 | 2.8   | 8.77 CL   | 7.5   | 8.74 PSC | 16.3 | 5.72 SLP | 30.5  | 1.20 SLP |
| 910.+ .00 | 47.2  | -4.02 PST | 65.7  | -4.64 NG | 87.9 | -4.78 NG | 107.7 | -5.92 NG |
| 910.+ .00 | 140.0 | -5.07 NG  |       |          |      |          |       |          |

|           |       |          |       |          |       |           |       |          |
|-----------|-------|----------|-------|----------|-------|-----------|-------|----------|
| 912.+ .00 | -60.7 | .30 WE   | -59.0 | 3.03 RP  | -50.6 | 3.51 RP   | -47.8 | 2.75 EOR |
| 912.+ .00 | -39.1 | 1.96 NG  | -30.1 | 2.22 NG  | -22.0 | 2.68 FS   | -13.0 | 5.37 SLP |
| 912.+ .00 | -2.5  | 8.84 FS  | .1    | 8.80 BL  | 2.9   | 8.83 CL   | 7.2   | 8.72 PSC |
| 912.+ .00 | 20.4  | 4.34 SLP | 32.1  | .35 SLP  | 44.9  | -3.43 PST | 64.5  | -4.74 NG |
| 912.+ .00 | 91.4  | -5.37 NG | 119.6 | -5.71 NG |       |           |       |          |

|           |       |          |       |         |       |           |       |          |
|-----------|-------|----------|-------|---------|-------|-----------|-------|----------|
| 914.+ .00 | -68.9 | .46 WE   | -66.7 | 2.87 RP | -57.4 | 3.14 RP   | -55.7 | 1.92 EOR |
| 914.+ .00 | -44.4 | 2.05 NG  | -33.0 | 2.07 NG | -23.2 | 2.53 FS   | -12.0 | 5.47 SLP |
| 914.+ .00 | -2.0  | 8.76 FS  | .2    | 8.75 BL | 2.7   | 8.70 CL   | 6.9   | 8.64 PSC |
| 914.+ .00 | 19.3  | 4.48 SLP | 32.5  | .21 SLP | 45.4  | -3.54 PST | 59.5  | -4.94 EW |

□ CROSS SECTION COORDINATES      Algiers West

| STATION   | DIST | ELEV NOTE | DIST | ELEV NOTE | DIST  | ELEV NOTE | DIST  | ELEV NOTE |
|-----------|------|-----------|------|-----------|-------|-----------|-------|-----------|
| 914.+ .00 | 76.4 | -5.16 NG  | 90.8 | -5.09 NG  | 125.5 | -5.51 NG  | 138.7 | -5.43 NG  |

|           |       |          |       |          |       |           |       |          |
|-----------|-------|----------|-------|----------|-------|-----------|-------|----------|
| 916.+ .00 | -63.7 | .20 WE   | -61.5 | 2.75 RP  | -51.5 | 3.13 RP   | -50.4 | 2.27 EOR |
| 916.+ .00 | -39.2 | 2.10 NG  | -28.4 | 2.38 NG  | -21.1 | 2.87 FS   | -11.3 | 5.89 SLP |
| 916.+ .00 | -2.0  | 8.89 FS  | .2    | 8.81 BL  | 3.3   | 8.84 CL   | 7.8   | 8.80 PSC |
| 916.+ .00 | 20.3  | 4.49 SLP | 33.0  | .34 SLP  | 44.4  | -3.22 PST | 59.2  | -4.55 EW |
| 916.+ .00 | 76.3  | -4.80 NG | 98.6  | -4.84 NG | 136.5 | -5.42 NG  |       |          |

|           |        |            |        |            |        |            |        |            |
|-----------|--------|------------|--------|------------|--------|------------|--------|------------|
| 918.+ .00 | -430.2 | -11.00 SND | -418.0 | -12.05 SND | -398.2 | -13.20 SND | -378.5 | -14.30 SND |
| 918.+ .00 | -358.5 | -15.70 SND | -338.1 | -17.10 SND | -318.5 | -17.50 SND | -298.2 | -17.40 SND |
| 918.+ .00 | -278.4 | -17.60 SND | -258.5 | -16.48 SND | -238.5 | -15.39 SND | -218.4 | -14.80 SND |
| 918.+ .00 | -198.3 | -13.12 SND | -178.2 | -11.15 SND | -158.3 | -9.70 SND  | -138.4 | -9.40 SND  |
| 918.+ .00 | -118.3 | -7.60 SND  | -99.2  | -3.55 SND  | -80.0  | .50 SND    | -75.9  | .13 WE     |
| 918.+ .00 | -73.1  | 3.41 RP    | -63.9  | 2.95 RP    | -61.4  | 1.77 EOR   | -48.2  | 1.95 NG    |
| 918.+ .00 | -36.4  | 2.08 NG    | -24.7  | 2.48 FS    | -11.4  | 5.57 SLP   | -1.5   | 8.98 FS    |
| 918.+ .00 | .0     | 8.95 BL    | 3.4    | 8.92 CL    | 7.3    | 8.94 PSC   | 20.1   | 4.64 SLP   |
| 918.+ .00 | 33.0   | .26 SLP    | 46.5   | -3.78 PST  | 54.6   | -4.33 EW   | 65.7   | -4.77 NG   |
| 918.+ .00 | 79.6   | -4.64 NG   | 94.5   | -5.45 NG   | 113.4  | -5.42 NG   |        |            |

|           |       |          |       |          |       |           |       |          |
|-----------|-------|----------|-------|----------|-------|-----------|-------|----------|
| 920.+ .00 | -70.4 | .65 WE   | -66.9 | 3.94 RP  | -59.7 | 3.56 RP   | -56.1 | 1.90 EOR |
| 920.+ .00 | -44.0 | 2.06 NG  | -32.3 | 2.31 NG  | -23.3 | 2.73 FS   | -11.8 | 5.67 SLP |
| 920.+ .00 | -2.2  | 8.99 FS  | .0    | 8.93 BL  | 2.8   | 8.95 CL   | 7.2   | 8.88 PSC |
| 920.+ .00 | 20.0  | 4.25 SLP | 31.8  | .55 SLP  | 45.4  | -3.15 PST | 54.2  | -4.18 NG |
| 920.+ .00 | 60.1  | -4.43 EW | 73.7  | -4.75 NG | 90.2  | -5.39 NG  | 107.3 | -5.84 NG |
| 920.+ .00 | 122.8 | -5.35 NG |       |          |       |           |       |          |

|      |   |     |        |            |        |            |        |            |        |            |
|------|---|-----|--------|------------|--------|------------|--------|------------|--------|------------|
| 922. | + | .00 | -422.3 | -11.60 SND | -420.0 | -11.80 SND | -400.2 | -13.10 SND | -380.1 | -14.30 SND |
| 922. | + | .00 | -359.7 | -15.50 SND | -340.2 | -16.80 SND | -319.9 | -17.10 SND | -300.1 | -17.10 SND |
| 922. | + | .00 | -280.1 | -17.20 SND | -260.0 | -16.40 SND | -239.8 | -15.00 SND | -219.8 | -14.10 SND |
| 922. | + | .00 | -200.0 | -12.70 SND | -179.9 | -11.00 SND | -160.2 | -9.70 SND  | -139.8 | -8.20 SND  |
| 922. | + | .00 | -119.7 | -6.10 SND  | -100.0 | -3.95 SND  | -80.4  | -1.26 SND  | -57.5  | .32 WE     |
| 922. | + | .00 | -54.6  | 2.85 RP    | -47.8  | 3.05 RP    | -45.0  | 2.10 EOR   | -35.2  | 2.16 NG    |
| 922. | + | .00 | -27.6  | 2.36 NG    | -21.6  | 2.87 FS    | -12.1  | 5.48 SLP   | -2.5   | 8.88 FS    |
| 922. | + | .00 | .0     | 8.88 BL    | 2.4    | 8.88 CL    | 6.7    | 8.88 PSC   | 18.5   | 5.02 SLP   |
| 922. | + | .00 | 30.5   | .97 SLP    | 42.0   | -2.44 PST  | 56.1   | -3.43 EW   | 70.9   | -3.85 NG   |
| 922. | + | .00 | 87.5   | -4.87 NG   | 103.6  | -6.79 NG   |        |            |        |            |

|      |   |     |       |          |       |          |       |           |       |          |
|------|---|-----|-------|----------|-------|----------|-------|-----------|-------|----------|
| 924. | + | .00 | -94.5 | .52 WE   | -91.8 | 3.65 RP  | -81.3 | 3.49 RP   | -79.1 | 2.10 EOR |
| 924. | + | .00 | -59.0 | 2.27 NG  | -42.9 | 2.75 NG  | -30.8 | 3.52 FS   | -21.4 | 5.58 SLP |
| 924. | + | .00 | -8.0  | 8.87 FS  | -1.5  | 9.04 CL  | 6.2   | 9.00 PSC  | 8.1   | 8.53 BL  |
| 924. | + | .00 | 20.4  | 5.31 SLP | 32.9  | 2.07 SLP | 49.2  | -1.62 PST | 56.7  | -1.58 EW |
| 924. | + | .00 | 72.7  | -.72 NG  | 81.6  | -.64 NG  | 91.8  | -3.71 NG  | 110.4 | -5.15 NG |
| 924. | + | .00 | 128.2 | -9.71 NG |       |          |       |           |       |          |

|      |   |     |        |        |        |         |        |         |        |          |
|------|---|-----|--------|--------|--------|---------|--------|---------|--------|----------|
| 926. | + | .00 | -151.5 | .47 WE | -148.6 | 2.38 RP | -140.2 | 3.01 RP | -138.3 | 1.56 EOR |
|------|---|-----|--------|--------|--------|---------|--------|---------|--------|----------|

□ CROSS SECTION COORDINATES      Algiers West

| STATION | DIST | ELEV NOTE | DIST   | ELEV NOTE | DIST  | ELEV NOTE | DIST  | ELEV NOTE |       |           |
|---------|------|-----------|--------|-----------|-------|-----------|-------|-----------|-------|-----------|
| 926.    | +    | .00       | -116.9 | 2.35 NG   | -92.8 | 2.45 NG   | -72.7 | 2.72 NG   | -55.2 | 3.51 FS   |
| 926.    | +    | .00       | -46.3  | 6.32 SLP  | -38.8 | 8.97 FS   | -35.2 | 9.18 BL   | -33.1 | 9.32 CL   |
| 926.    | +    | .00       | -28.0  | 9.15 PSC  | -16.6 | 5.23 SLP  | -4.7  | .95 SLP   | 6.3   | -1.15 PST |
| 926.    | +    | .00       | 19.2   | -2.30 EW  |       |           |       |           |       |           |

|      |   |     |        |            |        |            |        |            |        |            |
|------|---|-----|--------|------------|--------|------------|--------|------------|--------|------------|
| 928. | + | .00 | -417.8 | -11.10 SND | -407.5 | -12.73 SND | -387.2 | -14.35 SND | -367.4 | -15.20 SND |
| 928. | + | .00 | -347.4 | -16.10 SND | -327.1 | -16.96 SND | -307.5 | -16.77 SND | -287.5 | -16.70 SND |
| 928. | + | .00 | -267.1 | -16.46 SND | -247.4 | -16.10 SND | -227.6 | -14.50 SND | -207.3 | -12.20 SND |
| 928. | + | .00 | -187.5 | -11.30 SND | -167.3 | -9.40 SND  | -147.6 | -7.50 SND  | -127.5 | -6.50 SND  |
| 928. | + | .00 | -110.5 | -3.70 SND  | -93.5  | -.90 SND   | -50.3  | 2.17 NG    | -13.7  | 3.63 NG    |
| 928. | + | .00 | .5     | 3.25 NG    | 26.9   | 3.12 NG    | 61.4   | 2.74 NG    | 99.4   | 2.62 NG    |
| 928. | + | .00 | 142.0  | 2.46 NG    | 176.8  | 2.50 NG    | 209.2  | 2.72 NG    | 239.4  | 2.61 NG    |
| 928. | + | .00 | 266.1  | 2.77 NG    | 286.6  | 3.11 BL    | 306.3  | 3.77 NG    | 307.0  | 9.06 TC    |
| 928. | + | .00 | 308.8  | 9.07 TC    | 309.5  | 1.91 NG    | 324.6  | 2.03 NG    | 345.9  | 1.94 NG    |
| 928. | + | .00 | 364.5  | 1.99 NG    | 367.1  | -2.91 NG   | 385.3  | -3.12 NG   | 405.1  | -3.21 NG   |
| 928. | + | .00 | 427.0  | -3.24 NG   |        |            |        |            |        |            |

|      |   |     |        |            |        |            |        |            |        |            |
|------|---|-----|--------|------------|--------|------------|--------|------------|--------|------------|
| 930. | + | .00 | -409.8 | -11.90 SND | -394.0 | -13.70 SND | -373.8 | -14.68 SND | -353.8 | -16.10 SND |
| 930. | + | .00 | -334.0 | -16.97 SND | -314.0 | -17.23 SND | -293.9 | -16.93 SND | -273.5 | -16.10 SND |
| 930. | + | .00 | -253.9 | -15.64 SND | -233.5 | -14.86 SND | -214.0 | -13.24 SND | -193.8 | -11.84 SND |

|      |   |     |        |            |        |            |        |           |        |           |
|------|---|-----|--------|------------|--------|------------|--------|-----------|--------|-----------|
| 930. | + | .00 | -174.0 | -10.05 SND | -154.0 | -8.41 SND  | -134.1 | -8.14 SND | -113.7 | -7.82 SND |
| 930. | + | .00 | -93.9  | -5.92 SND  | -73.8  | -4.42 SND  | -53.9  | -5.85 SND | -33.9  | -8.10 SND |
| 930. | + | .00 | -13.9  | -8.00 SND  | 6.3    | -8.10 SND  | 26.2   | -7.30 SND | 46.2   | -5.00 SND |
| 930. | + | .00 | 66.1   | -4.00 SND  | 86.2   | -3.54 SND  | 106.0  | -3.30 SND | 126.2  | -3.37 SND |
| 930. | + | .00 | 146.0  | -4.00 SND  | 166.1  | -5.73 SND  | 186.1  | -7.83 SND | 206.1  | -9.33 SND |
| 930. | + | .00 | 226.2  | -11.20 SND | 246.2  | -11.40 SND |        |           |        |           |

|      |   |     |       |           |       |          |       |          |       |          |
|------|---|-----|-------|-----------|-------|----------|-------|----------|-------|----------|
| 932. | + | .00 | 136.7 | .43 WE    | 142.8 | 2.26 RP  | 162.2 | 3.44 RP  | 181.9 | 3.27 RP  |
| 932. | + | .00 | 193.1 | 1.43 EOR  | 217.8 | 1.27 NG  | 237.4 | 1.56 NG  | 252.5 | 1.84 BL  |
| 932. | + | .00 | 262.0 | 2.13 FS   | 276.5 | 3.96 SLP | 293.2 | 6.62 SLP | 303.6 | 8.52 FS  |
| 932. | + | .00 | 307.5 | 8.80 CL   | 312.4 | 8.50 PSC | 327.5 | 4.08 SLP | 340.4 | 1.48 SLP |
| 932. | + | .00 | 356.0 | -1.31 PST | 388.2 | -1.99 NG |       |          |       |          |

|      |   |     |        |          |        |          |        |          |        |          |
|------|---|-----|--------|----------|--------|----------|--------|----------|--------|----------|
| 934. | + | .00 | -226.8 | .64 WE   | -224.1 | 3.15 RP  | -217.0 | 3.22 RP  | -206.6 | 4.24 RP  |
| 934. | + | .00 | -205.1 | 3.33 EOR | -194.3 | 3.79 NG  | -179.6 | 4.20 NG  | -168.5 | 4.12 NG  |
| 934. | + | .00 | -154.3 | 4.17 NG  | -138.7 | 4.15 NG  | -118.8 | 2.83 NG  | -97.9  | 2.30 NG  |
| 934. | + | .00 | -79.3  | 2.76 NG  | -63.7  | 3.08 NG  | -52.1  | 3.74 FS  | -42.5  | 6.12 SLP |
| 934. | + | .00 | -32.6  | 8.98 FS  | -26.3  | 9.13 CL  | -20.7  | 9.03 PSC | -7.2   | 6.26 SLP |
| 934. | + | .00 | .1     | 4.86 BL  | 5.0    | 3.84 SLP | 14.6   | 1.93 SLP | 26.7   | -44 PST  |
| 934. | + | .00 | 38.4   | -1.50 NG | 49.2   | -2.21 NG | 57.2   | -2.64 EW | 73.1   | -3.70 NG |

|      |   |     |        |            |        |            |        |            |        |            |
|------|---|-----|--------|------------|--------|------------|--------|------------|--------|------------|
| 936. | + | .00 | -398.9 | -12.00 SND | -387.4 | -12.60 SND | -367.5 | -14.60 SND | -347.1 | -16.20 SND |
| 936. | + | .00 | -327.4 | -16.70 SND | -307.4 | -16.40 SND | -287.5 | -16.80 SND | -267.5 | -15.90 SND |
| 936. | + | .00 | -247.4 | -15.00 SND | -227.2 | -13.50 SND | -207.2 | -11.80 SND | -187.4 | -10.70 SND |
| 936. | + | .00 | -167.1 | -8.80 SND  | -147.2 | -8.20 SND  | -127.3 | -5.30 SND  | -107.5 | -3.50 SND  |

□ CROSS SECTION COORDINATES      Algiers West

| STATION | DIST | ELEV NOTE | DIST  | ELEV NOTE | DIST  | ELEV NOTE | DIST  | ELEV NOTE |       |          |
|---------|------|-----------|-------|-----------|-------|-----------|-------|-----------|-------|----------|
| 936.    | +    | .00       | -80.0 | -1.30 SND | -64.9 | .42 WE    | -61.9 | 3.01 RP   | -54.5 | 3.87 RP  |
| 936.    | +    | .00       | -52.5 | 2.72 EOR  | -40.8 | 3.67 NG   | -32.3 | 3.80 NG   | -23.4 | 4.41 FS  |
| 936.    | +    | .00       | -15.1 | 6.21 SLP  | -6.1  | 8.79 FS   | -1.4  | 8.99 BL   | 3.3   | 8.90 PSC |
| 936.    | +    | .00       | 14.0  | 5.51 SLP  | 24.6  | 2.00 SLP  | 41.1  | -2.05 PST | 53.8  | -2.64 NG |
| 936.    | +    | .00       | 64.4  | -2.79 NG  | 72.5  | -2.99 EW  | 83.0  | -3.25 NG  | 97.2  | -3.24 NG |
| 936.    | +    | .00       | 105.1 | -3.43 NG  |       |           |       |           |       |          |

|      |   |     |       |          |       |          |       |           |       |          |
|------|---|-----|-------|----------|-------|----------|-------|-----------|-------|----------|
| 938. | + | .00 | -80.0 | .62 WE   | -75.9 | 3.30 RP  | -64.9 | 3.93 RP   | -62.5 | 2.63 EOR |
| 938. | + | .00 | -52.6 | 3.23 NG  | -42.8 | 3.91 NG  | -33.5 | 4.36 NG   | -24.9 | 4.92 FS  |
| 938. | + | .00 | -15.7 | 6.61 SLP | -5.5  | 8.93 FS  | -.6   | 8.85 BL   | 3.4   | 8.72 PSC |
| 938. | + | .00 | 12.9  | 6.51 SLP | 26.8  | 2.78 SLP | 44.7  | -1.20 PST | 56.5  | -2.07 NG |
| 938. | + | .00 | 68.3  | -2.23 NG | 76.8  | -2.40 EW | 85.4  | -2.61 NG  | 99.5  | -2.73 NG |
| 938. | + | .00 | 106.0 | -7.83 NG |       |          |       |           |       |          |

|      |   |     |       |        |       |         |       |         |       |          |
|------|---|-----|-------|--------|-------|---------|-------|---------|-------|----------|
| 940. | + | .00 | -78.3 | .46 WE | -75.4 | 2.79 RP | -68.0 | 3.87 RP | -65.7 | 3.00 EOR |
|------|---|-----|-------|--------|-------|---------|-------|---------|-------|----------|

|           |       |          |       |          |       |          |       |          |
|-----------|-------|----------|-------|----------|-------|----------|-------|----------|
| 940.+ .00 | -56.7 | 3.11 NG  | -45.2 | 3.78 NG  | -35.1 | 4.23 NG  | -23.8 | 4.96 FS  |
| 940.+ .00 | -13.4 | 7.02 SLP | -4.7  | 8.73 FS  | -.2   | 8.83 BL  | 4.5   | 8.61 PSC |
| 940.+ .00 | 14.7  | 6.43 SLP | 28.4  | 3.20 SLP | 45.6  | -.36 PST | 57.9  | -1.13 NG |
| 940.+ .00 | 68.2  | -1.23 NG | 77.8  | -1.50 EW | 93.2  | -2.12 NG | 102.7 | -2.01 NG |
| 940.+ .00 | 116.6 | -2.10 NG |       |          |       |          |       |          |

|           |       |          |       |          |       |          |       |          |
|-----------|-------|----------|-------|----------|-------|----------|-------|----------|
| 942.+ .00 | -75.9 | .42 WE   | -73.3 | 3.27 RP  | -66.8 | 3.33 RP  | -64.3 | 3.07 EOR |
| 942.+ .00 | -56.0 | 3.64 NG  | -45.8 | 4.72 NG  | -33.7 | 5.39 NG  | -22.6 | 5.95 FS  |
| 942.+ .00 | -12.2 | 7.80 SLP | -4.9  | 9.03 FS  | -.1   | 9.11 BL  | 3.3   | 9.08 PSC |
| 942.+ .00 | 16.4  | 6.48 SLP | 30.2  | 3.03 SLP | 44.5  | -.02 PST | 58.7  | -.84 NG  |
| 942.+ .00 | 71.5  | -.87 NG  | 79.5  | -1.16 EW | 92.9  | -1.38 NG | 103.2 | -1.55 NG |
| 942.+ .00 | 116.1 | -1.56 NG |       |          |       |          |       |          |

|           |        |            |        |            |        |            |        |            |
|-----------|--------|------------|--------|------------|--------|------------|--------|------------|
| 944.+ .00 | -404.9 | -12.20 SND | -401.1 | -12.50 SND | -381.1 | -13.30 SND | -361.1 | -14.90 SND |
| 944.+ .00 | -341.1 | -15.80 SND | -320.9 | -16.60 SND | -300.9 | -16.70 SND | -280.9 | -16.30 SND |
| 944.+ .00 | -260.9 | -15.20 SND | -241.2 | -14.50 SND | -220.9 | -13.10 SND | -201.1 | -10.80 SND |
| 944.+ .00 | -181.2 | -9.70 SND  | -160.8 | -7.50 SND  | -141.1 | -4.70 SND  | -122.4 | -2.03 SND  |
| 944.+ .00 | -99.6  | .41 WE     | -95.1  | 2.98 RP    | -88.3  | 3.54 RP    | -85.6  | 1.91 EOR   |
| 944.+ .00 | -69.5  | 3.20 NG    | -57.9  | 4.25 NG    | -44.3  | 5.26 NG    | -27.6  | 5.90 FS    |
| 944.+ .00 | -27.5  | 5.92 NG    | -19.3  | 6.50 SLP   | -6.6   | 9.09 FS    | -1.2   | 9.16 BL    |
| 944.+ .00 | 3.7    | 8.99 PSC   | 15.6   | 6.23 SLP   | 27.9   | 3.34 SLP   | 43.5   | .42 PST    |
| 944.+ .00 | 58.6   | -.16 NG    | 71.4   | -.44 EW    | 86.4   | -.94 NG    | 97.8   | -1.06 NG   |
| 944.+ .00 | 111.0  | -1.21 NG   |        |            |        |            |        |            |

|           |       |          |       |          |       |          |       |          |
|-----------|-------|----------|-------|----------|-------|----------|-------|----------|
| 946.+ .00 | -87.2 | .45 WE   | -83.8 | 2.92 RP  | -78.5 | 3.13 RP  | -75.5 | 2.22 EOR |
| 946.+ .00 | -64.7 | 3.12 NG  | -49.7 | 4.25 NG  | -38.2 | 4.88 NG  | -30.8 | 5.17 NG  |
| 946.+ .00 | -22.5 | 5.64 FS  | -13.8 | 7.10 SLP | -4.1  | 9.03 FS  | -.1   | 8.97 BL  |
| 946.+ .00 | 4.7   | 8.95 PSC | 13.8  | 6.57 SLP | 25.5  | 3.71 SLP | 38.9  | .75 PST  |
| 946.+ .00 | 55.6  | -.24 NG  | 72.0  | -.68 EW  | 82.9  | -1.05 NG | 93.3  | -.68 NG  |
| 946.+ .00 | 100.6 | -.54 NG  | 106.9 | -1.29 NG |       |          |       |          |

□  
CROSS SECTION COORDINATES      Algiers West

| STATION   | DIST   | ELEV NOTE | DIST  | ELEV NOTE | DIST  | ELEV NOTE | DIST  | ELEV NOTE |
|-----------|--------|-----------|-------|-----------|-------|-----------|-------|-----------|
| 948.+ .00 | -100.2 | .89 WE    | -97.2 | 3.34 RP   | -88.1 | 3.40 RP   | -85.5 | 1.70 EOR  |
| 948.+ .00 | -75.6  | 2.60 NG   | -61.5 | 3.37 NG   | -49.1 | 4.78 NG   | -36.1 | 5.09 NG   |
| 948.+ .00 | -24.4  | 5.86 FS   | -15.2 | 7.35 SLP  | -4.6  | 9.17 FS   | .0    | 9.22 BL   |
| 948.+ .00 | 3.8    | 9.15 PSC  | 15.3  | 6.15 SLP  | 25.4  | 3.36 SLP  | 36.4  | 1.14 PST  |
| 948.+ .00 | 46.7   | .49 NG    | 57.1  | .29 EW    | 67.8  | .16 NG    | 82.2  | -.81 NG   |
| 948.+ .00 | 96.8   | -1.96 NG  | 110.2 | -2.50 NG  |       |           |       |           |

|           |        |         |        |         |        |         |        |          |
|-----------|--------|---------|--------|---------|--------|---------|--------|----------|
| 950.+ .00 | -133.8 | -.02 WE | -131.1 | 3.15 RP | -122.0 | 3.63 RP | -119.9 | 2.23 EOR |
| 950.+ .00 | -98.9  | 1.47 NG | -84.8  | 2.10 NG | -68.7  | 3.10 NG | -51.5  | 5.02 NG  |

|      |   |     |       |          |       |          |       |          |      |          |
|------|---|-----|-------|----------|-------|----------|-------|----------|------|----------|
| 950. | + | .00 | -38.5 | 5.76 NG  | -22.5 | 7.15 FS  | -12.0 | 8.13 SLP | -5.6 | 9.02 FS  |
| 950. | + | .00 | .0    | 9.23 BL  | 4.8   | 9.25 PSC | 15.9  | 6.52 SLP | 26.5 | 3.90 SLP |
| 950. | + | .00 | 38.9  | 1.73 PST | 51.8  | .64 NG   | 65.4  | .06 NG   | 82.6 | -.21 NG  |
| 950. | + | .00 | 102.4 | -.27 NG  | 102.9 | -.19 FL  |       |          |      |          |

|      |   |     |        |            |        |            |        |            |        |            |
|------|---|-----|--------|------------|--------|------------|--------|------------|--------|------------|
| 952. | + | .00 | -408.2 | -11.60 SND | -392.1 | -12.80 SND | -372.4 | -14.24 SND | -352.4 | -15.40 SND |
| 952. | + | .00 | -332.4 | -16.70 SND | -312.7 | -16.80 SND | -292.6 | -16.50 SND | -272.4 | -15.40 SND |
| 952. | + | .00 | -252.3 | -14.40 SND | -232.5 | -12.50 SND | -212.6 | -11.00 SND | -192.4 | -9.40 SND  |
| 952. | + | .00 | -172.4 | -8.20 SND  | -152.5 | -5.60 SND  | -132.2 | -3.40 SND  | -108.6 | .61 WE     |
| 952. | + | .00 | -106.1 | 3.10 RP    | -96.9  | 4.08 RP    | -93.8  | 2.46 EOR   | -83.8  | 2.73 NG    |
| 952. | + | .00 | -71.4  | 3.62 NG    | -56.8  | 4.82 NG    | -40.7  | 5.56 NG    | -28.5  | 6.00 NG    |
| 952. | + | .00 | -18.0  | 6.60 FS    | -10.7  | 7.55 SLP   | -4.5   | 8.73 FS    | .0     | 8.82 BL    |
| 952. | + | .00 | 4.5    | 8.82 PSC   | 17.0   | 5.87 SLP   | 28.8   | 2.84 SLP   | 40.1   | 1.20 PST   |
| 952. | + | .00 | 55.2   | -.12 NG    | 75.9   | -.82 NG    | 98.2   | -.77 FL    |        |            |

|      |   |     |       |          |       |          |       |          |       |          |
|------|---|-----|-------|----------|-------|----------|-------|----------|-------|----------|
| 954. | + | .00 | -98.9 | .55 WE   | -95.1 | 3.67 RP  | -86.7 | 3.85 RP  | -83.2 | 2.66 EOR |
| 954. | + | .00 | -71.2 | 3.35 NG  | -55.7 | 3.98 NG  | -36.0 | 4.88 NG  | -19.1 | 5.76 FS  |
| 954. | + | .00 | -9.3  | 7.43 SLP | -4.2  | 8.46 FS  | -.3   | 8.53 BL  | 4.0   | 8.57 PSC |
| 954. | + | .00 | 15.8  | 5.26 SLP | 28.1  | 2.43 SLP | 43.9  | -.25 PST | 58.7  | -1.04 NG |
| 954. | + | .00 | 76.3  | -1.18 NG | 93.4  | -.80 NG  | 117.7 | -.17 NG  | 134.1 | -.12 NG  |

|      |   |     |       |          |       |          |       |          |       |          |
|------|---|-----|-------|----------|-------|----------|-------|----------|-------|----------|
| 956. | + | .00 | -88.0 | .78 WE   | -84.3 | 3.50 RP  | -76.8 | 3.06 RP  | -74.4 | 1.97 EOR |
| 956. | + | .00 | -63.2 | 2.01 NG  | -46.8 | 2.52 NG  | -29.6 | 3.34 FS  | -15.0 | 5.81 SLP |
| 956. | + | .00 | -3.4  | 8.54 FS  | 1.0   | 8.49 BL  | 4.9   | 8.62 PSC | 14.7  | 5.84 SLP |
| 956. | + | .00 | 24.6  | 2.59 SLP | 38.9  | -.64 PST | 51.1  | -1.32 EW | 61.7  | -1.88 NG |
| 956. | + | .00 | 72.6  | -2.13 NG | 82.3  | -1.98 NG | 89.8  | -2.12 NG | 113.6 | -1.94 NG |

|      |   |     |       |          |       |           |       |          |       |          |
|------|---|-----|-------|----------|-------|-----------|-------|----------|-------|----------|
| 958. | + | .00 | -81.8 | .47 WE   | -77.3 | 2.68 RP   | -68.6 | 4.12 RP  | -64.1 | 2.82 EOR |
| 958. | + | .00 | -52.5 | 2.10 NG  | -39.1 | 2.49 NG   | -29.1 | 3.25 FS  | -14.4 | 6.18 SLP |
| 958. | + | .00 | -4.0  | 8.48 FS  | .0    | 8.56 BL   | 4.1   | 8.37 PSC | 18.4  | 4.69 SLP |
| 958. | + | .00 | 30.6  | .83 SLP  | 39.0  | -1.32 PST | 51.1  | -1.96 EW | 65.1  | -2.34 NG |
| 958. | + | .00 | 75.1  | -2.42 NG | 82.1  | -2.47 NG  | 87.8  | -2.40 NG | 97.7  | -2.26 NG |
| 958. | + | .00 | 101.5 | -1.87 NG | 110.2 | -2.06 NG  |       |          |       |          |

960. + .00 -408.5 -11.40 SND -404.2 -11.60 SND -384.4 -13.13 SND -364.4 -14.20 SND

□

CROSS SECTION COORDINATES      Algiers West

| STATION | DIST | ELEV NOTE | DIST   | ELEV NOTE  | DIST   | ELEV NOTE  | DIST   | ELEV NOTE  |        |            |
|---------|------|-----------|--------|------------|--------|------------|--------|------------|--------|------------|
| 960.    | +    | .00       | -344.0 | -15.80 SND | -324.2 | -16.82 SND | -304.2 | -17.00 SND | -284.2 | -16.50 SND |
| 960.    | +    | .00       | -264.4 | -14.40 SND | -244.4 | -13.30 SND | -224.3 | -12.30 SND | -204.4 | -9.50 SND  |
| 960.    | +    | .00       | -184.2 | -8.10 SND  | -164.5 | -7.30 SND  | -144.1 | -4.00 SND  | -124.3 | -3.30 SND  |
| 960.    | +    | .00       | -100.0 | -1.90 SND  | -85.1  | .11 WE     | -82.1  | 2.53 RP    | -71.9  | 3.50 RP    |
| 960.    | +    | .00       | -68.4  | 2.18 EOR   | -50.5  | 2.70 NG    | -35.9  | 2.82 NG    | -23.4  | 3.97 FS    |

|      |   |     |       |          |      |          |      |           |      |          |
|------|---|-----|-------|----------|------|----------|------|-----------|------|----------|
| 960. | + | .00 | -12.6 | 6.39 SLP | -4.1 | 8.88 FS  | .1   | 8.75 BL   | 4.9  | 8.79 PSC |
| 960. | + | .00 | 16.1  | 5.00 SLP | 25.3 | 1.73 SLP | 37.9 | -1.58 PST | 52.0 | -2.18 NG |
| 960. | + | .00 | 69.2  | -2.51 NG | 83.9 | -2.87 NG | 94.0 | -2.09 FL  |      |          |

|      |   |     |       |          |       |           |       |          |       |          |
|------|---|-----|-------|----------|-------|-----------|-------|----------|-------|----------|
| 962. | + | .00 | -83.2 | .37 WE   | -81.0 | 2.93 RP   | -71.2 | 3.55 RP  | -67.7 | 1.81 EOR |
| 962. | + | .00 | -54.1 | 2.18 NG  | -40.2 | 2.59 NG   | -23.6 | 3.44 FS  | -12.6 | 5.71 SLP |
| 962. | + | .00 | -3.6  | 8.47 FS  | .8    | 8.71 BL   | 5.7   | 8.66 PSC | 17.3  | 5.10 SLP |
| 962. | + | .00 | 30.5  | .70 SLP  | 42.2  | -2.03 PST | 58.3  | -2.43 NG | 76.1  | -2.76 NG |
| 962. | + | .00 | 94.2  | -2.78 NG | 95.7  | -2.90 FL  |       |          |       |          |

|      |   |     |       |          |       |          |       |           |       |          |
|------|---|-----|-------|----------|-------|----------|-------|-----------|-------|----------|
| 964. | + | .00 | -90.1 | .60 WE   | -84.1 | 3.36 RP  | -76.8 | 3.82 RP   | -71.9 | 1.66 EOR |
| 964. | + | .00 | -63.6 | 1.67 NG  | -48.9 | 2.06 NG  | -34.3 | 2.29 NG   | -25.0 | 3.00 FS  |
| 964. | + | .00 | -12.2 | 5.78 SLP | -3.5  | 8.96 FS  | .0    | 8.96 BL   | 4.6   | 8.97 PSC |
| 964. | + | .00 | 16.1  | 5.32 SLP | 29.1  | 1.00 SLP | 45.1  | -2.52 PST | 68.0  | -3.19 NG |
| 964. | + | .00 | 88.2  | -3.31 NG | 101.1 | -3.29 NG | 113.3 | -2.96 FL  |       |          |

|      |   |     |       |          |       |           |       |          |       |          |
|------|---|-----|-------|----------|-------|-----------|-------|----------|-------|----------|
| 966. | + | .00 | -90.3 | .36 WE   | -84.4 | 3.32 RP   | -77.6 | 3.83 RP  | -73.6 | 1.40 EOR |
| 966. | + | .00 | -51.9 | 1.93 NG  | -32.5 | 2.32 NG   | -23.4 | 2.94 FS  | -13.9 | 5.24 SLP |
| 966. | + | .00 | -3.8  | 8.64 FS  | -.5   | 8.70 BL   | 4.5   | 8.73 PSC | 16.2  | 4.95 SLP |
| 966. | + | .00 | 27.9  | 1.08 SLP | 43.1  | -2.69 PST | 63.3  | -2.96 NG | 80.8  | -3.19 NG |
| 966. | + | .00 | 94.4  | -3.20 NG | 100.2 | -3.03 FL  |       |          |       |          |

|      |   |     |        |            |        |            |        |            |        |            |
|------|---|-----|--------|------------|--------|------------|--------|------------|--------|------------|
| 968. | + | .00 | -399.8 | -11.70 SND | -383.3 | -12.81 SND | -363.4 | -14.60 SND | -343.3 | -16.70 SND |
| 968. | + | .00 | -323.4 | -17.20 SND | -303.3 | -17.50 SND | -283.3 | -16.60 SND | -263.2 | -13.80 SND |
| 968. | + | .00 | -243.6 | -11.90 SND | -223.4 | -9.80 SND  | -203.3 | -8.70 SND  | -183.4 | -6.34 SND  |
| 968. | + | .00 | -163.5 | -3.50 SND  | -143.5 | -3.29 SND  | -123.6 | -2.19 SND  | -100.0 | -2.30 SND  |
| 968. | + | .00 | -82.3  | .55 WE     | -79.2  | 2.06 RP    | -75.9  | 1.96 RP    | -74.3  | 1.95 EOR   |
| 968. | + | .00 | -64.6  | 2.22 NG    | -54.0  | 2.12 NG    | -48.5  | 2.31 FS    | -29.9  | 4.17 SLP   |
| 968. | + | .00 | -17.2  | 7.01 SLP   | -4.5   | 8.79 FS    | .0     | 8.88 BL    | 5.3    | 9.04 PSC   |
| 968. | + | .00 | 22.9   | 6.69 SLP   | 37.7   | 3.80 SLP   | 56.7   | -.42 PST   | 74.7   | -2.57 NG   |
| 968. | + | .00 | 92.7   | -3.35 NG   | 117.5  | -3.69 NG   |        |            |        |            |

|      |   |     |       |          |       |          |       |          |       |           |
|------|---|-----|-------|----------|-------|----------|-------|----------|-------|-----------|
| 970. | + | .00 | -81.1 | .55 WE   | -80.6 | 2.48 BL  | -61.2 | 3.74 NG  | -39.8 | 3.31 NG   |
| 970. | + | .00 | -29.5 | 3.59 FS  | -14.2 | 5.97 SLP | -4.2  | 8.77 FS  | -.1   | 8.77 BL   |
| 970. | + | .00 | 3.8   | 8.79 PSC | 15.3  | 5.34 SLP | 23.3  | 2.48 SLP | 41.1  | -1.49 PST |
| 970. | + | .00 | 59.0  | -2.33 NG | 74.3  | -2.66 NG | 96.3  | -2.21 NG | 112.3 | -1.53 NG  |

|      |   |     |        |         |        |         |       |         |       |          |
|------|---|-----|--------|---------|--------|---------|-------|---------|-------|----------|
| 972. | + | .00 | -115.2 | .60 WE  | -108.7 | 4.08 RP | -99.0 | 4.14 RP | -93.2 | 2.24 EOR |
| 972. | + | .00 | -74.8  | 1.84 NG | -53.8  | 1.89 NG | -37.2 | 2.59 NG | -27.5 | 3.24 FS  |

CROSS SECTION COORDINATES      Algiers West

| STATION | DIST | ELEV NOTE | | | | | | |
|---|---|---|---|---|---|---|---|---|
|---------|------|-----------|------|-----------|------|-----------|------|-----------|

|           |       |          |      |         |      |           |      |          |
|-----------|-------|----------|------|---------|------|-----------|------|----------|
| 972.+ .00 | -15.7 | 5.85 SLP | -5.5 | 8.72 FS | -.1  | 8.95 BL   | 3.8  | 8.90 PSC |
| 972.+ .00 | 15.3  | 5.14 SLP | 27.5 | .75 SLP | 39.7 | -2.36 PST | 50.3 | -2.67 FL |

|           |        |            |        |            |        |            |        |            |
|-----------|--------|------------|--------|------------|--------|------------|--------|------------|
| 974.+ .00 | -376.5 | -11.70 SND | -364.1 | -14.40 SND | -344.0 | -16.80 SND | -323.9 | -19.20 SND |
| 974.+ .00 | -303.9 | -19.20 SND | -284.1 | -16.90 SND | -264.1 | -14.10 SND | -244.0 | -10.30 SND |
| 974.+ .00 | -223.9 | -9.30 SND  | -204.0 | -6.20 SND  | -184.1 | -5.30 SND  | -160.0 | -2.60 SND  |
| 974.+ .00 | -146.1 | .60 WE     | -139.4 | 3.47 RP    | -132.3 | 3.44 RP    | -126.7 | 1.36 EOR   |
| 974.+ .00 | -106.7 | 1.66 EW    | -87.2  | 1.81 NG    | -66.8  | 2.06 NG    | -47.7  | 2.50 NG    |
| 974.+ .00 | -33.2  | 2.90 NG    | -27.7  | 3.04 FS    | -15.8  | 5.27 SLP   | -5.1   | 8.94 FS    |
| 974.+ .00 | .0     | 8.82 BL    | 4.6    | 8.78 PSC   | 16.4   | 4.83 SLP   | 26.2   | 1.36 SLP   |
| 974.+ .00 | 40.4   | -1.96 PST  | 58.6   | -2.46 NG   | 78.9   | -2.76 NG   | 97.6   | -2.63 NG   |
| 974.+ .00 | 116.7  | -2.47 NG   |        |            |        |            |        |            |

|             |        |            |        |            |        |            |        |            |
|-------------|--------|------------|--------|------------|--------|------------|--------|------------|
| 975.+ 60.00 | -385.4 | -11.00 SND | -379.5 | -12.20 SND | -359.5 | -15.00 SND | -339.7 | -18.10 SND |
| 975.+ 60.00 | -319.0 | -19.00 SND | -299.4 | -19.30 SND | -276.9 | -18.70 SND | -259.0 | -17.60 SND |
| 975.+ 60.00 | -239.6 | -15.45 SND | -219.0 | -6.70 SND  | -199.6 | -5.80 SND  | -185.0 | -2.00 SND  |
| 975.+ 60.00 | -157.8 | .55 WE     | -150.3 | 3.34 RP    | -145.9 | 3.40 RP    | -141.7 | 1.19 EOR   |
| 975.+ 60.00 | -127.5 | 1.25 NG    | -111.5 | 2.18 NG    | -94.3  | 1.90 EW    | -71.5  | 2.21 NG    |
| 975.+ 60.00 | -62.1  | 2.43 TB    | -41.4  | 4.75 NG    | -23.6  | 5.48 TP    | .0     | 6.12 CL    |
| 975.+ 60.00 | 24.2   | 5.42 TP    | 46.2   | 3.87 NG    | 71.0   | 2.41 NG    | 99.1   | -.60 TB    |
| 975.+ 60.00 | 126.7  | -.85 NG    | 152.6  | -1.00 NG   |        |            |        |            |

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#### TEMPLATE COORDINATES Algiers West

| STATION     | DIST  | ELEV NOTE | DIST | ELEV NOTE | DIST | ELEV NOTE | DIST | ELEV NOTE |
|-------------|-------|-----------|------|-----------|------|-----------|------|-----------|
| 771.+ 10.00 | -25.0 | 2.50      | 10.0 | 3.30      | 30.5 | 8.50      | 70.5 | 9.50      |
| 771.+ 10.00 | 70.5  | -5.00     |      |           |      |           |      |           |
| 772.+ .00   | -25.0 | 2.50      | 10.0 | 3.30      | 30.5 | 8.50      | 70.5 | 9.50      |
| 772.+ .00   | 70.5  | -5.00     |      |           |      |           |      |           |
| 774.+ .00   | -25.0 | 2.50      | 10.0 | 3.30      | 30.5 | 8.50      | 70.5 | 9.50      |
| 774.+ .00   | 70.5  | -5.00     |      |           |      |           |      |           |
| 776.+ .00   | -25.0 | 2.50      | 10.0 | 3.30      | 30.5 | 8.50      | 70.5 | 9.50      |
| 776.+ .00   | 70.5  | -5.00     |      |           |      |           |      |           |
| 778.+ .00   | -25.0 | 2.50      | 10.0 | 3.30      | 30.5 | 8.50      | 70.5 | 9.50      |
| 778.+ .00   | 70.5  | -5.00     |      |           |      |           |      |           |

|            |       |       |      |      |      |      |      |      |
|------------|-------|-------|------|------|------|------|------|------|
| 780. + .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 780. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |

|            |       |       |      |      |      |      |      |      |
|------------|-------|-------|------|------|------|------|------|------|
| 782. + .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 782. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |

|            |       |       |      |      |      |      |      |      |
|------------|-------|-------|------|------|------|------|------|------|
| 784. + .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 784. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |

|            |       |       |      |      |      |      |      |      |
|------------|-------|-------|------|------|------|------|------|------|
| 786. + .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 786. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |

|            |       |       |      |      |      |      |      |      |
|------------|-------|-------|------|------|------|------|------|------|
| 788. + .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 788. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |

|            |       |       |      |      |      |      |      |      |
|------------|-------|-------|------|------|------|------|------|------|
| 790. + .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 790. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |

|            |       |       |      |      |      |      |      |      |
|------------|-------|-------|------|------|------|------|------|------|
| 792. + .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 792. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |

|            |       |       |      |      |      |      |      |      |
|------------|-------|-------|------|------|------|------|------|------|
| 794. + .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 794. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |

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TEMPLATE COORDINATES      Algiers West

| STATION    | DIST  | ELEV NOTE | DIST | ELEV NOTE | DIST | ELEV NOTE | DIST | ELEV NOTE |
|------------|-------|-----------|------|-----------|------|-----------|------|-----------|
| 796. + .00 | -25.0 | 2.50      | 10.0 | 3.30      | 30.5 | 8.50      | 70.5 | 9.50      |
| 796. + .00 | 70.5  | -5.00     |      |           |      |           |      |           |
| 798. + .00 | -25.0 | 2.50      | 10.0 | 3.30      | 30.5 | 8.50      | 70.5 | 9.50      |
| 798. + .00 | 70.5  | -5.00     |      |           |      |           |      |           |

|      |   |     |       |       |      |      |      |      |      |      |
|------|---|-----|-------|-------|------|------|------|------|------|------|
| 800. | + | .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 800. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |
| 802. | + | .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 802. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |
| 804. | + | .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 804. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |
| 806. | + | .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 806. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |
| 808. | + | .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 808. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |
| 810. | + | .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 810. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |
| 812. | + | .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 812. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |
| 814. | + | .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 814. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |
| 816. | + | .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 816. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |
| 818. | + | .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 818. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |
| 820. | + | .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 820. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |

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## TEMPLATE COORDINATES Algiers West

| STATION    | DIST  | ELEV  | NOTE | DIST | ELEV | NOTE | DIST | ELEV | NOTE | DIST | ELEV | NOTE |
|------------|-------|-------|------|------|------|------|------|------|------|------|------|------|
| 822. + .00 | -25.0 | 2.50  |      | 10.0 | 3.30 |      | 30.5 | 8.50 |      | 70.5 | 9.50 |      |
| 822. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |      |      |      |      |
| 824. + .00 | -25.0 | 2.50  |      | 10.0 | 3.30 |      | 30.5 | 8.50 |      | 70.5 | 9.50 |      |
| 824. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |      |      |      |      |
| 826. + .00 | -25.0 | 2.50  |      | 10.0 | 3.30 |      | 30.5 | 8.50 |      | 70.5 | 9.50 |      |
| 826. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |      |      |      |      |
| 828. + .00 | -25.0 | 2.50  |      | 10.0 | 3.30 |      | 30.5 | 8.50 |      | 70.5 | 9.50 |      |
| 828. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |      |      |      |      |
| 830. + .00 | -25.0 | 2.50  |      | 10.0 | 3.30 |      | 30.5 | 8.50 |      | 70.5 | 9.50 |      |
| 830. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |      |      |      |      |
| 832. + .00 | -25.0 | 2.50  |      | 10.0 | 3.30 |      | 30.5 | 8.50 |      | 70.5 | 9.50 |      |
| 832. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |      |      |      |      |
| 834. + .00 | -25.0 | 2.50  |      | 10.0 | 3.30 |      | 30.5 | 8.50 |      | 70.5 | 9.50 |      |
| 834. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |      |      |      |      |
| 836. + .00 | -25.0 | 2.50  |      | 10.0 | 3.30 |      | 30.5 | 8.50 |      | 70.5 | 9.50 |      |
| 836. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |      |      |      |      |
| 838. + .00 | -25.0 | 2.50  |      | 10.0 | 3.30 |      | 30.5 | 8.50 |      | 70.5 | 9.50 |      |
| 838. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |      |      |      |      |
| 840. + .00 | -25.0 | 2.50  |      | 10.0 | 3.30 |      | 30.5 | 8.50 |      | 70.5 | 9.50 |      |
| 840. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |      |      |      |      |
| 842. + .00 | -25.0 | 2.50  |      | 10.0 | 3.30 |      | 30.5 | 8.50 |      | 70.5 | 9.50 |      |

842, + .00 70.5 -5.00

|            |       |       |      |      |      |      |      |      |
|------------|-------|-------|------|------|------|------|------|------|
| 844. + .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 844. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |

|            |       |       |      |      |      |      |      |      |
|------------|-------|-------|------|------|------|------|------|------|
| 846. + .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |
| 846 + .00  | 70.5  | -5.00 |      |      |      |      |      |      |

□ TEMPLATE COORDINATES Algiers West

| STATION    | DIST  | ELEV  | NOTE | DIST | ELEV | NOTE | DIST | ELEV | NOTE | DIST | ELEV | NOTE |
|------------|-------|-------|------|------|------|------|------|------|------|------|------|------|
| 848. + .00 | -25.0 | 2.50  |      | 10.0 | 3.30 |      | 30.5 | 8.50 |      | 70.5 | 9.50 |      |
| 848. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |      |      |      |      |
| 850. + .00 | -25.0 | 2.50  |      | 10.0 | 3.30 |      | 30.5 | 8.50 |      | 70.5 | 9.50 |      |
| 850. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |      |      |      |      |
| 852. + .00 | -25.0 | 2.50  |      | 10.0 | 3.30 |      | 30.5 | 8.50 |      | 70.5 | 9.50 |      |
| 852. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |      |      |      |      |
| 854. + .00 | -25.0 | 2.50  |      | 10.0 | 3.30 |      | 30.5 | 8.50 |      | 70.5 | 9.50 |      |
| 854. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |      |      |      |      |
| 856. + .00 | -25.0 | 2.50  |      | 10.0 | 3.30 |      | 30.5 | 8.50 |      | 70.5 | 9.50 |      |
| 856. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |      |      |      |      |
| 858. + .00 | -25.0 | 2.50  |      | 10.0 | 3.30 |      | 30.5 | 8.50 |      | 70.5 | 9.50 |      |
| 858. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |      |      |      |      |
| 860. + .00 | -25.0 | 2.50  |      | 10.0 | 3.30 |      | 30.5 | 8.50 |      | 70.5 | 9.50 |      |
| 860. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |      |      |      |      |
| 862. + .00 | -25.0 | 2.50  |      | 10.0 | 3.30 |      | 30.5 | 8.50 |      | 70.5 | 9.50 |      |

|            |       |       |      |      |      |      |      |      |  |  |  |
|------------|-------|-------|------|------|------|------|------|------|--|--|--|
| 862. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |  |  |  |
| 864. + .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |  |  |
| 864. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |  |  |  |
| 866. + .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |  |  |
| 866. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |  |  |  |
| 868. + .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |  |  |
| 868. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |  |  |  |
| 870. + .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |  |  |
| 870. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |  |  |  |
| 872. + .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |  |  |
| 872. + .00 | 70.5  | -5.00 |      |      |      |      |      |      |  |  |  |

TEMPLATE COORDINATES      Algiers West

| STATION    | DIST  | ELEV NOTE | DIST | ELEV NOTE | DIST | ELEV NOTE | DIST | ELEV NOTE |
|------------|-------|-----------|------|-----------|------|-----------|------|-----------|
| 874. + .00 | -25.0 | 2.50      | 10.0 | 3.30      | 30.5 | 8.50      | 70.5 | 9.50      |
| 874. + .00 | 70.5  | -5.00     |      |           |      |           |      |           |
| 876. + .00 | -25.0 | 2.50      | 10.0 | 3.30      | 30.5 | 8.50      | 70.5 | 9.50      |
| 876. + .00 | 70.5  | -5.00     |      |           |      |           |      |           |
| 878. + .00 | -25.0 | 2.50      | 10.0 | 3.30      | 30.5 | 8.50      | 70.5 | 9.50      |
| 878. + .00 | 70.5  | -5.00     |      |           |      |           |      |           |
| 880. + .00 | -25.0 | 2.50      | 10.0 | 3.30      | 30.5 | 8.50      | 70.5 | 9.50      |
| 880. + .00 | 70.5  | -5.00     |      |           |      |           |      |           |
| 882. + .00 | -25.0 | 2.50      | 10.0 | 3.30      | 30.5 | 8.50      | 70.5 | 9.50      |
| 882. + .00 | 70.5  | -5.00     |      |           |      |           |      |           |

|      |   |     |       |       |      |      |      |      |      |      |  |
|------|---|-----|-------|-------|------|------|------|------|------|------|--|
| 882. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |  |
| 884. | + | .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |
| 884. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |  |
| 886. | + | .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |
| 886. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |  |
| 888. | + | .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |
| 888. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |  |
| 890. | + | .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |
| 890. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |  |
| 892. | + | .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |
| 892. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |  |
| 894. | + | .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |
| 894. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |  |
| 896. | + | .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |
| 896. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |  |
| 898. | + | .00 | -25.0 | 2.50  | 10.0 | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |
| 898. | + | .00 | 70.5  | -5.00 |      |      |      |      |      |      |  |

□ TEMPLATE COORDINATES      Algiers West

| STATION | DIST | ELEV NOTE | DIST  | ELEV NOTE | DIST | ELEV NOTE | DIST | ELEV NOTE |      |      |  |
|---------|------|-----------|-------|-----------|------|-----------|------|-----------|------|------|--|
| 900.    | +    | .00       | -25.0 | 2.50      | 10.0 | 3.30      | 30.5 | 8.50      | 70.5 | 9.50 |  |
| 900.    | +    | .00       | 70.5  | -5.00     |      |           |      |           |      |      |  |
| 902.    | +    | .00       | -25.0 | 2.50      | 10.0 | 3.30      | 30.5 | 8.50      | 70.5 | 9.50 |  |

|      |      |     |       |       |       |      |      |      |      |      |  |
|------|------|-----|-------|-------|-------|------|------|------|------|------|--|
| 902. | +    | .00 | 70.5  | -5.00 |       |      |      |      |      |      |  |
| 904. | +    | .00 | -25.0 | 2.50  | 10.0  | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |
|      | 904. | +   | .00   | 70.5  | -5.00 |      |      |      |      |      |  |
| 906. | +    | .00 | -25.0 | 2.50  | 10.0  | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |
|      | 906. | +   | .00   | 70.5  | -5.00 |      |      |      |      |      |  |
| 908. | +    | .00 | -25.0 | 2.50  | 10.0  | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |
|      | 908. | +   | .00   | 70.5  | -5.00 |      |      |      |      |      |  |
| 910. | +    | .00 | -25.0 | 2.50  | 10.0  | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |
|      | 910. | +   | .00   | 70.5  | -5.00 |      |      |      |      |      |  |
| 912. | +    | .00 | -25.0 | 2.50  | 10.0  | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |
|      | 912. | +   | .00   | 70.5  | -5.00 |      |      |      |      |      |  |
| 914. | +    | .00 | -25.0 | 2.50  | 10.0  | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |
|      | 914. | +   | .00   | 70.5  | -5.00 |      |      |      |      |      |  |
| 916. | +    | .00 | -25.0 | 2.50  | 10.0  | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |
|      | 916. | +   | .00   | 70.5  | -5.00 |      |      |      |      |      |  |
| 918. | +    | .00 | -25.0 | 2.50  | 10.0  | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |
|      | 918. | +   | .00   | 70.5  | -5.00 |      |      |      |      |      |  |
| 920. | +    | .00 | -25.0 | 2.50  | 10.0  | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |
|      | 920. | +   | .00   | 70.5  | -5.00 |      |      |      |      |      |  |
| 922. | +    | .00 | -25.0 | 2.50  | 10.0  | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |
|      | 922. | +   | .00   | 70.5  | -5.00 |      |      |      |      |      |  |
| 924. | +    | .00 | -25.0 | 2.50  | 10.0  | 3.30 | 30.5 | 8.50 | 70.5 | 9.50 |  |
|      | 924. | +   | .00   | 70.5  | -5.00 |      |      |      |      |      |  |

□

## TEMPLATE COORDINATES

Algiers West

| STATION    | DIST | ELEV | NOTE | DIST | ELEV | NOTE  | DIST | ELEV | NOTE | DIST | ELEV | NOTE |
|------------|------|------|------|------|------|-------|------|------|------|------|------|------|
| 926. + .00 | .0   | .00  |      |      |      |       |      |      |      |      |      |      |
| 928. + .00 | .0   | .00  |      |      |      |       |      |      |      |      |      |      |
| 930. + .00 | .0   | .00  |      |      |      |       |      |      |      |      |      |      |
| 932. + .00 | .0   | .00  |      |      |      |       |      |      |      |      |      |      |
| 934. + .00 | .0   | 8.50 | 48.3 | 9.50 | 48.3 | -2.00 |      |      |      |      |      |      |
| 936. + .00 | .0   | 8.50 | 48.3 | 9.50 | 48.3 | -2.00 |      |      |      |      |      |      |
| 938. + .00 | .0   | 8.50 | 48.3 | 9.50 | 48.3 | -2.00 |      |      |      |      |      |      |
| 940. + .00 | .0   | 8.50 | 48.3 | 9.50 | 48.3 | -2.00 |      |      |      |      |      |      |
| 942. + .00 | .0   | 8.50 | 48.3 | 9.50 | 48.3 | -2.00 |      |      |      |      |      |      |
| 944. + .00 | .0   | 8.50 | 48.3 | 9.50 | 48.3 | -2.00 |      |      |      |      |      |      |
| 946. + .00 | .0   | 8.50 | 48.3 | 9.50 | 48.3 | -2.00 |      |      |      |      |      |      |
| 948. + .00 | .0   | 8.50 | 48.3 | 9.50 | 48.3 | -2.00 |      |      |      |      |      |      |

|            |    |      |      |      |      |       |
|------------|----|------|------|------|------|-------|
| 950. + .00 | .0 | 8.50 | 48.3 | 9.50 | 48.3 | -2.00 |
| 952. + .00 | .0 | 8.50 | 48.3 | 9.50 | 48.3 | -2.00 |
| 954. + .00 | .0 | 8.50 | 48.3 | 9.50 | 48.3 | -2.00 |
| 956. + .00 | .0 | 8.50 | 48.3 | 9.50 | 48.3 | -2.00 |
| 958. + .00 | .0 | 8.50 | 48.3 | 9.50 | 48.3 | -2.00 |

TEMPLATE COORDINATES      Algiers West

| STATION | DIST | ELEV NOTE | DIST | ELEV NOTE | DIST | ELEV NOTE | DIST | ELEV NOTE | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 960. + .00 | .0   | 8.50      | 48.3 | 9.50      | 48.3 | -2.00     |      |           |
| 962. + .00 | .0   | 8.50      | 48.3 | 9.50      | 48.3 | -2.00     |      |           |
| 964. + .00 | .0   | 8.50      | 48.3 | 9.50      | 48.3 | -2.00     |      |           |
| 966. + .00 | .0   | 8.50      | 48.3 | 9.50      | 48.3 | -2.00     |      |           |
| 968. + .00 | .0   | 8.50      | 48.3 | 9.50      | 48.3 | -2.00     |      |           |
| 970. + .00 | .0   | 8.50      | 48.3 | 9.50      | 48.3 | -2.00     |      |           |
| 972. + .00 | .0   | 8.50      | 48.3 | 9.50      | 48.3 | -2.00     |      |           |
| 974. + .00 | .0   | 8.50      | 48.3 | 9.50      | 48.3 | -2.00     |      |           |

975. + 60.00 .0 8.50 48.3 9.50 48.3 -2.00

□

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STATION NUMBER 771. + 10.00

INTERSECTIONS AREAS

X-COORD Y-COORD

25.15 7.14  
70.50 7.29 36.43

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 52.06 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
36.43 .00 0. 0. 0. 0.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
36.43 0. 0.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
47.74 55.49 55.35 0. 0. 0.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
0. 0. 0. 0. 0.

\*\*\*\*\*  
STATION NUMBER 772. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

70.50 6.07

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 .00 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
.00 .00 61. 0. 61. 0.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL

.00 61. 61.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
.00 .00 .00 2148. 2497. 2491.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
2148. 2497. 2491. 0. 0.

\*\*\*\*\*  
STATION NUMBER 774.+ .00

INTERSECTIONS AREAS

X-COORD Y-COORD

20.59 5.99  
70.50 .06 364.02

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.78 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
364.02 .00 1348. 0. 1409. 0.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
364.02 1348. 1409.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
59.68 60.71 59.91 5968. 6071. 5991.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
8116. 8568. 8482. 67. 67.

\*\*\*\*\*  
STATION NUMBER 776.+ .00

INTERSECTIONS AREAS

X-COORD Y-COORD

16.20 4.87  
70.50 -1.32 457.27

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 47.95 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
457.27 .00 3042. 0. 4451. 0.

FILL PLUS CUT AREA    FILL PLUS CUT VOL    CUM FILL PLUS CUT VOL  
457.27                3042.                4451.

SEEDING WIDTH    CLEARING WIDTH    PLAN WIDTH    SEEDING AREA    CLEARING AREA    PLAN AREA  
65.59                65.12                64.30                12526.                12584.                12422.

CUM AREA SEED    CUM AREA CLEAR    CUM AREA PLAN    VOLUME SURFACING    CUM VOL SURFACING  
20642.                21152.                20904.                67.                133.

\*\*\*\*\*

STATION NUMBER    778.+ .00

INTERSECTIONS    AREAS  
X-COORD Y-COORD  
16.34    4.91  
70.50   -1.58    465.71

TEMPLATE CENTERLINE    CENTROID OF FILL    CENTROID OF CUT  
.00                48.20                .00

RATIO (CUT/FILL) =    .00000

FILL AREA    CUT AREA    FILL VOL    CUT VOL    CUM FILL VOL    CUM CUT VOL  
465.71    .00    3418.    0.    7869.    0.

FILL PLUS CUT AREA    FILL PLUS CUT VOL    CUM FILL PLUS CUT VOL  
465.71                3418.                7869.

SEEDING WIDTH    CLEARING WIDTH    PLAN WIDTH    SEEDING AREA    CLEARING AREA    PLAN AREA  
65.70                64.99                64.16                13129.                13011.                12846.

CUM AREA SEED    CUM AREA CLEAR    CUM AREA PLAN    VOLUME SURFACING    CUM VOL SURFACING  
33771.                34163.                33750.                67.                200.

\*\*\*\*\*

STATION NUMBER    780.+ .00

INTERSECTIONS    AREAS  
X-COORD Y-COORD  
-24.96    2.50  
16.46    4.94    -145.59  
70.50   -1.91    472.94

TEMPLATE CENTERLINE    CENTROID OF FILL    CENTROID OF CUT  
.00                48.43                -2.27

RATIO (CUT/FILL) =    -.30784

FILL AREA    CUT AREA    FILL VOL    CUT VOL    CUM FILL VOL    CUM CUT VOL

472.94 -145.59 3476. -539. 11346. -539.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
327.35 2937. 10806.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
107.54 107.81 105.46 17324. 17280. 16962.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
51095. 51444. 50712. 67. 267.

\*\*\*\*\*

STATION NUMBER 782. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

16.81 5.03  
70.50 -1.79 471.89

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 48.37 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
471.89 .00 3499. -539. 14845. -1078.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
471.89 2960. 13767.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
65.42 64.63 63.69 17296. 17244. 16915.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
68392. 68688. 67626. 67. 333.

\*\*\*\*\*

STATION NUMBER 784. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

-23.79 2.53  
16.56 4.96 -140.62  
70.50 -2.77 500.47

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 48.78 -1.88

RATIO (CUT/FILL) = -.28098

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
500.47 -140.62 3601. -521. 18446. -1599.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
359.85 3081. 16847.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
107.23 106.75 104.29 17265. 17137. 16798.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
85657. 85825. 84424. 67. 400.

\*\*\*\*\*

STATION NUMBER 786. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

18.59 5.48  
70.50 -2.83 449.07

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.98 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
449.07 .00 3517. -521. 21963. -2120.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
449.07 2996. 19843.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
64.63 62.82 61.91 17186. 16957. 16620.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
102843. 102782. 101045. 67. 467.

\*\*\*\*\*

STATION NUMBER 788. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

17.44 5.19  
70.50 -3.66 515.28

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.49 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
515.28 .00 3572. 0. 25535. -2120.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
515.28 3572. 23415.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
66.64 64.28 63.06 13128. 12710. 12497.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
115971. 115493. 113542. 67. 533.

\*\*\*\*\*

STATION NUMBER 790. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD

17.69 5.25  
70.50 -4.91 533.82

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 50.12 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
533.82 .00 3886. 0. 29420. -2120.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
533.82 3886. 27300.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
67.63 64.17 62.81 13428. 12845. 12586.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
129399. 128338. 126128. 67. 600.

\*\*\*\*\*

STATION NUMBER 792. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD

16.88 5.04  
70.50 -5.17 561.16

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.68 .00

RATIO (CUT/FILL) = .00000

| FILL AREA | CUT AREA | FILL VOL | CUT VOL | CUM FILL VOL | CUM CUT VOL |
|-----------|----------|----------|---------|--------------|-------------|
| 561.16    | .00      | 4056.    | 0.      | 33476.       | -2120.      |

| FILL PLUS CUT AREA | FILL PLUS CUT VOL | CUM FILL PLUS CUT VOL |
|--------------------|-------------------|-----------------------|
| 561.16             | 4056.             | 31356.                |

| SEEDING WIDTH | CLEARING WIDTH | PLAN WIDTH | SEEDING AREA | CLEARING AREA | PLAN AREA |
|---------------|----------------|------------|--------------|---------------|-----------|
| 68.74         | 65.05          | 63.62      | 13637.       | 12922.        | 12643.    |

| CUM AREA SEED | CUM AREA CLEAR | CUM AREA PLAN | VOLUME SURFACING | CUM VOL SURFACING |
|---------------|----------------|---------------|------------------|-------------------|
| 143036.       | 141260.        | 138771.       | 67.              | 667.              |

\*\*\*\*\*

STATION NUMBER 794. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|        |       |         |
|--------|-------|---------|
| -24.52 | 2.51  |         |
| 16.05  | 4.83  | -123.52 |
| 70.50  | -7.42 | 625.91  |

| TEMPLATE CENTERLINE | CENTROID OF FILL | CENTROID OF CUT |
|---------------------|------------------|-----------------|
| .00                 | 49.99            | -1.23           |

RATIO (CUT/FILL) = -.19735

| FILL AREA | CUT AREA | FILL VOL | CUT VOL | CUM FILL VOL | CUM CUT VOL |
|-----------|----------|----------|---------|--------------|-------------|
| 625.91    | -123.52  | 4397.    | -457.   | 37872.       | -2578.      |

| FILL PLUS CUT AREA | FILL PLUS CUT VOL | CUM FILL PLUS CUT VOL |
|--------------------|-------------------|-----------------------|
| 502.39             | 3939.             | 35295.                |

| SEEDING WIDTH | CLEARING WIDTH | PLAN WIDTH | SEEDING AREA | CLEARING AREA | PLAN AREA |
|---------------|----------------|------------|--------------|---------------|-----------|
| 112.61        | 108.10         | 105.02     | 18135.       | 17315.        | 16864.    |

| CUM AREA SEED | CUM AREA CLEAR | CUM AREA PLAN | VOLUME SURFACING | CUM VOL SURFACING |
|---------------|----------------|---------------|------------------|-------------------|
| 161170.       | 158575.        | 155635.       | 67.              | 733.              |

\*\*\*\*\*

STATION NUMBER 796. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|        |       |        |
|--------|-------|--------|
| -11.47 | 2.81  |        |
| 23.56  | 6.74  | -98.77 |
| 70.50  | -5.33 | 433.66 |

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 53.40 8.35

RATIO (CUT/FILL) = -.22777

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
433.66 -98.77 3924. -823. 41797. -3401.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
334.88 3101. 38396.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
97.46 94.87 91.97 21007. 20297. 19699.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
182178. 178872. 175333. 67. 800.

\*\*\*\*\*  
STATION NUMBER 798.+ .00

INTERSECTIONS AREAS  
X-COORD Y-COORD  
-8.11 2.89  
23.49 6.72 -75.80  
70.50 -4.59 433.56

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 52.92 9.63

RATIO (CUT/FILL) = -.17484

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
433.56 -75.80 3212. -647. 45009. -4047.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
357.75 2565. 40961.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
93.36 91.18 88.61 19082. 18605. 18058.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
201260. 197478. 193391. 67. 867.

\*\*\*\*\*  
STATION NUMBER 800.+ .00

INTERSECTIONS AREAS  
X-COORD Y-COORD

17.59 5.23  
70.50 -4.77 536.00

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.85 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
536.00 .00 3591. -281. 48600. -4328.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
536.00 3310. 44271.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
67.60 64.27 62.91 16096. 15545. 15152.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
217356. 213022. 208543. 67. 933.

\*\*\*\*\*  
STATION NUMBER 802. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

-23.73 2.53  
16.16 4.86 -135.31  
70.50 -5.06 557.52

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.23 -1.49

RATIO (CUT/FILL) = -.24270

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
557.52 -135.31 4050. -501. 52650. -4829.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
422.21 3549. 47820.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
109.46 107.03 104.23 17706. 17130. 16714.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
235061. 230152. 225257. 67. 1000.

\*\*\*\*\*  
STATION NUMBER 804. + .00

## INTERSECTIONS AREAS

X-COORD Y-COORD

16.25 4.89  
70.50 -4.92 551.05TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.21 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
551.05 .00 4106. -501. 56756. -5331.FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
551.05 3605. 51425.SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
69.13 65.49 64.25 17859. 17251. 16848.CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
252920. 247403. 242105. 67. 1067.\*\*\*\*\*  
STATION NUMBER 806. + .00

## INTERSECTIONS AREAS

X-COORD Y-COORD

17.17 5.12  
70.50 -5.25 560.72TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.59 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
560.72 .00 4118. 0. 60873. -5331.FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
560.72 4118. 55543.SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
68.51 64.79 63.33 13764. 13028. 12757.CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
266685. 260431. 254863. 67. 1133.\*\*\*\*\*  
STATION NUMBER 808. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

20.14 5.87

70.50 -4.87 491.34

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT

.00 51.24 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
491.34 .00 3897. 0. 64770. -5331.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
491.34 3897. 59439.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
65.07 61.85 60.36 13358. 12664. 12369.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
280043. 273095. 267232. 67. 1200.

\*\*\*\*\*

STATION NUMBER 810. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

20.69 6.01

70.50 -3.94 473.16

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT

.00 51.31 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
473.16 .00 3572. 0. 68342. -5331.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
473.16 3572. 63011.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
63.58 61.26 59.81 12865. 12311. 12018.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
292907. 285406. 279249. 67. 1267.

\*\*\*\*\*

STATION NUMBER 812. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|        |        |
|--------|--------|
| -15.05 | 2.73   |
| 20.25  | 5.90   |
| 70.50  | -4.29  |
|        | 486.95 |

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 51.14 4.75

RATIO (CUT/FILL) = -.21731

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
486.95 -105.82 3556. -392. 71898. -5722.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
381.13 3164. 66175.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
100.01 98.21 95.55 16359. 15948. 15536.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
309266. 301354. 294786. 67. 1333.

\*\*\*\*\*

STATION NUMBER 814. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|        |        |
|--------|--------|
| -19.21 | 2.63   |
| 18.12  | 5.36   |
| 70.50  | -4.60  |
|        | 512.74 |

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 50.14 1.81

RATIO (CUT/FILL) = -.22887

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
512.74 -117.35 3703. -827. 75600. -6549.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
395.39 2876. 69051.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
104.49 102.26 99.71 20450. 20047. 19526.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
329716. 321401. 314312. 67. 1400.

\*\*\*\*\*

STATION NUMBER 816.+ .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|        |        |
|--------|--------|
| -23.70 | 2.53   |
| 15.72  | 4.75   |
| 70.50  | -4.02  |
|        | 544.19 |

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 48.82 -1.32

RATIO (CUT/FILL) = -.22459

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
544.19 -122.22 3915. -887. 79515. -7436.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
421.97 3027. 72079.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
108.39 106.77 104.20 21287. 20903. 20391.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
351004. 342305. 334703. 67. 1467.

\*\*\*\*\*  
STATION NUMBER 818.+ .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|        |        |
|--------|--------|
| -23.43 | 2.54   |
| 16.09  | 4.84   |
| 70.50  | -3.54  |
|        | 529.82 |

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 48.83 -1.16

RATIO (CUT/FILL) = -.23878

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
529.82 -126.51 3978. -921. 83493. -8358.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
403.31 3057. 75135.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
107.64 106.50 103.93 21603. 21327. 20813.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
372607. 363631. 355516. 67. 1533.

\*\*\*\*\*  
STATION NUMBER 820.+ .00

INTERSECTIONS AREAS

X-COORD Y-COORD

16.54 4.96  
70.50 -4.16 524.74

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.20 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
524.74 .00 3906. -469. 87399. -8826.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
524.74 3437. 78572.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
68.07 65.10 63.96 17572. 17160. 16789.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
390178. 380791. 372305. 67. 1600.

\*\*\*\*\*  
STATION NUMBER 822.+ .00

INTERSECTIONS AREAS

X-COORD Y-COORD

3.32 3.15  
70.50 -2.01 554.98

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 43.95 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
554.98 .00 3999. 0. 91398. -8826.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
554.98 3999. 82571.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
79.36 77.67 77.18 14743. 14277. 14115.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING

404921. 395068. 386420. 67. 1667.

\*\*\*\*\*  
STATION NUMBER 824. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

15.47 4.69  
70.50 -2.82 493.66

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 48.23 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
493.66 .00 3884. 0. 95281. -8826.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
493.66 3884. 86455.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
67.83 65.88 65.03 14719. 14355. 14221.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
419640. 409423. 400641. 67. 1733.

\*\*\*\*\*  
STATION NUMBER 826. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

-21.80 2.57  
17.01 5.08 -127.57  
70.50 -3.88 527.17

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.30 .09

RATIO (CUT/FILL) = -.24199

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
527.17 -127.57 3781. -472. 99062. -9299.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
399.60 3308. 89764.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
106.35 105.00 102.30 17419. 17088. 16733.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
437058. 426511. 417374. 67. 1800.

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STATION NUMBER 828. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD

-22.48 2.56  
16.82 5.03 -128.16  
70.50 -4.47 541.53

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.41 -.44

RATIO (CUT/FILL) = -.23666

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
541.53 -128.16 3958. -947. 103020. -10246.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
413.37 3011. 92775.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
107.62 105.68 102.98 21397. 21069. 20528.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
458456. 447580. 437902. 67. 1867.

---

STATION NUMBER 830. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD

-22.23 2.56  
16.59 4.97 -127.18  
70.50 -4.24 535.03

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.14 -.53

RATIO (CUT/FILL) = -.23770

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
535.03 -127.18 3987. -946. 107008. -11191.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
407.85 3042. 95816.

| SEEDING WIDTH | CLEARING WIDTH | PLAN WIDTH | SEEDING AREA | CLEARING AREA | PLAN AREA |
|---------------|----------------|------------|--------------|---------------|-----------|
| 107.15        | 105.40         | 102.73     | 21477.       | 21108.        | 20571.    |

| CUM AREA SEED | CUM AREA CLEAR | CUM AREA PLAN | VOLUME SURFACING | CUM VOL SURFACING |
|---------------|----------------|---------------|------------------|-------------------|
| 479933.       | 468688.        | 458473.       | 67.              | 1933.             |

\*\*\*\*\*  
STATION NUMBER 832. + .00

| INTERSECTIONS | AREAS   |
|---------------|---------|
| X-COORD       | Y-COORD |

|        |        |
|--------|--------|
| -21.34 | 2.58   |
| 16.45  | 4.94   |
| 70.50  | -4.71  |
|        | 528.16 |

| TEMPLATE CENTERLINE | CENTROID OF FILL | CENTROID OF CUT |
|---------------------|------------------|-----------------|
| .00                 | 49.20            | -.08            |

RATIO (CUT/FILL) = -.22283

| FILL AREA | CUT AREA | FILL VOL | CUT VOL | CUM FILL VOL | CUM CUT VOL |
|-----------|----------|----------|---------|--------------|-------------|
| 528.16    | -117.69  | 3938.    | -907.   | 110945.      | -12098.     |

| FILL PLUS CUT AREA | FILL PLUS CUT VOL | CUM FILL PLUS CUT VOL |
|--------------------|-------------------|-----------------------|
| 410.47             | 3031.             | 98847.                |

| SEEDING WIDTH | CLEARING WIDTH | PLAN WIDTH | SEEDING AREA | CLEARING AREA | PLAN AREA |
|---------------|----------------|------------|--------------|---------------|-----------|
| 106.72        | 104.40         | 101.84     | 21387.       | 20980.        | 20457.    |

| CUM AREA SEED | CUM AREA CLEAR | CUM AREA PLAN | VOLUME SURFACING | CUM VOL SURFACING |
|---------------|----------------|---------------|------------------|-------------------|
| 501319.       | 489668.        | 478930.       | 67.              | 2000.             |

\*\*\*\*\*  
STATION NUMBER 834. + .00

| INTERSECTIONS | AREAS   |
|---------------|---------|
| X-COORD       | Y-COORD |

|        |        |
|--------|--------|
| -21.31 | 2.58   |
| 16.80  | 5.02   |
| 70.50  | -4.04  |
|        | 527.25 |

| TEMPLATE CENTERLINE | CENTROID OF FILL | CENTROID OF CUT |
|---------------------|------------------|-----------------|
| .00                 | 49.13            | .59             |

RATIO (CUT/FILL) = -.21591

| FILL AREA | CUT AREA | FILL VOL | CUT VOL | CUM FILL VOL | CUM CUT VOL |
|-----------|----------|----------|---------|--------------|-------------|
| 527.25    | -113.84  | 3909.    | -858.   | 114854.      | -12956.     |

FILL PLUS CUT AREA    FILL PLUS CUT VOL    CUM FILL PLUS CUT VOL  
413.41                3051.                101898.

SEEDING WIDTH    CLEARING WIDTH    PLAN WIDTH    SEEDING AREA    CLEARING AREA    PLAN AREA  
106.01                104.35                101.81                21273.                20875.                20364.

CUM AREA SEED    CUM AREA CLEAR    CUM AREA PLAN    VOLUME SURFACING    CUM VOL SURFACING  
522592.                510543.                499295.                67.                2067.

\*\*\*\*\*

STATION NUMBER    836. + .00

INTERSECTIONS    AREAS  
X-COORD Y-COORD

-22.58    2.56  
15.98    4.82    -122.78  
70.50    -3.97    536.70

TEMPLATE CENTERLINE    CENTROID OF FILL    CENTROID OF CUT  
.00                48.77                -1.18

RATIO (CUT/FILL) = -.22878

FILL AREA    CUT AREA    FILL VOL    CUT VOL    CUM FILL VOL    CUM CUT VOL  
536.70    -122.78    3941.    -876.    118795.    -13832.

FILL PLUS CUT AREA    FILL PLUS CUT VOL    CUM FILL PLUS CUT VOL  
413.92                3064.                104963.

SEEDING WIDTH    CLEARING WIDTH    PLAN WIDTH    SEEDING AREA    CLEARING AREA    PLAN AREA  
107.23                105.58                103.08                21324.                20993.                20489.

CUM AREA SEED    CUM AREA CLEAR    CUM AREA PLAN    VOLUME SURFACING    CUM VOL SURFACING  
543916.                531536.                519783.                67.                2133.

\*\*\*\*\*

STATION NUMBER    838. + .00

INTERSECTIONS    AREAS  
X-COORD Y-COORD

-21.46    2.58  
16.49    4.95    -123.64  
70.50    -4.11    522.06

TEMPLATE CENTERLINE    CENTROID OF FILL    CENTROID OF CUT  
.00                49.16                -.33

RATIO (CUT/FILL) = -.23683

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
522.06 -123.64 3921. -913. 122716. -14745.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
398.42 3009. 107971.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
106.25 104.50 101.96 21347. 21009. 20505.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
565264. 552545. 540288. 67. 2200.

\*\*\*\*\*  
STATION NUMBER 840. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|        |       |         |
|--------|-------|---------|
| -23.43 | 2.54  |         |
| 16.37  | 4.92  | -132.13 |
| 70.50  | -3.72 | 517.88  |

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 48.72 -1.54

RATIO (CUT/FILL) = -.25515

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
517.88 -132.13 3852. -947. 126568. -15692.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
385.75 2904. 110876.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
107.82 106.42 103.93 21407. 21093. 20589.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
586671. 573638. 560878. 67. 2267.

\*\*\*\*\*  
STATION NUMBER 842. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|        |       |         |
|--------|-------|---------|
| -21.38 | 2.58  |         |
| 15.40  | 4.67  | -117.72 |
| 70.50  | -4.32 | 553.36  |

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT

.00 48.46 -1.15

RATIO (CUT/FILL) = -.21274

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
553.36 -117.72 3968. -925. 130535. -16618.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
435.64 3042. 113918.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
106.37 104.52 101.88 21419. 21095. 20581.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
608090. 594732. 581459. 67. 2333.

\*\*\*\*\*

STATION NUMBER 844. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

-12.85 2.78  
20.72 6.02 -97.43  
70.50 -4.27 469.37

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 51.35 6.12

RATIO (CUT/FILL) = -.20758

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
469.37 -97.43 3788. -797. 134323. -17414.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
371.94 2991. 116909.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
97.79 95.98 93.35 20416. 20051. 19523.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
628506. 614783. 600982. 67. 2400.

\*\*\*\*\*

STATION NUMBER 846. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

-21.75 2.57  
16.02 4.83 -108.39

70.50 -3.88 511.44

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.03 -.77

RATIO (CUT/FILL) = -.21193

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
511.44 -108.39 3633. -762. 137956. -18177.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
403.05 2870. 119779.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
106.29 104.25 102.25 20408. 20023. 19560.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
648914. 634807. 620542. 67. 2467.

\*\*\*\*\*  
STATION NUMBER 848. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD

-24.80 2.50  
14.04 4.33 -124.02  
70.50 -4.86 568.80

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 48.41 -3.16

RATIO (CUT/FILL) = -.21803

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
568.80 -124.02 4001. -861. 141957. -19038.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
444.78 3140. 122919.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
110.33 107.83 105.30 21662. 21208. 20754.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
670576. 656015. 641297. 67. 2533.

\*\*\*\*\*  
STATION NUMBER 850. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|        |        |
|--------|--------|
| -20.02 | 2.61   |
| 17.37  | 5.17   |
| 70.50  | -5.09  |
|        | 536.97 |

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.90 1.02

RATIO (CUT/FILL) = -.22082

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
536.97 -118.57 4095. -898. 146052. -19936.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
418.40 3197. 126116.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
105.77 103.28 100.52 21610. 21111. 20581.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
692186. 677125. 661878. 67. 2600.

\*\*\*\*\*  
STATION NUMBER 852.+ .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|        |        |
|--------|--------|
| -23.72 | 2.53   |
| 16.23  | 4.88   |
| 70.50  | -4.37  |
|        | 546.26 |

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.04 -.95

RATIO (CUT/FILL) = -.22937

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
546.26 -125.30 4012. -903. 150064. -20839.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
420.97 3109. 129225.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
108.77 106.89 104.22 21454. 21017. 20474.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
713640. 698142. 682351. 67. 2667.

\*\*\*\*\*  
STATION NUMBER 854.+ .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|        |        |
|--------|--------|
| -24.29 | 2.52   |
| 15.27  | 4.64   |
| 70.50  | -4.67  |
|        | 561.04 |

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 48.85 -2.61

RATIO (CUT/FILL) = -.24922

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
561.04 -139.82 4101. -982. 154165. -21821.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
421.22 3119. 132344.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
109.64 107.60 104.80 21840. 21448. 20902.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
735480. 719591. 703253. 67. 2733.

\*\*\*\*\*  
STATION NUMBER 856. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|        |        |
|--------|--------|
| -22.98 | 2.55   |
| 16.72  | 5.00   |
| 70.50  | -5.03  |
|        | 551.64 |

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.38 -.88

RATIO (CUT/FILL) = -.24881

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
551.64 -137.25 4121. -1026. 158286. -22847.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
414.38 3095. 135439.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
108.68 106.35 103.48 21832. 21395. 20828.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
757311. 740985. 724080. 67. 2800.

\*\*\*\*\*

STATION NUMBER 858.+ .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|        |       |         |
|--------|-------|---------|
| -24.82 | 2.50  |         |
| 17.24  | 5.14  | -129.73 |
| 70.50  | -5.30 | 550.65  |

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.88 .20

RATIO (CUT/FILL) = -.23559

| FILL AREA | CUT AREA | FILL VOL | CUT VOL | CUM FILL VOL | CUM CUT VOL |
|-----------|----------|----------|---------|--------------|-------------|
| 550.65    | -129.73  | 4083.    | -989.   | 162369.      | -23836.     |

| FILL PLUS CUT AREA | FILL PLUS CUT VOL | CUM FILL PLUS CUT VOL |
|--------------------|-------------------|-----------------------|
| 420.93             | 3094.             | 138533.               |

| SEEDING WIDTH | CLEARING WIDTH | PLAN WIDTH | SEEDING AREA | CLEARING AREA | PLAN AREA |
|---------------|----------------|------------|--------------|---------------|-----------|
| 110.78        | 108.24         | 105.32     | 21947.       | 21459.        | 20880.    |

| CUM AREA SEED | CUM AREA CLEAR | CUM AREA PLAN | VOLUME SURFACING | CUM VOL SURFACING |
|---------------|----------------|---------------|------------------|-------------------|
| 779258.       | 762444.        | 744960.       | 67.              | 2867.             |

\*\*\*\*\*

STATION NUMBER 860.+ .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|        |       |         |
|--------|-------|---------|
| -21.03 | 2.59  |         |
| 17.40  | 5.18  | -130.42 |
| 70.50  | -5.19 | 542.27  |

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.83 .40

RATIO (CUT/FILL) = -.24051

| FILL AREA | CUT AREA | FILL VOL | CUT VOL | CUM FILL VOL | CUM CUT VOL |
|-----------|----------|----------|---------|--------------|-------------|
| 542.27    | -130.42  | 4048.    | -964.   | 166417.      | -24800.     |

| FILL PLUS CUT AREA | FILL PLUS CUT VOL | CUM FILL PLUS CUT VOL |
|--------------------|-------------------|-----------------------|
| 411.85             | 3084.             | 141617.               |

| SEEDING WIDTH | CLEARING WIDTH | PLAN WIDTH | SEEDING AREA | CLEARING AREA | PLAN AREA |
|---------------|----------------|------------|--------------|---------------|-----------|
| 106.88        | 104.42         | 101.53     | 21767.       | 21266.        | 20684.    |

| CUM AREA SEED | CUM AREA CLEAR | CUM AREA PLAN | VOLUME SURFACING | CUM VOL SURFACING |
|---------------|----------------|---------------|------------------|-------------------|
| 801025.       | 783711.        | 765644.       | 67.              | 2933.             |

\*\*\*\*\*  
STATION NUMBER 862.+ .00

INTERSECTIONS AREAS

X-COORD Y-COORD

17.13 5.11  
70.50 -5.16 539.30

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.97 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
539.30 .00 4006. -483. 170423. -25283.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
539.30 3523. 145140.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
68.47 64.67 63.37 17535. 16909. 16490.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
818559. 800620. 782134. 67. 3000.

\*\*\*\*\*  
STATION NUMBER 864.+ .00

INTERSECTIONS AREAS

X-COORD Y-COORD

-20.69 2.60  
15.54 4.71 -115.90  
70.50 -5.38 586.83

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.13 -.70

RATIO (CUT/FILL) = -.19750

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
586.83 -115.90 4171. -429. 174593. -25712.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
470.93 3742. 148881.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
106.74 104.03 101.19 17520. 16871. 16456.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
836079. 817491. 798590. 67. 3067.

\*\*\*\*\*  
STATION NUMBER 866.+ .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|        |       |         |
|--------|-------|---------|
| -20.75 | 2.60  |         |
| 15.44  | 4.68  | -113.25 |
| 70.50  | -6.22 | 611.38  |

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.15 -.72

RATIO (CUT/FILL) = -.18524

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
611.38 -113.25 4438. -849. 179031. -26561.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
498.13 3589. 152471.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
107.64 104.18 101.25 21438. 20822. 20244.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
857518. 838313. 818834. 67. 3133.

\*\*\*\*\*  
STATION NUMBER 868.+ .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|        |       |         |
|--------|-------|---------|
| -23.54 | 2.53  |         |
| 15.57  | 4.71  | -130.50 |
| 70.50  | -6.23 | 611.40  |

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.21 -2.03

RATIO (CUT/FILL) = -.21344

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
611.40 -130.50 4529. -903. 183560. -27464.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
480.90 3626. 156097.

SEEDING WIDTH    CLEARING WIDTH    PLAN WIDTH    SEEDING AREA    CLEARING AREA    PLAN AREA  
110.43    107.09    104.04    21808.    21127.    20529.

CUM AREA SEED    CUM AREA CLEAR    CUM AREA PLAN    VOLUME SURFACING    CUM VOL SURFACING  
879326.    859440.    839363.    67.    3200.

\*\*\*\*\*

STATION NUMBER    870. + .00

INTERSECTIONS    AREAS

X-COORD Y-COORD

19.93    5.82  
70.50    -4.48    420.94

TEMPLATE CENTERLINE    CENTROID OF FILL    CENTROID OF CUT  
.00    51.85    .00

RATIO (CUT/FILL) =    .00000

FILL AREA    CUT AREA    FILL VOL    CUT VOL    CUM FILL VOL    CUM CUT VOL  
420.94    .00    3823.    -483.    187384.    -27947.

FILL PLUS CUT AREA    FILL PLUS CUT VOL    CUM FILL PLUS CUT VOL  
420.94    3340.    159437.

SEEDING WIDTH    CLEARING WIDTH    PLAN WIDTH    SEEDING AREA    CLEARING AREA    PLAN AREA  
64.90    61.63    60.57    17533.    16872.    16461.

CUM AREA SEED    CUM AREA CLEAR    CUM AREA PLAN    VOLUME SURFACING    CUM VOL SURFACING  
896859.    876312.    855824.    67.    3267.

\*\*\*\*\*

STATION NUMBER    872. + .00

INTERSECTIONS    AREAS

X-COORD Y-COORD

-24.29    2.52  
16.90    5.05    -143.24  
70.50    -3.65    526.93

TEMPLATE CENTERLINE    CENTROID OF FILL    CENTROID OF CUT  
.00    48.91    -.88

RATIO (CUT/FILL) =    -.27184

FILL AREA    CUT AREA    FILL VOL    CUT VOL    CUM FILL VOL    CUM CUT VOL  
526.93    -143.24    3511.    -531.    190894.    -28477.

FILL PLUS CUT AREA    FILL PLUS CUT VOL    CUM FILL PLUS CUT VOL

383.69            2980.            162417.

SEEDING WIDTH    CLEARING WIDTH    PLAN WIDTH    SEEDING AREA    CLEARING AREA    PLAN AREA  
108.62        107.62        104.79        17352.        16926.        16536.

CUM AREA SEED    CUM AREA CLEAR    CUM AREA PLAN    VOLUME SURFACING    CUM VOL SURFACING  
914211.        893238.        872360.        67.        3333.

\*\*\*\*\*

STATION NUMBER    874. + .00

INTERSECTIONS            AREAS

X-COORD    Y-COORD

-22.55    2.56  
16.05    4.84    -123.27  
70.50    -4.06    539.13

TEMPLATE CENTERLINE    CENTROID OF FILL    CENTROID OF CUT  
.00        48.81        -1.01

RATIO (CUT/FILL) =    -.22865

FILL AREA    CUT AREA    FILL VOL    CUT VOL    CUM FILL VOL    CUM CUT VOL  
539.13    -123.27    3948.    -987.    194843.    -29464.

FILL PLUS CUT AREA    FILL PLUS CUT VOL    CUM FILL PLUS CUT VOL  
415.86        2961.        165378.

SEEDING WIDTH    CLEARING WIDTH    PLAN WIDTH    SEEDING AREA    CLEARING AREA    PLAN AREA  
107.27        105.65        103.05        21589.        21327.        20784.

CUM AREA SEED    CUM AREA CLEAR    CUM AREA PLAN    VOLUME SURFACING    CUM VOL SURFACING  
935799.        914565.        893144.        67.        3400.

\*\*\*\*\*

STATION NUMBER    876. + .00

INTERSECTIONS            AREAS

X-COORD    Y-COORD

70.50    .40

TEMPLATE CENTERLINE    CENTROID OF FILL    CENTROID OF CUT  
.00        .00        .00

RATIO (CUT/FILL) =    .00000

FILL AREA    CUT AREA    FILL VOL    CUT VOL    CUM FILL VOL    CUM CUT VOL  
.00        .00        1997.        -457.        196839.        -29921.

FILL PLUS CUT AREA    FILL PLUS CUT VOL    CUM FILL PLUS CUT VOL  
.00                1540.                166918.

SEEDING WIDTH    CLEARING WIDTH    PLAN WIDTH    SEEDING AREA    CLEARING AREA    PLAN AREA  
.00                .00                .00                10727.                10565.                10305.

CUM AREA SEED    CUM AREA CLEAR    CUM AREA PLAN    VOLUME SURFACING    CUM VOL SURFACING  
946527.                925130.                903449.                0.                3400.

\*\*\*\*\*

STATION NUMBER    878. + .00

INTERSECTIONS    AREAS  
X-COORD Y-COORD  
70.50 -12.27

TEMPLATE CENTERLINE    CENTROID OF FILL    CENTROID OF CUT  
.00                .00                .00

RATIO (CUT/FILL) = .00000

FILL AREA    CUT AREA    FILL VOL    CUT VOL    CUM FILL VOL    CUM CUT VOL  
.00                .00                0.                0.                196839.                -29921.

FILL PLUS CUT AREA    FILL PLUS CUT VOL    CUM FILL PLUS CUT VOL  
.00                0.                166918.

SEEDING WIDTH    CLEARING WIDTH    PLAN WIDTH    SEEDING AREA    CLEARING AREA    PLAN AREA  
.00                .00                .00                0.                0.                0.

CUM AREA SEED    CUM AREA CLEAR    CUM AREA PLAN    VOLUME SURFACING    CUM VOL SURFACING  
946527.                925130.                903449.                0.                3400.

\*\*\*\*\*

STATION NUMBER    880. + .00

INTERSECTIONS    AREAS  
X-COORD Y-COORD  
70.50 -1.00

TEMPLATE CENTERLINE    CENTROID OF FILL    CENTROID OF CUT  
.00                .00                .00

RATIO (CUT/FILL) = .00000

FILL AREA    CUT AREA    FILL VOL    CUT VOL    CUM FILL VOL    CUM CUT VOL  
.00                .00                0.                0.                196839.                -29921.

FILL PLUS CUT AREA    FILL PLUS CUT VOL    CUM FILL PLUS CUT VOL

.00 0. 166918.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
.00 .00 .00 0. 0. 0.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
946527. 925130. 903449. 0. 3400.

\*\*\*\*\*

STATION NUMBER 882. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

13.15 4.10  
70.50 -4.03 588.66

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 47.47 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
588.66 .00 2180. 0. 199020. -29921.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
588.66 2180. 169099.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
71.44 68.44 67.35 7144. 6844. 6735.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
953670. 931974. 910184. 67. 3467.

\*\*\*\*\*

STATION NUMBER 884. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

16.58 4.97  
70.50 -2.67 439.09

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.79 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
439.09 .00 3806. 0. 202826. -29921.

FILL PLUS CUT AREA    FILL PLUS CUT VOL    CUM FILL PLUS CUT VOL  
439.09                3806.                172905.

SEEDING WIDTH    CLEARING WIDTH    PLAN WIDTH    SEEDING AREA    CLEARING AREA    PLAN AREA  
66.54                64.56                63.92                13798.                13300.                13126.

CUM AREA SEED    CUM AREA CLEAR    CUM AREA PLAN    VOLUME SURFACING    CUM VOL SURFACING  
967468.                945275.                923310.                67.                3533.

\*\*\*\*\*

STATION NUMBER    886. + .00

INTERSECTIONS    AREAS

X-COORD Y-COORD

|        |       |         |
|--------|-------|---------|
| -24.36 | 2.51  |         |
| 16.54  | 4.96  | -144.93 |
| 70.50  | -3.30 | 520.53  |

TEMPLATE CENTERLINE    CENTROID OF FILL    CENTROID OF CUT  
.00                48.77                -1.70

RATIO (CUT/FILL) = -.27842

FILL AREA    CUT AREA    FILL VOL    CUT VOL    CUM FILL VOL    CUM CUT VOL  
520.53    -144.93    3554.    -537.    206380.    -30458.

FILL PLUS CUT AREA    FILL PLUS CUT VOL    CUM FILL PLUS CUT VOL  
375.61                3017.                175922.

SEEDING WIDTH    CLEARING WIDTH    PLAN WIDTH    SEEDING AREA    CLEARING AREA    PLAN AREA  
108.33                107.65                104.86                17486.                17220.                16878.

CUM AREA SEED    CUM AREA CLEAR    CUM AREA PLAN    VOLUME SURFACING    CUM VOL SURFACING  
984955.                962495.                940188.                67.                3600.

\*\*\*\*\*

STATION NUMBER    888. + .00

INTERSECTIONS    AREAS

X-COORD Y-COORD

|        |       |         |
|--------|-------|---------|
| -24.02 | 2.52  |         |
| 16.50  | 4.95  | -139.58 |
| 70.50  | -4.18 | 543.26  |

TEMPLATE CENTERLINE    CENTROID OF FILL    CENTROID OF CUT  
.00                49.11                -1.45

RATIO (CUT/FILL) = -.25693

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
543.26 -139.58 3940. -1054. 210320. -31512.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
403.68 2886. 178809.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
108.87 107.39 104.52 21720. 21504. 20938.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1006675. 983999. 961126. 67. 3667.

\*\*\*\*\*

STATION NUMBER 890. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

-24.27 2.52  
16.23 4.88 -134.56  
70.50 -4.44 556.89

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 48.90 -1.59

RATIO (CUT/FILL) = -.24163

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
556.89 -134.56 4075. -1015. 214395. -32527.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
422.33 3059. 181868.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
109.39 107.57 104.77 21826. 21497. 20930.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1028501. 1005496. 982056. 67. 3733.

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STATION NUMBER 892. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

16.83 5.03  
70.50 -5.23 560.09

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.55 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
560.09 .00 4137. -498. 218532. -33025.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
560.09 3639. 185507.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
68.85 65.11 63.67 17824. 17269. 16845.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1046325. 1022764. 998901. 67. 3800.

\*\*\*\*\*

STATION NUMBER 894. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

16.89 5.05  
70.50 -5.09 562.28

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.68 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
562.28 .00 4157. 0. 222689. -33025.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
562.28 4157. 189664.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
68.64 65.11 63.61 13749. 13022. 12728.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1060074. 1035786. 1011629. 67. 3867.

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STATION NUMBER 896. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

-22.97 2.55  
16.82 5.03 -134.07  
70.50 -5.36 563.48

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT

.00 49.61 -.97

RATIO (CUT/FILL) = -.23794

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
563.48 -134.07 4169. -497. 226858. -33522.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
429.41 3673. 193336.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
109.00 106.37 103.47 17764. 17149. 16708.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1077837. 1052935. 1028336. 67. 3933.

\*\*\*\*\*

STATION NUMBER 898. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

-23.19 2.54  
16.78 5.02 -129.96  
70.50 -5.16 568.61

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.51 -.66

RATIO (CUT/FILL) = -.22856

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
568.61 -129.96 4193. -978. 231051. -34500.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
438.65 3215. 196551.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
109.02 106.57 103.69 21802. 21295. 20716.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1099639. 1074230. 1049052. 67. 4000.

\*\*\*\*\*

STATION NUMBER 900. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

-22.26 2.56  
17.46 5.19 -133.76

70.50 -5.33 553.75

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.99 -.07

RATIO (CUT/FILL) = -.24155

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
553.75 -133.76 4157. -977. 235208. -35476.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
419.99 3180. 199732.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
108.26 105.69 102.76 21728. 21226. 20645.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1121368. 1095455. 1069697. 67. 4067.

\*\*\*\*\*  
STATION NUMBER 902.+ .00

INTERSECTIONS AREAS

X-COORD Y-COORD

17.72 5.26  
70.50 -5.41 548.03

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 50.11 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
548.03 .00 4081. -495. 239289. -35972.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
548.03 3585. 203317.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
68.10 64.29 62.78 17636. 16998. 16553.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1139004. 1112453. 1086251. 67. 4133.

\*\*\*\*\*  
STATION NUMBER 904.+ .00

INTERSECTIONS AREAS

X-COORD Y-COORD

-24.10 2.52  
17.65 5.24 -138.51  
70.50 -5.83 568.91

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 50.00 -.07

RATIO (CUT/FILL) = -.24347

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
568.91 -138.51 4137. -513. 243426. -36485.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
430.40 3624. 206941.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
110.59 107.79 104.60 17870. 17209. 16737.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1156874. 1129662. 1102988. 67. 4200.

\*\*\*\*\*  
STATION NUMBER 906. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD  
-22.14 2.57  
17.75 5.27 -139.56  
70.50 -5.11 542.51

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 50.05 -.07

RATIO (CUT/FILL) = -.25726

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
542.51 -139.56 4116. -1030. 247542. -37515.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
402.95 3086. 210027.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
107.92 105.66 102.64 21852. 21346. 20724.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1178726. 1151007. 1123712. 67. 4267.

\*\*\*\*\*  
STATION NUMBER 908. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|        |        |
|--------|--------|
| -21.39 | 2.58   |
| 17.74  | 5.26   |
| 70.50  | -5.43  |
|        | 554.99 |

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 50.14 .26

RATIO (CUT/FILL) = -.24635

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
554.99 -136.72 4065. -1023. 251607. -38538.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
418.27 3042. 213069.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
107.49 105.01 101.89 21541. 21068. 20453.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1200267. 1172075. 1144165. 67. 4333.

\*\*\*\*\*  
STATION NUMBER 910. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|       |        |
|-------|--------|
| 17.74 | 5.26   |
| 70.50 | -4.67  |
|       | 532.58 |

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 50.01 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
532.58 .00 4028. -506. 255635. -39044.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
532.58 3522. 216590.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
67.35 64.20 62.76 17484. 16921. 16465.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1217750. 1188996. 1160630. 67. 4400.

\*\*\*\*\*

STATION NUMBER 912.+ .00

INTERSECTIONS AREAS  
X-COORD Y-COORD  
17.67 5.25  
70.50 -4.88 536.30

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.86 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
536.30 .00 3959. 0. 259594. -39044.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
536.30 3959. 220549.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
67.63 64.23 62.83 13498. 12843. 12559.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1231248. 1201840. 1173189. 67. 4467.

\*\*\*\*\*  
STATION NUMBER 914.+ .00

INTERSECTIONS AREAS  
X-COORD Y-COORD  
-23.15 2.54  
17.30 5.15 -137.34  
70.50 -5.08 545.91

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.88 -.45

RATIO (CUT/FILL) = -.25158

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
545.91 -137.34 4008. -509. 263602. -39553.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
408.57 3499. 224049.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
108.91 106.52 103.65 17654. 17075. 16648.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1248902. 1218914. 1189838. 67. 4533.

\*\*\*\*\*

STATION NUMBER 916.+ .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|        |       |
|--------|-------|
| 17.92  | 5.31  |
| 70.50  | -4.72 |
| 530.79 |       |

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 50.01 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
530.79 .00 3988. -509. 267590. -40062.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
530.79 3479. 227528.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
67.20 63.98 62.58 17611. 17050. 16623.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1266513. 1235964. 1206461. 67. 4600.

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STATION NUMBER 918.+ .00

INTERSECTIONS AREAS

X-COORD Y-COORD

|        |       |
|--------|-------|
| -24.57 | 2.51  |
| 18.03  | 5.34  |
| 70.50  | -4.73 |
| 534.24 |       |

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 50.04 -.21

RATIO (CUT/FILL) = -.27211

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
534.24 -145.37 3945. -538. 271534. -40600.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
388.87 3406. 230934.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
109.97 108.04 105.07 17717. 17202. 16765.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1284230. 1253166. 1223226. 67. 4667.

\*\*\*\*\*  
STATION NUMBER 920. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD  
17.42 5.18  
70.50 -4.67 531.67

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.82 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
531.67 .00 3948. -538. 275482. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
531.67 3409. 234343.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
67.68 64.37 63.08 17765. 17241. 16815.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1301995. 1270407. 1240041. 67. 4733.

\*\*\*\*\*

STATION NUMBER 922. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD  
17.75 5.27  
70.50 -3.84 510.13

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 49.56 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
510.13 .00 3859. 0. 279340. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
510.13 3859. 238202.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
66.51 63.99 62.75 13419. 12836. 12583.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1315413. 1283243. 1252624. 67. 4800.

\*\*\*\*\*  
STATION NUMBER 924. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD  
19.18 5.63  
70.50 -.84 412.19

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 50.04 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
412.19 .00 3416. 0. 282756. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
412.19 3416. 241618.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
62.03 62.21 61.32 12853. 12620. 12407.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1328267. 1295862. 1265031. 67. 4867.

\*\*\*\*\*  
STATION NUMBER 926. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 .00 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
.00 .00 1527. 0. 284283. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
.00 1527. 243145.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
.00 .00 .00 6203. 6221. 6132.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1334469. 1302083. 1271163. 0. 4867.

\*\*\*\*\*  
STATION NUMBER 928. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 .00 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
.00 .00 0. 0. 284283. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
.00 0. 243145.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
.00 .00 .00 0. 0. 0.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1334469. 1302083. 1271163. 0. 4867.

\*\*\*\*\*

STATION NUMBER 930. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 .00 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
.00 .00 0. 0. 284283. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
.00 0. 243145.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
.00 .00 .00 0. 0. 0.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1334469. 1302083. 1271163. 0. 4867.

\*\*\*\*\*

STATION NUMBER 932. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 .00 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
.00 .00 0. 0. 284283. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
.00 0. 243145.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
.00 .00 .00 0. 0. 0.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1334469. 1302083. 1271163. 0. 4867.

\*\*\*\*\*

STATION NUMBER 934. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD  
48.30 -2.15

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 .00 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
.00 .00 0. 0. 284283. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
.00 0. 243145.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
.00 .00 .00 0. 0. 0.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1334469. 1302083. 1271163. 0. 4867.

\*\*\*\*\*

STATION NUMBER 936. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

4.28 8.59  
48.30 -2.38 306.18

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 32.98 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
306.18 .00 1134. 0. 285417. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
306.18 1134. 244279.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
55.91 55.56 54.02 5591. 5556. 5402.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1340060. 1307639. 1276564. 67. 4933.

\*\*\*\*\*  
STATION NUMBER 938. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

3.99 8.58  
48.30 -1.47 259.47

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 33.42 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
259.47 .00 2095. 0. 287512. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
259.47 2095. 246374.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
55.28 55.49 54.31 11120. 11104. 10833.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1351180. 1318743. 1287397. 67. 5000.

\*\*\*\*\*

STATION NUMBER 940. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

4.57 8.59  
48.30 -.53 230.35

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 33.68 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
230.35 .00 1814. 0. 289326. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
230.35 1814. 248188.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
53.77 54.70 53.73 10905. 11019. 10804.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1362085. 1329762. 1298201. 67. 5067.

\*\*\*\*\*  
STATION NUMBER 942. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

5.63 8.62  
48.30 -.24 218.57

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 34.22 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
218.57 .00 1663. 0. 290989. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
218.57 1663. 249850.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
52.41 53.63 52.67 10618. 10833. 10639.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1372703. 1340595. 1308840. 67. 5133.

\*\*\*\*\*

STATION NUMBER 944. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

5.34 8.61  
48.30 .24 223.13

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 33.57 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
223.13 .00 1636. 0. 292625. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
223.13 1636. 251486.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
52.24 53.85 52.96 10465. 10747. 10563.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1383168. 1351342. 1319403. 67. 5200.

\*\*\*\*\*  
STATION NUMBER 946. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

5.95 8.62  
48.30 .19 229.68

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 33.55 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
229.68 .00 1677. 0. 294302. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
229.68 1677. 253163.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
51.67 53.30 52.35 10390. 10714. 10531.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1393559. 1362057. 1329934. 67. 5267.

\*\*\*\*\*

STATION NUMBER 948. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

5.83 8.62  
48.30 .46 232.93

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 33.28 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
232.93 .00 1713. 0. 296015. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
232.93 1713. 254877.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
51.52 53.41 52.47 10319. 10671. 10482.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1403878. 1372728. 1340417. 67. 5333.

\*\*\*\*\*

STATION NUMBER 950. + .00

INTERSECTIONS AREAS

X-COORD Y-COORD

7.24 8.65  
48.30 .94 204.27

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 33.88 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
204.27 .00 1619. 0. 297635. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
204.27 1619. 256496.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
49.63 51.86 51.06 10115. 10527. 10353.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1413993. 1383254. 1350770. 67. 5400.

\*\*\*\*\*  
STATION NUMBER 952. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD  
5.38 8.61  
48.30 .48 223.41

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 33.33 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
223.41 .00 1584. 0. 299219. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
223.41 1584. 258080.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
51.94 53.77 52.92 10158. 10563. 10398.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1424150. 1393817. 1361167. 67. 5467.

\*\*\*\*\*

STATION NUMBER 954. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD  
2.88 8.56  
48.30 -.48 256.05

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 32.66 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
256.05 .00 1776. 0. 300994. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
256.05 1776. 259856.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
55.42 56.43 55.42 10736. 11020. 10834.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1434887. 1404837. 1372001. 67. 5533.

\*\*\*\*\*  
STATION NUMBER 956.+ .00

INTERSECTIONS AREAS  
X-COORD Y-COORD  
.04 8.50  
3.43 8.57 .05  
4.96 8.60 -.01  
48.30 -1.16 274.76

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 33.15 .06

RATIO (CUT/FILL) = -.00005

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
274.81 -.01 1966. 0. 302960. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
274.79 1966. 261822.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
58.93 59.54 58.26 11435. 11597. 11368.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1446322. 1416435. 1383369. 67. 5600.

\*\*\*\*\*  
STATION NUMBER 958.+ .00

INTERSECTIONS AREAS  
X-COORD Y-COORD  
.89 8.52  
48.30 -1.81 289.59

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 33.08 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
289.59 .00 2090. 0. 305051. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
289.59 2090. 263912.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
58.73 58.75 57.41 11766. 11830. 11566.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1458087. 1428264. 1394936. 67. 5667.

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STATION NUMBER 960.+ .00

INTERSECTIONS AREAS  
X-COORD Y-COORD  
5.43 8.61  
48.30 -2.02 302.46

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 33.15 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
302.46 .00 2193. 0. 307244. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
302.46 2193. 266105.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
54.41 54.47 52.88 11313. 11322. 11028.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1469401. 1439587. 1405964. 67. 5733.

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STATION NUMBER 962.+ .00

INTERSECTIONS AREAS  
X-COORD Y-COORD  
5.83 8.62  
48.30 -2.18 288.45

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 33.70 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
288.45 .00 2189. 0. 309432. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
288.45 2189. 268293.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
54.16 54.03 52.47 10857. 10850. 10535.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1480258. 1450437. 1416498. 67. 5800.

---

STATION NUMBER 964. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD

5.71 8.62  
48.30 -2.61 292.72

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 33.60 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
292.72 .00 2152. 0. 311585. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
292.72 2152. 270446.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
54.71 54.19 52.59 10888. 10822. 10506.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1491145. 1461258. 1427005. 67. 5867.

---

STATION NUMBER 966. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD

4.90 8.60  
48.30 -2.76 307.37

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 33.32 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
307.37 .00 2223. 0. 313807. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
307.37 2223. 272668.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA

|               |                |               |                  |                   |        |
|---------------|----------------|---------------|------------------|-------------------|--------|
| 55.67         | 55.06          | 53.40         | 11039.           | 10925.            | 10599. |
| CUM AREA SEED | CUM AREA CLEAR | CUM AREA PLAN | VOLUME SURFACING | CUM VOL SURFACING |        |
| 1502184.      | 1472183.       | 1437604.      | 67.              | 5933.             |        |

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STATION NUMBER 968. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD  
8.09 8.67  
48.30 1.45 146.11

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 35.67 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
146.11 .00 1680. 0. 315487. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
146.11 1680. 274348.

SEEDING WIDTH CLEARING WIDTH PLAN WIDTH SEEDING AREA CLEARING AREA PLAN AREA  
48.27 50.88 50.21 10394. 10594. 10361.

CUM AREA SEED CUM AREA CLEAR CUM AREA PLAN VOLUME SURFACING CUM VOL SURFACING  
1512578. 1482777. 1447965. 67. 6000.

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STATION NUMBER 970. + .00

INTERSECTIONS AREAS  
X-COORD Y-COORD  
4.46 8.59  
48.30 -1.83 292.93

TEMPLATE CENTERLINE CENTROID OF FILL CENTROID OF CUT  
.00 32.98 .00

RATIO (CUT/FILL) = .00000

FILL AREA CUT AREA FILL VOL CUT VOL CUM FILL VOL CUM CUT VOL  
292.93 .00 1626. 0. 317113. -41139.

FILL PLUS CUT AREA FILL PLUS CUT VOL CUM FILL PLUS CUT VOL  
292.93 1626. 275974.

| SEEDING WIDTH | CLEARING WIDTH | PLAN WIDTH    | SEEDING AREA     | CLEARING AREA     | PLAN AREA |
|---------------|----------------|---------------|------------------|-------------------|-----------|
| 55.18         | 55.26          | 53.84         | 10345.           | 10614.            | 10405.    |
| CUM AREA SEED | CUM AREA CLEAR | CUM AREA PLAN | VOLUME SURFACING | CUM VOL SURFACING |           |
| 1522923.      | 1493391.       | 1458371.      | 67.              | 6067.             |           |

---

STATION NUMBER 972.+ .00

| INTERSECTIONS | AREAS   |
|---------------|---------|
| X-COORD       | Y-COORD |
| 4.72          | 8.60    |
| 48.30         | -2.61   |
|               | 316.94  |

| TEMPLATE CENTERLINE | CENTROID OF FILL | CENTROID OF CUT |
|---------------------|------------------|-----------------|
| .00                 | 33.12            | .00             |

RATIO (CUT/FILL) = .00000

| FILL AREA | CUT AREA | FILL VOL | CUT VOL | CUM FILL VOL | CUM CUT VOL |
|-----------|----------|----------|---------|--------------|-------------|
| 316.94    | .00      | 2259.    | 0.      | 319371.      | -41139.     |

| FILL PLUS CUT AREA | FILL PLUS CUT VOL | CUM FILL PLUS CUT VOL |
|--------------------|-------------------|-----------------------|
| 316.94             | 2259.             | 278233.               |

| SEEDING WIDTH | CLEARING WIDTH | PLAN WIDTH | SEEDING AREA | CLEARING AREA | PLAN AREA |
|---------------|----------------|------------|--------------|---------------|-----------|
| 55.70         | 55.29          | 53.58      | 11087.       | 11055.        | 10742.    |

| CUM AREA SEED | CUM AREA CLEAR | CUM AREA PLAN | VOLUME SURFACING | CUM VOL SURFACING |  |
|---------------|----------------|---------------|------------------|-------------------|--|
| 1534011.      | 1504446.       | 1469112.      | 67.              | 6133.             |  |

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STATION NUMBER 974.+ .00

| INTERSECTIONS | AREAS   |
|---------------|---------|
| X-COORD       | Y-COORD |
| 5.12          | 8.61    |
| 48.30         | -2.18   |
|               | 305.40  |

| TEMPLATE CENTERLINE | CENTROID OF FILL | CENTROID OF CUT |
|---------------------|------------------|-----------------|
| .00                 | 33.10            | .00             |

RATIO (CUT/FILL) = .00000

| FILL AREA | CUT AREA | FILL VOL | CUT VOL | CUM FILL VOL | CUM CUT VOL |
|-----------|----------|----------|---------|--------------|-------------|
| 305.40    | .00      | 2305.    | 0.      | 321676.      | -41139.     |

| FILL PLUS CUT AREA | FILL PLUS CUT VOL | CUM FILL PLUS CUT VOL |
|--------------------|-------------------|-----------------------|
| 305.40             | 2305.             | 280538.               |

SEEDING WIDTH    CLEARING WIDTH    PLAN WIDTH    SEEDING AREA    CLEARING AREA    PLAN AREA  
54.87        54.78        53.18        11056.        11006.        10676.

CUM AREA SEED    CUM AREA CLEAR    CUM AREA PLAN    VOLUME SURFACING    CUM VOL SURFACING  
1545067.        1515452.        1479788.        67.        6200.

\*\*\*\*\*  
STATION NUMBER    975. + 60.00

INTERSECTIONS    AREAS  
X-COORD    Y-COORD  
48.30    3.75

TEMPLATE CENTERLINE    CENTROID OF FILL    CENTROID OF CUT  
.00        .00        .00

RATIO (CUT/FILL) =    .00000

FILL AREA    CUT AREA    FILL VOL    CUT VOL    CUM FILL VOL    CUM CUT VOL  
.00    .00    905.    0.    322581.    -41139.

FILL PLUS CUT AREA    FILL PLUS CUT VOL    CUM FILL PLUS CUT VOL  
.00        905.        281443.

SEEDING WIDTH    CLEARING WIDTH    PLAN WIDTH    SEEDING AREA    CLEARING AREA    PLAN AREA  
.00        .00        .00        4389.        4382.        4254.

CUM AREA SEED    CUM AREA CLEAR    CUM AREA PLAN    VOLUME SURFACING    CUM VOL SURFACING  
1549456.        1519834.        1484042.        0.        6200.

□

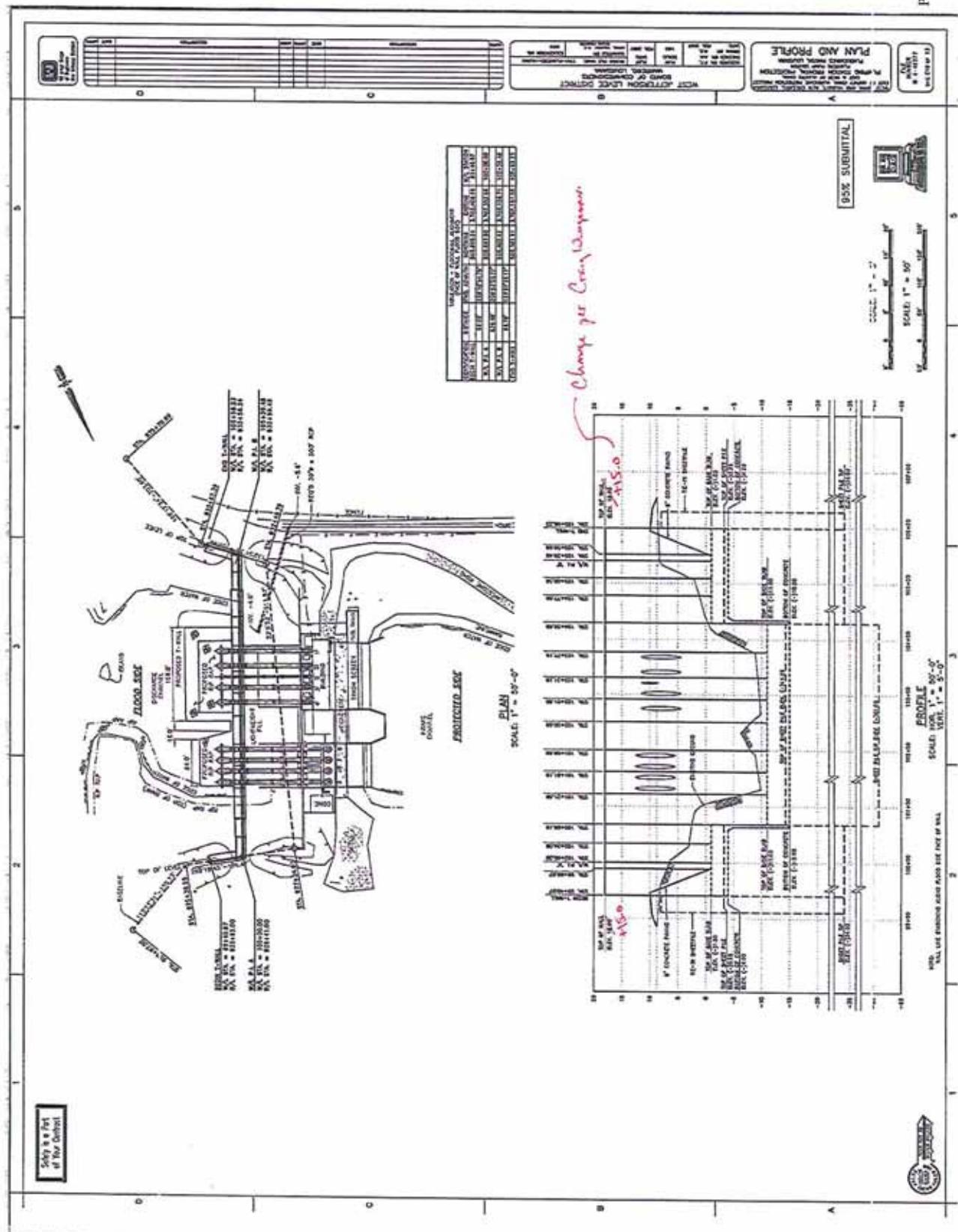
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STATION NUMBER    772. + .00 IS PLOTTED  
STATION NUMBER    774. + .00 IS PLOTTED  
STATION NUMBER    776. + .00 IS PLOTTED  
STATION NUMBER    778. + .00 IS PLOTTED  
STATION NUMBER    780. + .00 IS PLOTTED  
STATION NUMBER    782. + .00 IS PLOTTED  
STATION NUMBER    784. + .00 IS PLOTTED  
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STATION NUMBER    788. + .00 IS PLOTTED  
STATION NUMBER    790. + .00 IS PLOTTED

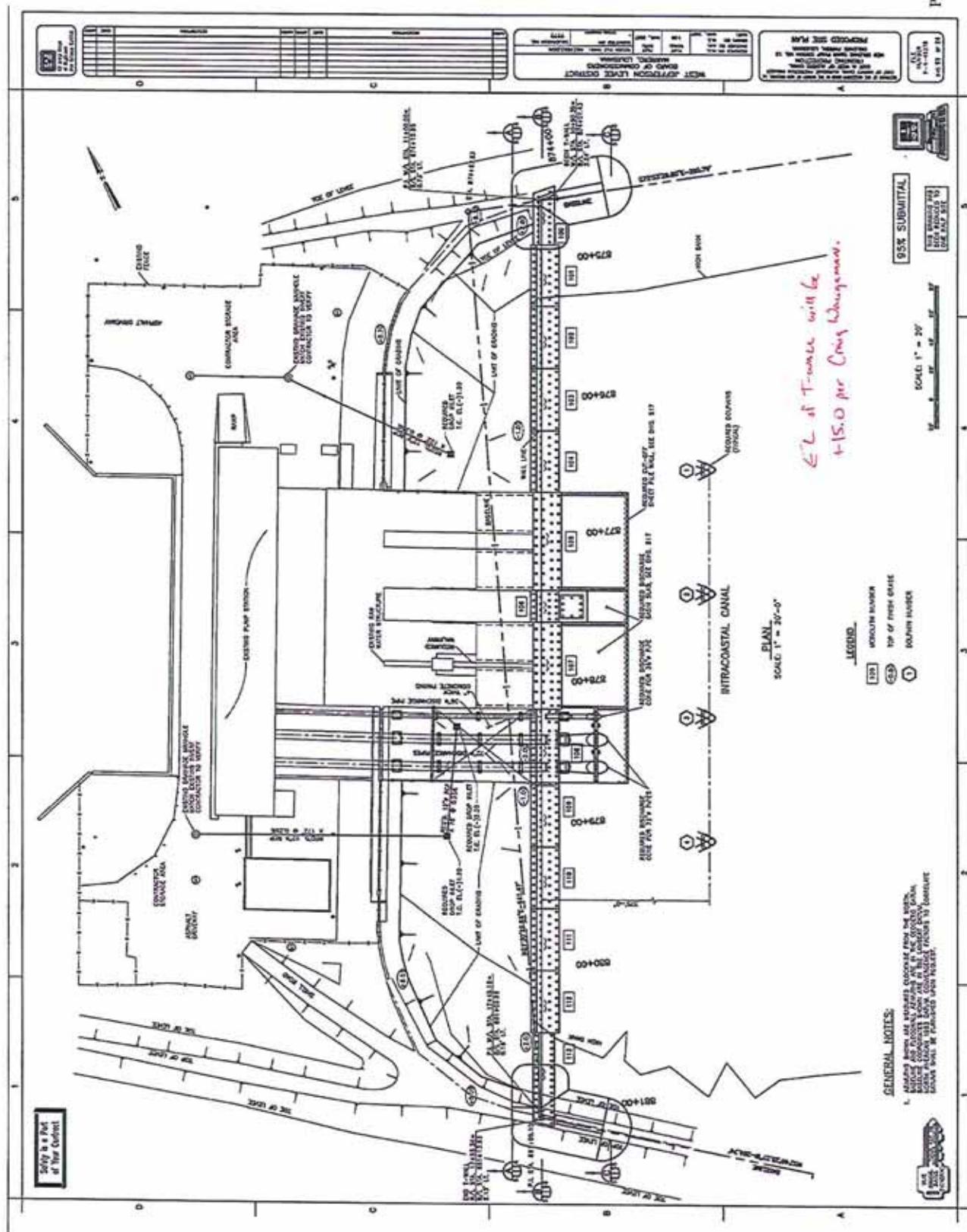
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STATION NUMBER 972. + .00 IS PLOTTED  
STATION NUMBER 974. + .00 IS PLOTTED  
STATION NUMBER 975. + 60.00 IS PLOTTED





## Ryan Foster

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**From:** Scott Chehardy [schehardy@harteng.com]  
**Sent:** Friday, August 01, 2008 9:55 AM  
**To:** Ryan Foster  
**Subject:** FW: emails - Algiers West

**Importance:** High



R3W hand calcs for R3W hand calcs for  
2057 levee ... 2057 levee ...

Ryan:

Include this email and the printed attachments in the calcs appendix. The attachments are light so print them dark!

Scott G. Chehardy, P.E.  
Hartman Engineering, Inc.  
Senior Project Manager  
(985) 233-9763

-----Original Message-----

From: Carlos Cepero [mailto:ccepero@csi-geo.com]  
Sent: Tuesday, July 22, 2008 1:21 PM  
To: schehardy@harteng.com  
Cc: Ramesh Kalvakaalva; Bruce Khosrozadeh  
Subject: RE: emails

Scott, the drawing I sent you was for the reinforced levee alternative for Reach 3W. For the unreinforced levee option, I get a center to center spacing of 198.1 ft. I've attached a similar drawing (to that sent yesterday) showing how I get that measurement.

Basically, one would establish the limits of the berm by using the 2nd lift. I also use the 2nd lift to get the coordinate of the new levee reference point, shown with coordinates of (-61.5, 2.1). Knowing that the centerline of the existing levee is at x = 65.6, the distance from C/L of existing levee to this point is 127.1 ft.

Then, the fourth lift is used to determine its centerline location, which I estimated as being at (-132.5, 18.6) and C/L to C/L distance of 198.1 ft.

Lastly, the geometry of the 2057 levee can be drawn.

I have also included the one from yesterday.

Please, call me on my cell phone if you need further clarification.

Carlos

-----Original Message-----

From: schehardy@harteng.com [mailto:schehardy@harteng.com]  
Sent: Tuesday, July 22, 2008 1:05 PM  
To: Ramesh Kalvakaalva  
Cc: Carlos Cepero  
Subject: Re: emails

Carlos/Ramesh:

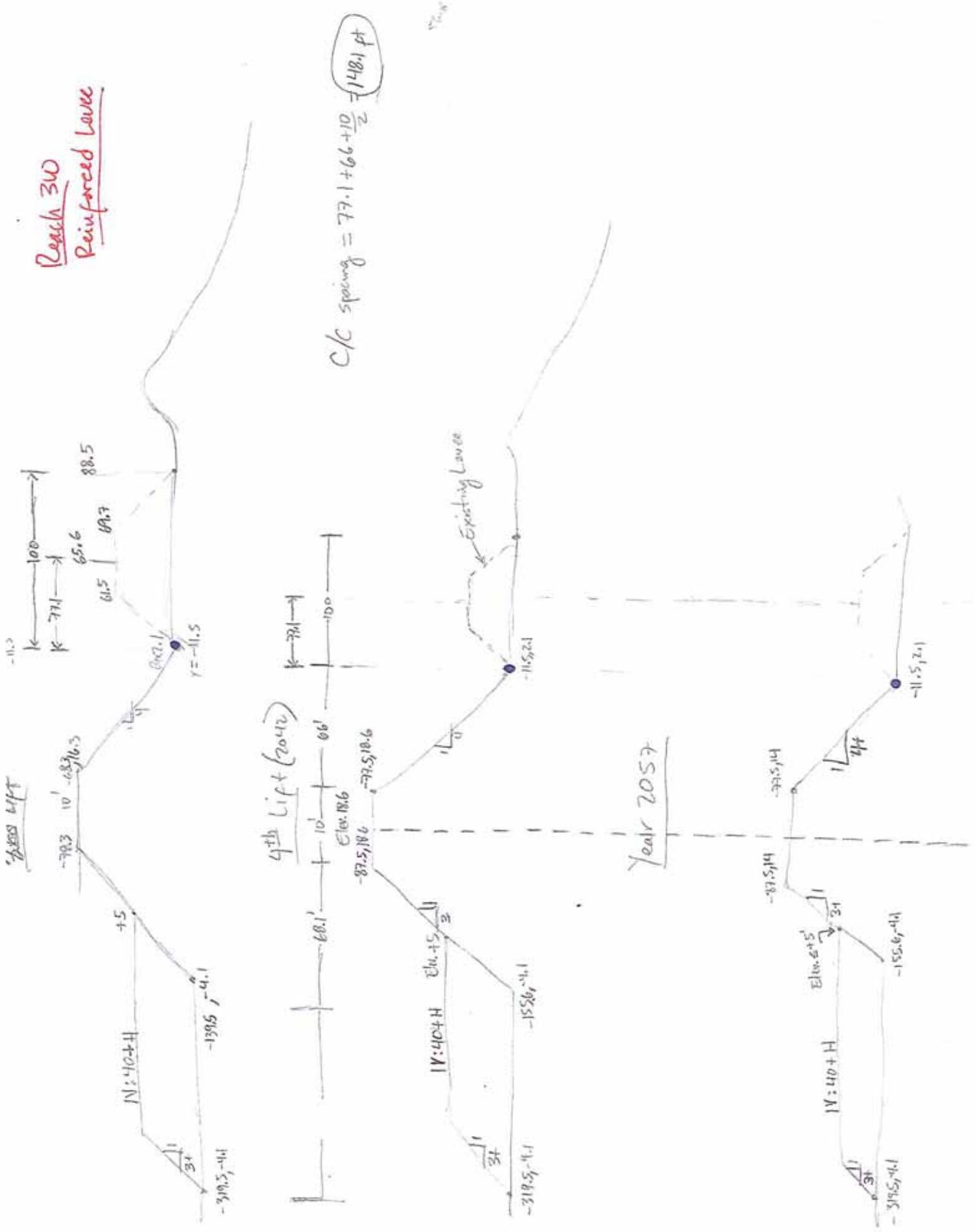
See my crude sketch for the Reach 3 levee at sta 850+00. My approx C/L to C/L spacing is 180-feet. Carlos has it shown on his sketch at 148.1.

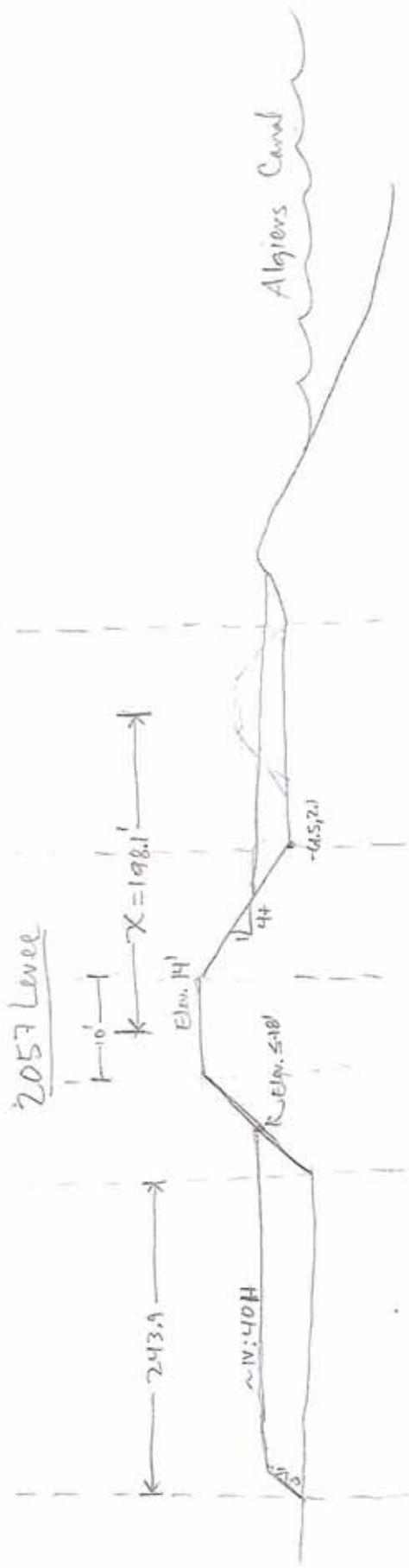
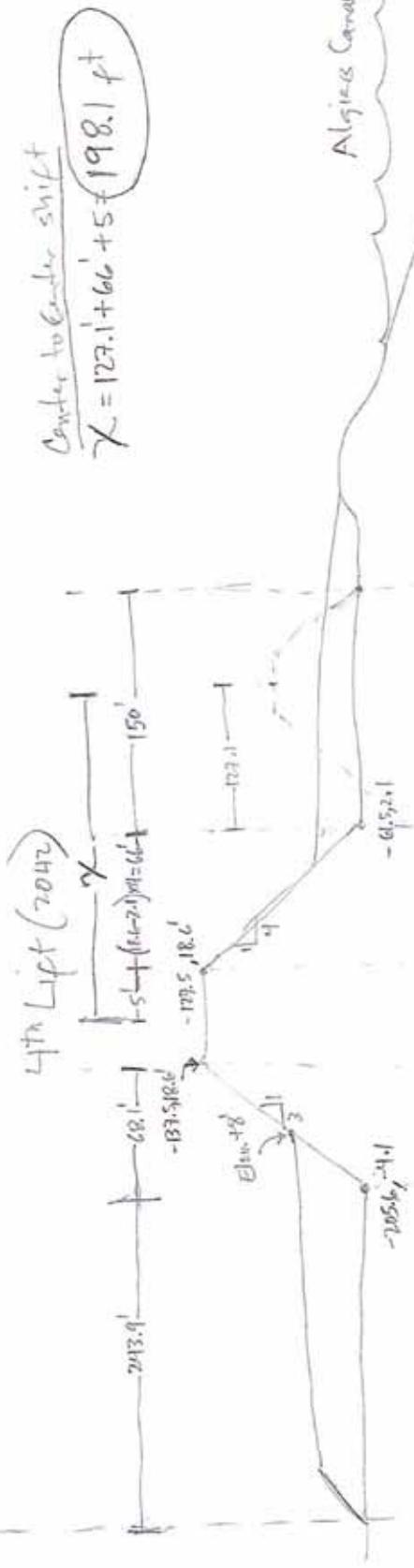
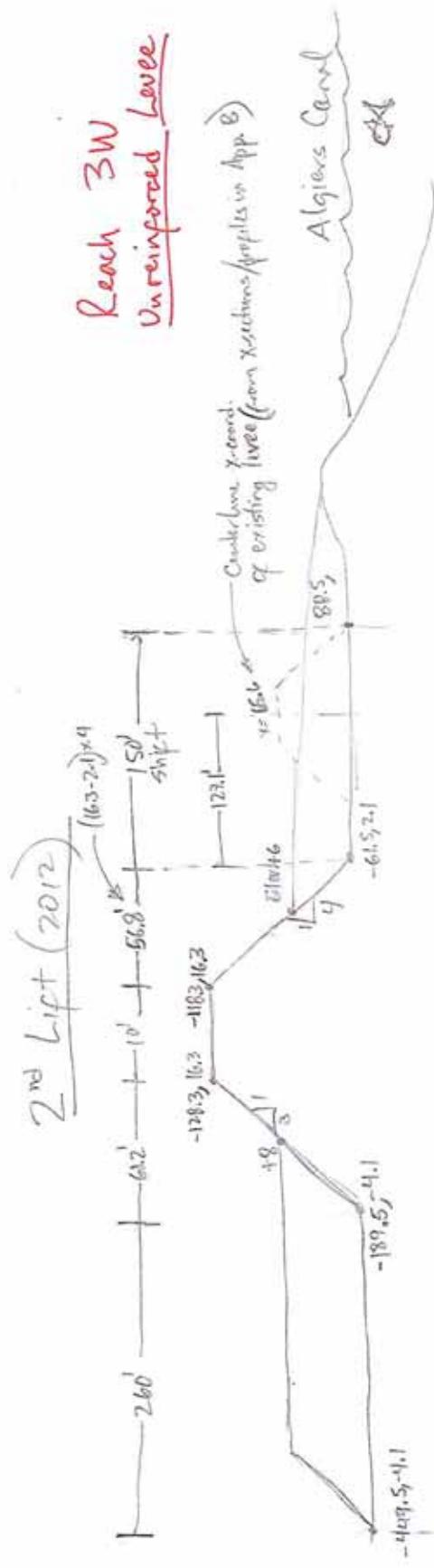
At a 4:1 flood side slope and we are going almost 6-feet higher, the C/L to C/L has to be longer than the flood side to flood side.

Didn't you say the flood side was the point to hold?

See if you agree with what I have here. I did not show the berms in this sketch.

Scott





**ALGIERS CANAL LEVEE WEST, ALGIERS LOCK TO HWY. 23, WBV-47.2  
B/L STA. 770+70 TO STA. 978+18  
ORLEANS AND PLAQUEMINES PARISHES, LOUISIANA  
CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5**

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**APPENDIX 'D'  
COST ESTIMATE**

**West Bank and Vicinity Hurricane Protection Project**

**Phase 2 Hurricane Protection**

**Algiers Canal Levee West, Algiers Lock to Hwy 23 (WBV 47.2)**

**B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana**

**Contract No. W912P8-08-D-0002-Task Order 0005**

**Opinion of Probable Construction Cost  
Unreinforced Earthen Levee Option  
1st Lift**

| Item No. | Item Description                         | Unit | Estimated Quantity | Unit Price           | Estimated Amount        |
|----------|------------------------------------------|------|--------------------|----------------------|-------------------------|
| 1        | Mobilization (5%)                        | LS   | 1                  | \$8,800,000.00       | \$8,800,000.00          |
| 2        | Demolition of Structures                 | SF   | 1,190,100          | \$6.00               | \$7,140,600.00          |
| 3        | Clearing and Grubbing                    | AC   | 23                 | \$9,000.00           | \$207,000.00            |
| 4        | Excavation                               | CY   | 77,100             | \$15.00              | \$1,156,500.00          |
| 5        | 14x73 Steel H-Piles                      | LF   | 35,600             | \$85.00              | \$3,026,000.00          |
| 6        | 24 Diameter Steel Pipe Piles             | LF   | 179,300            | \$160.00             | \$28,688,000.00         |
| 7        | Pile Load Test                           | LS   | 1                  | \$250,000.00         | \$250,000.00            |
| 8        | Steel Sheet Pile Cut Off Wall (PZ22)     | SF   | 194,300            | \$30.00              | \$5,829,000.00          |
| 9        | Painting PZ 22 Sheet Piles               | SF   | 15,800             | \$6.00               | \$94,800.00             |
| 10       | Painting H-Piles                         | SF   | 12,400             | \$6.00               | \$74,400.00             |
| 11       | Painting Pipe Piles                      | SF   | 49,400             | \$6.00               | \$296,400.00            |
| 12       | Reinforced Concrete for Wall Base        | CY   | 9,100              | \$550.00             | \$5,005,000.00          |
| 13       | Reinforced Concrete for Wall Stem        | CY   | 5,100              | \$850.00             | \$4,335,000.00          |
| 14       | Railroad Gate                            | LS   | 1                  | \$560,000.00         | \$560,000.00            |
| 15       | Embankment (Compacted)                   | CY   | 3,143,100          | \$35.00              | \$110,008,500.00        |
| 16       | Seedling and Fertilizing                 | AC   | 207                | \$2,600.00           | \$538,824.00            |
| 17       | Geotextile Fabric                        | SY   | 0                  | \$18.00              | \$0.00                  |
| 18       | Install and Remove Temporary Access Road | SY   | 32,000             | \$68.00              | \$2,176,000.00          |
| 19       | Relocation of Utilities                  | LS   | 1                  | \$6,544,000.00       | \$6,544,000.00          |
| 20       | Real Estate Acquisition**                | LS   | 1                  | \$0.00               | \$0.00                  |
| 21       | Drainage Canal                           | LS   | 1                  | \$245,000.00         | \$245,000.00            |
|          |                                          |      |                    | Contingency (25%)    | \$46,200,000.00         |
|          |                                          |      |                    | <b>TOTAL</b>         | <b>\$231,175,024.00</b> |
|          |                                          |      |                    | <b>ROUNDED TOTAL</b> | <b>\$231,200,000.00</b> |

\*\* Real Estate Acquisition costs were not done as directed by the USACE Real Estate Division

**West Bank and Vicinity Hurricane Protection Project**  
**Phase 2 Hurricane Protection**  
**Algiers Canal Levee West, Algiers Lock to Hwy 23 (WBV 47.2)**  
**B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana**  
**Contract No. W912P8-08-D-0002-Task Order 0005**

**Opinion of Probable Construction Cost**  
**Unreinforced Earthen Levee Option**  
**2nd Lift**

| Item No. | Item Description                         | Unit | Estimated Quantity | Unit Price           | Estimated Amount       |
|----------|------------------------------------------|------|--------------------|----------------------|------------------------|
| 1        | Mobilization (5%)                        | LS   | 1                  | \$415,000.00         | \$415,000.00           |
| 2        | Demolition of Structures                 | SF   | 0                  | \$6.00               | \$0.00                 |
| 3        | Clearing and Grubbing                    | AC   | 0                  | \$9,000.00           | \$0.00                 |
| 4        | Excavation                               | CY   | 10,900             | \$15.00              | \$163,500.00           |
| 5        | 14x73 Steel H-Piles                      | LF   | 0                  | \$85.00              | \$0.00                 |
| 6        | 24 Diameter Steel Pipe Piles             | LF   | 0                  | \$160.00             | \$0.00                 |
| 7        | Pile Load Test                           | LS   | 0                  | \$250,000.00         | \$0.00                 |
| 8        | Steel Sheet Pile Cut Off Wall (PZ22)     | SF   | 0                  | \$30.00              | \$0.00                 |
| 9        | Painting PZ 22 Sheet Piles               | SF   | 0                  | \$6.00               | \$0.00                 |
| 10       | Painting H-Piles                         | SF   | 0                  | \$6.00               | \$0.00                 |
| 11       | Painting Pipe Piles                      | SF   | 0                  | \$6.00               | \$0.00                 |
| 12       | Reinforced Concrete for Wall Base        | CY   | 0                  | \$550.00             | \$0.00                 |
| 13       | Reinforced Concrete for Wall Stem        | CY   | 0                  | \$850.00             | \$0.00                 |
| 14       | Railroad Gate                            | LS   | 0                  | \$560,000.00         | \$0.00                 |
| 15       | Embankment (Compacted)                   | CY   | 144,000            | \$35.00              | \$5,040,000.00         |
| 16       | Seeding and Fertilizing                  | AC   | 208.00             | \$2,600.00           | \$540,800.00           |
| 17       | Geotextile Fabric                        | SY   | 0                  | \$18.00              | \$0.00                 |
| 18       | Install and Remove Temporary Access Road | SY   | 32,000             | \$68.00              | \$2,176,000.00         |
| 19       | Relocation of Utilities                  | LS   | 1                  | \$374,000.00         | \$374,000.00           |
| 20       | Real Estate Acquisition                  | LS   | 1                  | \$0.00               | \$0.00                 |
| 21       | Drainage Canal                           | LS   | 1                  | \$0.00               | \$0.00                 |
|          |                                          |      |                    | Contingency (25%)    | \$2,200,000.00         |
|          |                                          |      |                    | <b>TOTAL</b>         | <b>\$10,909,300.00</b> |
|          |                                          |      |                    | <b>ROUNDED TOTAL</b> | <b>\$11,000,000.00</b> |

**West Bank and Vicinity Hurricane Protection Project**

**Phase 2 Hurricane Protection**

**Algiers Canal Levee West, Algiers Lock to Hwy 23 (WBV 47.2)**

**B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana**

**Contract No. W912P8-08-D-0002-Task Order 0005**

**Opinion of Probable Construction Cost  
Unreinforced Earthen Levee Option  
3rd Lift**

| Item No. | Item Description                         | Unit | Estimated Quantity | Unit Price           | Estimated Amount       |
|----------|------------------------------------------|------|--------------------|----------------------|------------------------|
| 1        | Mobilization (5%)                        | LS   | 1                  | \$419,000.00         | \$419,000.00           |
| 2        | Demolition of Structures                 | SF   | 0                  | \$6.00               | \$0.00                 |
| 3        | Cleaning and Grubbing                    | AC   | 0.00               | \$9,000.00           | \$0.00                 |
| 4        | Excavation                               | CY   | 11,900             | \$15.00              | \$178,500.00           |
| 5        | 14x73 Steel H-Piles                      | LF   | 0                  | \$85.00              | \$0.00                 |
| 6        | 24 Diameter Steel Pipe Piles             | LF   | 0                  | \$160.00             | \$0.00                 |
| 7        | Pile Load Test                           | LS   | 0                  | \$250,000.00         | \$0.00                 |
| 8        | Steel Sheet Pile Cut Off Wall (PZ22)     | SF   | 0                  | \$30.00              | \$0.00                 |
| 9        | Painting PZ 22 Sheet Piles               | SF   | 0                  | \$6.00               | \$0.00                 |
| 10       | Painting H-Piles                         | SF   | 0                  | \$6.00               | \$0.00                 |
| 11       | Painting Pipe Files                      | SF   | 0                  | \$6.00               | \$0.00                 |
| 12       | Reinforced Concrete for Wall Base        | CY   | 0                  | \$550.00             | \$0.00                 |
| 13       | Reinforced Concrete for Wall Stem        | CY   | 0                  | \$850.00             | \$0.00                 |
| 14       | Railroad Gate                            | LS   | 0                  | \$560,000.00         | \$0.00                 |
| 15       | Embankment (Compacted)                   | CY   | 146,000            | \$35.00              | \$5,110,000.00         |
| 16       | Seeding and Fertilizing                  | AC   | 208.00             | \$2,600.00           | \$540,800.00           |
| 17       | Geotextile Fabric                        | SY   | 0                  | \$18.00              | \$0.00                 |
| 18       | Install and Remove Temporary Access Road | SY   | 32,000             | \$68.00              | \$2,176,000.00         |
| 19       | Relocation of Utilities                  | LS   | 1                  | \$374,000.00         | \$374,000.00           |
| 20       | Real Estate Acquisition                  | LS   | 1                  | \$0.00               | \$0.00                 |
| 21       | Drainage Canal                           | LS   | 1                  | \$0.00               | \$0.00                 |
|          |                                          |      |                    | Contingency (25%)    | \$2,200,000.00         |
|          |                                          |      |                    | <b>TOTAL</b>         | <b>\$10,998,300.00</b> |
|          |                                          |      |                    | <b>ROUNDED TOTAL</b> | <b>\$11,000,000.00</b> |

**West Bank and Vicinity Hurricane Protection Project**

**Phase 2 Hurricane Protection**

**Algiers Canal Levee West, Algiers Lock to Hwy 23 (WBV 47.2)**

**B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana**

**Contract No. W912P8-08-D-0002-Task Order 0005**

**Opinion of Probable Construction Cost  
Unreinforced Earthen Levee Option  
4th Lift**

| Item No. | Item Description                         | Unit | Estimated Quantity | Unit Price           | Estimated Amount       |
|----------|------------------------------------------|------|--------------------|----------------------|------------------------|
| 1        | Mobilization (5%)                        | LS   | 1                  | \$491,000.00         | \$491,000.00           |
| 2        | Demolition of Structures                 | SF   | 0                  | \$6.00               | \$0.00                 |
| 3        | Clearing and Grubbing                    | AC   | 0.00               | \$9,000.00           | \$0.00                 |
| 4        | Excavation                               | CY   | 13,700             | \$15.00              | \$205,500.00           |
| 5        | 14x73 Steel H-Piles                      | LF   | 0                  | \$85.00              | \$0.00                 |
| 6        | 24 Diameter Steel Pipe Piles             | LF   | 0                  | \$160.00             | \$0.00                 |
| 7        | Pile Load Test                           | LS   | 0                  | \$250,000.00         | \$0.00                 |
| 8        | Steel Sheet Pile Cut Off Wall (PZ22)     | SF   | 0                  | \$30.00              | \$0.00                 |
| 9        | Painting PZ 22 Sheet Piles               | SF   | 0                  | \$6.00               | \$0.00                 |
| 10       | Painting H-Piles                         | SF   | 0                  | \$6.00               | \$0.00                 |
| 11       | Painting Pipe Piles                      | SF   | 0                  | \$6.00               | \$0.00                 |
| 12       | Reinforced Concrete for Wall Base        | CY   | 0                  | \$550.00             | \$0.00                 |
| 13       | Reinforced Concrete for Wall Stem        | CY   | 0                  | \$850.00             | \$0.00                 |
| 14       | Railroad Gate                            | LS   | 0                  | \$560,000.00         | \$0.00                 |
| 15       | Embankment (Compacted)                   | CY   | 186,000            | \$35.00              | \$6,510,000.00         |
| 16       | Seeding and Fertilizing                  | AC   | 209.00             | \$2,600.00           | \$543,400.00           |
| 17       | Geotextile Fabric                        | SY   | 0                  | \$18.00              | \$0.00                 |
| 18       | Install and Remove Temporary Access Road | SY   | 32,000             | \$68.00              | \$2,176,000.00         |
| 19       | Relocation of Utilities                  | LS   | 1                  | \$374,000.00         | \$374,000.00           |
| 20       | Real Estate Acquisition                  | LS   | 1                  | \$0.00               | \$0.00                 |
| 21       | Drainage Canal                           | LS   | 1                  | \$0.00               | \$0.00                 |
|          |                                          |      |                    | Contingency (25%)    | \$2,600,000.00         |
|          |                                          |      |                    | <b>TOTAL</b>         | <b>\$12,899,900.00</b> |
|          |                                          |      |                    | <b>ROUNDED TOTAL</b> | <b>\$13,000,000.00</b> |

**West Bank and Vicinity Hurricane Protection Project**  
**Phase 2 Hurricane Protection**  
**Algiers Canal Levee West, Algiers Lock to Hwy 23 (WBV 47.2)**  
**B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana**  
**Contract No. W912P8-08-D-0002-Task Order 0005**

**Opinion of Probable Construction Cost**  
**Unreinforced Earthen Levee Option**  
**Lifts 1, 2, 3, and 4**

|                                                                |                      |
|----------------------------------------------------------------|----------------------|
| Opinion of Probable Construction Cost - Lift 1                 | \$231,200,000        |
| Opinion of Probable Construction Cost - Lift 2                 | \$11,000,000         |
| Opinion of Probable Construction Cost - Lift 3                 | \$11,000,000         |
| Opinion of Probable Construction Cost - Lift 4                 | \$13,000,000         |
| <b>Total Opinion of Probable Construction Cost - Lifts 1-4</b> | <b>\$266,200,000</b> |

**West Bank and Vicinity Hurricane Protection Project**

**Phase 2 Hurricane Protection**

**Algiers Canal Levee West, Algiers Lock to Hwy 23 (WBV 47.2)**

**B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana**

**Contract No. W912P8-08-D-0002-Task Order 0005**

**Opinion of Probable Construction Cost  
Reinforced Earthen Levee Option  
1st Lift**

| Item No. | Item Description                         | Unit | Estimated Quantity | Unit Price           | Estimated Amount        |
|----------|------------------------------------------|------|--------------------|----------------------|-------------------------|
| 1        | Mobilization (5%)                        | LS   | 1                  | \$7,200,000.00       | \$7,200,000.00          |
| 2        | Demolition of Structures                 | SF   | 1,005,100          | \$6.00               | \$6,030,600.00          |
| 3        | Clearing and Grubbing                    | AC   | 23.00              | \$9,000.00           | \$207,000.00            |
| 4        | Excavation                               | CY   | 172,400            | \$15.00              | \$2,586,000.00          |
| 5        | 14x73 Steel H-Piles                      | LF   | 35,800             | \$85.00              | \$3,043,000.00          |
| 6        | 24 Diameter Steel Pipe Piles             | LF   | 183,700            | \$160.00             | \$29,392,000.00         |
| 7        | Pile Load Test                           | LS   | 1                  | \$250,000.00         | \$250,000.00            |
| 8        | Steel Sheet Pile Cut Off Wall (PZ22)     | SF   | 198,300            | \$30.00              | \$5,949,000.00          |
| 9        | Painting PZ 22 Sheet Piles               | SF   | 16,100             | \$6.00               | \$96,600.00             |
| 10       | Painting H-Piles                         | SF   | 12,500             | \$6.00               | \$75,000.00             |
| 11       | Painting Pipe Piles                      | SF   | 50,700             | \$6.00               | \$304,200.00            |
| 12       | Reinforced Concrete for Wall Base        | CY   | 9,300              | \$550.00             | \$5,115,000.00          |
| 13       | Reinforced Concrete for Wall Stem        | CY   | 5,300              | \$850.00             | \$4,505,000.00          |
| 14       | Railroad Gate                            | LS   | 1                  | \$660,000.00         | \$660,000.00            |
| 15       | Embankment (Compacted)                   | CY   | 2,092,100          | \$35.00              | \$73,223,500.00         |
| 16       | Seeding and Fertilizing                  | AC   | 162.00             | \$2,600.00           | \$421,200.00            |
| 17       | Geotextile Fabric                        | SY   | 180,200            | \$18.00              | \$3,243,600.00          |
| 18       | Install and Remove Temporary Access Road | SY   | 32,000             | \$68.00              | \$2,176,000.00          |
| 19       | Relocation of Utilities                  | LS   | 1                  | \$6,283,000.00       | \$6,283,000.00          |
| 20       | Real Estate Acquisition**                | LS   | 1                  | \$0.00               | \$0.00                  |
| 21       | Drainage Canal                           | LS   | 1                  | \$245,000.00         | \$245,000.00            |
|          |                                          |      |                    | Contingency (25%)    | \$37,700,000.00         |
|          |                                          |      |                    | <b>TOTAL</b>         | <b>\$188,605,700.00</b> |
|          |                                          |      |                    | <b>ROUNDED TOTAL</b> | <b>\$189,000,000.00</b> |

\*\* Real Estate Acquisition costs were not done as directed by the USACE Real Estate Division

**West Bank and Vicinity Hurricane Protection Project**

**Phase 2 Hurricane Protection**

**Algiers Canal Levee West, Algiers Lock to Hwy 23 (WBV 47.2)**

**B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana**

**Contract No. W912P8-08-D-0002-Task Order 0005**

**Opinion of Probable Construction Cost  
Reinforced Earthen Levee Option  
2nd Lift**

| Item No. | Item Description                         | Unit | Estimated Quantity | Unit Price           | Estimated Amount       |
|----------|------------------------------------------|------|--------------------|----------------------|------------------------|
| 1        | Mobilization (5%)                        | LS   | 1                  | \$513,000.00         | \$513,000.00           |
| 2        | Demolition of Structures                 | SF   | 0                  | \$6.00               | \$0.00                 |
| 3        | Clearing and Grubbing                    | AC   | 0.00               | \$9,000.00           | \$0.00                 |
| 4        | Excavation                               | CY   | 13,800             | \$15.00              | \$207,000.00           |
| 5        | 14x73 Steel H-Piles                      | LF   | 0                  | \$85.00              | \$0.00                 |
| 6        | 24 Diameter Steel Pipe Piles             | LF   | 0                  | \$160.00             | \$0.00                 |
| 7        | Pile Load Test                           | LS   | 0                  | \$250,000.00         | \$0.00                 |
| 8        | Steel Sheet Pile Cut Off Wall (PZ22)     | SF   | 0                  | \$30.00              | \$0.00                 |
| 9        | Painting PZ 22 Sheet Piles               | SF   | 0                  | \$6.00               | \$0.00                 |
| 10       | Painting H-Piles                         | SF   | 0                  | \$6.00               | \$0.00                 |
| 11       | Painting Pipe Piles                      | SF   | 0                  | \$6.00               | \$0.00                 |
| 12       | Reinforced Concrete for Wall Base        | CY   | 0                  | \$550.00             | \$0.00                 |
| 13       | Reinforced Concrete for Wall Stem        | CY   | 0                  | \$850.00             | \$0.00                 |
| 14       | Railroad Gate                            | LS   | 0                  | \$560,000.00         | \$0.00                 |
| 15       | Embankment (Compacted)                   | CY   | 204,800            | \$35.00              | \$7,168,000.00         |
| 16       | Seeding and Fertilizing                  | AC   | 163.00             | \$2,600.00           | \$423,800.00           |
| 17       | Geotextile Fabric                        | SY   | 0                  | \$18.00              | \$0.00                 |
| 18       | Install and Remove Temporary Access Road | SY   | 32,000             | \$68.00              | \$2,176,000.00         |
| 19       | Relocation of Utilities                  | LS   | 1                  | \$280,500.00         | \$280,500.00           |
| 20       | Real Estate Acquisition                  | LS   | 1                  | \$0.00               | \$0.00                 |
| 21       | Drainage Canal                           | LS   | 1                  | \$0.00               | \$0.00                 |
|          |                                          |      |                    | Contingency (25%)    | \$2,700,000.00         |
|          |                                          |      |                    | <b>TOTAL</b>         | <b>\$13,468,300.00</b> |
|          |                                          |      |                    | <b>ROUNDED TOTAL</b> | <b>\$13,500,000.00</b> |

**West Bank and Vicinity Hurricane Protection Project**

**Phase 2 Hurricane Protection**

**Algiers Canal Levee West. Algiers Lock to Hwy 23 (WBV 47.2)**  
**B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana**  
**Contract No. W912P8-08-D-0002-Task Order 005**

**Opinion of Probable Construction Cost  
 Reinforced Earthen Levee Option  
 3rd Lift**

| Item No. | Item Description                         | Unit | Estimated Quantity | Unit Price           | Estimated Amount       |
|----------|------------------------------------------|------|--------------------|----------------------|------------------------|
| 1        | Mobilization (5%)                        | LS   | 1                  | \$484,200.00         | \$484,200.00           |
| 2        | Demolition of Structures                 | SF   | 0                  | \$6.00               | \$0.00                 |
| 3        | Clearing and Grubbing                    | AC   | 0.00               | \$9,000.00           | \$0.00                 |
| 4        | Excavation                               | CY   | 14,900             | \$15.00              | \$223,500.00           |
| 5        | 14x73 Steel H-Piles                      | LF   | 0                  | \$85.00              | \$0.00                 |
| 6        | 24 Diameter Steel Pipe Piles             | LF   | 0                  | \$160.00             | \$0.00                 |
| 7        | Pile Load Test                           | LS   | 0                  | \$250,000.00         | \$0.00                 |
| 8        | Steel Sheet Pile Cut Off Wall (PZ22)     | SF   | 0                  | \$30.00              | \$0.00                 |
| 9        | Painting PZ 22 Sheet Piles               | SF   | 0                  | \$6.00               | \$0.00                 |
| 10       | Painting H-Piles                         | SF   | 0                  | \$6.00               | \$0.00                 |
| 11       | Painting Pipe Piles                      | SF   | 0                  | \$6.00               | \$0.00                 |
| 12       | Reinforced Concrete for Wall Base        | CY   | 0                  | \$550.00             | \$0.00                 |
| 13       | Reinforced Concrete for Wall Stem        | CY   | 0                  | \$850.00             | \$0.00                 |
| 14       | Railroad Gate                            | LS   | 0                  | \$560,000.00         | \$0.00                 |
| 15       | Embankment (Compacted)                   | CY   | 188,000            | \$35.00              | \$6,580,000.00         |
| 16       | Seeding and Fertilizing                  | AC   | 163.00             | \$2,600.00           | \$423,800.00           |
| 17       | Geotextile Fabric                        | SY   | 0                  | \$18.00              | \$0.00                 |
| 18       | Install and Remove Temporary Access Road | SY   | 32,000             | \$68.00              | \$2,176,000.00         |
| 19       | Relocation of Utilities                  | LS   | 1                  | \$280,500.00         | \$280,500.00           |
| 20       | Real Estate Acquisition                  | LS   | 1                  | \$0.00               | \$0.00                 |
| 21       | Drainage Canal                           | LS   | 1                  | \$0.00               | \$0.00                 |
|          |                                          |      |                    | Contingency (25%)    | \$2,600,000.00         |
|          |                                          |      |                    | <b>TOTAL</b>         | <b>\$12,768,000.00</b> |
|          |                                          |      |                    | <b>ROUNDED TOTAL</b> | <b>\$12,800,000.00</b> |

**West Bank and Vicinity Hurricane Protection Project**

**Phase 2 Hurricane Protection**

**Algiers Canal Levee West, Algiers Lock to Hwy 23 (WBV 47.2)**

**B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana**

**Contract No. W912P8-08-D-0002-Task Order 0005**

**Opinion of Probable Construction Cost  
Reinforced Earthen Levee Option  
4th Lift**

| Item No. | Item Description                         | Unit | Estimated Quantity | Unit Price           | Estimated Amount       |
|----------|------------------------------------------|------|--------------------|----------------------|------------------------|
| 1        | Mobilization (5%)                        | LS   | 1                  | \$577,000.00         | \$577,000.00           |
| 2        | Demolition of Structures                 | SF   | 0                  | \$6.00               | \$0.00                 |
| 3        | Clearing and Grubbing                    | AC   | 0.00               | \$9,000.00           | \$0.00                 |
| 4        | Excavation                               | CY   | 16,700             | \$15.00              | \$250,500.00           |
| 5        | 14x73 Steel H-Piles                      | LF   | 0                  | \$85.00              | \$0.00                 |
| 6        | 24 Diameter Steel Pipe Piles             | LF   | 0                  | \$160.00             | \$0.00                 |
| 7        | Pile Load Test                           | LS   | 0                  | \$250,000.00         | \$0.00                 |
| 8        | Steel Sheet Pile Cut Off Wall (PZ22)     | SF   | 0                  | \$30.00              | \$0.00                 |
| 9        | Painting PZ 22 Sheet Piles               | SF   | 0                  | \$6.00               | \$0.00                 |
| 10       | Painting H-Piles                         | SF   | 0                  | \$6.00               | \$0.00                 |
| 11       | Painting Pipe Piles                      | SF   | 0                  | \$6.00               | \$0.00                 |
| 12       | Reinforced Concrete for Wall Base        | CY   | 0                  | \$550.00             | \$0.00                 |
| 13       | Reinforced Concrete for Wall Stem        | CY   | 0                  | \$850.00             | \$0.00                 |
| 14       | Railroad Gate                            | LS   | 0                  | \$560,000.00         | \$0.00                 |
| 15       | Embankment (Compacted)                   | CY   | 240,100            | \$35.00              | \$8,403,500.00         |
| 16       | Seeding and Fertilizing                  | AC   | 163.00             | \$2,600.00           | \$423,800.00           |
| 17       | Geotextile Fabric                        | SY   | 0                  | \$18.00              | \$0.00                 |
| 18       | Install and Remove Temporary Access Road | SY   | 32,000             | \$68.00              | \$2,176,000.00         |
| 19       | Relocation of Utilities                  | LS   | 1                  | \$280,500.00         | \$280,500.00           |
| 20       | Real Estate Acquisition                  | LS   | 1                  | \$0.00               | \$0.00                 |
| 21       | Drainage Canal                           | LS   | 1                  | \$0.00               | \$0.00                 |
|          |                                          |      |                    | Contingency (25%)    | \$3,100,000.00         |
|          |                                          |      |                    | <b>TOTAL</b>         | <b>\$15,211,300.00</b> |
|          |                                          |      |                    | <b>ROUNDED TOTAL</b> | <b>\$15,300,000.00</b> |

**West Bank and Vicinity Hurricane Protection Project**  
**Phase 2 Hurricane Protection**  
**Algiers Canal Levee West. Algiers Lock to Hwy 23 (WBV 47.2)**  
**B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana**  
**Contract No. W912P8-08-D-0002-Task Order 0005**

**Opinion of Probable Construction Cost  
Reinforced Earthen Levee Option  
Lifts 1, 2, 3, and 4**

|                                                                |                      |
|----------------------------------------------------------------|----------------------|
| <b>Opinion of Probable Construction Cost - Lift 1</b>          | \$189,000,000        |
| <b>Opinion of Probable Construction Cost - Lift 2</b>          | \$13,500,000         |
| <b>Opinion of Probable Construction Cost - Lift 3</b>          | \$12,800,000         |
| <b>Opinion of Probable Construction Cost - Lift 4</b>          | \$15,300,000         |
| <b>Total Opinion of Probable Construction Cost - Lifts 1-4</b> | <b>\$230,600,000</b> |

**West Bank and Vicinity Hurricane Protection Project**

**Phase 2 Hurricane Protection**

**Algiers Canal Levee West, Algiers Lock to Hwy 23 (WBV 47.2)**

**B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana**

**Contract No. W912P8-08-D-0002-Task Order 0005**

**Opinion of Probable Construction Cost  
T-Wall Option**

| Item No. | Item Description                         | Unit | Estimated Quantity | Unit Price           | Estimated Amount        |
|----------|------------------------------------------|------|--------------------|----------------------|-------------------------|
| 1        | Mobilization (5%)                        | LS   | 1                  | \$16,200,000.00      | \$16,200,000.00         |
| 2        | Demolition of Structures                 | SF   | 24,800             | \$6.00               | \$148,800.00            |
| 3        | Clearing and Grubbing                    | AC   | 23.00              | \$9,000.00           | \$207,000.00            |
| 4        | Excavation                               | CY   | 84,800             | \$15.00              | \$1,272,000.00          |
| 5        | 14x73 Steel H-Piles                      | LF   | 201,200            | \$85.00              | \$17,102,000.00         |
| 6        | 24 Diameter Steel Pipe Piles             | LF   | 1,179,000          | \$160.00             | \$188,640,000.00        |
| 7        | Pile Load Test                           | LS   | 1                  | \$250,000.00         | \$250,000.00            |
| 8        | Steel Sheet Pile Cut Off Wall (PZ22)     | SF   | 1,240,200          | \$30.00              | \$37,206,000.00         |
| 9        | Painting PZ 22 Sheet Piles               | SF   | 100,000            | \$6.00               | \$600,000.00            |
| 10       | Painting H-Piles                         | SF   | 69,900             | \$6.00               | \$419,400.00            |
| 11       | Painting Pipe Piles                      | SF   | 324,800            | \$6.00               | \$1,948,800.00          |
| 12       | Reinforced Concrete for Wall Base        | CY   | 58,200             | \$550.00             | \$32,010,000.00         |
| 13       | Reinforced Concrete for Wall Stem        | CY   | 32,500             | \$850.00             | \$27,625,000.00         |
| 14       | Railroad Gate                            | LS   | 1                  | \$560,000.00         | \$560,000.00            |
| 15       | Embankment (Compacted)                   | CY   | 322,600            | \$35.00              | \$11,291,000.00         |
| 16       | Seedling and Fertilizing                 | AC   | 29.00              | \$2,600.00           | \$75,400.00             |
| 17       | Geotextile Fabric                        | SY   | 0                  | \$18.00              | \$0.00                  |
| 18       | Install and Remove Temporary Access Road | SY   | 34,000             | \$68.00              | \$2,312,000.00          |
| 19       | Relocation of Utilities                  | LS   | 1                  | \$1,595,000.00       | \$1,595,000.00          |
| 20       | Real Estate Acquisition**                | LS   | 1                  | \$0.00               | \$0.00                  |
|          |                                          |      |                    | Contingency (25%)    | \$85,000,000.00         |
|          |                                          |      |                    | <b>TOTAL</b>         | <b>\$424,462,400.00</b> |
|          |                                          |      |                    | <b>ROUNDED TOTAL</b> | <b>\$425,000,000.00</b> |

\*\* Real Estate Acquisition costs were not done as directed by the USACE Real Estate Division

**West Bank and Vicinity Hurricane Protection Project**

**Phase 2 Hurricane Protection**

**Algiers Canal Levee West, Algiers Lock to Hwy 23 (WBV 47.2)**  
**B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana**

**Contract No. W912P8-08-D-0002-Task Order 0005**

**Opinion of Probable Construction Cost**  
**T-Wall & Reinforced Earthen Levee Option**

| Item No. | Item Description                         | Unit | Estimated Quantity | Unit Price           | Estimated Amount        |
|----------|------------------------------------------|------|--------------------|----------------------|-------------------------|
| 1        | Mobilization (5%)                        | LS   | 1                  | \$13,900,000.00      | \$13,900,000.00         |
| 2        | Demolition of Structures                 | SF   | 24,800             | \$6.00               | \$148,800.00            |
| 3        | Clearing and Grubbing                    | AC   | 23.00              | \$9,000.00           | \$207,000.00            |
| 4        | Excavation                               | CY   | 109,700            | \$15.00              | \$1,645,500.00          |
| 5        | 14x73 Steel H-Piles                      | LF   | 157,200            | \$85.00              | \$13,362,000.00         |
| 6        | 24 Diameter Steel Pipe Piles             | LF   | 931,000            | \$160.00             | \$148,960,000.00        |
| 7        | Pile Load Test                           | LS   | 1                  | \$250,000.00         | \$250,000.00            |
| 8        | Steel Sheet Pile Cut Off Wall (PZ22)     | SF   | 977,500            | \$30.00              | \$29,325,000.00         |
| 9        | Painting PZ 22 Sheet Piles               | SF   | 78,700             | \$6.00               | \$472,200.00            |
| 10       | Painting H-Piles                         | SF   | 70,000             | \$6.00               | \$420,000.00            |
| 11       | Painting Pipe Piles                      | SF   | 257,000            | \$6.00               | \$1,542,000.00          |
| 12       | Reinforced Concrete for Wall Base        | CY   | 46,000             | \$550.00             | \$25,300,000.00         |
| 13       | Reinforced Concrete for Wall Stem        | CY   | 25,600             | \$850.00             | \$21,760,000.00         |
| 14       | Railroad Gate                            | LS   | 1                  | \$560,000.00         | \$560,000.00            |
| 15       | Embankment (Compacted)                   | CY   | 796,500            | \$35.00              | \$27,877,500.00         |
| 16       | Seeding and Fertilizing                  | AC   | 23.00              | \$2,600.00           | \$59,800.00             |
| 17       | Geotextile Fabric                        | SY   | 35,600             | \$18.00              | \$640,800.00            |
| 18       | Install and Remove Temporary Access Road | SY   | 34,000             | \$68.00              | \$2,312,000.00          |
| 19       | Relocation of Utilities                  | LS   | 1                  | \$1,595,000.00       | \$1,595,000.00          |
| 20       | Real Estate Acquisition**                | LS   | 1                  | \$0.00               | \$0.00                  |
| 21       | Drainage Canal                           | LS   | 1                  | \$56,000.00          | \$56,000.00             |
|          |                                          |      |                    | Contingency (25%)    | \$73,000,000.00         |
|          |                                          |      |                    | <b>TOTAL</b>         | <b>\$363,393,600.00</b> |
|          |                                          |      |                    | <b>ROUNDED TOTAL</b> | <b>\$365,000,000.00</b> |

\*\* Real Estate Acquisition costs were not done as directed by the USACE Real Estate Division

Cost Estimate (Algiers West) :

\* General cost for items that apply to all three options

- ① Price of 24"dia pipe pile \$160/LF
- ② Fertilizing and seeding → \$2600/AC  
→ price obtained from average of bid results from "Canal No. 7 Drainage Improvements" in Jefferson Parish. 2/07/08 Bid Date
- ③ Install and Remove temporary Access Road  
# 68 /sy

(A)

T-Wall Option :

- ① Mobilization (5%)
  - ② Demolition of structures  
Demolition of Existing structures #6/SF
  - ③ Clearing and grubbing  
50' width × length of project [50' × 19972'] = 2.12 acres
  - ④ Excavation : Area of concrete base × length of project  
 $(48 \times 4460) + (87.5 \times 15512) = 58199 \text{ cy}$   
Assume approx. 75% of area of base will require excavation  
 $= 43,650 \text{ cy}$   
+ cut of existing levee → 41,138CY
- 84,788 CY

T-Wall option (contd.):

⑤ 14x73 steel H-Piles

Total length of required piles

201,146 LF

⑥ 24" Diameter Steel Pipe Piles Total length of required Piles

1,178,912 LF

⑦ Pile Load Test 1 Lmp Sam

⑧ Steel Sheet Pile Cut off Wall (PZ22)

Length of sheet pile times length of project:

$$(52' \times 4460') + (65' \times 15512') = \underline{1240200 SF}$$

⑨ Painting PZ22 Sheet Piles 5' x length of project

$$5' \times 19972' = 99860 SF$$

⑩ Painting H-Piles

surface area = 6.96 SF/LF (include only top five (5) feet)

$$2007 \text{ piles} \times 5' \times 6.96 \text{ SF/LF} = 69844 \text{ SF}$$

⑪ Painting Pipe Piles

24" diameter steel pipe pile surface area 6.28 SF/LF

$$10342 \text{ piles} \times 5' \times 6.28 \text{ SF/LF} = 32,4748 \text{ SF}$$

⑫ Reinforced Concrete for Wall Base

Base area of wall x length of project

$$[48.44^2 \times 4460] + [87.5 \times 15512] = 58199 \text{ cy}$$

⑬ Reinforced Concrete for Wall Stem

Wall Stem area x length of project

$$[40 \times 4460] + [45 \times 15512] = 32461 \text{ cy}$$

T- Wall Option (Contd)

(14) Railroad Gate → \$250,000 Lump Sum

(15) Embankment (Compacted)

322,581 cy

(16) Seeding & Fertilizing

28.75 acres

(17) Geotextile Fabric → 0

(18) Install and Remove Temporary Access Road

34,000 sy

(19) Relocation of Utilities

\* (Refer to Additional sheets at end.)

B

Unreinforced Earthen Levee Option - 1st Lift1st Lift

- ② Demolition of Structures  
Refer to sheets at end.

③ Clearing & Grubbing 22.92 AC

④ Excavation → 77,033 CY

⑤, 6 T-Wall Lengths: Type I → 2358 ft

Type II → 789 ft

Pile lengths

14x73 piles: Type II ( $45.1 \text{ LF/ft}$  piles  $\times 789$ ) = 35,584 ft

24" Dia pipe piles: Type I ( $176.0 \text{ LF/ft}$   $\times 2358$ ) = 179,208 ft

⑦ pile load Test → 1 Lump Sum

⑧ Steel sheet Pile Cut off wall (PZ22)

Type I:  $65' \times 2358' = 153,270 \text{ SF}$

Type II:  $52' \times 789' = 41,028 \text{ SF}$

Total = 194,298 SF

⑨ Painting PZ22 sheet Piles (Top 5' of each sheet pile)  
 $(5' \times 2358') + (5' \times 789') = 15,735 \text{ SF}$

⑩ Painting H-Piles (Top 5' only)

$355 \text{ piles} \times 5' = 1775 \text{ LF} \times 6.96 \text{ SF/LF}$  (surface area)  
= 12,354 SF

Unreinforced Eartha Leree Option 1st Lift (Cont'D)

(11) Painting Pipe Piles (Top 5' only)

$$1572 \text{ piles} \times 5' = 7860 \times 6.28 \text{ SF/LF} \quad (\text{surface area})$$

$$\underline{49,360 \text{ SF}}$$

(12) Reinforced concrete for Wall Base

$$\text{Type I } (87.5 \text{ ft}^2 \times 2358) = 206325 \text{ ft}^3 = 7642 \text{ cy}$$

$$\text{Type II } (48 \text{ ft}^2 \times 789') = 37872 \text{ ft}^3 = 1403 \text{ cy}$$

$$\text{Total} = \underline{9045 \text{ cy}}$$

(13) Reinforced concrete for Wall Stem

$$\text{Type I } (45 \text{ ft}^2 \times 2358) = 106110 \text{ ft}^3 = 3930 \text{ cy}$$

$$\text{Type II } (40 \text{ ft}^2 \times 789') = 31560 \text{ ft}^3 = 1170 \text{ cy}$$

$$\text{Total} = \underline{5100 \text{ cy}}$$

(14) Railroad Gate 1 Lump Sum

(15) Embankment

$$3,143,034 \text{ cy}$$

(16) Seeding and Fertilizing

$$207.24 \text{ ac.}$$

(17) Geotextile Fabric N/A

(18) Install and Remove Temporary Access Road

$$19,182 \text{ LF} \times 15' \text{ Width} = 287730 \text{ SF} = 31970 \text{ sy}$$

(19) Relocation of Utilities

Unreinforced Earthen levee Option 2nd Lift :

- ① Mobilization 5%  
N/A
- ② Removal of existing structures  
N/A
- ③ Clearing and grubbing  
N/A
- ④ Excavation  
10,895 CY
- ⑤ 14x73 piles  
N/A
- ⑥ 24" Diameter Pipe Piles  
N/A
- ⑦ Pile Load test  
N/A
- ⑧ Steel Sheet Pile  
N/A
- ⑨ Painting PZ22 sheet pile  
N/A
- ⑩ Painting H-piles  
N/A
- ⑪ Painting 24" Ø Pipe Pil  
N/A
- ⑫ Concrete for Wall Base  
N/A
- ⑬ Concrete for Wall Stem  
N/A
- ⑭ Larboard Gate  
N/A

Unreinforced Levee Option 2<sup>nd</sup> Lift (contd)

(15) Embankment (Compacted)

143,992 Cy

(16) Seeding and Fertilizing

207.77 acres

(17) Geotextile Fabric

N/A

(18) Install and Remove Temporary Access Rd.

19,182 LF x 15' Width = 31,970 SY

(19) Relocation of Utilities

N/A

Unreinforced Lwee Option 3rd Lift:

① Mobilization 5%

Item 2+3 N/A

④ Excavation

11,885 Cy

Items 5 - 14 N/A

⑯ Embankment

145,083 Cy

⑯ Seeding and Fertilizing

207.89 acres

⑰ N/A

⑱ Install and Remove Temporary Access Road

19,182 LF x 15' Width = 31,970 Sy

⑲ Relocation of Utilities

N/A

Unreinforced Levee Option 4<sup>th</sup> Lift

① Mobilization 5%

Items 2-3 N/A

④ Excavation

13,681 CY

> Items 5-14

N/A

⑫ Embankment

185,566 CY

⑯ Seeding and Fertilizing

208.04 acres

⑰ N/A

⑮ Install and Remove temporary Access Road

19,182 LF X 15' width = 31,970 SY

⑲ N/A

Reinforced River Option 1<sup>st</sup> Lift -

- ① Mobilization 5%
- ② Demolition of structures

- ③ Clearing and Grubbing

50' width x length of project [50' x 19972'] = 22.92 acres.

- ④ Excavation

172,362 CY

- ⑤, ⑥ T-Wall lengths : Type I : 2417 feet

Type II : 792 feet

pile lengths

14x73 piles : Type II (45.1 LF/ft piles x 792) = 35,720 feet

24" Dia pipe piles : Type I (76.0 LF/ft piles x 2417) = 183,692 feet

- ⑦ Pile load test → 1 Lump Sum

- ⑧ Steel sheet piles cut off wall (PZ22)

Type I : 65' x 2417' = 157,105 SF

Type II : 52' x 792' = 41,184 SF

Total = 198,289 SF

- ⑨ Painting PZ22 sheet Piles (top 5' of each sheet pile)

(5' x 2417') + (5' x 792') = 16,045 SF

- ⑩ Painting H-Piles (Top 5' only)

357 piles x 5' = 1785 LF x 6.96 SF/LF (surface area)

= 12,424 SF

Reinforced Lattice Option 1st Lift (Contd) :

- ⑩ Painting Pipe Piles (Top 5' only)

$$1612 \text{ piles} \times 5' = 8060' \times 6.28 \text{ SF/LF} \text{ (surface area)} \\ = 50,617 \text{ SF}$$

- ⑪ Reinforced concrete for Wall Base

$$\text{Type I } (87.5 \text{ ft}^2 \times 2417') = 7833 \text{ cy}$$

$$\text{Type II } (48 \text{ ft}^2 \times 792') = 1408 \text{ cy}$$

$$\text{Total} = 9241 \text{ cy}$$

- ⑫ Reinforced concrete for Wall Stem

$$\text{Type I } (45 \text{ ft}^2 \times 2417') = 4029 \text{ cy}$$

$$\text{Type II } (40 \text{ ft}^2 \times 792') = 1174 \text{ cy}$$

$$\text{Total} = 5203 \text{ cy}$$

- ⑬ Railroad Grade  $\rightarrow$  1Lump sum

- ⑭ Embankment  $\rightarrow$  2,092,061 cy

- ⑮ Seeding and Fertilizing

161.96 acres

- ⑯ Geotextile Fabric

180,115 SY

- ⑰ Install and Remove temporary access road

$$19,055 \text{ LF} \times 15' \text{ W:dth} = 285,825 \text{ SF} = 31,760 \text{ SY}$$

- ⑱ Relocation of Utilities

Reinforced Levee Option 2<sup>nd</sup> Lift

① Mobilization → 5%

Items 2+3 N/A

④ Excavation

13,796 cy

Items 5 - 14 N/A

⑯ Embankment

204,758 cy

⑯ Seeding and Fertilizing

162.24 acres

⑰ Geotextile fabric

0 sy

⑯ Install and Remove Temporary Access Road

31,760 sy

⑯ Relocation of Utilities

\* (Refer to sheets at end)

Reinforced levee option 3rd lift :

① Mobilization → 5%

Items 2+3 N/A

④ Excavation

14,818 c y

Items 5-14

N/A

⑯ Embankment

189,961 c y

⑯ Seeding and Fertilizing

162.35 acres

⑰ Geotextile fabric

0 s y

⑱ Install and Remove Temporary Access Road

31,760 s y

⑲ N/A

Reinforced River Option 4th Lift

① Mobilization → 5%

Items 2+3 N/A

④ Excavation

16,670 cy

Items 5-14

⑮ Embankment

240,013 cy

⑯ Seeding and Vegetation

162.51 acres

⑰ Geotextile Fabric

0.54

⑲ Install and Remove Temporary Access Road

31,760 sy

Utility Relocations = (T-Wall, Unreinforced Earthen Levee, & Reinforced Earthen Levee)

→ ① 12" Gas pipe line (Buried) Sta. 805+62.31

(A) T-Wall → pass through steel sheet pile

$$75 \text{ ft} + \text{one sleeve} = 100 \text{ ft}$$

$$15 \text{ sleeve} = \$20,000 + 100 \text{ ft} = \$20,000$$

(B) Unreinforced Levee

$$400 \text{ LF} \times \$60/\text{LF} = \$24,000$$

(C) Reinforced Levee

$$300 \text{ LF} \times \$60/\text{LF} = \$18,000$$

→ ② 42" SPM Sta. 786+49.35

(A) T-Wall

$$= \$75,000 \quad 75,000 (\text{sleeve})$$

(B) Unreinforced Levee

$$400 \text{ LF} \times \$800/\text{LF} = \$320,000$$

(C) Reinforced Levee

$$300 \text{ LF} \times \$800/\text{LF} = \$240,000$$

→ ③ Electrical Transmission Tower and line Sta. 795+86

(A) T-Wall

Relocation of Tower + line Lump sum

$$= \$350,000$$

(B) Unreinforced → \$350,000

(C) Reinforced → \$350,000

Utility Relocation (Contd)

→ ④ Communicator Line (4 conduit Duct Bank) Sta. 823+85

(A) T-Wall

Sheet Pile wall sleeve \$30,000

(B) Unreinforced levee

$$400 \text{ LF} \times \$75/\text{LF} = \$30,000$$

(C) Reinforced levee

$$300 \text{ LF} \times \$75/\text{LF} = \$22,500$$

→ ⑤ 30" Diameter Gas Pipeline : Sta. 823+98.11 - 884+00

(A) T-Wall

(2) sheet pile wall sleeves : \$75,000 EA  
 - \$150,000

(B) Unreinforced Levee

$$5400 \text{ LF} \times \$800/\text{LF} = \$4,320,000 + 25 \text{ sleeves } (150,000 \text{ ea})$$

(C) Reinforced Levee

\$4,620,000

$$5200 \text{ LF} \times \$800/\text{LF} = \$4,160,000 + 300,000 = \$4,460,000$$

→ ⑥ Electrical Transmission Tower and Line Sta 823+02

(A) T-Wall → \$350,000 LS

(B) Unreinforced → \$350,000 LS

(C) Reinforced → \$350,000 LS

- ⑦ 12" Diameter Watertower Sta. 869+76.36
- (A) T-Wall sheet pile sleeve → \$ 20,000
  - (B) Unreinforced sheet pile sleeve → \$ 20,000
  - (C) Reinforced sheet pile sleeve → \$ 20,000
- ⑧ Electrical Transmission Tower and Line Sta. 920+90
- (A) T-Wall → \$ 350,000
  - (B) Unreinforced → \$ 350,000
  - (C) Reinforced → \$ 350,000
- ⑨ Electrical Distribution Line Sta. 975+28
- (A) T-Wall No action
  - (B) Unreinforced  $400\text{LF} \times \$45/\text{LF} = \$18,000$
  - (C) Reinforced  $300\text{LF} \times \$45/\text{LF} = \$13,500$
- ⑩ Telephone line (aerial) Sta. 977+93 :
- (A) T-Wall No action
  - (B) Unreinforced  $400\text{LF} \times \$30/\text{LF} = \$12,000$
  - (C) Reinforced  $300\text{LF} \times \$30/\text{LF} = \$9,000$

→ ⑪ 36-4" Telephone Conduits Sta. 977+93

Steel Sheet Pile sleeve → \$60,000 Lump Sum

(A), (B), (C)

→ ⑫ 2-5" Anchored Telephone Cables Sta. 978+03

Steel Sheet Pile sleeve → \$ 20,000 Lump Sum

(A), (B), (C)

→ ⑬ Electrical Transmission Tower and Line Sta. 966+90

(A) T-Wall No action

(B) Unreinforced Lintel

\$ 350,000 Lump Sum

(C) Reinforced Lintel

\$ 350,000 Lump Sum

→ ⑭ 12" Waterline (Buried) Sta. 977+83

Steel Sheet Pile sleeve → \$ 20,000 Lump Sum

(A), (B), (C)

### Totals

(A) T-Wall → \$ 1,595,000

(B) 1<sup>st</sup> Lift = \$ 6,544,000

2<sup>nd</sup> Lift = \$ 374,000

3<sup>rd</sup> Lift = \$ 374,000

4<sup>th</sup> Lift = \$ 374,000

(C) 1<sup>st</sup> Lift = \$ 6,283,000

2<sup>nd</sup> Lift = \$ 280,500

3<sup>rd</sup> Lift = \$ 280,500

4<sup>th</sup> Lift = \$ 280,500

Demolition Cost :I Unreinforced L levee option :

Ground areas of several different types of structures (houses, apartments and applied to all)

- ① 2000 SF x 16 houses = 32,000 SF
- ② 4000 SF x 36 houses = 144,000 SF
- ③ 5500 SF x 16 condos x 2 Levels = 176,000 SF
- ④ 8500 SF x 14 apartments x 3 Levels = 357,000 SF
- ⑤ 11000 SF x 8 apartments x 3 Levels = 264,000 SF
- ⑥ 3200 SF x 11 apartments x 3 Levels = 105,600 SF
- ⑦ 3000 SF x 27 houses = 81,000 SF
- ⑧ 3100 SF x 5 houses = 15,500 SF
- ⑨ 5800 SF x 25 houses = 145,000 SF

Total = 1190100 SF

II Reinforced L levee Option

- ① 2000 SF x 7 houses = 14,000 SF
- ② 4000 SF x 32 houses = 128,000 SF
- ③ 5500 SF x 12 condos x 2 Levels = 132,000 SF
- ④ 8500 SF x 12 apartments x 3 Levels = 306,000 SF
- ⑤ 11,000 SF x 6 apartments x 3 Levels = 198,000 SF
- ⑥ 3200 SF x 8 apartments x 3 Levels = 76,800 SF
- ⑦ 3000 SF x 14 houses = 42,000 SF
- ⑧ 3100 SF x 5 houses = 15,500 SF
- ⑨ 5800 SF x 16 houses = 92,800 SF

Total = 1,005,100

Demolition Costs (Contd)

T-Wall Option :

① 3100 SF x 8 houses = 24,800 SF

Total = 24,800 SF

Cost Estimate

T-Wall + Reinforced Earthen Levee Option :

\* Reinforced Earthen levee portion of this option will be computed as 1 Final Lift.

① Mobilization (5%)

② Demolition of Structures

24,800 SF

③ Clearing and Grubbing

$$50' \text{ width} \times \text{length of project } [50' \times 19972'] = 22.92 \text{ acres}$$

④ Excavation :

T-Wall portion : Area of concrete base  $\times$  length of project  
 $(484 \times 3485') + (87.5 \text{ ft}^2 \times 12250) = 48,895 \text{ cy}$

Assume 75% of area of base will require excavation

$$34,421 \text{ cy} + \text{cut of earthen levee}$$

$$34,421 \text{ cy} + 33,044 \text{ cy}$$

$$= \underline{\underline{67,465 \text{ cy}}}$$

Reinforced Levee portion :

$$= 42,140 \text{ cy}$$

$$\underline{\underline{\text{Total} = 109605 \text{ cy}}}$$

⑤ → ⑥ T-Wall lengths : Type I = 12,250'  
 Type II = 3485'

pile lengths

14x73 piles : Type II ( $45.1 \text{ LF/ft} \times \text{piles} \times 3485'$ ) = 157,174 feet  
 24" Dia pipe piles : Type I ( $76.0 \text{ LF/ft} \times \text{piles} \times 12,250'$ ) = 931,000 feet

⑦ Pile load Test → 1 Lump Sum

⑧ Steel sheet pile cut off wall (PZ22)

Type I :  $65' \times 12,250' = 796,250 \text{ SF}$

Type II :  $52' \times 3485' = 181,220 \text{ SF}$

Total = 977,470 SF

⑨ Painting PZ22 Sheet Piles (Top 5' of each sheet pile)

$(5' \times 12,250') + (5' \times 3485') = 78675 \text{ SF}$

⑩ Painting H-piles (Top 5' only)

$1568 \text{ piles} \times 5' = 7842 \text{ LF} \times 6.96 \text{ SF/LF}$   
 $= 54575 \text{ SF}$

⑪ Painting Pipe Piles (Top 5' only)

$8167 \text{ piles} \times 5' = 40834 \text{ LF} \times 6.28 \text{ SF/LF} \text{ (surface area)}$   
 $= 256,434 \text{ SF}$

⑫ Reinforced concrete for Wall Base

Type I ( $87.5 \text{ ft}^2 \times 12,250'$ ) = 39700 cy

Type II ( $48 \text{ ft}^2 \times 3485'$ ) = 6196 cy

Total = 45896 cy

⑬ Reinforced concrete for Wall stem

Type I ( $45\text{ft}^2 \times 12250'$ ) = 20,417 cy

Type II ( $40\text{ft}^2 \times 3485'$ ) = 5,163 cy

Total = 25,580 cy

⑭ Railroad Gate  $\rightarrow$  1 Lump Sum

⑮ Embankment

T-Wall  $\approx$  258,931 cy

Reinforced Levee  $\approx$  537,507 cy

Total = 796,439 cy

⑯ Seeding and Fertilizing

T-Wall  $\approx$  22.65 acres

Reinforced Levee  $\approx$  128 acres

Total = 150.68 acres

⑰ Geotextile Fabric

= 35,531 sy

⑱ Install and Remove Temporary Access Road

34,000 sy

⑲ Relocation of Utilities  $\approx$

\$14,450,000 Lump Sum

⑳ Real Estate  $\rightarrow$  No Cost Per USACE Real Estate Division

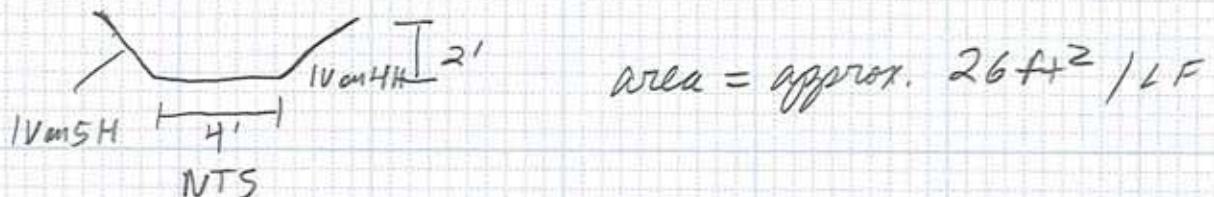
Railroad Gate Cost :

- ① Concrete / piles = \$233,490 Lump Sum  
 (Used linear foot cost for Reach 2 T-Wall 11)
- ② Cost of gate (steel) = \$75,000
- ③ Falsework = \$250,000

Total = \$558,490

Runoff Drainage Canal :

When this project proceeds to a DDR or full design, a more detailed design of a runoff drainage canal will be needed including a hydraulic analysis.



area = approx.  $26 \text{ ft}^2/\text{LF}$

$$\text{Unreinforced + Reinforced} = 16825 \text{ LF} \times 26 \text{ ft}^2/\text{LF} = 16,200 \text{ cu yd}$$

$$16,200 \text{ cu yd} \times \$15/\text{cu yd} = \$243,000$$

T-Wall / Combination

$$3867' \times 26 \text{ ft}^2/\text{LF} = 3723 \text{ cu yd}$$

$$3723 \text{ cu yd} \times \$15/\text{cu yd} = \$55,857$$

HEI

Hartman Engineering, Inc.

CLIENT C.O.E.

COMPUTED BY JM

JOB NO.

DATE

7-28-08

CHECKED BY/DATE

PAGE NO.

TO #5 Algiers West

Summary of QuantitiesUnReinforced Levee

| <u>Lift #</u> | <u>Embankment/Fill</u> | <u>Excavation</u> | <u>Seed/Fert./Mulch</u> | <u>Geotextile</u> |
|---------------|------------------------|-------------------|-------------------------|-------------------|
| 1             | 3,143,033.56           | 77,032.88         | 207.24                  | -                 |
| 2             | 143,991.76             | 10,894.86         | 207.77                  | -                 |
| 3             | 145,082.61             | 11,885.30         | 207.89                  | -                 |
| 4             | 185,565.14             | 13,680.47         | 208.04                  | -                 |

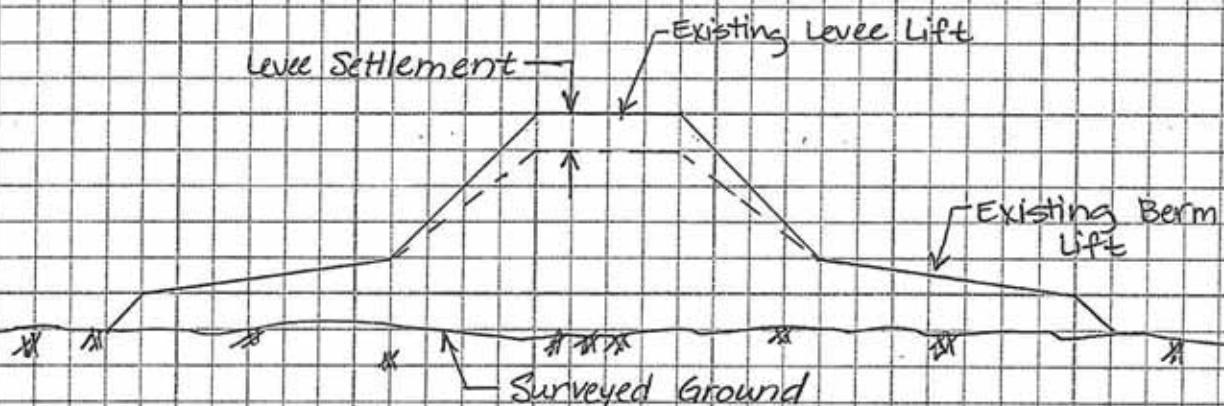
Reinforced Levee

| <u>Lift #</u> | <u>Embankment/Fill</u> | <u>Excavation</u> | <u>Seed/Fert./Mulch</u> | <u>Geotextile</u> |
|---------------|------------------------|-------------------|-------------------------|-------------------|
| 1             | 2,092,060.14           | 172,361.27        | 161.91                  | 120,115           |
| 2             | 203,757.81             | 13,775.29         | 162.24                  | -                 |
| 3             | 187,910.80             | 14,817.16         | 162.35                  | -                 |
| 4             | 240,012.46             | 16,609.31         | 162.51                  | -                 |

Units : Embankment/Fill [CY]  
 Excavation [CY]  
 Seed/Fert./Mulch [acres]  
 Geotextile [SY]

Embankment QuantitiesAssumptions

1. The Contractor shall remove the top 3" Layer of the existing ground or lift.
2. Assumed no berm settlement
3. Other Settlement:

Levee Settlement:

Settlement of each lift is determined by the geotech. Overbuild for each lift is as follows

- Lift 1: Not Applicable (No settlement)
- Lift 2: 5.5'
- Lift 3: 5.0'
- Lift 4: 5.5'

NOTE:

The above diagram depicts how quantities shall be computed based on settlement.

EARTHWORK\_UNREINFORCED\_new.xls      T/O #5 ALGIERS WEST  
TOTAL EMBANKMENT      STATION TO STATION EMBANKMENT TOTALS

7/28/2008

| X-SECTION<br>STATION (CL) | END AREA<br>(FT <sup>2</sup> ) | AVE. END AREA<br>(FT <sup>2</sup> ) | DIST.<br>BETWEEN<br>SECTIONS | VOLUME OF<br>EMBANKMENT<br>(YD <sup>3</sup> ) |
|---------------------------|--------------------------------|-------------------------------------|------------------------------|-----------------------------------------------|
|                           |                                | <i>LIFT 1 EMBANKMENT TOTAL</i>      |                              | 3,143,033.56                                  |
|                           |                                | <i>LIFT 2 EMBANKMENT TOTAL</i>      |                              | 143,991.76                                    |
|                           |                                | <i>LIFT 3 EMBANKMENT TOTAL</i>      |                              | 145,082.61                                    |
|                           |                                | <i>LIFT 4 EMBANKMENT TOTAL</i>      |                              | 185,565.14                                    |
|                           |                                | <b>GRAND TOTAL EMBANKMENT</b>       |                              | <b>3,617,673.06</b>                           |

| X-SECTION<br>STATION (CL) | END AREA<br>(FT <sup>2</sup> ) | AVE. END AREA<br>(FT <sup>2</sup> ) | DIST.<br>BETWEEN<br>SECTIONS | VOLUME OF<br>EXCAVATION<br>(YD <sup>3</sup> ) |
|---------------------------|--------------------------------|-------------------------------------|------------------------------|-----------------------------------------------|
|                           |                                | LIFT 1 EXCAVATION TOTAL             |                              | 77,032.88                                     |
|                           |                                | LIFT 2 EXCAVATION TOTAL             |                              | 10,894.86                                     |
|                           |                                | LIFT 3 EXCAVATION TOTAL             |                              | 11,885.30                                     |
|                           |                                | LIFT 4 EXCAVATION TOTAL             |                              | 13,680.47                                     |
|                           |                                | GRAND TOTAL EXCAVATION              |                              | 113,493.51                                    |

| X-SECTION<br>STATION (CL)            | END AREA<br>(FT <sup>2</sup> ) | AVE. END AREA<br>(FT <sup>2</sup> ) | DIST.<br>BETWEEN<br>SECTIONS | VOLUME OF<br>EMBANKMENT<br>(YD <sup>3</sup> ) |
|--------------------------------------|--------------------------------|-------------------------------------|------------------------------|-----------------------------------------------|
| 773+50.00                            | 3672.93                        |                                     |                              |                                               |
| 776+00.00                            | 3672.93                        | 3672.93                             | 250.00                       | 34008.61                                      |
| 784+00.00                            | 4358.43                        | 4015.68                             | 800.00                       | 118983.11                                     |
| 792+00.00                            | 5495.90                        | 4927.17                             | 800.00                       | 145990.07                                     |
| 800+00.00                            | 5784.50                        | 5640.20                             | 800.00                       | 167117.04                                     |
| 808+00.00                            | 5662.40                        | 5723.45                             | 800.00                       | 169583.70                                     |
| 816+00.00                            | 5581.61                        | 5622.01                             | 800.00                       | 166577.93                                     |
| 819+51.00                            | 5581.61                        | 5581.61                             | 351.00                       | 72560.93                                      |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>874,821.39</b>                             |
| 827+81.00                            | 5307.59                        |                                     |                              |                                               |
| 834+00.00                            | 5307.59                        | 5307.59                             | 619.00                       | 121681.42                                     |
| 842+00.00                            | 5825.16                        | 5566.38                             | 800.00                       | 164929.63                                     |
| 850+00.00                            | 5444.34                        | 5634.75                             | 800.00                       | 166955.56                                     |
| 858+00.00                            | 5522.90                        | 5483.62                             | 800.00                       | 162477.63                                     |
| 866+00.00                            | 6266.26                        | 5894.58                             | 800.00                       | 174654.22                                     |
| 872+28.44                            | 6266.26                        | 6266.26                             | 628.44                       | 145850.68                                     |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>936,549.13</b>                             |
| 882+92.74                            | 4142.10                        |                                     |                              |                                               |
| 886+00.00                            | 4142.10                        | 4142.10                             | 307.26                       | 47137.10                                      |
| 894+00.00                            | 5187.22                        | 4664.66                             | 800.00                       | 138212.15                                     |
| 902+00.00                            | 5548.41                        | 5367.82                             | 800.00                       | 159046.37                                     |
| 910+00.00                            | 5436.75                        | 5492.58                             | 800.00                       | 162743.11                                     |
| 922+00.00                            | 6122.66                        | 5779.71                             | 1200.00                      | 256875.78                                     |
| 923+50.00                            | 6122.66                        | 6122.66                             | 150.00                       | 34014.78                                      |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>798,029.28</b>                             |
| 935+75.00                            | 4648.11                        |                                     |                              |                                               |
| 936+00.00                            | 4648.11                        | 4648.11                             | 25.00                        | 4303.81                                       |
| 944+00.00                            | 3554.80                        | 4101.46                             | 800.00                       | 121524.59                                     |
| 952+00.00                            | 3380.10                        | 3467.45                             | 800.00                       | 102739.26                                     |
| 960+00.00                            | 4083.44                        | 3731.77                             | 800.00                       | 110570.96                                     |
| 968+00.00                            | 4620.68                        | 4352.06                             | 800.00                       | 128949.93                                     |
| 971+83.00                            | 4620.68                        | 4620.68                             | 383.00                       | 65545.20                                      |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>533,633.75</b>                             |
| <b>GRAND TOTAL BORROW EMBANKMENT</b> |                                |                                     |                              | <b>3,143,033.56</b>                           |

| X-SECTION<br>STATION (CL)            | END AREA<br>(FT <sup>2</sup> ) | AVE. END AREA<br>(FT <sup>2</sup> ) | DIST.<br>BETWEEN<br>SECTIONS | VOLUME OF<br>EXCAVATION<br>(YD <sup>3</sup> ) |
|--------------------------------------|--------------------------------|-------------------------------------|------------------------------|-----------------------------------------------|
| 773+50.00                            | 122.60                         |                                     |                              |                                               |
| 776+00.00                            | 122.60                         | 122.60                              | 250.00                       | 1135.19                                       |
| 784+00.00                            | 123.60                         | 123.10                              | 800.00                       | 3647.41                                       |
| 792+00.00                            | 125.40                         | 124.50                              | 800.00                       | 3688.89                                       |
| 800+00.00                            | 125.70                         | 125.55                              | 800.00                       | 3720.00                                       |
| 808+00.00                            | 124.50                         | 125.10                              | 800.00                       | 3706.67                                       |
| 816+00.00                            | 126.00                         | 125.25                              | 800.00                       | 3711.11                                       |
| 819+51.00                            | 126.00                         | 126.00                              | 351.00                       | 1638.00                                       |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>21,247.26</b>                              |
| 827+81.00                            | 125.20                         |                                     |                              |                                               |
| 834+00.00                            | 125.20                         | 125.20                              | 619.00                       | 2870.33                                       |
| 842+00.00                            | 126.60                         | 125.90                              | 800.00                       | 3730.37                                       |
| 850+00.00                            | 125.10                         | 125.85                              | 800.00                       | 3728.89                                       |
| 858+00.00                            | 125.30                         | 125.20                              | 800.00                       | 3709.63                                       |
| 866+00.00                            | 127.30                         | 126.30                              | 800.00                       | 3742.22                                       |
| 872+28.44                            | 127.30                         | 127.30                              | 628.44                       | 2962.98                                       |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>20,744.42</b>                              |
| 882+92.74                            | 123.30                         |                                     |                              |                                               |
| 886+00.00                            | 123.30                         | 123.30                              | 307.26                       | 1403.15                                       |
| 894+00.00                            | 124.80                         | 124.05                              | 800.00                       | 3675.56                                       |
| 902+00.00                            | 125.20                         | 125.00                              | 800.00                       | 3703.70                                       |
| 910+00.00                            | 125.00                         | 125.10                              | 800.00                       | 3706.67                                       |
| 922+00.00                            | 126.30                         | 125.65                              | 1200.00                      | 5584.44                                       |
| 923+50.00                            | 126.30                         | 126.30                              | 150.00                       | 701.67                                        |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>18,775.19</b>                              |
| 935+75.00                            | 124.30                         |                                     |                              |                                               |
| 936+00.00                            | 124.30                         | 124.30                              | 25.00                        | 115.09                                        |
| 944+00.00                            | 121.00                         | 122.65                              | 800.00                       | 3634.07                                       |
| 952+00.00                            | 120.90                         | 120.95                              | 800.00                       | 3583.70                                       |
| 960+00.00                            | 123.30                         | 122.10                              | 800.00                       | 3617.78                                       |
| 968+00.00                            | 120.30                         | 121.80                              | 800.00                       | 3608.89                                       |
| 971+83.00                            | 120.30                         | 120.30                              | 383.00                       | 1706.48                                       |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>16,266.01</b>                              |
| <b>GRAND TOTAL BORROW EXCAVATION</b> |                                |                                     |                              | <b>77,032.88</b>                              |

EARTHWORK\_UNREINFORCED\_new.xls T/O #5 ALGIERS WEST  
 LIFT 2-EMBANKMENT STATION TO STATION EMBANKMENT TOTALS

7/28/2008

| X-SECTION<br>STATION (CL)            | END AREA<br>(FT <sup>2</sup> ) | AVE. END AREA<br>(FT <sup>2</sup> ) | DIST.<br>BETWEEN<br>SECTIONS | VOLUME OF<br>EMBANKMENT<br>(YD <sup>3</sup> ) |
|--------------------------------------|--------------------------------|-------------------------------------|------------------------------|-----------------------------------------------|
| 773+50.00                            | 237.60                         |                                     |                              |                                               |
| 776+00.00                            | 237.60                         | 237.60                              | 250.00                       | 2200.00                                       |
| 784+00.00                            | 237.60                         | 237.60                              | 800.00                       | 7040.00                                       |
| 792+00.00                            | 237.60                         | 237.60                              | 800.00                       | 7040.00                                       |
| 800+00.00                            | 237.60                         | 237.60                              | 800.00                       | 7040.00                                       |
| 808+00.00                            | 237.60                         | 237.60                              | 800.00                       | 7040.00                                       |
| 816+00.00                            | 237.60                         | 237.60                              | 800.00                       | 7040.00                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>37,400.00</b>                              |
| 827+81.00                            | 237.60                         |                                     |                              |                                               |
| 834+00.00                            | 237.60                         | 237.60                              | 619.00                       | 5447.20                                       |
| 842+00.00                            | 237.60                         | 237.60                              | 800.00                       | 7040.00                                       |
| 850+00.00                            | 237.60                         | 237.60                              | 800.00                       | 7040.00                                       |
| 858+00.00                            | 237.60                         | 237.60                              | 800.00                       | 7040.00                                       |
| 866+00.00                            | 237.60                         | 237.60                              | 800.00                       | 7040.00                                       |
| 872+28.44                            | 237.60                         | 237.60                              | 628.44                       | 5530.27                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>39,137.47</b>                              |
| 882+92.74                            | 237.60                         |                                     |                              |                                               |
| 886+00.00                            | 237.60                         | 237.60                              | 307.26                       | 2703.89                                       |
| 894+00.00                            | 237.60                         | 237.60                              | 800.00                       | 7040.00                                       |
| 902+00.00                            | 237.60                         | 237.60                              | 800.00                       | 7040.00                                       |
| 910+00.00                            | 237.60                         | 237.60                              | 800.00                       | 7040.00                                       |
| 922+00.00                            | 237.60                         | 237.60                              | 1200.00                      | 10560.00                                      |
| 923+50.00                            | 237.60                         | 237.60                              | 150.00                       | 1320.00                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>35,703.89</b>                              |
| 935+75.00                            | 237.60                         |                                     |                              |                                               |
| 936+00.00                            | 237.60                         | 237.60                              | 25.00                        | 220.00                                        |
| 944+00.00                            | 237.60                         | 237.60                              | 800.00                       | 7040.00                                       |
| 952+00.00                            | 237.60                         | 237.60                              | 800.00                       | 7040.00                                       |
| 960+00.00                            | 237.60                         | 237.60                              | 800.00                       | 7040.00                                       |
| 968+00.00                            | 237.60                         | 237.60                              | 800.00                       | 7040.00                                       |
| 971+83.00                            | 237.60                         | 237.60                              | 383.00                       | 3370.40                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>31,750.40</b>                              |
| <b>GRAND TOTAL BORROW EMBANKMENT</b> |                                |                                     |                              | <b>143,991.76</b>                             |

EARTHWORK\_UNREINFORCED\_new.xls T/O #5 ALGIERS WEST  
LIFT 2-EXCAVATION STATION TO STATION EXCAVATION TOTALS

7/28/2008

| X-SECTION STATION (CL)               | END AREA (FT <sup>2</sup> ) | AVE. END AREA (FT <sup>2</sup> ) | DIST. BETWEEN SECTIONS | VOLUME OF EXCAVATION (YD <sup>3</sup> ) |
|--------------------------------------|-----------------------------|----------------------------------|------------------------|-----------------------------------------|
| 773+50.00                            | 17.60                       |                                  |                        |                                         |
| 776+00.00                            | 17.60                       | 17.60                            | 250.00                 | 162.96                                  |
| 784+00.00                            | 17.60                       | 17.60                            | 800.00                 | 521.48                                  |
| 792+00.00                            | 17.60                       | 17.60                            | 800.00                 | 521.48                                  |
| 800+00.00                            | 17.60                       | 17.60                            | 800.00                 | 521.48                                  |
| 808+00.00                            | 17.60                       | 17.60                            | 800.00                 | 521.48                                  |
| 816+00.00                            | 17.60                       | 17.60                            | 800.00                 | 521.48                                  |
| 819+51.00                            | 17.60                       | 17.60                            | 351.00                 | 228.80                                  |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                             |                                  |                        | <b>2,999.17</b>                         |
| 827+81.00                            | 17.60                       |                                  |                        |                                         |
| 834+00.00                            | 17.60                       | 17.60                            | 619.00                 | 403.50                                  |
| 842+00.00                            | 17.60                       | 17.60                            | 800.00                 | 521.48                                  |
| 850+00.00                            | 17.60                       | 17.60                            | 800.00                 | 521.48                                  |
| 858+00.00                            | 17.60                       | 17.60                            | 800.00                 | 521.48                                  |
| 866+00.00                            | 17.60                       | 17.60                            | 800.00                 | 521.48                                  |
| 872+28.44                            | 17.60                       | 17.60                            | 628.44                 | 409.65                                  |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                             |                                  |                        | <b>2,899.07</b>                         |
| 882+92.74                            | 17.60                       |                                  |                        |                                         |
| 886+00.00                            | 17.60                       | 17.60                            | 307.26                 | 200.29                                  |
| 894+00.00                            | 17.60                       | 17.60                            | 800.00                 | 521.48                                  |
| 902+00.00                            | 17.60                       | 17.60                            | 800.00                 | 521.48                                  |
| 910+00.00                            | 17.60                       | 17.60                            | 800.00                 | 521.48                                  |
| 922+00.00                            | 17.60                       | 17.60                            | 1200.00                | 782.22                                  |
| 923+50.00                            | 17.60                       | 17.60                            | 150.00                 | 97.78                                   |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                             |                                  |                        | <b>2,644.73</b>                         |
| 935+75.00                            | 17.60                       |                                  |                        |                                         |
| 936+00.00                            | 17.60                       | 17.60                            | 25.00                  | 16.30                                   |
| 944+00.00                            | 17.60                       | 17.60                            | 800.00                 | 521.48                                  |
| 952+00.00                            | 17.60                       | 17.60                            | 800.00                 | 521.48                                  |
| 960+00.00                            | 17.60                       | 17.60                            | 800.00                 | 521.48                                  |
| 968+00.00                            | 17.60                       | 17.60                            | 800.00                 | 521.48                                  |
| 971+83.00                            | 17.60                       | 17.60                            | 383.00                 | 249.66                                  |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                             |                                  |                        | <b>2,351.88</b>                         |
| <b>GRAND TOTAL BORROW EXCAVATION</b> |                             |                                  |                        | <b>10,894.86</b>                        |

EARTHWORK\_UNREINFORCED\_new.xls T/O #5 ALGIERS WEST  
 LIFT 3-EMBANKMENT STATION TO STATION EMBANKMENT TOTALS

7/28/2008

| X-SECTION<br>STATION (CL)            | END AREA<br>(FT <sup>2</sup> ) | AVE. END AREA<br>(FT <sup>2</sup> ) | DIST.<br>BETWEEN<br>SECTIONS | VOLUME OF<br>EMBANKMENT<br>(YD <sup>3</sup> ) |
|--------------------------------------|--------------------------------|-------------------------------------|------------------------------|-----------------------------------------------|
| 773+50.00                            | 239.40                         |                                     |                              |                                               |
| 776+00.00                            | 239.40                         | 239.40                              | 250.00                       | 2216.67                                       |
| 784+00.00                            | 239.40                         | 239.40                              | 800.00                       | 7093.33                                       |
| 792+00.00                            | 239.40                         | 239.40                              | 800.00                       | 7093.33                                       |
| 800+00.00                            | 239.40                         | 239.40                              | 800.00                       | 7093.33                                       |
| 808+00.00                            | 239.40                         | 239.40                              | 800.00                       | 7093.33                                       |
| 816+00.00                            | 239.40                         | 239.40                              | 800.00                       | 7093.33                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>37,683.33</b>                              |
| 827+81.00                            | 239.40                         |                                     |                              |                                               |
| 834+00.00                            | 239.40                         | 239.40                              | 619.00                       | 5488.47                                       |
| 842+00.00                            | 239.40                         | 239.40                              | 800.00                       | 7093.33                                       |
| 850+00.00                            | 239.40                         | 239.40                              | 800.00                       | 7093.33                                       |
| 858+00.00                            | 239.40                         | 239.40                              | 800.00                       | 7093.33                                       |
| 866+00.00                            | 239.40                         | 239.40                              | 800.00                       | 7093.33                                       |
| 872+28.44                            | 239.40                         | 239.40                              | 628.44                       | 5572.17                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>39,433.97</b>                              |
| 882+92.74                            | 239.40                         |                                     |                              |                                               |
| 886+00.00                            | 239.40                         | 239.40                              | 307.26                       | 2724.37                                       |
| 894+00.00                            | 239.40                         | 239.40                              | 800.00                       | 7093.33                                       |
| 902+00.00                            | 239.40                         | 239.40                              | 800.00                       | 7093.33                                       |
| 910+00.00                            | 239.40                         | 239.40                              | 800.00                       | 7093.33                                       |
| 922+00.00                            | 239.40                         | 239.40                              | 1200.00                      | 10640.00                                      |
| 923+50.00                            | 239.40                         | 239.40                              | 150.00                       | 1330.00                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>35,974.37</b>                              |
| 935+75.00                            | 239.40                         |                                     |                              |                                               |
| 936+00.00                            | 239.40                         | 239.40                              | 25.00                        | 221.67                                        |
| 944+00.00                            | 239.40                         | 239.40                              | 800.00                       | 7093.33                                       |
| 952+00.00                            | 239.40                         | 239.40                              | 800.00                       | 7093.33                                       |
| 960+00.00                            | 239.40                         | 239.40                              | 800.00                       | 7093.33                                       |
| 968+00.00                            | 239.40                         | 239.40                              | 800.00                       | 7093.33                                       |
| 971+83.00                            | 239.40                         | 239.40                              | 383.00                       | 3395.93                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>31,990.93</b>                              |
| <b>GRAND TOTAL BORROW EMBANKMENT</b> |                                |                                     |                              | <b>145,082.61</b>                             |

EARTHWORK\_UNREINFORCED\_new.xls T/O #5 ALGIERS WEST  
LIFT 3-EXCAVATION STATION TO STATION EXCAVATION TOTALS

7/28/2008

| X-SECTION STATION (C/L)              | END AREA (FT <sup>2</sup> ) | AVE. END AREA (FT <sup>2</sup> ) | DIST. BETWEEN SECTIONS | VOLUME OF EXCAVATION (YD <sup>3</sup> ) |
|--------------------------------------|-----------------------------|----------------------------------|------------------------|-----------------------------------------|
| 773+50.00                            | 19.20                       |                                  |                        |                                         |
| 776+00.00                            | 19.20                       | 19.20                            | 250.00                 | 177.78                                  |
| 784+00.00                            | 19.20                       | 19.20                            | 800.00                 | 568.89                                  |
| 792+00.00                            | 19.20                       | 19.20                            | 800.00                 | 568.89                                  |
| 800+00.00                            | 19.20                       | 19.20                            | 800.00                 | 568.89                                  |
| 808+00.00                            | 19.20                       | 19.20                            | 800.00                 | 568.89                                  |
| 816+00.00                            | 19.20                       | 19.20                            | 800.00                 | 568.89                                  |
| 819+51.00                            | 19.20                       | 19.20                            | 351.00                 | 249.60                                  |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                             |                                  |                        | <b>3,271.82</b>                         |
| 827+81.00                            | 19.20                       |                                  |                        |                                         |
| 834+00.00                            | 19.20                       | 19.20                            | 619.00                 | 440.18                                  |
| 842+00.00                            | 19.20                       | 19.20                            | 800.00                 | 568.89                                  |
| 850+00.00                            | 19.20                       | 19.20                            | 800.00                 | 568.89                                  |
| 858+00.00                            | 19.20                       | 19.20                            | 800.00                 | 568.89                                  |
| 866+00.00                            | 19.20                       | 19.20                            | 800.00                 | 568.89                                  |
| 872+28.44                            | 19.20                       | 19.20                            | 628.44                 | 446.89                                  |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                             |                                  |                        | <b>3,162.62</b>                         |
| 882+92.74                            | 19.20                       |                                  |                        |                                         |
| 886+00.00                            | 19.20                       | 19.20                            | 307.26                 | 218.50                                  |
| 894+00.00                            | 19.20                       | 19.20                            | 800.00                 | 568.89                                  |
| 902+00.00                            | 19.20                       | 19.20                            | 800.00                 | 568.89                                  |
| 910+00.00                            | 19.20                       | 19.20                            | 800.00                 | 568.89                                  |
| 922+00.00                            | 19.20                       | 19.20                            | 1200.00                | 853.33                                  |
| 923+50.00                            | 19.20                       | 19.20                            | 150.00                 | 106.67                                  |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                             |                                  |                        | <b>2,885.16</b>                         |
| 935+75.00                            | 19.20                       |                                  |                        |                                         |
| 936+00.00                            | 19.20                       | 19.20                            | 25.00                  | 17.78                                   |
| 944+00.00                            | 19.20                       | 19.20                            | 800.00                 | 568.89                                  |
| 952+00.00                            | 19.20                       | 19.20                            | 800.00                 | 568.89                                  |
| 960+00.00                            | 19.20                       | 19.20                            | 800.00                 | 568.89                                  |
| 968+00.00                            | 19.20                       | 19.20                            | 800.00                 | 568.89                                  |
| 971+83.00                            | 19.20                       | 19.20                            | 383.00                 | 272.36                                  |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                             |                                  |                        | <b>2,565.69</b>                         |
| <b>GRAND TOTAL BORROW EXCAVATION</b> |                             |                                  |                        | <b>11,885.30</b>                        |

EARTHWORK\_UNREINFORCED\_new.xls T/O #5 ALGIERS WEST  
LIFT 4-EMBANKMENT STATION TO STATION EMBANKMENT TOTALS

7/28/2008

| X-SECTION<br>STATION (CL)            | END AREA<br>(FT <sup>2</sup> ) | AVE. END AREA<br>(FT <sup>2</sup> ) | DIST.<br>BETWEEN<br>SECTIONS | VOLUME OF<br>EMBANKMENT<br>(YD <sup>3</sup> ) |
|--------------------------------------|--------------------------------|-------------------------------------|------------------------------|-----------------------------------------------|
| 773+50.00                            | 306.20                         |                                     |                              |                                               |
| 776+00.00                            | 306.20                         | 306.20                              | 250.00                       | 2835.19                                       |
| 784+00.00                            | 306.20                         | 306.20                              | 800.00                       | 9072.59                                       |
| 792+00.00                            | 306.20                         | 306.20                              | 800.00                       | 9072.59                                       |
| 800+00.00                            | 306.20                         | 306.20                              | 800.00                       | 9072.59                                       |
| 808+00.00                            | 306.20                         | 306.20                              | 800.00                       | 9072.59                                       |
| 816+00.00                            | 306.20                         | 306.20                              | 800.00                       | 9072.59                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>48,198.15</b>                              |
| 827+81.00                            | 306.20                         |                                     |                              |                                               |
| 834+00.00                            | 306.20                         | 306.20                              | 619.00                       | 7019.92                                       |
| 842+00.00                            | 306.20                         | 306.20                              | 800.00                       | 9072.59                                       |
| 850+00.00                            | 306.20                         | 306.20                              | 800.00                       | 9072.59                                       |
| 858+00.00                            | 306.20                         | 306.20                              | 800.00                       | 9072.59                                       |
| 866+00.00                            | 306.20                         | 306.20                              | 800.00                       | 9072.59                                       |
| 872+28.44                            | 306.20                         | 306.20                              | 628.44                       | 7126.98                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>50,437.26</b>                              |
| 882+92.74                            | 306.20                         |                                     |                              |                                               |
| 886+00.00                            | 306.20                         | 306.20                              | 307.26                       | 3484.56                                       |
| 894+00.00                            | 306.20                         | 306.20                              | 800.00                       | 9072.59                                       |
| 902+00.00                            | 306.20                         | 306.20                              | 800.00                       | 9072.59                                       |
| 910+00.00                            | 306.20                         | 306.20                              | 800.00                       | 9072.59                                       |
| 922+00.00                            | 306.20                         | 306.20                              | 1200.00                      | 13608.89                                      |
| 923+50.00                            | 306.20                         | 306.20                              | 150.00                       | 1701.11                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>46,012.33</b>                              |
| 935+75.00                            | 306.20                         |                                     |                              |                                               |
| 936+00.00                            | 306.20                         | 306.20                              | 25.00                        | 283.52                                        |
| 944+00.00                            | 306.20                         | 306.20                              | 800.00                       | 9072.59                                       |
| 952+00.00                            | 306.20                         | 306.20                              | 800.00                       | 9072.59                                       |
| 960+00.00                            | 306.20                         | 306.20                              | 800.00                       | 9072.59                                       |
| 968+00.00                            | 306.20                         | 306.20                              | 800.00                       | 9072.59                                       |
| 971+83.00                            | 306.20                         | 306.20                              | 383.00                       | 4343.50                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>40,917.39</b>                              |
| <b>GRAND TOTAL BORROW EMBANKMENT</b> |                                |                                     |                              | <b>185,565.14</b>                             |

| X-SECTION<br>STATION (CL)            | END AREA<br>(FT <sup>2</sup> ) | AVE. END AREA<br>(FT <sup>2</sup> ) | DIST.<br>BETWEEN<br>SECTIONS | VOLUME OF<br>EXCAVATION<br>(YD <sup>3</sup> ) |
|--------------------------------------|--------------------------------|-------------------------------------|------------------------------|-----------------------------------------------|
| 773+50.00                            | 22.10                          |                                     |                              |                                               |
| 776+00.00                            | 22.10                          | 22.10                               | 250.00                       | 204.63                                        |
| 784+00.00                            | 22.10                          | 22.10                               | 800.00                       | 654.81                                        |
| 792+00.00                            | 22.10                          | 22.10                               | 800.00                       | 654.81                                        |
| 800+00.00                            | 22.10                          | 22.10                               | 800.00                       | 654.81                                        |
| 808+00.00                            | 22.10                          | 22.10                               | 800.00                       | 654.81                                        |
| 816+00.00                            | 22.10                          | 22.10                               | 800.00                       | 654.81                                        |
| 819+51.00                            | 22.10                          | 22.10                               | 351.00                       | 287.30                                        |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>3,766.00</b>                               |
| 827+81.00                            | 22.10                          |                                     |                              |                                               |
| 834+00.00                            | 22.10                          | 22.10                               | 619.00                       | 506.66                                        |
| 842+00.00                            | 22.10                          | 22.10                               | 800.00                       | 654.81                                        |
| 850+00.00                            | 22.10                          | 22.10                               | 800.00                       | 654.81                                        |
| 858+00.00                            | 22.10                          | 22.10                               | 800.00                       | 654.81                                        |
| 866+00.00                            | 22.10                          | 22.10                               | 800.00                       | 654.81                                        |
| 872+28.44                            | 22.10                          | 22.10                               | 628.44                       | 514.39                                        |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>3,640.31</b>                               |
| 882+92.74                            | 22.10                          |                                     |                              |                                               |
| 886+00.00                            | 22.10                          | 22.10                               | 307.26                       | 251.50                                        |
| 894+00.00                            | 22.10                          | 22.10                               | 800.00                       | 654.81                                        |
| 902+00.00                            | 22.10                          | 22.10                               | 800.00                       | 654.81                                        |
| 910+00.00                            | 22.10                          | 22.10                               | 800.00                       | 654.81                                        |
| 922+00.00                            | 22.10                          | 22.10                               | 1200.00                      | 982.22                                        |
| 923+50.00                            | 22.10                          | 22.10                               | 150.00                       | 122.78                                        |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>3,320.94</b>                               |
| 935+75.00                            | 22.10                          |                                     |                              |                                               |
| 936+00.00                            | 22.10                          | 22.10                               | 25.00                        | 20.46                                         |
| 944+00.00                            | 22.10                          | 22.10                               | 800.00                       | 654.81                                        |
| 952+00.00                            | 22.10                          | 22.10                               | 800.00                       | 654.81                                        |
| 960+00.00                            | 22.10                          | 22.10                               | 800.00                       | 654.81                                        |
| 968+00.00                            | 22.10                          | 22.10                               | 800.00                       | 654.81                                        |
| 971+83.00                            | 22.10                          | 22.10                               | 383.00                       | 313.49                                        |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>2,953.21</b>                               |
| <b>GRAND TOTAL BORROW EXCAVATION</b> |                                |                                     |                              | <b>13,680.47</b>                              |

| X-SECTION<br>STATION (C/L)     | END AREA<br>(FT <sup>2</sup> ) | AVE. END AREA<br>(FT <sup>2</sup> ) | DIST.<br>BETWEEN<br>SECTIONS | VOLUME OF<br>EMBANKMENT<br>(YD <sup>3</sup> ) |
|--------------------------------|--------------------------------|-------------------------------------|------------------------------|-----------------------------------------------|
| <i>LIFT 1 EMBANKMENT TOTAL</i> |                                |                                     |                              | 2,092,060.61                                  |
| <i>LIFT 2 EMBANKMENT TOTAL</i> |                                |                                     |                              | 204,757.84                                    |
| <i>LIFT 3 EMBANKMENT TOTAL</i> |                                |                                     |                              | 187,960.80                                    |
| <i>LIFT 4 EMBANKMENT TOTAL</i> |                                |                                     |                              | 240,012.46                                    |
| <b>GRAND TOTAL EMBANKMENT</b>  |                                |                                     |                              | <b>2,724,791.72</b>                           |

| X-SECTION<br>STATION (CL)      | END AREA<br>(FT <sup>2</sup> ) | AVE. END AREA<br>(FT <sup>2</sup> ) | DIST.<br>BETWEEN<br>SECTIONS | VOLUME OF<br>EXCAVATION<br>(YD <sup>3</sup> ) |
|--------------------------------|--------------------------------|-------------------------------------|------------------------------|-----------------------------------------------|
| <b>LIFT 1 EXCAVATION TOTAL</b> |                                |                                     |                              | 172,361.27                                    |
| <b>LIFT 2 EXCAVATION TOTAL</b> |                                |                                     |                              | 13,795.29                                     |
| <b>LIFT 3 EXCAVATION TOTAL</b> |                                |                                     |                              | 14,817.16                                     |
| <b>LIFT 4 EXCAVATION TOTAL</b> |                                |                                     |                              | 16,669.31                                     |
| <b>GRAND TOTAL EXCAVATION</b>  |                                |                                     |                              | 217,643.03                                    |

| X-SECTION<br>STATION (CL)            | END AREA<br>(FT <sup>2</sup> ) | AVE. END AREA<br>(FT <sup>2</sup> ) | DIST.<br>BETWEEN<br>SECTIONS | VOLUME OF<br>EXCAVATION<br>(YD <sup>3</sup> ) |
|--------------------------------------|--------------------------------|-------------------------------------|------------------------------|-----------------------------------------------|
| 773+50.00                            | 2269.90                        |                                     |                              |                                               |
| 776+00.00                            | 2269.90                        | 2269.90                             | 250.00                       | 21017.59                                      |
| 784+00.00                            | 2772.50                        | 2521.20                             | 800.00                       | 74702.22                                      |
| 792+00.00                            | 3584.03                        | 3178.27                             | 800.00                       | 94170.81                                      |
| 800+00.00                            | 3771.60                        | 3677.82                             | 800.00                       | 108972.30                                     |
| 808+00.00                            | 3679.10                        | 3725.35                             | 800.00                       | 110380.74                                     |
| 816+00.00                            | 3632.80                        | 3655.95                             | 800.00                       | 108324.44                                     |
| 820+33.00                            | 3632.80                        | 3632.80                             | 433.00                       | 58259.35                                      |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>575,827.46</b>                             |
| 826+99.00                            | 3439.80                        |                                     |                              |                                               |
| 834+00.00                            | 3439.80                        | 3439.80                             | 701.00                       | 89307.40                                      |
| 842+00.00                            | 3805.00                        | 3622.40                             | 800.00                       | 107330.37                                     |
| 850+00.00                            | 3548.40                        | 3676.70                             | 800.00                       | 108939.26                                     |
| 858+00.00                            | 3600.50                        | 3574.45                             | 800.00                       | 105909.63                                     |
| 866+00.00                            | 4158.70                        | 3879.60                             | 800.00                       | 114951.11                                     |
| 871+77.69                            | 4158.70                        | 4158.70                             | 577.69                       | 88979.24                                      |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>615,417.01</b>                             |
| 883+43.58                            | 2621.50                        |                                     |                              |                                               |
| 886+00.00                            | 2621.50                        | 2621.50                             | 256.42                       | 24896.48                                      |
| 894+00.00                            | 3374.50                        | 2998.00                             | 800.00                       | 88829.63                                      |
| 902+00.00                            | 3618.00                        | 3496.25                             | 800.00                       | 103592.59                                     |
| 910+00.00                            | 3538.10                        | 3578.05                             | 800.00                       | 106016.30                                     |
| 922+00.00                            | 3998.60                        | 3768.35                             | 1200.00                      | 167482.22                                     |
| 925+82.00                            | 3998.60                        | 3998.60                             | 382.00                       | 56572.79                                      |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>547,390.01</b>                             |
| 934+34.00                            | 2964.90                        |                                     |                              |                                               |
| 936+00.00                            | 2964.90                        | 2964.90                             | 166.00                       | 18228.64                                      |
| 944+00.00                            | 2147.90                        | 2556.40                             | 800.00                       | 75745.19                                      |
| 952+00.00                            | 2025.60                        | 2086.75                             | 800.00                       | 61829.63                                      |
| 960+00.00                            | 2557.00                        | 2291.30                             | 800.00                       | 67890.37                                      |
| 968+00.00                            | 2880.40                        | 2718.70                             | 800.00                       | 80554.07                                      |
| 972+78.00                            | 2675.30                        | 2777.85                             | 478.00                       | 49178.23                                      |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>353,426.14</b>                             |
| <b>GRAND TOTAL BORROW EMBANKMENT</b> |                                |                                     |                              | <b>2,092,060.61</b>                           |

| X-SECTION<br>STATION (CL)            | END AREA<br>(FT <sup>2</sup> ) | AVE. END AREA<br>(FT <sup>2</sup> ) | DIST.<br>BETWEEN<br>SECTIONS | VOLUME OF<br>EXCAVATION<br>(YD <sup>3</sup> ) |
|--------------------------------------|--------------------------------|-------------------------------------|------------------------------|-----------------------------------------------|
| 773+50.00                            | 244.90                         |                                     |                              |                                               |
| 776+00.00                            | 244.90                         | 244.90                              | 250.00                       | 2267.59                                       |
| 784+00.00                            | 237.50                         | 241.20                              | 800.00                       | 7146.67                                       |
| 792+00.00                            | 234.30                         | 235.90                              | 800.00                       | 6989.63                                       |
| 800+00.00                            | 239.90                         | 237.10                              | 800.00                       | 7025.19                                       |
| 808+00.00                            | 216.10                         | 228.00                              | 800.00                       | 6755.56                                       |
| 816+00.00                            | 219.70                         | 217.90                              | 800.00                       | 6456.30                                       |
| 820+33.00                            | 219.70                         | 219.70                              | 433.00                       | 3523.34                                       |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>40,164.26</b>                              |
| 826+99.00                            | 212.70                         |                                     |                              |                                               |
| 834+00.00                            | 212.70                         | 212.70                              | 701.00                       | 5522.32                                       |
| 842+00.00                            | 214.90                         | 213.80                              | 800.00                       | 6334.81                                       |
| 850+00.00                            | 219.00                         | 216.95                              | 800.00                       | 6428.15                                       |
| 858+00.00                            | 229.80                         | 224.40                              | 800.00                       | 6648.89                                       |
| 866+00.00                            | 211.10                         | 220.45                              | 800.00                       | 6531.85                                       |
| 871+77.69                            | 211.10                         | 211.10                              | 577.69                       | 4516.68                                       |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>35,982.71</b>                              |
| 883+43.58                            | 241.10                         |                                     |                              |                                               |
| 886+00.00                            | 241.10                         | 241.10                              | 256.42                       | 2289.74                                       |
| 894+00.00                            | 242.40                         | 241.75                              | 800.00                       | 7162.96                                       |
| 902+00.00                            | 248.40                         | 245.40                              | 800.00                       | 7271.11                                       |
| 910+00.00                            | 239.90                         | 244.15                              | 800.00                       | 7234.07                                       |
| 922+00.00                            | 245.40                         | 242.65                              | 1200.00                      | 10784.44                                      |
| 925+82.00                            | 245.40                         | 245.40                              | 382.00                       | 3471.96                                       |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>38,214.28</b>                              |
| 934+34.00                            | 317.00                         |                                     |                              |                                               |
| 936+00.00                            | 317.00                         | 317.00                              | 166.00                       | 1948.96                                       |
| 944+00.00                            | 477.60                         | 397.30                              | 800.00                       | 11771.85                                      |
| 952+00.00                            | 517.10                         | 497.35                              | 800.00                       | 14736.30                                      |
| 960+00.00                            | 313.00                         | 415.05                              | 800.00                       | 12297.78                                      |
| 968+00.00                            | 384.10                         | 348.55                              | 800.00                       | 10327.41                                      |
| 972+78.00                            | 397.40                         | 390.75                              | 478.00                       | 6917.72                                       |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>58,000.02</b>                              |
| <b>GRAND TOTAL BORROW EXCAVATION</b> |                                |                                     |                              | <b>172,361.27</b>                             |

| X-SECTION<br>STATION (CL)            | END AREA<br>(FT <sup>2</sup> ) | AVE. END AREA<br>(FT <sup>2</sup> ) | DIST.<br>BETWEEN<br>SECTIONS | VOLUME OF<br>EMBANKMENT<br>(YD <sup>3</sup> ) |
|--------------------------------------|--------------------------------|-------------------------------------|------------------------------|-----------------------------------------------|
| 773+50.00                            | 320.60                         |                                     |                              |                                               |
| 776+00.00                            | 320.60                         | 320.60                              | 250.00                       | 2968.52                                       |
| 784+00.00                            | 320.60                         | 320.60                              | 800.00                       | 9499.26                                       |
| 792+00.00                            | 320.60                         | 320.60                              | 800.00                       | 9499.26                                       |
| 800+00.00                            | 320.60                         | 320.60                              | 800.00                       | 9499.26                                       |
| 808+00.00                            | 320.60                         | 320.60                              | 800.00                       | 9499.26                                       |
| 816+00.00                            | 320.60                         | 320.60                              | 800.00                       | 9499.26                                       |
| 820+33.00                            | 320.60                         | 320.60                              | 433.00                       | 5141.47                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>55,606.29</b>                              |
| 826+99.00                            | 320.60                         |                                     |                              |                                               |
| 834+00.00                            | 320.60                         | 320.60                              | 701.00                       | 8323.73                                       |
| 842+00.00                            | 320.60                         | 320.60                              | 800.00                       | 9499.26                                       |
| 850+00.00                            | 320.60                         | 320.60                              | 800.00                       | 9499.26                                       |
| 858+00.00                            | 320.60                         | 320.60                              | 800.00                       | 9499.26                                       |
| 866+00.00                            | 320.60                         | 320.60                              | 800.00                       | 9499.26                                       |
| 871+77.69                            | 320.60                         | 320.60                              | 577.69                       | 6859.53                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>53,180.30</b>                              |
| 883+43.58                            | 320.60                         |                                     |                              |                                               |
| 886+00.00                            | 320.60                         | 320.60                              | 256.42                       | 3044.75                                       |
| 894+00.00                            | 320.60                         | 320.60                              | 800.00                       | 9499.26                                       |
| 902+00.00                            | 320.60                         | 320.60                              | 800.00                       | 9499.26                                       |
| 910+00.00                            | 320.60                         | 320.60                              | 800.00                       | 9499.26                                       |
| 922+00.00                            | 320.60                         | 320.60                              | 1200.00                      | 14248.89                                      |
| 925+82.00                            | 320.60                         | 320.60                              | 382.00                       | 4535.90                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>50,327.31</b>                              |
| 934+34.00                            | 320.60                         |                                     |                              |                                               |
| 936+00.00                            | 320.60                         | 320.60                              | 166.00                       | 1971.10                                       |
| 944+00.00                            | 320.60                         | 320.60                              | 800.00                       | 9499.26                                       |
| 952+00.00                            | 320.60                         | 320.60                              | 800.00                       | 9499.26                                       |
| 960+00.00                            | 320.60                         | 320.60                              | 800.00                       | 9499.26                                       |
| 968+00.00                            | 320.60                         | 320.60                              | 800.00                       | 9499.26                                       |
| 972+78.00                            | 320.60                         | 320.60                              | 478.00                       | 5675.81                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>45,643.94</b>                              |
| <b>GRAND TOTAL BORROW EMBANKMENT</b> |                                |                                     |                              | <b>204,757.84</b>                             |

| X-SECTION<br>STATION (CL)            | END AREA<br>(FT <sup>2</sup> ) | AVE. END AREA<br>(FT <sup>2</sup> ) | DIST.<br>BETWEEN<br>SECTIONS | VOLUME OF<br>EXCAVATION<br>(YD <sup>3</sup> ) |
|--------------------------------------|--------------------------------|-------------------------------------|------------------------------|-----------------------------------------------|
| 773+50.00                            | 21.60                          |                                     |                              |                                               |
| 776+00.00                            | 21.60                          | 21.60                               | 250.00                       | 200.00                                        |
| 784+00.00                            | 21.60                          | 21.60                               | 800.00                       | 640.00                                        |
| 792+00.00                            | 21.60                          | 21.60                               | 800.00                       | 640.00                                        |
| 800+00.00                            | 21.60                          | 21.60                               | 800.00                       | 640.00                                        |
| 808+00.00                            | 21.60                          | 21.60                               | 800.00                       | 640.00                                        |
| 816+00.00                            | 21.60                          | 21.60                               | 800.00                       | 640.00                                        |
| 820+33.00                            | 21.60                          | 21.60                               | 433.00                       | 346.40                                        |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>3,746.40</b>                               |
| 826+99.00                            | 21.60                          |                                     |                              |                                               |
| 834+00.00                            | 21.60                          | 21.60                               | 701.00                       | 560.80                                        |
| 842+00.00                            | 21.60                          | 21.60                               | 800.00                       | 640.00                                        |
| 850+00.00                            | 21.60                          | 21.60                               | 800.00                       | 640.00                                        |
| 858+00.00                            | 21.60                          | 21.60                               | 800.00                       | 640.00                                        |
| 866+00.00                            | 21.60                          | 21.60                               | 800.00                       | 640.00                                        |
| 871+77.69                            | 21.60                          | 21.60                               | 577.69                       | 462.15                                        |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>3,582.95</b>                               |
| 883+43.58                            | 21.60                          |                                     |                              |                                               |
| 886+00.00                            | 21.60                          | 21.60                               | 256.42                       | 205.14                                        |
| 894+00.00                            | 21.60                          | 21.60                               | 800.00                       | 640.00                                        |
| 902+00.00                            | 21.60                          | 21.60                               | 800.00                       | 640.00                                        |
| 910+00.00                            | 21.60                          | 21.60                               | 800.00                       | 640.00                                        |
| 922+00.00                            | 21.60                          | 21.60                               | 1200.00                      | 960.00                                        |
| 925+82.00                            | 21.60                          | 21.60                               | 382.00                       | 305.60                                        |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>3,390.74</b>                               |
| 934+34.00                            | 21.60                          |                                     |                              |                                               |
| 936+00.00                            | 21.60                          | 21.60                               | 166.00                       | 132.80                                        |
| 944+00.00                            | 21.60                          | 21.60                               | 800.00                       | 640.00                                        |
| 952+00.00                            | 21.60                          | 21.60                               | 800.00                       | 640.00                                        |
| 960+00.00                            | 21.60                          | 21.60                               | 800.00                       | 640.00                                        |
| 968+00.00                            | 21.60                          | 21.60                               | 800.00                       | 640.00                                        |
| 972+78.00                            | 21.60                          | 21.60                               | 478.00                       | 382.40                                        |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>3,075.20</b>                               |
| <b>GRAND TOTAL BORROW EXCAVATION</b> |                                |                                     |                              | <b>13,795.29</b>                              |

| X-SECTION<br>STATION (CL)            | END AREA<br>(FT <sup>2</sup> ) | AVE. END AREA<br>(FT <sup>2</sup> ) | DIST.<br>BETWEEN<br>SECTIONS | VOLUME OF<br>EMBANKMENT<br>(YD <sup>3</sup> ) |
|--------------------------------------|--------------------------------|-------------------------------------|------------------------------|-----------------------------------------------|
| 773+50.00                            | 294.30                         |                                     |                              |                                               |
| 776+00.00                            | 294.30                         | 294.30                              | 250.00                       | 2725.00                                       |
| 784+00.00                            | 294.30                         | 294.30                              | 800.00                       | 8720.00                                       |
| 792+00.00                            | 294.30                         | 294.30                              | 800.00                       | 8720.00                                       |
| 800+00.00                            | 294.30                         | 294.30                              | 800.00                       | 8720.00                                       |
| 808+00.00                            | 294.30                         | 294.30                              | 800.00                       | 8720.00                                       |
| 816+00.00                            | 294.30                         | 294.30                              | 800.00                       | 8720.00                                       |
| 820+33.00                            | 294.30                         | 294.30                              | 433.00                       | 4719.70                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>51,044.70</b>                              |
| 826+99.00                            | 294.30                         |                                     |                              |                                               |
| 834+00.00                            | 294.30                         | 294.30                              | 701.00                       | 7640.90                                       |
| 842+00.00                            | 294.30                         | 294.30                              | 800.00                       | 8720.00                                       |
| 850+00.00                            | 294.30                         | 294.30                              | 800.00                       | 8720.00                                       |
| 858+00.00                            | 294.30                         | 294.30                              | 800.00                       | 8720.00                                       |
| 866+00.00                            | 294.30                         | 294.30                              | 800.00                       | 8720.00                                       |
| 871+77.69                            | 294.30                         | 294.30                              | 577.69                       | 6296.82                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>48,817.72</b>                              |
| 883+43.58                            | 294.30                         |                                     |                              |                                               |
| 886+00.00                            | 294.30                         | 294.30                              | 256.42                       | 2794.98                                       |
| 894+00.00                            | 294.30                         | 294.30                              | 800.00                       | 8720.00                                       |
| 902+00.00                            | 294.30                         | 294.30                              | 800.00                       | 8720.00                                       |
| 910+00.00                            | 294.30                         | 294.30                              | 800.00                       | 8720.00                                       |
| 922+00.00                            | 294.30                         | 294.30                              | 1200.00                      | 13080.00                                      |
| 925+82.00                            | 294.30                         | 294.30                              | 382.00                       | 4163.80                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>46,198.78</b>                              |
| 934+34.00                            | 294.30                         |                                     |                              |                                               |
| 936+00.00                            | 294.30                         | 294.30                              | 166.00                       | 1809.40                                       |
| 944+00.00                            | 294.30                         | 294.30                              | 800.00                       | 8720.00                                       |
| 952+00.00                            | 294.30                         | 294.30                              | 800.00                       | 8720.00                                       |
| 960+00.00                            | 294.30                         | 294.30                              | 800.00                       | 8720.00                                       |
| 968+00.00                            | 294.30                         | 294.30                              | 800.00                       | 8720.00                                       |
| 972+78.00                            | 294.30                         | 294.30                              | 478.00                       | 5210.20                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>41,899.60</b>                              |
| <b>GRAND TOTAL BORROW EMBANKMENT</b> |                                |                                     |                              | <b>187,960.80</b>                             |

| X-SECTION<br>STATION (C/L)           | END AREA<br>(FT <sup>2</sup> ) | AVE. END AREA<br>(FT <sup>2</sup> ) | DIST.<br>BETWEEN<br>SECTIONS | VOLUME OF<br>EXCAVATION<br>(YD <sup>3</sup> ) |
|--------------------------------------|--------------------------------|-------------------------------------|------------------------------|-----------------------------------------------|
| 773+50.00                            | 23.20                          |                                     |                              |                                               |
| 776+00.00                            | 23.20                          | 23.20                               | 250.00                       | 214.81                                        |
| 784+00.00                            | 23.20                          | 23.20                               | 800.00                       | 687.41                                        |
| 792+00.00                            | 23.20                          | 23.20                               | 800.00                       | 687.41                                        |
| 800+00.00                            | 23.20                          | 23.20                               | 800.00                       | 687.41                                        |
| 808+00.00                            | 23.20                          | 23.20                               | 800.00                       | 687.41                                        |
| 816+00.00                            | 23.20                          | 23.20                               | 800.00                       | 687.41                                        |
| 820+33.00                            | 23.20                          | 23.20                               | 433.00                       | 372.06                                        |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>4,023.91</b>                               |
| 826+99.00                            | 23.20                          |                                     |                              |                                               |
| 834+00.00                            | 23.20                          | 23.20                               | 701.00                       | 602.34                                        |
| 842+00.00                            | 23.20                          | 23.20                               | 800.00                       | 687.41                                        |
| 850+00.00                            | 23.20                          | 23.20                               | 800.00                       | 687.41                                        |
| 858+00.00                            | 23.20                          | 23.20                               | 800.00                       | 687.41                                        |
| 866+00.00                            | 23.20                          | 23.20                               | 800.00                       | 687.41                                        |
| 871+77.69                            | 23.20                          | 23.20                               | 577.69                       | 496.39                                        |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>3,848.36</b>                               |
| 883+43.58                            | 23.20                          |                                     |                              |                                               |
| 886+00.00                            | 23.20                          | 23.20                               | 256.42                       | 220.33                                        |
| 894+00.00                            | 23.20                          | 23.20                               | 800.00                       | 687.41                                        |
| 902+00.00                            | 23.20                          | 23.20                               | 800.00                       | 687.41                                        |
| 910+00.00                            | 23.20                          | 23.20                               | 800.00                       | 687.41                                        |
| 922+00.00                            | 23.20                          | 23.20                               | 1200.00                      | 1031.11                                       |
| 925+82.00                            | 23.20                          | 23.20                               | 382.00                       | 328.24                                        |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>3,641.90</b>                               |
| 934+34.00                            | 23.20                          |                                     |                              |                                               |
| 936+00.00                            | 23.20                          | 23.20                               | 166.00                       | 142.64                                        |
| 944+00.00                            | 23.20                          | 23.20                               | 800.00                       | 687.41                                        |
| 952+00.00                            | 23.20                          | 23.20                               | 800.00                       | 687.41                                        |
| 960+00.00                            | 23.20                          | 23.20                               | 800.00                       | 687.41                                        |
| 968+00.00                            | 23.20                          | 23.20                               | 800.00                       | 687.41                                        |
| 972+78.00                            | 23.20                          | 23.20                               | 478.00                       | 410.73                                        |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>3,302.99</b>                               |
| <b>GRAND TOTAL BORROW EXCAVATION</b> |                                |                                     |                              | <b>14,817.16</b>                              |

| X-SECTION<br>STATION (CL)            | END AREA<br>(FT <sup>2</sup> ) | AVE. END AREA<br>(FT <sup>2</sup> ) | DIST.<br>BETWEEN<br>SECTIONS | VOLUME OF<br>EMBANKMENT<br>(YD <sup>3</sup> ) |
|--------------------------------------|--------------------------------|-------------------------------------|------------------------------|-----------------------------------------------|
| 773+50.00                            | 375.80                         |                                     |                              |                                               |
| 776+00.00                            | 375.80                         | 375.80                              | 250.00                       | 3479.63                                       |
| 784+00.00                            | 375.80                         | 375.80                              | 800.00                       | 11134.81                                      |
| 792+00.00                            | 375.80                         | 375.80                              | 800.00                       | 11134.81                                      |
| 800+00.00                            | 375.80                         | 375.80                              | 800.00                       | 11134.81                                      |
| 808+00.00                            | 375.80                         | 375.80                              | 800.00                       | 11134.81                                      |
| 816+00.00                            | 375.80                         | 375.80                              | 800.00                       | 11134.81                                      |
| 820+33.00                            | 375.80                         | 375.80                              | 433.00                       | 6026.72                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>65,180.42</b>                              |
| 826+99.00                            | 375.80                         |                                     |                              |                                               |
| 834+00.00                            | 375.80                         | 375.80                              | 701.00                       | 9756.88                                       |
| 842+00.00                            | 375.80                         | 375.80                              | 800.00                       | 11134.81                                      |
| 850+00.00                            | 375.80                         | 375.80                              | 800.00                       | 11134.81                                      |
| 858+00.00                            | 375.80                         | 375.80                              | 800.00                       | 11134.81                                      |
| 866+00.00                            | 375.80                         | 375.80                              | 800.00                       | 11134.81                                      |
| 871+77.69                            | 375.80                         | 375.80                              | 577.69                       | 8040.59                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>62,336.73</b>                              |
| 883+43.58                            | 375.80                         |                                     |                              |                                               |
| 886+00.00                            | 375.80                         | 375.80                              | 256.42                       | 3568.99                                       |
| 894+00.00                            | 375.80                         | 375.80                              | 800.00                       | 11134.81                                      |
| 902+00.00                            | 375.80                         | 375.80                              | 800.00                       | 11134.81                                      |
| 910+00.00                            | 375.80                         | 375.80                              | 800.00                       | 11134.81                                      |
| 922+00.00                            | 375.80                         | 375.80                              | 1200.00                      | 16702.22                                      |
| 925+82.00                            | 375.80                         | 375.80                              | 382.00                       | 5316.87                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>58,992.53</b>                              |
| 934+34.00                            | 375.80                         |                                     |                              |                                               |
| 936+00.00                            | 375.80                         | 375.80                              | 166.00                       | 2310.47                                       |
| 944+00.00                            | 375.80                         | 375.80                              | 800.00                       | 11134.81                                      |
| 952+00.00                            | 375.80                         | 375.80                              | 800.00                       | 11134.81                                      |
| 960+00.00                            | 375.80                         | 375.80                              | 800.00                       | 11134.81                                      |
| 968+00.00                            | 375.80                         | 375.80                              | 800.00                       | 11134.81                                      |
| 972+78.00                            | 375.80                         | 375.80                              | 478.00                       | 6653.05                                       |
| <b>SUBTOTAL BORROW EMBANKMENT</b>    |                                |                                     |                              | <b>53,502.79</b>                              |
| <b>GRAND TOTAL BORROW EMBANKMENT</b> |                                |                                     |                              | <b>240,012.46</b>                             |

| X-SECTION<br>STATION (C/L)           | END AREA<br>(FT <sup>2</sup> ) | AVE. END AREA<br>(FT <sup>2</sup> ) | DIST.<br>BETWEEN<br>SECTIONS | VOLUME OF<br>EXCAVATION<br>(YD <sup>3</sup> ) |
|--------------------------------------|--------------------------------|-------------------------------------|------------------------------|-----------------------------------------------|
| 773+50.00                            | 26.10                          |                                     |                              |                                               |
| 776+00.00                            | 26.10                          | 26.10                               | 250.00                       | 241.67                                        |
| 784+00.00                            | 26.10                          | 26.10                               | 800.00                       | 773.33                                        |
| 792+00.00                            | 26.10                          | 26.10                               | 800.00                       | 773.33                                        |
| 800+00.00                            | 26.10                          | 26.10                               | 800.00                       | 773.33                                        |
| 808+00.00                            | 26.10                          | 26.10                               | 800.00                       | 773.33                                        |
| 816+00.00                            | 26.10                          | 26.10                               | 800.00                       | 773.33                                        |
| 820+33.00                            | 26.10                          | 26.10                               | 433.00                       | 418.57                                        |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>4,526.90</b>                               |
| 826+99.00                            | 26.10                          |                                     |                              |                                               |
| 834+00.00                            | 26.10                          | 26.10                               | 701.00                       | 677.63                                        |
| 842+00.00                            | 26.10                          | 26.10                               | 800.00                       | 773.33                                        |
| 850+00.00                            | 26.10                          | 26.10                               | 800.00                       | 773.33                                        |
| 858+00.00                            | 26.10                          | 26.10                               | 800.00                       | 773.33                                        |
| 866+00.00                            | 26.10                          | 26.10                               | 800.00                       | 773.33                                        |
| 871+77.69                            | 26.10                          | 26.10                               | 577.69                       | 558.43                                        |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>4,329.40</b>                               |
| 883+43.58                            | 26.10                          |                                     |                              |                                               |
| 886+00.00                            | 26.10                          | 26.10                               | 256.42                       | 247.87                                        |
| 894+00.00                            | 26.10                          | 26.10                               | 800.00                       | 773.33                                        |
| 902+00.00                            | 26.10                          | 26.10                               | 800.00                       | 773.33                                        |
| 910+00.00                            | 26.10                          | 26.10                               | 800.00                       | 773.33                                        |
| 922+00.00                            | 26.10                          | 26.10                               | 1200.00                      | 1160.00                                       |
| 925+82.00                            | 26.10                          | 26.10                               | 382.00                       | 369.27                                        |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>4,097.14</b>                               |
| 934+34.00                            | 26.10                          |                                     |                              |                                               |
| 936+00.00                            | 26.10                          | 26.10                               | 166.00                       | 160.47                                        |
| 944+00.00                            | 26.10                          | 26.10                               | 800.00                       | 773.33                                        |
| 952+00.00                            | 26.10                          | 26.10                               | 800.00                       | 773.33                                        |
| 960+00.00                            | 26.10                          | 26.10                               | 800.00                       | 773.33                                        |
| 968+00.00                            | 26.10                          | 26.10                               | 800.00                       | 773.33                                        |
| 972+78.00                            | 26.10                          | 26.10                               | 478.00                       | 462.07                                        |
| <b>SUBTOTAL BORROW EXCAVATION</b>    |                                |                                     |                              | <b>3,715.87</b>                               |
| <b>GRAND TOTAL BORROW EXCAVATION</b> |                                |                                     |                              | <b>16,669.31</b>                              |

HET

Hartman Engineering, Inc.

CLIENT C.O.E.  
JOB NO.

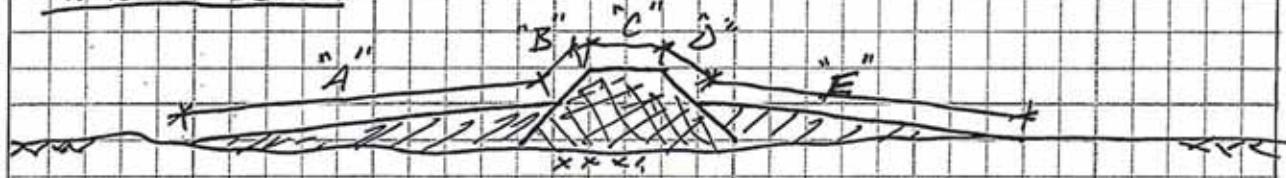
COMPUTED BY J.M.

DATE 7-27-08

CHECKED BY/DATE

PAGE NO.

TO. #5 Algiers West

Seeding, Fertilizer, + MulchReinforced Levee:

|        | <u>"A" Length</u> | <u>"B" Length</u> | <u>"C" Length</u> | <u>"D" Length</u> | <u>"E" Length</u> | <u>Total Length</u> |
|--------|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------|
| Lift 1 | 11.1              | 35.4              | 10                | 25.1              | 227.5             | 410.1'              |
| Lift 2 | 11.1              | 44.9              | 10                | 33.7              | 210.1             | 409.8               |
| Lift 3 | 11.1              | 48.2              | 10                | 36.8              | 204.0             | 410.1               |
| Lift 4 | 11.1              | 54.4              | 10                | 42.4              | 192.6             | 410.5               |

Length of Levee: 17,245'

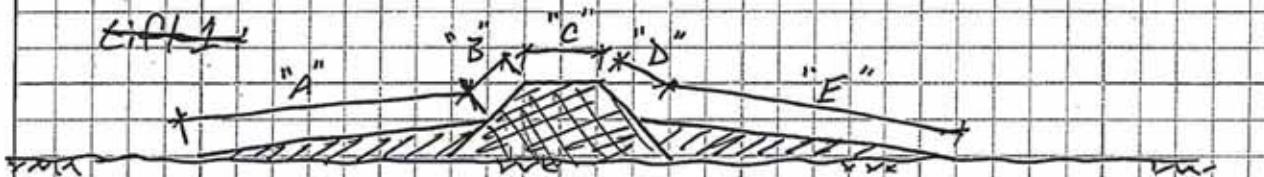
$$\text{Area (Lift 1)} = 409.1' \times 17,245' = 7,054,929.5 \text{ ft}^2 \approx \underline{\underline{161.96 \text{ acres}}}$$

$$\text{Area (Lift 2)} = 409.8' \times 17,245' = \underline{\underline{162.24 \text{ acres}}}$$

$$\text{Area (Lift 3)} = 410.1' \times 17,245' = \underline{\underline{162.35 \text{ acres}}}$$

$$\text{Area (Lift 4)} = 410.5' \times 17,245' = \underline{\underline{162.51 \text{ acres}}}$$

J.O. #5 Algiers West

Seeding, Fertilizer, & MulchUnreinforced Levee:

|        | <u>"A" Length</u> | <u>"B" Length</u> | <u>"C" Length</u> | <u>"D" Length</u> | <u>"E" Length</u> | <u>Total Length</u> |
|--------|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------|
| Lift 1 | 166.7             | 29.7              | 10                | 14.7              | 31.9              | 540.1               |
| Lift 2 | 166.7             | 39.2              | 10                | 23.3              | 302.3             | 541.5               |
| Lift 3 | 166.7             | 92.5              | 10                | 26.3              | 296.3             | 541.8               |
| Lift 4 | 166.7             | 48.7              | 10                | 31.9              | 284.9             | 542.2               |

$$\text{Length of Levee: } 773 + 50 \text{ to } 819 + 51 \Rightarrow L = 4601'$$

$$827 + 81 \text{ to } 872 + 28.44 \Rightarrow L = 4447.4'$$

$$882 + 92.74 \text{ to } 923 + 50 \Rightarrow L = 4057.3'$$

$$935 + 75 \text{ to } 971 + 83 \Rightarrow L = 3608'$$

$$\text{Total Length} = 16,714'$$

Se  $\text{Area (Lift 1)} = 540.1' \times 16,714' = 9,027,231.4 \text{ ft}^2 \approx 1,003,025.71 \text{ yd}^2 \approx 207.26 \text{ acres}$

$$\text{Area (Lift 2)} = 541.5' \times 16,714' = 9,050,631 \text{ ft}^2 \approx 1,005,625.67 \text{ yd}^2 \approx 207.77 \text{ acres}$$

$$\text{Area (Lift 3)} = 541.8' \times 16,714' = 9,055,645.2 \text{ ft}^2 \approx 207.89 \text{ acres}$$

$$\text{Area (Lift 4)} = 542.2' \times 16,714' = 9,062,330.8 \text{ ft}^2 \approx 208.04 \text{ acres}$$

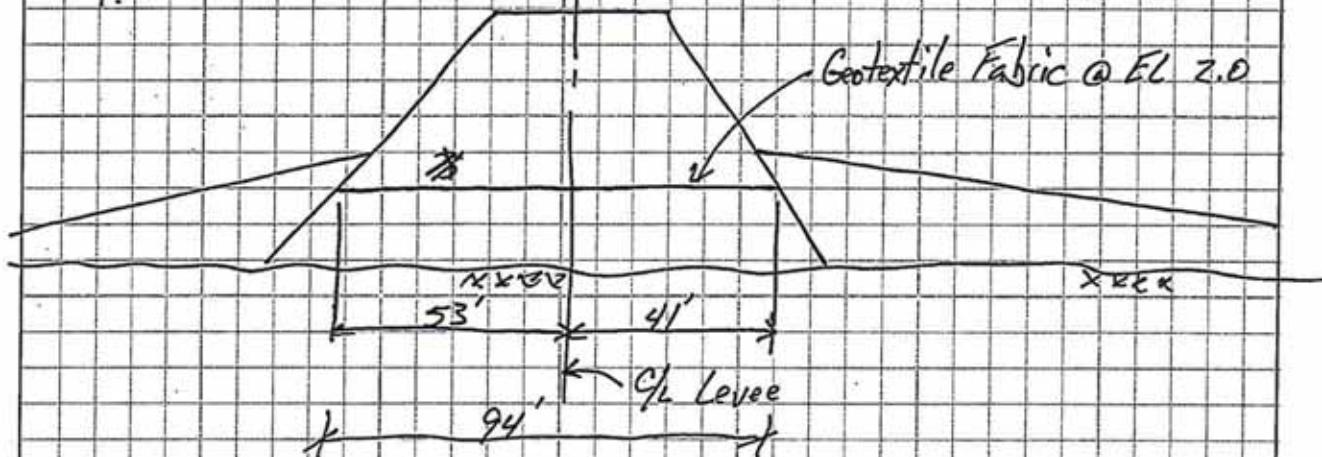
T.O. #5 Algiers West

CHECKED BY/DATE

Reinforced LeveeGeotextile Fabric:Install During Lift 1

F.S.

P.S.



Length of Levee:

$$773 + 50 \text{ to } 820 + 33 \Rightarrow L = 4683'$$

$$826 + 99 \text{ to } 871 + 77.69 \Rightarrow L = 4479'$$

$$883 + 43.58 \text{ to } 925 + 82 \Rightarrow L = 4239'$$

$$934 + 34 \text{ to } 972 + 78 \Rightarrow L = 3844'$$

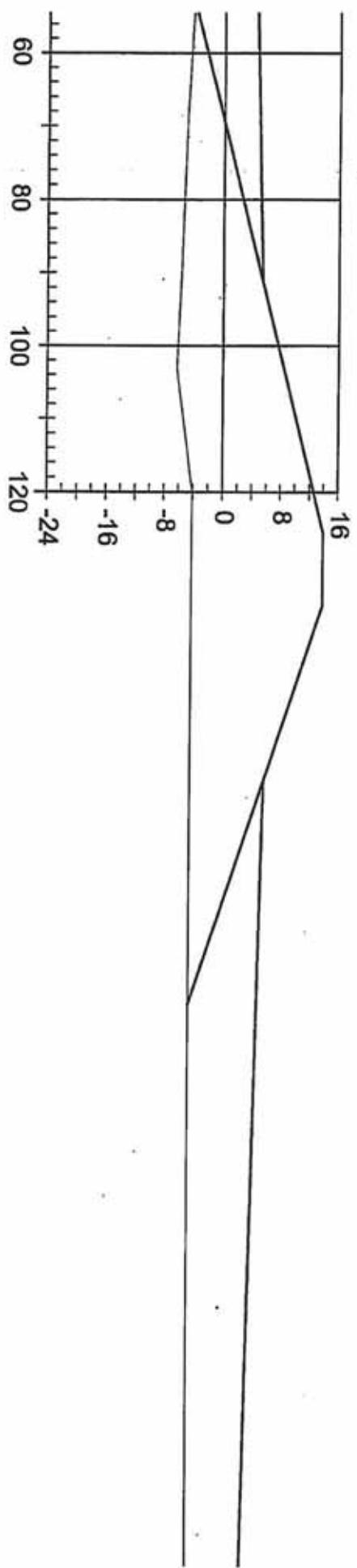
$$\text{Total Length} = 17,245'$$

Area of Geotextile Fabric:

$$94' \times 17,245' = 1,621,030 \text{ ft}^2$$

$$\approx \underline{\underline{180,115 \text{ yd}^2}}$$

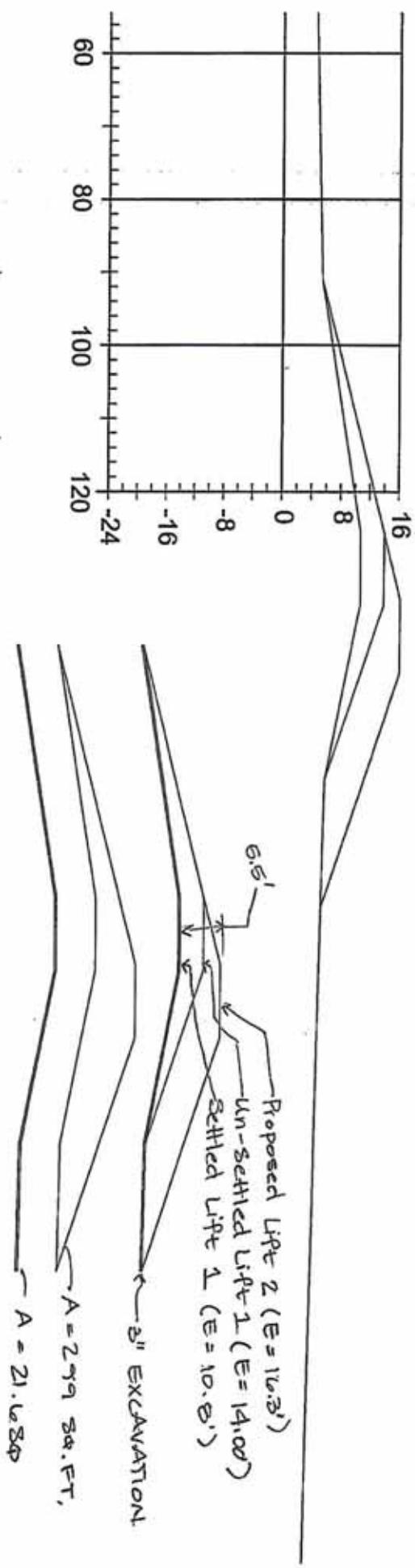
# Reinforced Levee - Lift 1



$$\frac{1}{\frac{1}{2}} \quad \frac{1}{\frac{1}{2}} \quad \frac{1}{\frac{1}{2}}$$

EMBANKMENT AND EXCAVATION VARIES. SEE EMBANKMENT  
AND EXCAVATION SPREADSHEETS FOR TOTALS.

Reinforced Levee - Lift 2



$$\frac{1}{?} + \frac{1}{?} = \frac{1}{?}$$

EMBANKMENT (TYP.) = 299.00 SQ.FT. + 21.6 SQ.FT = 320.6 SQ.FT.

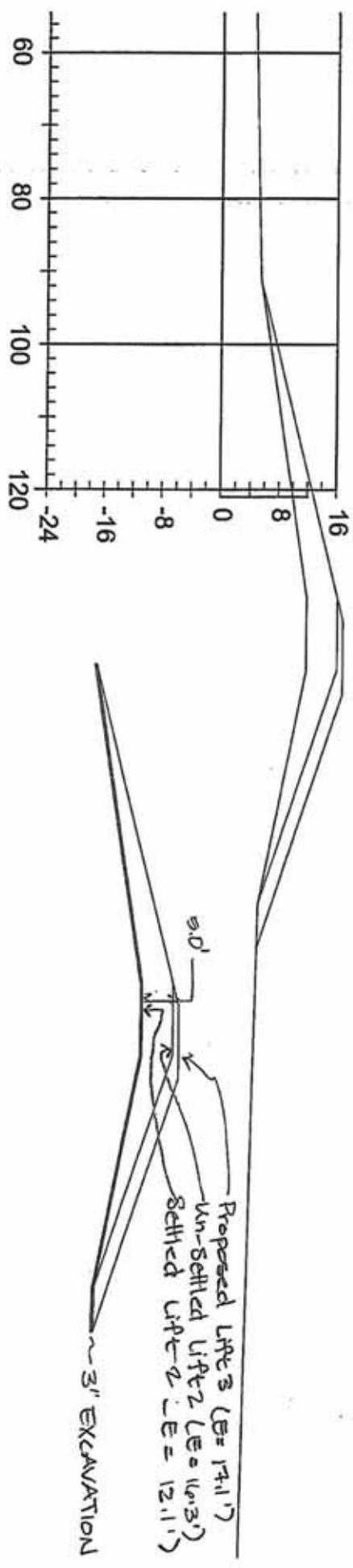
NOTES:

EMBANKMENT (TYP.) = 299.00 SQ.FT. + 21.6 SQ.FT = 320.6 SQ.FT.  
EXCAVATION (TYP.) = 21.6 SQ.FT.

**EXCAVATION: 3" STRIP WHERE FILL IS APPLIED BELOW SETTLED LIFT 1  
EMBANKMENT: BETWEEN PROPOSED AND BOTTOM OF 3" EXCAVATION**

See Embankment, Excavation Spreadsheets for details.

# Reinforced Levee - Lift 3



EMBANKMENT (TYP.) = 271.1 SQ.FT. + 23.2 SQ.FT. = 294.3 SQ.FT.

NOTES:  
 EXCAVATION: 3" STRIP WHERE FILL IS APPLIED BELOW SETTLED LIFT 1  
 EMBANKMENT: BETWEEN PROPOSED AND BOTTOM OF 3" EXCAVATION  
 See Embankment & Excavation Spreadsheets  
 for totals.

# Reinforced Levee - Lift 4



EMBANKMENT (TYP.) = 349.7 SQ.FT. + 26.1 SQ.FT. = 375.8 SQ.FT.

EXCAVATION (TYP.) = 26.1 SQ.FT.

$\frac{1}{2}$

$\frac{1}{2}$

$\frac{1}{2}$

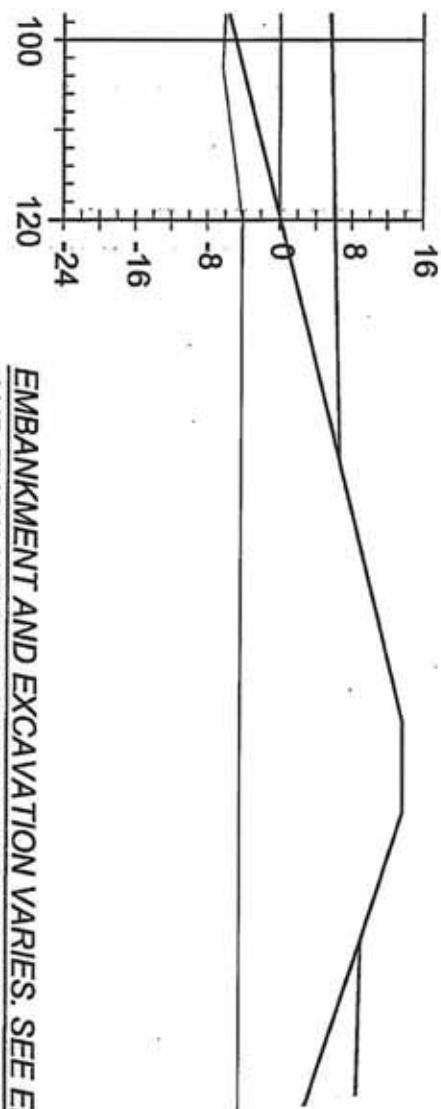
$\frac{1}{2}$

## NOTES:

EXCAVATION: 3" STRIP WHERE FILL IS APPLIED BELOW SETTLED LIFT 1  
 EMBANKMENT: BETWEEN PROPOSED AND BOTTOM OF 3" EXCAVATION  
 See Embankment & Excavation Spreadsheets  
 for totals.

# Unreinforced Levee - Lift 1

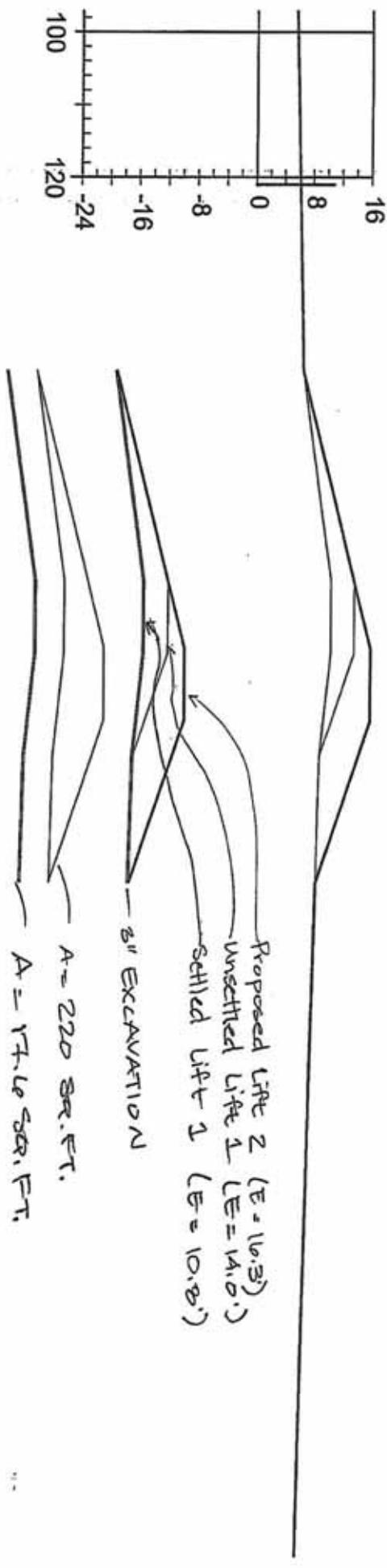
x-sect lift 1  
(Unreinforced  
Directory)



EMBANKMENT AND EXCAVATION VARIES. SEE EMBANKMENT  
AND EXCAVATION SPREADSHEETS FOR TOTALS.

$$\frac{1}{2} \quad \frac{1}{2}$$

# Unreinforced Levee - Lift 2



$$\frac{\text{EMBANKMENT (TYP.)} = 220 \text{ SQ.FT.} + 17.6 \text{ SQ.FT.} = 237.6 \text{ SQ.FT.}}{\text{EXCAVATION (TYP.)} = 17.6 \text{ SQ.FT.}}$$

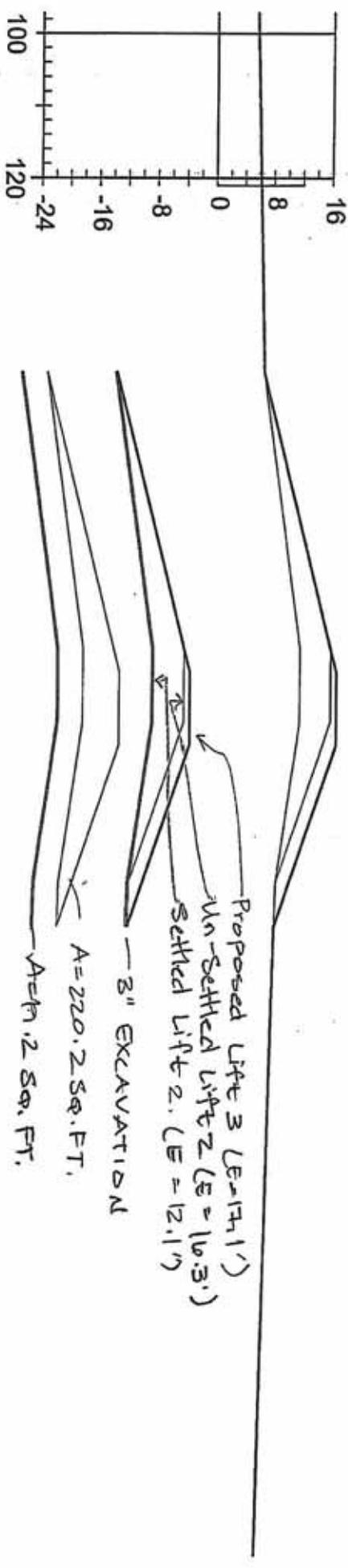
(See Emb. & Exc. Spreadsheets  
for totals)

NOTES:

EXCAVATION: 3" STRIP WHERE FILL IS APPLIED BELOW SETTLED LIFT 1  
EMBANKMENT: BETWEEN PROPOSED AND BOTTOM OF 3" EXCAVATION

$$\frac{1}{2} - \frac{1}{2}$$

# Unreinforced Levee - Lift 3



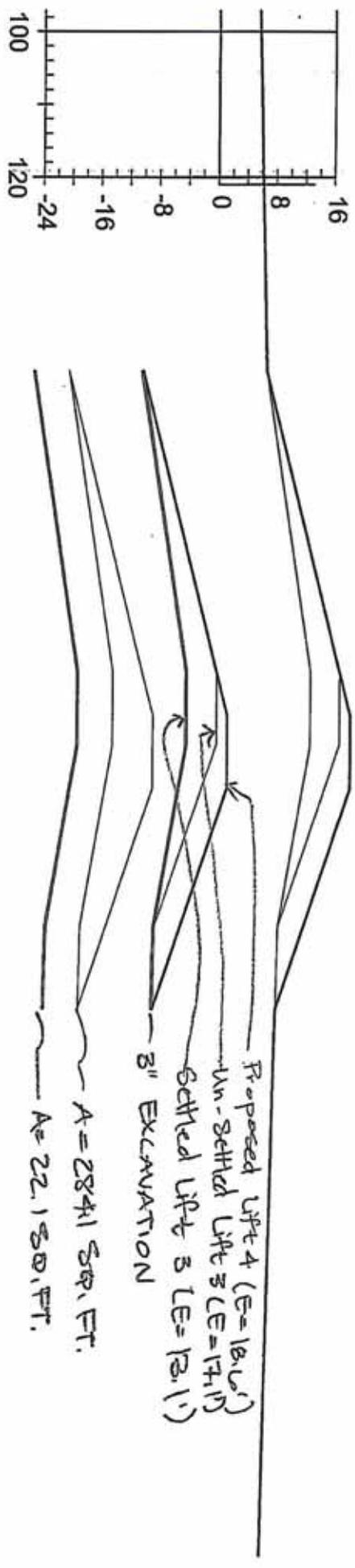
$$\frac{\text{EMBANKMENT (TYP.)} = 220.2 \text{ SQ.FT.} + 19.2 \text{ SQ.FT.} = 239.4 \text{ SQ.FT.}}{\text{EXCAVATION (TYP.)} = 19.2 \text{ SQ.FT.}}$$

(See Emb. & Exc. Spreadsheets  
for totals)

NOTES:

EXCAVATION: 3" STRIP WHERE FILL IS APPLIED BELOW SETTLED LIFT 1  
EMBANKMENT: BETWEEN PROPOSED AND BOTTOM OF 3" EXCAVATION

# Unreinforced Levee - Lift 4



$$\frac{\text{EMBANKMENT (TYP.)} = 284.1 \text{ SQ.FT.} + 22.1 \text{ SQ. FT.} = 306.2 \text{ SQ.FT.}}{\text{EXCAVATION (TYP.)} = 22.1 \text{ SQ.FT.}}$$

$\frac{1}{?}$

(See Emb. & Exc. Spreadsheets  
for totals)

NOTES:  
 EXCAVATION: 3" STRIP WHERE FILL IS APPLIED BELOW SETTLED LIFT 1  
 EMBANKMENT: BETWEEN PROPOSED AND BOTTOM OF 3" EXCAVATION

$\frac{1}{?}$

**REACH 1 T - WALL ALTERNATIVE FINAL**  
**BASIC T-WALL GEOMETRY**  
**Structural Quantity Data**

| Item No.         | Description                 | Unit     | Quantity Per Foot | Unit Price  | Estimated Amount |
|------------------|-----------------------------|----------|-------------------|-------------|------------------|
| 1                | Pile Load Tests             | Lump Sum | 1                 | LS          | \$150,000        |
| 2                | 24" Dia. Steel Pipe Piles   | LF       | 76.0              | \$ 140.00   | \$10,644         |
| 3                | Tension Anchors             | LF       | 0.67              | \$ 1,250.00 | \$833            |
| 4                | Sheetpile Cutoffs           | LF       | 30.00             | \$ 40.00    | \$1,200          |
| 5                | Stabilization Concrete (6") | LF       | 0.481             | \$ 200.00   | \$96             |
| 6                | Concrete in Base Slab       | LF       | 3.241             | \$ 550.00   | \$1,782          |
| 7                | Concrete in Walls           | LF       | 1.667             | \$ 850.00   | \$1,417          |
| 8                |                             |          |                   |             |                  |
| <b>Sub Total</b> |                             |          |                   |             | <b>\$15,972</b>  |

**REACH 3 T - WALL ALTERNATIVE FINAL**  
**BASIC T-WALL GEOMETRY**  
**Structural Quantity Data**

| Item No.         | Description                 | Unit     | Quantity Per Foot | Unit Price  | Estimated Amount |
|------------------|-----------------------------|----------|-------------------|-------------|------------------|
| 1                | Pile Load Tests             | Lump Sum | 1                 | LS          | \$150,000        |
| 2                | 24" Dia. Steel Pipe Piles   | LF       | 68.4              | \$ 140.00   | \$9,579          |
| 3                | Tension Anchors             | LF       | 0.60              | \$ 1,000.00 | \$600            |
| 4                | Sheetpile Cutoffs           | LF       | 30.00             | \$ 40.00    | \$1,200          |
| 5                | Stabilization Concrete (6") | LF       | 0.481             | \$ 200.00   | \$96             |
| 6                | Concrete in Base Slab       | LF       | 3.241             | \$ 550.00   | \$1,782          |
| 7                | Concrete in Walls           | LF       | 1.667             | \$ 850.00   | \$1,417          |
| 8                |                             |          |                   |             |                  |
| <b>Sub Total</b> |                             |          |                   |             | <b>\$14,675</b>  |

**ALGIERS CANAL LEVEE WEST, ALGIERS LOCK TO HWY. 23, WBV-47.2  
B/L STA. 770+70 TO STA. 978+18  
ORLEANS AND PLAQUEMINES PARISHES, LOUISIANA  
CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5**

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**APPENDIX 'E'  
CONSTRUCTION DURATION**

**Estimated time duration for 1st Lift of Algiers Levee (Earthen Levee Options)**

|                                          | Reinforced Earthen Levee                   | Unreinforced Earthen Levee          |
|------------------------------------------|--------------------------------------------|-------------------------------------|
| 1      Mobilization                      | 5 days                                     | 5 days                              |
| 2      Survey                            | 7 days                                     | 7 days                              |
| 3      Excavation                        |                                            |                                     |
| 3a     For 2,000' section, volume =      | 132,514 CY/19,988 ft = 6.63 CY/FT          | 110,304 CY/ 19,988 = 5.51 CY/FT     |
|                                          | Use 4,000 CY/day for excavation rate:      | 5.51CY/FT x 2,000 FT = 11,020 CY    |
|                                          | No. of days required per 200 FT            |                                     |
| 3c     Section                           | 13,260/4000= 3.3 days/2000'                | 11020/4000=2.76 days/2000'          |
|                                          | Total hours for excavation                 | 2.76x19988/2000=28 days             |
| 4      Compact Fill                      |                                            |                                     |
|                                          | 1,367,326 CY / 19,988 FT = 68.4 CY/FT      | 1,774,490 CY/19,988 FT = 88.8 CY/FT |
|                                          | Volume=2,000 x 68.4 CY/FT=136,800 CY       | Volume=2,000x88.8 CY/FT=177,600 CY  |
|                                          | 4508 - 5,500 CY/day                        | 4508 - 5500 CY/day                  |
|                                          | Use 4,500 CY/day                           | Use 4,500 CY/day                    |
|                                          | No. of days required to complete 200       |                                     |
|                                          | FT section                                 | 136,800/4,500 = 30 days             |
|                                          | Total No. of days to complete 19,988       | 177,600/4,500 = 40 days             |
|                                          | FT of levee                                |                                     |
|                                          | 30 x 19,988/2,000 = 300 days               | 40 x 19,988/2,000 = 400 days        |
| 5      Geotextile                        | 340 rolls @ 10 rolls/day = 34 days         | 0                                   |
| 6      Fertilizing, seeding and mulching | 5 days                                     | 10 days                             |
| 7      Close - Up                        | 5 days                                     | 7 days                              |
|                                          | No. of rain days                           |                                     |
| 8      (Assume 80% efficiency)           | 78 days                                    | 92 days                             |
|                                          | Total No. of days to complete 19,988 FT of | 549 days                            |
|                                          | levee (Calendar Days)                      | 467 days                            |

**Estimated time duration for T-Wall Option**

|                                                                              |                                                                                                                                                      |                                        |
|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| 1                                                                            | Sheet Piling Driving Operations                                                                                                                      |                                        |
|                                                                              | Type I piles = 12 piles/day                                                                                                                          | 10,342 piles / 12 piles/day = 862 days |
|                                                                              | Type II piles = 16 piles/day                                                                                                                         | 2007 piles / 16 piles/day = 126        |
|                                                                              | Assume 3 Pile Driving Crews                                                                                                                          | 988 days / 3 crews = 329 days          |
|                                                                              | Total Pile Driving Time                                                                                                                              | 329 days                               |
| 2                                                                            | Concrete                                                                                                                                             |                                        |
|                                                                              | Base Slabs will take 1 concrete crew 5 days / monolith                                                                                               | 334 monoliths x 5 days = 1670 days     |
|                                                                              | Stem walls will take 1 concrete crew 10 days / monolith                                                                                              | 334 monoliths x 10 days = 3340 days    |
|                                                                              | Assume 9 concrete crews                                                                                                                              | 5010 days / 9 = 557 days               |
|                                                                              | Lag time for concrete crews to start (pile driving operations must work ahead in the beginning)                                                      | 30 days                                |
|                                                                              | Total Concrete time                                                                                                                                  | 587 days                               |
| 3                                                                            | Embankment                                                                                                                                           |                                        |
|                                                                              | Assume embankment work will be coordinated so that no single monolith is loaded with embankment until 28 days after the completion of concrete work. | 28 days                                |
| 4                                                                            | Fertilizing, seeding and mulching                                                                                                                    | 5 days                                 |
| 5                                                                            | No. of rain days (Assume 80% efficiency)                                                                                                             | 130 days                               |
| <b>Total No. of days to complete 19,988 FT of T-Wall<br/>(Calendar Days)</b> |                                                                                                                                                      | 750 days                               |

**Estimated time duration for T-Wall/Reinforced Levee Option**

|                                                                              |                                                                                                                                                      |                                      |
|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| 1                                                                            | Sheet Piling Driving Operations                                                                                                                      |                                      |
|                                                                              | Type I piles = 8 piles/day                                                                                                                           | 8167 piles / 12 piles/day = 681 days |
|                                                                              | Type II piles = 12 piles/day                                                                                                                         | 1569 piles / 16 piles/day = 98       |
|                                                                              | Assume 3 Pile Driving Crews                                                                                                                          | 779 days / 3 crews = 487 days        |
|                                                                              | Total Pile Driving Time                                                                                                                              | 260 days                             |
| 2                                                                            | Concrete                                                                                                                                             |                                      |
|                                                                              | Base Slabs will take 1 concrete crew 5 days / monolith                                                                                               | 263 monoliths x 5 days = 1312 days   |
|                                                                              | Stem walls will take 1 concrete crew 10 days / monolith                                                                                              | 263 monoliths x 10 days = 2630 days  |
|                                                                              | Assume 9 concrete crews                                                                                                                              | 3942 days / 9 = 438 days             |
|                                                                              | Lag time for concrete crews to start (pile driving operations must work ahead in the beginning)                                                      | 45 days                              |
|                                                                              | Total Concrete time                                                                                                                                  | 483 days                             |
| 3                                                                            | Embankment                                                                                                                                           |                                      |
|                                                                              | Assume embankment work will be coordinated so that no single monolith is loaded with embankment until 28 days after the completion of concrete work. | 28 days                              |
| 4                                                                            | Fertilizing, seeding and mulching                                                                                                                    | 5 days                               |
| 5                                                                            | No. of rain days (Assume 80% efficiency)                                                                                                             | 130 days                             |
| 6                                                                            | Construction of 3868 feet of Reinforced Earthen Levee                                                                                                | 90 days                              |
| <b>Total No. of days to complete 19,988 FT of T-Wall<br/>(Calendar Days)</b> |                                                                                                                                                      | <b>736 days</b>                      |

**ALGIERS CANAL LEVEE WEST, ALGIERS LOCK TO HWY. 23, WBV-47.2  
B/L STA. 770+70 TO STA. 978+18  
ORLEANS AND PLAQUEMINES PARISHES, LOUISIANA  
CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5**

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**APPENDIX 'F'**

**DESIGN QUALITY CONTROL PLAN**

## **DESIGN QUALITY CONTROL PLAN (DQCP)**

**PREPARATION OF AN ENGINEERS ALTERNATIVE REPORT  
FOR  
WESTBANK AND VICINITY, NEW ORLEANS, LOUISIANA  
HURRICANE PROTECTION PROJECT  
PHASE 2 HURRICANE PROTECTION  
ALGIERS CANAL LEVEE WEST,  
ALGIERS LOCK TO HWY. 23  
WBV-47.2  
B/L STA. 770+77 to STA. 978+18  
ORLEANS AND PLAQUEMINES PARISHES, LOUISIANA**

**CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5**



**US Army Corps  
of Engineers ®**



**APRIL 2008**

**PREPARATION OF AN ENGINEERS ALTERNATIVE REPORT  
FOR  
WESTBANK AND VICINITY, NEW ORLEANS, LOUISIANA  
HURRICANE PROTECTION PROJECT  
PHASE 2 HURRICANE PROTECTION  
ALGIERS CANAL LEVEE WEST, ALGIERS LOCK TO HWY. 23  
WBV-47.2  
B/L STA. 770+77 to STA. 978+18  
ORLEANS AND PLAQUEMINES PARISHES, LOUISIANA  
CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5**

**DESIGN QUALITY CONTROL PLAN (DQCP)**

**APRIL 2008**

**1. Product/Project Description**

- a. Project Number: WBV-47.2.
- b. Project Name: Engineers Alternative Report (EAR) for Phase 2 Hurricane Protection, Algiers Canal Levee West, Algiers Lock to Hwy. 23.
- c. Project Location: Algiers Canal Levee West, Algiers Lock to Hwy. 23, Plaquemines and Orleans Parish, Louisiana.
- d. Project Description: Engineer Alternative Report to explore multiple levee alternatives to provide the 100-year level of protection.
- e. Project Work: Preparation of an Alternative Selection Report for replacement of the existing Hurricane Protection system with new protection designed for 100-year elevations.

**2. Purpose and Scope of DQCP**

- 2.1 Purpose - This DQCP outlines the professional expertise, technical criteria, and technical review processes that will be used to produce a quality product satisfying technical, functional, legal, safety and environmental requirements.

**2.2 Scope**

The scope of the proposed Task Order No. 4 consists of geotechnical, civil and structural analyses required to evaluate three (3) alternatives for a 20,748 linear foot section of Algiers Canal Levee West from Station 770+70 to Station 978+18. The alternatives to be evaluated are:

1. All earthen levee, un-reinforced, with landside shift.
2. All earthen levee with reinforcing geotextile, with landslide shift.

3. Reinforced concrete T-Wall along landslide levee toe with existing levee as a barge barrier.

Design elevation shall be for the year 2057 level, top of levee elevation 14.0 NAVD 88. The design shall also consider the 2007 level, top of levee elevation 10.5 NAVD 88.

The EAR shall be performed utilizing Government furnished survey data and soil borings. The EAR shall consider existing and required right-of-way, required utility relocations and tie-ins required at Hwy. 23, Planters Pump Station, Orleans S&WB Pump Station and Algiers Lock. The EAR shall also investigate the affect of the three (3) levee types on the existing high-rise bridge. Separate Independent Technical Reviews (ITR) will be performed on the geotechnical, structural and civil aspects of the evaluation. These reviews will be performed by licensed professional engineers with the A/E prior to submittal to the Government. The technical review will consist of reviews performed by the A/E, the New Orleans District, and Local Sponsors.

### **3. Deliverables**

Deliverables will be supplied at the 30%, 65%, 95% and 100% completion stages. The 30% submittal shall consist of one (1) hard copy and one (1) electronic copy and will include geologic profiles, soil parameters, complete geotechnical analysis methodology and results of one cross section along with all proposed geotechnical cross sections and proposed soil parameters.

The 65% submittal shall include ten (10) hard copies of the report, 5 hard copies of appendices and one (1) electronic copy of all required items. The level of completion shall be such that the critical geotechnical analyses are complete and that all right-of-way limits have been established.

The 95% submittal shall include twenty-five (25) hard copies of the report and all appendices with the exception of the engineering calculations for which ten (10) hard copies will be provided. One (1) electronic copy of all information will also be supplied. The 95% submittal shall be complete with the exception of resolution of the 95% review comments.

The 100% completed document shall incorporate all comments and resolutions from the 95% submittal. Ten (10) hard copies and one (1) electronic copy of all required information shall be submitted.

### **4. Customer Involvement**

The Product Delivery Team (PDT) will engage and involve other appropriate USACE organizations, Federal agencies, state and local governments, local utility and infrastructure agencies, and local citizens groups and associations, to keep them informed and to solicit their feedback and assistance. This involvement includes formal meetings

and presentations, formal reviews, informal meetings and discussions, teleconferences, e-mails and telephone conversations. Customer involvement at all levels is vital to instill confidence that the customers' needs are being addressed and the recovery efforts are of high quality.

The following is a list of government authorities and affected utility owners that will be given an opportunity to review and comment on this alternative study. The need for additional agencies to review the project will be determined as the documents we developed.

1. U.S. Army Corps of Engineers
2. Jefferson Parish Dept. of Public Works
3. West Jefferson Levee District
4. Louisiana Department of Transportation and Development
5. Known affected utility owners
6. New Orleans Sewer and Water Board

**5. Metric System:**

- 5.1 Reference: CECW-CE, Engineering and Construction Bulletin, No. 2004-13, Issued 30 Aug 2004. This guidance states that the metric system shall be used unless such use leads to inefficiencies or is otherwise impracticable.
- 5.2 The existing hurricane protection projects were designed and constructed using the inch-pound system of measurement. It is not practicable to use metric on the continued design and construction of these projects due to inefficiencies.

**6. Technical Criteria**

- a. Hurricane Storm Damage Reduction System. Design Guidelines, New Orleans District, October 2007.
- b. ER 1110-1-12, Quality Management, 21 July 2006.
- c. Guidelines for Technical Documentation, dated 30 March 2006.
- d. ER 1110-1-8159, Engineering and Design, Dr. Checks, 10 May 2001.
- e. American Association of State Highway and Transportation Officials, Standard Specifications for Highway Bridges, 17<sup>th</sup>, or latest, Edition.
- f. EM 1110-2-1902, Slope Stability, Oct. 03.
- g. EM 1110-2-1913, Design and Construction of Levees, Apr. 00.
- h. EM 1110-2-2502, Retaining and Flood Walls, Sept. 89.
- i. EM 1110-2-2504, Design of Sheet Pile Walls, March 94.
- k. EM 1110-2-2906, Design of Pile Foundations, Jan. 91.
- l. DIVR 1110-1-400, Soil Mechanic Data, Dec. 98.
- m. ETL 1110-2-569, Design Guidance for Levee Underseepage, May 05.
- n. ACI, American Concrete Institute.
- o. PCI, Prestressed and Precast Concrete.

- p. CRSI, Concrete Reinforcing Steel Institute, Manual of Practice.
- q. American Welding Society, Structural Welding Code, Steel (AWS-D1.1-02).
- r. EM 385-1-1 Safety and Health Requirements Manual, ENG Form 5044-R (Nov. 03),
- s. EM 1110-2-2000 Standard Practice for Concrete for Civil Works Structures Change 2 (Mar 01).
- t. EM 1110-2-2100 Stability Analysis of Concrete Structures (Dec 05).
- u. EM 1110-2-2102 Waterstops and Other Joint Materials (Sep 95).
- v. EM 1110-2-2104 Strength Design Criteria for Reinforced Concrete Hydraulic Structures (Jun 92, Aug 03).
- w. EM 1110-2-2105 Design of Hydraulic Steel Structures Change 1 (May 94).
- x. EM 1110-2-2400 Structural Design and Evaluation of Outlet Works (Jun 03).
- y. EM 1110-2-2503 Design of Sheet Pile Cellular Structures Cofferdams & Retaining Structures (Sep 89)
- z. EM 1110-2-2701 Vertical Lift Gates (Nov 97).
- aa. EM 1110-2-3102 General Principles of Pumping Station Design and Layout (Feb 95).
- bb. EM 1110-2-2902 Conduits, Culverts, and Pipes (Mar 98).
- cc. EM 1110-2-3102 General Principles of Pumping Station Design and Layout (Feb 95).
- dd. EM 1110-2-3104 Structural and Architectural Design of Pumping Stations (Jun 89).
- ee. American Association of State Highway and Transportation Officials, A Policy on Geometric Design of Highways and Streets, 4<sup>th</sup> Edition (The Green Book), 2001.
- ff. American Association of State Highway and Transportation Officials, Manual on Uniform Traffic Control Devices, 2001.
- gg. Louisiana Department of Transportation and Development, Bridge Design Manual (English).
- hh. Louisiana Department of Transportation and Development, Road Design Manual.
- ii. Louisiana Department of Transportation and Development, Standard Specifications for Roads and Bridges (LSSRB), 2006.
- jj. EM 1110-2-2610 Change 1, Lock and Dam Gate Operating and Control Systems (Dec 03, Apr 04).
- kk. EM 1110-2-2608 Navigation Locks – Fire Protection Provisions (Feb 94).
- ll. EM 1110-2-2703 Lock Gates and Operating Equipment
- mm. EM 1110-2-2704 Cathodic Protection Systems for Civil Works Structure (Jan 99).
- nn. EM 1110-2-3105 Mechanical and Electrical Design for Pumping Stations (Mar 94, Aug 94, Nov 99)
- oo. WES Technical Report H70-2 including Appendix A, Operating Forces on Sector Gates under Reverse Heads, March 70 and Dec. 71.
- pp. NFPA 70, National Electric Code, 1999

**7. Vertical Datums:**

- The establishment and use of vertical datums in the design work will follow the guidance provided in CECW-CE, INTERIM GUIDANCE FOR A PRELIMINARY EVALUATION OF VERITCAL DATUMS ON FLOOD CONTROL, SHORE PROTECTION, HURRICANE PROTECTION, AND NAVIGATION PROJECTS, dated 31 October 2006
- Vertical datums were provided by the Government with the supplied survey drawings.
- No additional field survey work is proposed to be performed under this EAR.

**8. Product Delivery Team (PDT)**

The PDT is led by an experienced leader who has designed or led PDTs in the successful completion of similar work. Other PDT members have extensive professional experience in their assigned responsibilities. Should future requirements require the application of different skills or experience, appropriate personnel will be added to the PDT.

HPA will sub-contract the work to various team members. The individual firms involved in this task order and their responsibilities are as follows:

Hartman Engineering, Inc. (HEI) – Lead Technical Engineer, Product Delivery Team Manager and Task Order Manager responsible for all civil/structural design including right-of-way drawings, utility relocations and report preparation.

Civil Services, Inc. (CSI) – All geotechnical design including geotechnical ITR.

Digital Engineering & Imaging, Inc. (DEII) – Overall contract management and task order QA/QC, DQCP and Civil/Structural ITR.

The Product Delivery Team Manager and Task Order Manager shall be Mr. Manish Mardia who serves as Executive Vice-President of HEI and is a licensed professional civil engineer in the State of Louisiana with over 15 years of experience in the New Orleans area and will provide management and QA/QC of the interim and final submittals.

Mr. Scott Chehardy will serve as HEI's project manager. Mr. Chehardy also is a licensed professional civil engineer and possesses over 13 years of experience in the New Orleans area. Mr. Chehardy has been involved in past USACE projects such as the Harahan Pump to the River, Soniat Canal Improvements, and Drainage, Water and Wastewater Infrastructure Planning and Design in the Cities of Natchez and Picayune, MS.

Mr. Justin Bottger and Mr. Robert Yokum will serve as HEI's chief structural engineers. Both gentlemen are licensed professional civil engineers with an excess of 30 years experience each.

Mr. Ramesh Kalvakaalva is a licensed professional civil engineer and Branch Manager of CSI, New Orleans. His experience is derived from working on various projects in Louisiana and the Southeast region, including the TVA, LaDOTD, Jacksonville COE, and Savannah COE. He will serve as the project manager for the Geotech effort.

CSI's geotechnical efforts will be led by Mr. Carlos Cepero who will serve as Senior Geotechnical Engineer. Mr. Cepero is a licensed professional civil engineer in multiple states with 9 years of experience including 4 years of employment with the USACE Jacksonville District. He has been involved with over a dozen flood control embankment design projects.

#### **9. Independent Technical Review (ITR)**

- Independent Technical Review will be performed on all products, following the guidance provided in ER 1110-1-12, Engineering and Design, QUALITY MANAGEMENT, dated 30 September 2005.
- As previously stated separate ITR's will be performed for the geotechnical, structural and civil portions of the work.
- Mr. Silas Cunningham will serve as the ITR Team Leader and will coordinate all activities of the ITR team. Mr. Cunningham is a licensed professional civil engineer in the State of Louisiana.
- Mr. Bruce Khosrozadeh will serve as the lead ITR for the geotechnical portion of the work. Mr. Khosrozadeh is also a licensed professional civil engineer.
- Mr. Frank Liang will serve as the lead ITR for the civil portion of the work and Mr. Daniel Marsalone will be the lead structural ITR person. Both are registered professional civil engineers.
- Reviews will be performed continuously throughout the project with one formal review being completed at the 95% review stage.
- All resolutions to review comments will be entered into Dr. Checks.
- Documentation will be provided for all ITRs, consisting of a completed (signed) statement of technical review and certification (ref. ER 1110-1-12), to which is attached all review comments (identified by the Reviewer) and the response of the designer to the comment. Documentation will be submitted concurrently with the final design product.

## **10. Schedule/Checklist**

The task order is proposed to be completed within the following time frames:

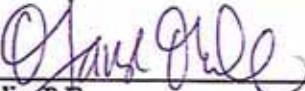
| Work Item                           | Time Interval<br>For Work Item<br>In Calendar<br>Days | Time in Calendar Days<br>From Date of<br>Acknowledgement of<br>Receipt of Notice to<br>Proceed |
|-------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Notice to Proceed                   |                                                       | 0                                                                                              |
| Pre-Work Conference                 | 3                                                     | 3                                                                                              |
| Submit DQCP                         | 4                                                     | 7                                                                                              |
| 30% Submittal                       | 10                                                    | 17                                                                                             |
| 30% Review                          | 2                                                     | 19                                                                                             |
| 30% Comment                         |                                                       |                                                                                                |
| Resolution/Decision Point           | 1                                                     | 20                                                                                             |
| 65% Submittal (Alt. Study<br>Rept.) | 25                                                    | 45                                                                                             |
| 65% Review                          | 10                                                    | 55                                                                                             |
| 65% Comment                         |                                                       |                                                                                                |
| Resolution/Decision Point           | 7                                                     | 62                                                                                             |
| 95% Submittal and ITR<br>Submittal  | 12                                                    | 74                                                                                             |
| 95% Review                          | 14                                                    | 88                                                                                             |
| 95% Comment Resolution              | 7                                                     | 95                                                                                             |
| 100% Submittal                      | 7                                                     | 102                                                                                            |

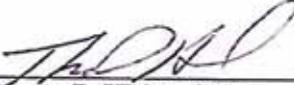
## **11. Record Maintenance**

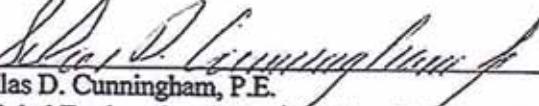
The following QC documentation will be provided, in both hard copy and electronic format, to the Government:

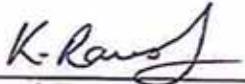
- The initial Design Quality Control Plan (within 7 days of commencing design) and any changes during the design process.
- ITR review comments, resolution of comments, and statement of technical review and certification (concurrent with final submittal of design product).
- Design Documentation Report, which includes the technical documentation of the design (e.g. calculations, load cases, etc. as required) plus the items above.

This DQCP has been reviewed and accepted by the following:

  
Manish Mardia, P.E. \_\_\_\_\_ Date  
Hartman Engineering, Inc., Product Delivery Team Manager and Task Order Manager

  
Thomas P. Hickey, P.E. \_\_\_\_\_ Date  
Digital Engineering & Imaging, Inc., HPA Contract Manager

  
Silas D. Cunningham, P.E. \_\_\_\_\_ Date  
Digital Engineering & Imaging, Inc., ITR Team Leader

  
Ramesh Kalvakaalva, P.E. \_\_\_\_\_ Date  
Civil Services, Inc., Project Manager

**ALGIERS CANAL LEVEE WEST, ALGIERS LOCK TO HWY. 23, WBV-47.2  
B/L STA. 770+70 TO STA. 978+18  
ORLEANS AND PLAQUEMINES PARISHES, LOUISIANA  
CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5**

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## **APPENDIX 'G'**

## **INDEPENDENT TECHNICAL REVIEW**

65% ITR Comments

Comment Report: All Comments

Project: WBV-47.2, Algiers Lock to Hwy 23

Review: A-E ITR

Displaying 42 comments for the criteria specified in this report.

2156 ms to run this page

| <u><a href="#">Id</a></u> | <u><a href="#">Discipline</a></u> | <u><a href="#">Section/Figure</a></u> | <u><a href="#">Page Number</a></u> | <u><a href="#">Line Number</a></u> |
|---------------------------|-----------------------------------|---------------------------------------|------------------------------------|------------------------------------|
| 1927306                   | Structural                        | n/a'                                  | n/a                                | n/a                                |

(Document Reference: Cost Estimates) [This item is flagged as a critical issue.]

For all alternatives a sufficient factor to cover settlement during construction of the levee lifts should be included in the embankment quantities.

Submitted By: [Dan Marsalone](#) (504-887-3702). Submitted On: 28-May-08

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0 | <b>Evaluation Non-concurred</b><br>The quantities of embankment needed were calculated for each lift based on the lift schedule provided in the geotech report. Thus each lift calculation incorporated the estimated settlement shown in the lift schedule. This should take the place of the factor you are referring to. Do you agree?<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 29-May-08                                                                                                                                                                                                       |
| 1-1 | <b>Backcheck Recommendation Open Comment</b><br>For each lift there will be settlement that takes place during construction-this is settlement of the foundation is due to the weight of the fill. For instance this is normally between 10 and 15% of the theoretical section volumes. The question is: Was this estimated amount of embankment due to settlement included in your quantities? Each succeeding lift will include the needed embankment because of settlement of the preceding lift for the time period between scheduled lifts.<br><br>Submitted By: <a href="#">Dan Marsalone</a> (504-887-3702) Submitted On: 10-Jun-08 |
| 2-0 | <b>Evaluation Concurred</b><br>I will confirm with the geotech whether the settlement tables they prepared include settlement during construction. If not, we will adjust the quantity upward to account for this.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 18-Jun-08                                                                                                                                                                                                                                                                                                                              |
|     | <b>Backcheck not conducted</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|     | <b>Current Comment Status:</b> <a href="#">Comment Open</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

|         |            |      |     |     |
|---------|------------|------|-----|-----|
| 1927329 | Structural | n/a' | n/a | n/a |
|---------|------------|------|-----|-----|

(Document Reference: Cost Estimates) [This item is flagged as a critical issue.]

For the two levee alternatives, runoff from the levee is increased significantly (200 ft. plus) because of the added embankment section and berms. A cost should be added to the estimate to cover the collection and drainage of runoff from the levee.

Submitted By: [Dan Marsalone](#) (504-887-3702). Submitted On: 28-May-08

|     |                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0 | <b>Evaluation Non-concurred</b><br>What drainage system is used/designed for the existing levee? I don't think there is any. Do you feel the runoff issue is significant enough to include in this study? Since the COE specified a R/W line to be located 15-feet off the toe of the levee, there is limited room to work with.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 30-May-08 |
| 1-1 | <b>Backcheck Recommendation Open Comment</b><br>I think a statement could be added in the report about the issue of drainage and the added runoff from the increased levee section. This runoff if not collected will go through private properties to the street. If the levee project is constructed runoff will become an issue.                                                                                         |

|                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                        |      |     |     |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|-----|-----|
|                                                                                                                                                                                                                                                                                             | Submitted By: <a href="#">Dan Marsalone</a> (504-887-3702) Submitted On: 10-Jun-08                                                                                                                                                                                                                                                                     |      |     |     |     |
| 2-0                                                                                                                                                                                                                                                                                         | <b>Evaluation Concurred</b><br>We will address this in the report.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 18-Jun-08<br><i>Backcheck not conducted</i><br>Current Comment Status: <b>Comment Open</b>                                                                                                         |      |     |     |     |
| 1927333                                                                                                                                                                                                                                                                                     | Structural                                                                                                                                                                                                                                                                                                                                             | n/a* | n/a | n/a | n/a |
| (Document Reference: Cost Estimates)                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                        |      |     |     |     |
| Coating quantities for steel piles and sheet piles should be computed from the tops of the piles to 4 feet below the water table.                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                        |      |     |     |     |
| Submitted By: <a href="#">Dan Marsalone</a> (504-887-3702). Submitted On: 28-May-08                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                        |      |     |     |     |
| 1-0                                                                                                                                                                                                                                                                                         | <b>Evaluation Potential Cost Impact Concurred</b><br>In actuality little to no coating is required because the highest base is at El. -5.0. Will use 5 feet as a minimum for this study.<br><br>Submitted By: <a href="#">Robert Yokum</a> ((985) 674-1846) Submitted On: 07-Jun-08                                                                    |      |     |     |     |
| 1-1                                                                                                                                                                                                                                                                                         | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Dan Marsalone</a> (504-887-3702) Submitted On: 10-Jun-08<br>Current Comment Status: <b>Comment Closed</b>                                                                                                                                    |      |     |     |     |
| 1927349                                                                                                                                                                                                                                                                                     | Structural                                                                                                                                                                                                                                                                                                                                             | n/a* | n/a | n/a | n/a |
| (Document Reference: Drawings-Plan of Railroad Swing Gate)                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                        |      |     |     |     |
| The railroad gate opening is shown at 18 feet with the railroad crossing at a skew to the gate monolith. The minimum distance as measured perpendicular from the center of the tracks to nearest obstruction (concrete columns) is 8.5 feet. This minimum clear distance should be checked. |                                                                                                                                                                                                                                                                                                                                                        |      |     |     |     |
| Submitted By: <a href="#">Dan Marsalone</a> (504-887-3702). Submitted On: 28-May-08                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                        |      |     |     |     |
| 1-0                                                                                                                                                                                                                                                                                         | <b>Evaluation Concurred</b><br>Will recheck dimensions and revise accordingly. A quick check indicates that the current layout provides approximately 8'-6 1/2". Will revise opening to provide a minimum of 9 feet of clearance since this is a main line.<br><br>Submitted By: <a href="#">Robert Yokum</a> ((985) 674-1846) Submitted On: 07-Jun-08 |      |     |     |     |
| 1-1                                                                                                                                                                                                                                                                                         | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Dan Marsalone</a> (504-887-3702) Submitted On: 10-Jun-08<br>Current Comment Status: <b>Comment Closed</b>                                                                                                                                    |      |     |     |     |
| 1927357                                                                                                                                                                                                                                                                                     | Structural                                                                                                                                                                                                                                                                                                                                             | n/a* | n/a | n/a | n/a |
| (Document Reference: Cost Estimate- Railroad Swing Gate)                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                        |      |     |     |     |
| The cost of a temporary false bridge with a removable section of tracks should be included in the cost estimate for the railroad swing gate. This will allow for the passage of trains during the construction of the gate structure. This false bridge                                     |                                                                                                                                                                                                                                                                                                                                                        |      |     |     |     |

should be supported on steel pipe piles.

Submitted By: [Dan Marsalone](#) (504-887-3702). Submitted On: 28-May-08

|                                                               |                                                                                                                                                                                                                                                                                                                                      |      |     |     |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|-----|
| 1-0                                                           | <b>Evaluation Concurred</b><br>While no hard design was performed for these items, costs were added for the railroad gate to account for these items. Will further review the cost estimate to assure that the added costs were included.<br><br>Submitted By: <a href="#">Robert Yokum</a> ((985) 674-1846) Submitted On: 05-Jun-08 |      |     |     |
| 1-1                                                           | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Dan Marsalone</a> (504-887-3702) Submitted On: 10-Jun-08                                                                                                                                                                   |      |     |     |
| <b>Current Comment Status:</b> <a href="#">Comment Closed</a> |                                                                                                                                                                                                                                                                                                                                      |      |     |     |
| 1927367                                                       | Structural                                                                                                                                                                                                                                                                                                                           | n/a' | n/a | n/a |

(Document Reference: T-Wall Design Calculations)

In the T-Wall design calculations a boat impact load of 100 kips was included. With the earthen berm provided on the floodside of the wall it is doubtful that a barge boat could hit the wall. But this is a conservative assumption.

Submitted By: [Dan Marsalone](#) (504-887-3702). Submitted On: 28-May-08

|                                                               |                                                                                                                                                                                                                                                                                                                                       |      |     |     |
|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|-----|
| 1-0                                                           | <b>Evaluation Concurred</b><br>This was included only for load conditions with water at the top of the wall because the designer considered it a possibility. No furhter action required since we agree that the approach is conservative.<br><br>Submitted By: <a href="#">Robert Yokum</a> ((985) 674-1846) Submitted On: 05-Jun-08 |      |     |     |
| 1-1                                                           | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Dan Marsalone</a> (504-887-3702) Submitted On: 10-Jun-08                                                                                                                                                                    |      |     |     |
| <b>Current Comment Status:</b> <a href="#">Comment Closed</a> |                                                                                                                                                                                                                                                                                                                                       |      |     |     |
| 1927379                                                       | Structural                                                                                                                                                                                                                                                                                                                            | n/a' | n/a | n/a |

(Document Reference: Cost Estimates)

The cost estimates for each alternatives hve items that are extended to the penny. Round off all lump sum items; use percentage item to the +/- percent to get rounded numbers, and round off the total estimates to the nearest \$5 million. The degree of accuracy of the cost estimates in this study does not justify anything better than a total cost rounded to the nearest 5 or 10 million dollars.

Submitted By: [Dan Marsalone](#) (504-887-3702). Submitted On: 28-May-08

|                                                               |                                                                                                                                                                    |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0                                                           | <b>Evaluation Concurred</b><br>Ok<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08                                       |
| 1-1                                                           | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Dan Marsalone</a> (504-887-3702) Submitted On: 10-Jun-08 |
| <b>Current Comment Status:</b> <a href="#">Comment Closed</a> |                                                                                                                                                                    |

|                              |            |      |     |                       |
|------------------------------|------------|------|-----|-----------------------|
| 1927385                      | Structural | n/a' | 3.1 | Line 1, Paragraph 3.0 |
| (Document Reference: Report) |            |      |     |                       |

The first sentence which states, "the main purpose of the current work is to raise the level of levee protection to enable participation in the National Flood Insurance Program", should be changed to the following: "The purpose of the work is to raise the level of levee protection to provide protection for the 100 year storm event." Although participation in the National Flood Insurance Program is important, the main purpose of the project is to prevent flooding.

Submitted By: [Dan Marsalone](#) (504-887-3702). Submitted On: 28-May-08

|     |                                                                          |                                                                                     |
|-----|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1-0 | Evaluation Concurred<br>ok                                               | Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08 |
| 1-1 | Backcheck Recommendation <b>Close Comment</b><br>Closed without comment. | Submitted By: <a href="#">Dan Marsalone</a> (504-887-3702) Submitted On: 10-Jun-08  |
|     | Current Comment Status: <b>Comment Closed</b>                            |                                                                                     |

|                                                                                                                                                                                                         |       |      |     |         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|-----|---------|
| 1929392                                                                                                                                                                                                 | Civil | n/a' | 5-1 | para. 5 |
| The railroad gate monolith should also be shown as an alternative and a section should be added which indicates that it is common for all three (3) alternatives and discusses the construction method. |       |      |     |         |

Submitted By: [Silas Cunningham](#) (504-468-6129). Submitted On: 29-May-08

|     |                                                                                                                                                                                                                                                                                                                            |                                                                                       |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1-0 | Evaluation Concurred<br>The word 'alternative' indicates to me that there are other alternatives to be considered. A railroad gate does not fit in as an alternative like the 3 flood protection options (there is no choice here); however since the COE SOW calls it an alternatives, we will address it as you suggest. | Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08   |
| 1-1 | Backcheck Recommendation <b>Close Comment</b><br>OK                                                                                                                                                                                                                                                                        | Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08 |
|     | Current Comment Status: <b>Comment Closed</b>                                                                                                                                                                                                                                                                              |                                                                                       |

|                                                                                                                                                                                                                                                                            |       |      |           |                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|-----------|-----------------|
| 1929406                                                                                                                                                                                                                                                                    | Civil | n/a' | 5-1 & 5-2 | para. 5.1 & 5.2 |
| Paragraph 5.1 and 5.2 the first sentence defines project limits, but a gap in stationing exists. This is presumably because a T-Wall must be constructed at the bridge and there are 2 pump stations, which are common to all 3 alternatives but this should be explained. |       |      |           |                 |

Submitted By: [Silas Cunningham](#) (504-468-6129). Submitted On: 29-May-08

|     |                                                        |                                                                                       |
|-----|--------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1-0 | Evaluation Concurred<br>Correct. We will explain this. | Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08   |
| 1-1 | Backcheck Recommendation <b>Close Comment</b><br>OK    | Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08 |
|     | Current Comment Status: <b>Comment Closed</b>          |                                                                                       |

|                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                |      |     |           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|-----------|
| 1929409                                                                                                                                                                                                                                                                                                       | Civil                                                                                                                                                                                                                                                                                                                                                                                                          | n/a' | 6-2 | n/a       |
| At the bottom of the page a reference to sheet C-301-U (typical section) would be helpful in the description of the design section.                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                |      |     |           |
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129). Submitted On: 29-May-08                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                |      |     |           |
| 1-0                                                                                                                                                                                                                                                                                                           | Evaluation Concurred<br>Ok<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08                                                                                                                                                                                                                                                                                          |      |     |           |
| 1-1                                                                                                                                                                                                                                                                                                           | Backcheck Recommendation Close Comment<br>OK<br><br>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08                                                                                                                                                                                                                                                                      |      |     |           |
|                                                                                                                                                                                                                                                                                                               | Current Comment Status: <a href="#">Comment Closed</a>                                                                                                                                                                                                                                                                                                                                                         |      |     |           |
| 1929415                                                                                                                                                                                                                                                                                                       | Civil                                                                                                                                                                                                                                                                                                                                                                                                          | n/a' | 6-2 | n/a       |
| Can the berm be measured from where it intersects the levee slope? It would save Right of Way. Additional Right of Way will be required for longitudinal drainage. This could be substantial.                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                |      |     |           |
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129). Submitted On: 29-May-08                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                |      |     |           |
| 1-0                                                                                                                                                                                                                                                                                                           | Evaluation Concurred<br>No, because this is not how the geotechnical engineer designed his section. His design for the length of the berm assumed it starts as we explained in section 6.0 of the report. If we measure it as you suggest, than the berm would be too short. Otherwise, we agree it would save R/W.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08 |      |     |           |
| 1-1                                                                                                                                                                                                                                                                                                           | Backcheck Recommendation Close Comment<br>OK<br><br>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08                                                                                                                                                                                                                                                                      |      |     |           |
|                                                                                                                                                                                                                                                                                                               | Current Comment Status: <a href="#">Comment Closed</a>                                                                                                                                                                                                                                                                                                                                                         |      |     |           |
| 1929420                                                                                                                                                                                                                                                                                                       | Civil                                                                                                                                                                                                                                                                                                                                                                                                          | n/a' | 6-3 | n/a       |
| There should be some discussion during this section as to where T-Walls are required and some consideration made as to how the T-Wall/Railroad Gate at Hwy 23 will be constructed across the existing bridge and tunnel structures, as well as how to construct while leaving the existing wall/gate in-place |                                                                                                                                                                                                                                                                                                                                                                                                                |      |     |           |
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129). Submitted On: 29-May-08                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                |      |     |           |
| 1-0                                                                                                                                                                                                                                                                                                           | Evaluation Concurred<br>We will discuss this.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08                                                                                                                                                                                                                                                                       |      |     |           |
| 1-1                                                                                                                                                                                                                                                                                                           | Backcheck Recommendation Close Comment<br>OK<br><br>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08                                                                                                                                                                                                                                                                      |      |     |           |
|                                                                                                                                                                                                                                                                                                               | Current Comment Status: <a href="#">Comment Closed</a>                                                                                                                                                                                                                                                                                                                                                         |      |     |           |
| 1929425                                                                                                                                                                                                                                                                                                       | Civil                                                                                                                                                                                                                                                                                                                                                                                                          | n/a' | 6-3 | 3rd. para |
| , the Public utilities may not design or pay for relocations. Utility cost should be included in the cost estimate                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                |      |     |           |

Submitted By: [Silas Cunningham](#) (504-468-6129). Submitted On: 29-May-08

**1-0 Evaluation Concurred**

Per the SOW, it is the COE's responsibility to determine which utilities are to be relocated. We will include cost estimates in the next submittal after we receive this information.

Submitted By: [Scott Chehardy](#) (504-466-5667) Submitted On: 06-Jun-08

**1-1 Backcheck Recommendation Close Comment**

OK

Submitted By: [Silas Cunningham](#) (504-468-6129) Submitted On: 10-Jun-08

Current Comment Status: **Comment Closed**

1929431

Civil

n/a'

6-5

n/a

At the bottom of the page a reference to sheet C-301-R (typical section) would be helpful in the description of the design section.

Submitted By: [Silas Cunningham](#) (504-468-6129). Submitted On: 29-May-08

**1-0 Evaluation Concurred**

Ok.

Submitted By: [Scott Chehardy](#) (504-466-5667) Submitted On: 06-Jun-08

**1-1 Backcheck Recommendation Close Comment**

None

Submitted By: [Silas Cunningham](#) (504-468-6129) Submitted On: 10-Jun-08

Current Comment Status: **Comment Closed**

1929438

Civil

n/a'

6-8

n/a

A reference to sheet C-301-T (typical section) would be helpful in the description of the design section.

Submitted By: [Silas Cunningham](#) (504-468-6129). Submitted On: 29-May-08

**1-0 Evaluation Concurred**

Ok.

Submitted By: [Scott Chehardy](#) (504-466-5667) Submitted On: 06-Jun-08

**1-1 Backcheck Recommendation Close Comment**

None

Submitted By: [Silas Cunningham](#) (504-468-6129) Submitted On: 10-Jun-08

Current Comment Status: **Comment Closed**

1929441

Structural

n/a'

6-8

n/a

Load cases state 100k barge impact, 2 sentences down it states "impact loading from barge collision not a load case". This appears to conflict. This also appears on page 6-9.

Submitted By: [Silas Cunningham](#) (504-468-6129). Submitted On: 29-May-08

**1-0 Evaluation Non-concurred**

Barge impact deemed appropriate for the top of wall condition because 4 to 5 feet of water depth available. While not required the application is conservative.

|                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                          |      |      |            |  |         |            |      |      |            |
|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------------|--|---------|------------|------|------|------------|
|                                                                                                        | Submitted By: <a href="#">Robert Yokum</a> ((985) 674-1846) Submitted On: 07-Jun-08                                                                                                                                                                                                                                                                                                      |      |      |            |  |         |            |      |      |            |
| 1-1                                                                                                    | <p>Backcheck Recommendation <b>Close Comment</b><br/>none</p> <p>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08</p>                                                                                                                                                                                                                               |      |      |            |  |         |            |      |      |            |
|                                                                                                        | Current Comment Status: <b>Comment Closed</b>                                                                                                                                                                                                                                                                                                                                            |      |      |            |  |         |            |      |      |            |
| 1929447                                                                                                | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">1929447</td><td style="width: 20%;">Structural</td><td style="width: 20%;">n/a'</td><td style="width: 20%;">6-8</td><td style="width: 20%;">n/a</td></tr> </table>                                                                                                                       |      |      |            |  | 1929447 | Structural | n/a' | 6-8  | n/a        |
| 1929447                                                                                                | Structural                                                                                                                                                                                                                                                                                                                                                                               | n/a' | 6-8  | n/a        |  |         |            |      |      |            |
| last paragraph, should call out type 2 and type 1 T-Wall for each reach.                               |                                                                                                                                                                                                                                                                                                                                                                                          |      |      |            |  |         |            |      |      |            |
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 29-May-08                  |                                                                                                                                                                                                                                                                                                                                                                                          |      |      |            |  |         |            |      |      |            |
| 1-0                                                                                                    | <p>Evaluation <b>Concurred</b><br/>Ok</p> <p>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08</p>                                                                                                                                                                                                                                                     |      |      |            |  |         |            |      |      |            |
| 1-1                                                                                                    | <p>Backcheck Recommendation <b>Close Comment</b><br/>none</p> <p>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08</p>                                                                                                                                                                                                                               |      |      |            |  |         |            |      |      |            |
|                                                                                                        | Current Comment Status: <b>Comment Closed</b>                                                                                                                                                                                                                                                                                                                                            |      |      |            |  |         |            |      |      |            |
| 1929450                                                                                                | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">1929450</td><td style="width: 20%;">Structural</td><td style="width: 20%;">n/a'</td><td style="width: 20%;">6-9</td><td style="width: 20%;">1st. para.</td></tr> </table>                                                                                                                |      |      |            |  | 1929450 | Structural | n/a' | 6-9  | 1st. para. |
| 1929450                                                                                                | Structural                                                                                                                                                                                                                                                                                                                                                                               | n/a' | 6-9  | 1st. para. |  |         |            |      |      |            |
| Is extrapolating from a 70ft. or 105ft. boring to a pile length of 146ft reasonable?                   |                                                                                                                                                                                                                                                                                                                                                                                          |      |      |            |  |         |            |      |      |            |
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 29-May-08                  |                                                                                                                                                                                                                                                                                                                                                                                          |      |      |            |  |         |            |      |      |            |
| 1-0                                                                                                    | <p>Evaluation Potential Cost Impact <b>Concurred</b><br/>No it isn't, but given the magnitude of the unbalanced forces involved, this was the only way to come up with any kind of reasonable foundation design. The given pile capacities at the shallow depth didn't leave much choice.</p> <p>Submitted By: <a href="#">Robert Yokum</a> ((985) 674-1846) Submitted On: 07-Jun-08</p> |      |      |            |  |         |            |      |      |            |
| 1-1                                                                                                    | <p>Backcheck Recommendation <b>Close Comment</b><br/>none</p> <p>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08</p>                                                                                                                                                                                                                               |      |      |            |  |         |            |      |      |            |
|                                                                                                        | Current Comment Status: <b>Comment Closed</b>                                                                                                                                                                                                                                                                                                                                            |      |      |            |  |         |            |      |      |            |
| 1929455                                                                                                | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">1929455</td><td style="width: 20%;">Structural</td><td style="width: 20%;">n/a'</td><td style="width: 20%;">6-11</td><td style="width: 20%;">1st. para.</td></tr> </table>                                                                                                               |      |      |            |  | 1929455 | Structural | n/a' | 6-11 | 1st. para. |
| 1929455                                                                                                | Structural                                                                                                                                                                                                                                                                                                                                                                               | n/a' | 6-11 | 1st. para. |  |         |            |      |      |            |
| Will all utilities have to be removed to drive sheet piles, install sleeve and then reinstall utility? |                                                                                                                                                                                                                                                                                                                                                                                          |      |      |            |  |         |            |      |      |            |
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 29-May-08                  |                                                                                                                                                                                                                                                                                                                                                                                          |      |      |            |  |         |            |      |      |            |
| 1-0                                                                                                    | <p>Evaluation <b>Concurred</b><br/>Complete removal isn't typically required but, in general, sleeves will be required..</p> <p>Submitted By: <a href="#">Robert Yokum</a> ((985) 674-1846) Submitted On: 07-Jun-08</p>                                                                                                                                                                  |      |      |            |  |         |            |      |      |            |
| 1-1                                                                                                    | <p>Backcheck Recommendation <b>Close Comment</b><br/>This is a construction procedure that will have to be discussed.</p> <p>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08</p>                                                                                                                                                                   |      |      |            |  |         |            |      |      |            |
|                                                                                                        | Current Comment Status: <b>Comment Closed</b>                                                                                                                                                                                                                                                                                                                                            |      |      |            |  |         |            |      |      |            |

|                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                 |      |     |            |
|------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|------------|
| 1929459                                                                                                                            | Civil                                                                                                                                                                                                                                                                                                                                                                                           | n/a' | 7-1 | para. 7.0  |
| additional right of way for a ditch would appear to be required.                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                 |      |     |            |
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129). Submitted On: 29-May-08                                             |                                                                                                                                                                                                                                                                                                                                                                                                 |      |     |            |
| 1-0                                                                                                                                | <b>Evaluation Concurred</b><br>The COE dictated that the R/W line would be 15-feet from the toe of the levee berm. This was given data in the SOW. If we are directed to make this change by the COE then we can do so.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08                                                                              |      |     |            |
| 1-1                                                                                                                                | <b>Backcheck Recommendation Close Comment</b><br>Drainage along the levee will be required<br><br>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08                                                                                                                                                                                                         |      |     |            |
|                                                                                                                                    | <b>Current Comment Status:</b> <a href="#">Comment Closed</a>                                                                                                                                                                                                                                                                                                                                   |      |     |            |
| 1929470                                                                                                                            | Structural                                                                                                                                                                                                                                                                                                                                                                                      | n/a' | 7-2 | last para. |
| can batter piles be driven that extend past the right of way? Batter piles beneath the bridge structures could be a major problem. |                                                                                                                                                                                                                                                                                                                                                                                                 |      |     |            |
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129). Submitted On: 29-May-08                                             |                                                                                                                                                                                                                                                                                                                                                                                                 |      |     |            |
| 1-0                                                                                                                                | <b>Evaluation Concurred</b><br>Yes. An underground servitude will be required. At the bridge location, detailed foundation information would be required from LDOTD to see what kind of new foundations can be installed. Further coordination and special designs would be required in these areas.<br><br>Submitted By: <a href="#">Robert Yokum</a> ((985) 674-1846) Submitted On: 07-Jun-08 |      |     |            |
| 1-1                                                                                                                                | <b>Backcheck Recommendation Close Comment</b><br>OK<br><br>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08                                                                                                                                                                                                                                                |      |     |            |
|                                                                                                                                    | <b>Current Comment Status:</b> <a href="#">Comment Closed</a>                                                                                                                                                                                                                                                                                                                                   |      |     |            |
| 1929474                                                                                                                            | Civil                                                                                                                                                                                                                                                                                                                                                                                           | n/a' | 9-1 | n/a        |
| Item 2 seems low for the number of properties involved.                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                 |      |     |            |
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129). Submitted On: 29-May-08                                             |                                                                                                                                                                                                                                                                                                                                                                                                 |      |     |            |
| 1-0                                                                                                                                | <b>Evaluation Concurred</b><br>It does not include demolition of housing/businesses/apartment complexes. We will address these with the next submittal.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08                                                                                                                                              |      |     |            |
| 1-1                                                                                                                                | <b>Backcheck Recommendation Close Comment</b><br>None<br><br>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08                                                                                                                                                                                                                                              |      |     |            |
|                                                                                                                                    | <b>Current Comment Status:</b> <a href="#">Comment Closed</a>                                                                                                                                                                                                                                                                                                                                   |      |     |            |
| 1929480                                                                                                                            | Civil                                                                                                                                                                                                                                                                                                                                                                                           | n/a' | 9-2 | n/a        |
| Item 7 should be per each. Two types of piles need to be load tested.                                                              |                                                                                                                                                                                                                                                                                                                                                                                                 |      |     |            |

Submitted By: [Silas Cunningham](#) (504-468-6129). Submitted On: 29-May-08

|                                               |                                                                                                                                                                    |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0                                           | Evaluation Concurred<br>The lump sum included both types of pile tests.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08 |
| 1-1                                           | Backcheck Recommendation Close Comment<br>None<br><br>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08                        |
| Current Comment Status: <b>Comment Closed</b> |                                                                                                                                                                    |

1929487 Civil n/a' 9-2 n/a

Item 14 seems high.

Submitted By: [Silas Cunningham](#) (504-468-6129). Submitted On: 29-May-08

|                                               |                                                                                                                                                    |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0                                           | Evaluation Concurred<br>Agreed. We will look into this.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08 |
| 1-1                                           | Backcheck Recommendation Close Comment<br>None<br><br>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08        |
| Current Comment Status: <b>Comment Closed</b> |                                                                                                                                                    |

1929491 Civil n/a' 9-2 n/a

Item 16 Item should be install and remove temporary access road, unit price seems low.

Submitted By: [Silas Cunningham](#) (504-468-6129). Submitted On: 29-May-08

|                                               |                                                                                                                                             |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0                                           | Evaluation Concurred<br>We will investigate.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08     |
| 1-1                                           | Backcheck Recommendation Close Comment<br>None<br><br>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08 |
| Current Comment Status: <b>Comment Closed</b> |                                                                                                                                             |

1929496 Civil n/a' 9-3 & 9-4 n/a

Same comments as 9-1 and 9-2

Submitted By: [Silas Cunningham](#) (504-468-6129). Submitted On: 29-May-08

|     |                                                                                                                                                                 |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0 | Evaluation Concurred<br>We will apply the resolutions to these also.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08 |
| 1-1 | Backcheck Recommendation Close Comment<br>None                                                                                                                  |

|                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                 |     |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------|-----|--|
|                                                                                                                                                   | Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08                                                                                                                                                                                                                                                                                                                                                              |      |                 |     |  |
|                                                                                                                                                   | Current Comment Status: <a href="#">Comment Closed</a>                                                                                                                                                                                                                                                                                                                                                                                             |      |                 |     |  |
| 1929501                                                                                                                                           | Civil                                                                                                                                                                                                                                                                                                                                                                                                                                              | n/a' | 9-3             | n/a |  |
| Explain how quantity for item 4 excavation is higher for the reinforced alternative than the unreinforced.                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                 |     |  |
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 29-May-08                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                 |     |  |
| 1-0                                                                                                                                               | <b>Evaluation Concurred</b><br>Reinforced alternative is higher because we are cutting down the existing levee. Look at C-301-R versus C-301-U for a comparison.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08                                                                                                                                                                                        |      |                 |     |  |
| 1-1                                                                                                                                               | <b>Backcheck Recommendation Close Comment</b><br>None<br><br>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08                                                                                                                                                                                                                                                                                                 |      |                 |     |  |
|                                                                                                                                                   | <a href="#">Current Comment Status: Comment Closed</a>                                                                                                                                                                                                                                                                                                                                                                                             |      |                 |     |  |
| 1929510                                                                                                                                           | Civil                                                                                                                                                                                                                                                                                                                                                                                                                                              | n/a' | Appex. A        | n/a |  |
| Pile load capacities chart a. At top is el. -62.5 an elevation or distance? b. Where is natural ground? c. Standardize symbols with other charts. |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                 |     |  |
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 29-May-08                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                 |     |  |
| 1-0                                                                                                                                               | <b>Evaluation Concurred</b><br>What you are looking at was just supplemental info submitted for the COE to see. The full App A Geotech report was submitted under separate cover to the COE. Ultimately we expect it will be its own volume. EL means elevation, thus -62.5 is an elevation. Along the vertical axis it states Ground Surface= EL -5.2.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08 |      |                 |     |  |
| 1-1                                                                                                                                               | <b>Backcheck Recommendation Close Comment</b><br>None<br><br>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08                                                                                                                                                                                                                                                                                                 |      |                 |     |  |
|                                                                                                                                                   | <a href="#">Current Comment Status: Comment Closed</a>                                                                                                                                                                                                                                                                                                                                                                                             |      |                 |     |  |
| 1929518                                                                                                                                           | Civil                                                                                                                                                                                                                                                                                                                                                                                                                                              | n/a' | Drawing V-101-U | n/a |  |
| Confirm right of way required for drainage.                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                 |     |  |
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 29-May-08                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                 |     |  |
| 1-0                                                                                                                                               | <b>Evaluation Concurred</b><br>The right of way was dictated by the COE in the SOW. It meets their specified criteria.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 10-Jun-08                                                                                                                                                                                                                                  |      |                 |     |  |
| 1-1                                                                                                                                               | <b>Backcheck Recommendation Close Comment</b><br>None<br><br>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08                                                                                                                                                                                                                                                                                                 |      |                 |     |  |
|                                                                                                                                                   | <a href="#">Current Comment Status: Comment Closed</a>                                                                                                                                                                                                                                                                                                                                                                                             |      |                 |     |  |
| 1929525                                                                                                                                           | Civil                                                                                                                                                                                                                                                                                                                                                                                                                                              | n/a' | Drawing C-101-U | n/a |  |

Is it standard to have the plan and section separated? Show boring locations.

Submitted By: [Silas Cunningham](#) (504-468-6129). Submitted On: 29-May-08

|                                               |                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0                                           | Evaluation Non-concurred<br>Do not understand the question about plan and section being separated. Is it necessary to show boring locations on the plans for a study? The approximate station range is provided on the logs to provide a general idea.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08 |
| 1-1                                           | Backcheck Recommendation Close Comment<br>None<br><br>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08                                                                                                                                                                                                       |
| Current Comment Status: <b>Comment Closed</b> |                                                                                                                                                                                                                                                                                                                                                   |

1929531 Civil n/a' Drawing C-301-U n/a

Show drainage. Stationing is not continuous. What happens between stations shown? Show water surface elevation.

Submitted By: [Silas Cunningham](#) (504-468-6129). Submitted On: 29-May-08

|                                               |                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0                                           | Evaluation Non-concurred<br>a) Refer to other comments regarding drainage. b) Stationing is as we intended it. Please explain further. c) The gaps are where the existing pump stations are located. d) Not sure if this info was provided to us with the COE survey info. If it is available we will show it.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08 |
| 1-1                                           | Backcheck Recommendation Close Comment<br>None<br><br>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08                                                                                                                                                                                                                                                               |
| Current Comment Status: <b>Comment Closed</b> |                                                                                                                                                                                                                                                                                                                                                                                                           |

1929534 Civil n/a' Drawing S-101-T n/a

Confirm 9" embedment at centerline.. of 24" diameter pile is sufficient? May want to increase. There may be a conflict between driving sheet pile and the 24" diameter piles.

Submitted By: [Silas Cunningham](#) (504-468-6129). Submitted On: 29-May-08

|                                               |                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0                                           | Evaluation Concurred<br>The 9" imbedment has been used in the past. Will look further at the spacing between the piles and the sheetpile to assure at least 1-foot +/- of clearance.<br><br>Submitted By: <a href="#">Robert Yokum</a> ((985) 674-1846) Submitted On: 07-Jun-08 |
| 1-1                                           | Backcheck Recommendation Close Comment<br>None<br><br>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08                                                                                                                                     |
| Current Comment Status: <b>Comment Closed</b> |                                                                                                                                                                                                                                                                                 |

1929543 Civil n/a' Drawing S-102-T n/a

Why are the top of slab for a type 1 & 2 different? Conflict in driving piles.

|                                                                                                                           |                                                                                                                                                                                                                                                                                         |      |                 |     |
|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------|-----|
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129). Submitted On: 29-May-08                                    |                                                                                                                                                                                                                                                                                         |      |                 |     |
| 1-0                                                                                                                       | <b>Evaluation Concurred</b><br>Different soil conditions resulted in different geotechnical recommendations. The height was determined by the geotechnical engineer as part of his analysis.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08 |      |                 |     |
| 1-1                                                                                                                       | Backcheck Recommendation <b>Close Comment</b><br>None<br><br>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08                                                                                                                                      |      |                 |     |
|                                                                                                                           | Current Comment Status: <b>Comment Closed</b>                                                                                                                                                                                                                                           |      |                 |     |
| 1929551                                                                                                                   | Civil                                                                                                                                                                                                                                                                                   | n/a' | Drawing S-103-T | n/a |
| Confirm with the railroad the minimum horizontal clearance and show on drawing.                                           |                                                                                                                                                                                                                                                                                         |      |                 |     |
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129). Submitted On: 29-May-08                                    |                                                                                                                                                                                                                                                                                         |      |                 |     |
| 1-0                                                                                                                       | <b>Evaluation Concurred</b><br>Minimum clearance is 8.5 feet from the centerline. Will revise opening to provide at least 9 feet of clearance.<br><br>Submitted By: <a href="#">Robert Yokum</a> ((985) 674-1846) Submitted On: 07-Jun-08                                               |      |                 |     |
| 1-1                                                                                                                       | Backcheck Recommendation <b>Close Comment</b><br>None<br><br>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08                                                                                                                                      |      |                 |     |
|                                                                                                                           | Current Comment Status: <b>Comment Closed</b>                                                                                                                                                                                                                                           |      |                 |     |
| 1929559                                                                                                                   | Civil                                                                                                                                                                                                                                                                                   | n/a' | Appex. D        | n/a |
| Round up to nearest 100 or 1000 on all quantities. The mobilization figure of 5% does not appear correct.                 |                                                                                                                                                                                                                                                                                         |      |                 |     |
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129). Submitted On: 29-May-08                                    |                                                                                                                                                                                                                                                                                         |      |                 |     |
| 1-0                                                                                                                       | <b>Evaluation Concurred</b><br>a) we will round quantities as suggested. b) The 5% calculates properly when I check it.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08                                                                      |      |                 |     |
| 1-1                                                                                                                       | Backcheck Recommendation <b>Close Comment</b><br>None<br><br>Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129) Submitted On: 10-Jun-08                                                                                                                                      |      |                 |     |
|                                                                                                                           | Current Comment Status: <b>Comment Closed</b>                                                                                                                                                                                                                                           |      |                 |     |
| 1930800                                                                                                                   | Civil                                                                                                                                                                                                                                                                                   | n/a' | Sheet C-301-U   | n/a |
| <b>[This item is flagged as a critical issue.]</b>                                                                        |                                                                                                                                                                                                                                                                                         |      |                 |     |
| Sheet C-102-U shows a T-wall section under the Woodland Hwy Bridge. Typical section on sheet C-301-U should reflect this. |                                                                                                                                                                                                                                                                                         |      |                 |     |
| Submitted By: <a href="#">Frank Liang</a> (504-438-6129). Submitted On: 29-May-08                                         |                                                                                                                                                                                                                                                                                         |      |                 |     |
| 1-0                                                                                                                       | <b>Evaluation Concurred</b><br>We will address this in some fashion for the 95% submittal.                                                                                                                                                                                              |      |                 |     |

|         |                                                                                                                                                                                                 |      |               |     |  |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------|-----|--|
|         | Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08                                                                                                             |      |               |     |  |
| 1-1     | <p>Backcheck Recommendation <b>Close Comment</b><br/>           We'll verify with the 95% submittal</p> <p>Submitted By: <a href="#">Frank Liang</a> (504-438-6129) Submitted On: 10-Jun-08</p> |      |               |     |  |
|         | Current Comment Status: <b>Comment Closed</b>                                                                                                                                                   |      |               |     |  |
| 1930801 | Civil                                                                                                                                                                                           | n/a' | Sheet C-301-R | n/a |  |

[This item is flagged as a critical issue.]

Sheet C-102-R shows a T-wall section under the Woodland Hwy Bridge. Typical section on sheet C-301-R should reflect this. Also levee section at N.O. S&WB Pump Station 13 ends at Sta. 870+87.76. Typical section should match this station

Submitted By: [Frank Liang](#) (504-438-6129) Submitted On: 29-May-08

|     |                                                                                                                                                                                                       |  |  |  |  |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
|     | Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08                                                                                                                   |  |  |  |  |
| 1-0 | <p>Evaluation <b>Concurred</b><br/>           We will address this in some fashion for the 95% submittal.</p> <p>Submitted By: <a href="#">Frank Liang</a> (504-438-6129) Submitted On: 10-Jun-08</p> |  |  |  |  |
| 1-1 | <p>Backcheck Recommendation <b>Close Comment</b><br/>           We'll verify with the 95% submittal</p> <p>Submitted By: <a href="#">Frank Liang</a> (504-438-6129) Submitted On: 10-Jun-08</p>       |  |  |  |  |
|     | Current Comment Status: <b>Comment Closed</b>                                                                                                                                                         |  |  |  |  |

1930804 Civil n/a' Sheet C-102-T n/a

Elevation of bridge should be checked to make sure that there will not be any interference with the bridge when driving the pilings. Also bridge bents should be located to make sure that they will not be in conflict with the battered piles of the T-wall section.

Submitted By: [Frank Liang](#) (504-438-6129) Submitted On: 29-May-08

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |  |  |  |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
|     | Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08                                                                                                                                                                                                                                                                                                                                                                        |  |  |  |  |
| 1-0 | <p>Evaluation <b>Non-concurred</b><br/>           This is a study. The COE provided the only survey. The piles are approximately 150-feet long thus there will be conflicts to deal with. Special design considerations will need to be considered to address close proximity to the bridge bents and overhead bridge, but this should be reserved for design.</p> <p>Submitted By: <a href="#">Frank Liang</a> (504-438-6129) Submitted On: 10-Jun-08</p> |  |  |  |  |
| 1-1 | <p>Backcheck Recommendation <b>Close Comment</b><br/>           none</p> <p>Submitted By: <a href="#">Frank Liang</a> (504-438-6129) Submitted On: 10-Jun-08</p>                                                                                                                                                                                                                                                                                           |  |  |  |  |
|     | Current Comment Status: <b>Comment Closed</b>                                                                                                                                                                                                                                                                                                                                                                                                              |  |  |  |  |

1930808 Civil Cost Estimate Quantity Calculation n/a n/a

[This item is flagged as a critical issue.]

Check factor (40.5 lf/ft piles for H-pile and 108.8 lf/ft piles for pipe pile) used to determine the total lenght of pile required. These factors seem high.

Submitted By: [Frank Liang](#) (504-438-6129) Submitted On: 29-May-08

|     |                                                                                  |  |  |  |  |
|-----|----------------------------------------------------------------------------------|--|--|--|--|
|     | Submitted By: <a href="#">Frank Liang</a> (504-438-6129) Submitted On: 29-May-08 |  |  |  |  |
| 1-0 | <p>Evaluation <b>Concurred</b></p>                                               |  |  |  |  |

|                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                         |                                    |     |     |     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-----|-----|-----|
|                                                                                                                                                                                                                                                                 | Will review as suggested. In a 60-foot monolith there are 27 piles, 90 feet long. $27 \times 90 / 60 = 40.5$ . Similar calculation done for the, much longer, pipe piles. Factors should be slightly higher to account for pile batters |                                    |     |     |     |
|                                                                                                                                                                                                                                                                 | Submitted By: <a href="#">Robert Yokum</a> ((985) 674-1846) Submitted On: 07-Jun-08                                                                                                                                                     |                                    |     |     |     |
| 1-1                                                                                                                                                                                                                                                             | <b>Backcheck Recommendation Close Comment</b><br>We'll verify with the 95% submittal                                                                                                                                                    |                                    |     |     |     |
|                                                                                                                                                                                                                                                                 | Submitted By: <a href="#">Frank Liang</a> (504-438-6129) Submitted On: 10-Jun-08                                                                                                                                                        |                                    |     |     |     |
|                                                                                                                                                                                                                                                                 | Current Comment Status: <a href="#">Comment Closed</a>                                                                                                                                                                                  |                                    |     |     |     |
| 1930810                                                                                                                                                                                                                                                         | Civil                                                                                                                                                                                                                                   | Cost Estimate Quantity Calculation | n/a | n/a | n/a |
| Like the H-pile and pipe piles, can only the top 10 feet of the cut off wall be painted since it is above the water table?                                                                                                                                      |                                                                                                                                                                                                                                         |                                    |     |     |     |
| Submitted By: <a href="#">Frank Liang</a> (504-438-6129). Submitted On: 29-May-08                                                                                                                                                                               |                                                                                                                                                                                                                                         |                                    |     |     |     |
| 1-0                                                                                                                                                                                                                                                             | <b>Evaluation Concurred</b><br>We will handle these the same as the sheet pile.                                                                                                                                                         |                                    |     |     |     |
|                                                                                                                                                                                                                                                                 | Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08                                                                                                                                                     |                                    |     |     |     |
| 1-1                                                                                                                                                                                                                                                             | <b>Backcheck Recommendation Close Comment</b><br>We'll verify with the 95% submittal                                                                                                                                                    |                                    |     |     |     |
|                                                                                                                                                                                                                                                                 | Submitted By: <a href="#">Frank Liang</a> (504-438-6129) Submitted On: 10-Jun-08                                                                                                                                                        |                                    |     |     |     |
|                                                                                                                                                                                                                                                                 | Current Comment Status: <a href="#">Comment Closed</a>                                                                                                                                                                                  |                                    |     |     |     |
| 1931527                                                                                                                                                                                                                                                         | Geotechnical                                                                                                                                                                                                                            | n/a'                               | n/a | n/a | n/a |
| Geotechnical ITR was performed for the 65% EAR submittal. Comments were included in Appendix G of the Geotechnical Report, which itself was an Appendix of the EAR 65% submittal. All comments were subsequently addressed. No further comments at this moment. |                                                                                                                                                                                                                                         |                                    |     |     |     |
| Submitted By: <a href="#">Bruce Khosrozadeh</a> (9046411834). Submitted On: 30-May-08                                                                                                                                                                           |                                                                                                                                                                                                                                         |                                    |     |     |     |
| 1-0                                                                                                                                                                                                                                                             | <b>Evaluation Concurred</b><br>ok                                                                                                                                                                                                       |                                    |     |     |     |
|                                                                                                                                                                                                                                                                 | Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 06-Jun-08                                                                                                                                                     |                                    |     |     |     |
| 1-1                                                                                                                                                                                                                                                             | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.                                                                                                                                                                |                                    |     |     |     |
|                                                                                                                                                                                                                                                                 | Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 09-Jul-08                                                                                                                                                      |                                    |     |     |     |
|                                                                                                                                                                                                                                                                 | Current Comment Status: <a href="#">Comment Closed</a>                                                                                                                                                                                  |                                    |     |     |     |

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**65% USACE Comments**

## Comment Report: All Comments

Project: WBV-47.2, Algiers Lock to Hwy 23

Review: 65% EAR WBV-47.2

Displaying 72 comments for the criteria specified in this report.

2094 ms to run this page

| <u><a href="#">Id</a></u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <u><a href="#">Discipline</a></u>                                                                                                                                                                                               | <u><a href="#">DocType</a></u> | <u><a href="#">Spec</a></u> | <u><a href="#">Sheet</a></u> | <u><a href="#">Detail</a></u> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------|------------------------------|-------------------------------|
| 1922867                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Environmental                                                                                                                                                                                                                   | Technical Report               | n/a'                        | n/a                          | n/a                           |
| Status of National Environmental Policy Act (NEPA) Compliance: The subject work will be covered in the individual environmental report (IER) #12 entitled "Harvey and Algiers Canal Levee and Floodwalls, Jefferson, Orleans, and Plaquemines Parishes", which is scheduled to be completed 03 July 2008. In addition, the comprehensive environmental document (CED) will have been prepared and include the subject work from IER #12. The subject work is not currently compliance with NEPA. |                                                                                                                                                                                                                                 |                                |                             |                              |                               |
| Submitted By: <a href="#">Getrisc Coulson</a> (504-862-1095). Submitted On: 23-May-08                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                 |                                |                             |                              |                               |
| 1-0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Evaluation Concurred<br>no comment                                                                                                                                                                                              |                                |                             |                              |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 09-Jun-08                                                                                                                                             |                                |                             |                              |                               |
| 1-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Backcheck Recommendation Close Comment<br>Closed without comment.                                                                                                                                                               |                                |                             |                              |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Submitted By: <a href="#">Getrisc Coulson</a> (504-862-1095) Submitted On: 12-Jun-08                                                                                                                                            |                                |                             |                              |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Current Comment Status: <a href="#">Comment Closed</a>                                                                                                                                                                          |                                |                             |                              |                               |
| 1933968                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Structural                                                                                                                                                                                                                      | Engineering Appendix           | n/a'                        | n/a                          | n/a                           |
| (Document Reference: General)<br>Coordinating Discipline(s): Structural                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                 |                                |                             |                              |                               |
| There are three alternatives but add the one that says Sta. 770+00 to 792+00, 790+00 to 806+00, 880+00 to 924+00, 934+00 to 945+00 on the levee and the others on T-walls.                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                 |                                |                             |                              |                               |
| Submitted By: <a href="#">Gerard Giroir</a> (504-862-2701). Submitted On: 02-Jun-08                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                 |                                |                             |                              |                               |
| 1-0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Evaluation Non-concurred<br>I am confused by the wording of this comment, and do not understand what you are trying to say. Please clarify. I tried emailing the listed emailing address, but it was returned as undeliverable. |                                |                             |                              |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 09-Jun-08                                                                                                                                             |                                |                             |                              |                               |
| 1-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Backcheck Recommendation Open Comment<br>There are three alternatives-two alternatives of levees and one alternatives of t-wall. Try mix of levee and t-walls                                                                   |                                |                             |                              |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Submitted By: <a href="#">Gerard Giroir</a> (504-862-2701) Submitted On: 19-Jun-08                                                                                                                                              |                                |                             |                              |                               |
| 2-0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Evaluation Concurred<br>This was not part of the Scope of Work, however we have stated in the executive summary of this 65% submittal that we would explore a combination alternative for the 95% submittal.                    |                                |                             |                              |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 20-Jun-08                                                                                                                                             |                                |                             |                              |                               |
| 2-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Backcheck Recommendation Close Comment<br>Closed without comment.                                                                                                                                                               |                                |                             |                              |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Submitted By: <a href="#">Gerard Giroir</a> (504-862-2701) Submitted On: 07-Jul-08                                                                                                                                              |                                |                             |                              |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Current Comment Status: <a href="#">Comment Closed</a>                                                                                                                                                                          |                                |                             |                              |                               |
| 1933978                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Structural                                                                                                                                                                                                                      | Engineering                    | n/a'                        | n/a                          | n/a                           |

| Appendix                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |      |     |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------|-----|-----|
| (Document Reference: Pg. 5-2, Section 5.2)<br>Coordinating Discipline(s): Structural                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |      |     |     |
| In the reinforcing levee, it is like soil mixing? What can you do with soil mixing?                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |      |     |     |
| Submitted By: <a href="#">Gerard Giroir</a> (504-862-2701). Submitted On: 02-Jun-08                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |      |     |     |
| 1-0                                                                                                                                                                                                                                                            | <b>Evaluation Concurred</b><br>The levee reinforcement consists of geotextile. Soil mixing was not one of the alternatives to be analyzed per discussions with the COE.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08                                                                                                                                                                                                         |                      |      |     |     |
| 1-1                                                                                                                                                                                                                                                            | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Gerard Giroir</a> (504-862-2701) Submitted On: 19-Jun-08                                                                                                                                                                                                                                                                                                         |                      |      |     |     |
| Current Comment Status: <b>Comment Closed</b>                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |      |     |     |
| 1933984                                                                                                                                                                                                                                                        | Structural                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Engineering Appendix | n/a' | n/a | n/a |
| (Document Reference: Pg. 5-3, Section 5.3)<br>Coordinating Discipline(s): Structural                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |      |     |     |
| What is "barge barrier"? Is it El. 9 or El. 7 or ...?                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |      |     |     |
| Submitted By: <a href="#">Gerard Giroir</a> (504-862-2701). Submitted On: 02-Jun-08                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |      |     |     |
| 1-0                                                                                                                                                                                                                                                            | <b>Evaluation Concurred</b><br>The existing levee elevation according to the COE provided survey ranges from +8 to +9.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 09-Jun-08                                                                                                                                                                                                                                                          |                      |      |     |     |
| 1-1                                                                                                                                                                                                                                                            | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Gerard Giroir</a> (504-862-2701) Submitted On: 19-Jun-08                                                                                                                                                                                                                                                                                                         |                      |      |     |     |
| Current Comment Status: <b>Comment Closed</b>                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |      |     |     |
| 1933986                                                                                                                                                                                                                                                        | Structural                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Engineering Appendix | n/a' | n/a | n/a |
| (Document Reference: Pg. 6-2, Section 6.1)<br>Coordinating Discipline(s): Structural                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |      |     |     |
| It says the "geotechnical design criteria are discussed in full in the geotechnical report (Appendix A). For the 65% submittal, the geotechnical report was submittal separately so the review process could begin early". Can we see the geotechnical report? |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |      |     |     |
| Submitted By: <a href="#">Gerard Giroir</a> (504-862-2701). Submitted On: 02-Jun-08                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |      |     |     |
| 1-0                                                                                                                                                                                                                                                            | <b>Evaluation Concurred</b><br>Yes, you may see it. A PDF version of the report along with 3 hard copies were submitted to Ell Pilie. This would be the most convenient way to obtain a copy. The report is 9 files and 257 MB. This is presumably too large to attach here. We can mail you a CD if necessary or we can coordinate an ftp server location to download it from.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 09-Jun-08 |                      |      |     |     |

|     |                                                                                                                                                             |  |  |  |  |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| 1-1 | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Gerard Giroir</a> (504-862-2701) Submitted On: 19-Jun-08 |  |  |  |  |
|     | Current Comment Status: <b>Comment Closed</b>                                                                                                               |  |  |  |  |

|         |            |                      |      |     |     |
|---------|------------|----------------------|------|-----|-----|
| 1933989 | Structural | Engineering Appendix | n/a' | n/a | n/a |
|---------|------------|----------------------|------|-----|-----|

(Document Reference: Pg. 6-8, Section 6.3)

Coordinating Discipline(s): Structural

It says "Per the Scope of Work, the existing levee will serve as a barge barrier; thus, impact loading from barge collision was not included as a load case". But, App. C, pg. 2 and 3 shows impact of 100k. Delete?? Or see dwg. C-301-T.

Submitted By: [Gerard Giroir](#) (504-862-2701). Submitted On: 02-Jun-08

|     |                                                                                                                                                                                                                                                       |  |  |  |  |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| 1-0 | Evaluation Non-concurred<br>This was included only for load conditions with water at the top of the wall because the designer considered it a possibility.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08 |  |  |  |  |
| 1-1 | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Gerard Giroir</a> (504-862-2701) Submitted On: 19-Jun-08                                                                                           |  |  |  |  |
|     | Current Comment Status: <b>Comment Closed</b>                                                                                                                                                                                                         |  |  |  |  |

|         |            |                      |      |     |     |
|---------|------------|----------------------|------|-----|-----|
| 1933990 | Structural | Engineering Appendix | n/a' | n/a | n/a |
|---------|------------|----------------------|------|-----|-----|

(Document Reference: Pg. 9-1, Section 9.0)

Coordinating Discipline(s): Structural

Add the right of way costs to each one (9.1, 9.2 and 9.3) so we can come with the total.

Submitted By: [Gerard Giroir](#) (504-862-2701). Submitted On: 02-Jun-08

|     |                                                                                                                                                             |  |  |  |  |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| 1-0 | Evaluation Concurred<br>we will do this for the next submittal.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 09-Jun-08  |  |  |  |  |
| 1-1 | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Gerard Giroir</a> (504-862-2701) Submitted On: 19-Jun-08 |  |  |  |  |
|     | Current Comment Status: <b>Comment Closed</b>                                                                                                               |  |  |  |  |

|         |            |                      |      |     |     |
|---------|------------|----------------------|------|-----|-----|
| 1933992 | Structural | Engineering Appendix | n/a' | n/a | n/a |
|---------|------------|----------------------|------|-----|-----|

(Document Reference: APPENDIX A, Pg. 2 thru 4)

Coordinating Discipline(s): Structural

Are the pile loading with FOS=2 or FOS=1 or others?

Submitted By: [Gerard Giroir](#) (504-862-2701). Submitted On: 02-Jun-08

|     |                      |
|-----|----------------------|
| 1-0 | Evaluation Concurred |
|-----|----------------------|

|                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                     | If the curves say ultimate or total capacity, then that is what it is; no safety factors (FS = 1.0). If the curves state "Allowable", then the corresponding safety factors for either the Q-case or the S-case are incorporated. Basically, FS = 1.5 for S case with or without load test; for the Q-case, FS =3 for no load test case, and FS =2 if a load test is performed. A discussion is provided in the geotech report. |
| Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08 |                                                                                                                                                                                                                                                                                                                                                                                                                                 |

|                                        |                                                                                                                                                             |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1-1</b>                             | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Gerard Giroir</a> (504-862-2701) Submitted On: 19-Jun-08 |
| Current Comment Status: Comment Closed |                                                                                                                                                             |

|         |            |                      |      |     |     |
|---------|------------|----------------------|------|-----|-----|
| 1933994 | Structural | Engineering Appendix | n/a' | n/a | n/a |
|---------|------------|----------------------|------|-----|-----|

(Document Reference: APPENDIX A)  
Coordinating Discipline(s): Structural

Include the soil parameters with Q-Case and S-Case of cohesion vs. depth at least.

Submitted By: [Gerard Giroir](#) (504-862-2701) Submitted On: 02-Jun-08

|                                        |                                                                                                                                                                                                                                                                          |  |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>1-0</b>                             | Evaluation Concurred<br>Soil parameters for both Q-case and S-case can be found in the input/output info included in Appendix F (pile capacities) of the geotechnical report.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08 |  |
| <b>1-1</b>                             | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Gerard Giroir</a> (504-862-2701) Submitted On: 19-Jun-08                                                                                                              |  |
| Current Comment Status: Comment Closed |                                                                                                                                                                                                                                                                          |  |

|         |            |                      |      |     |     |
|---------|------------|----------------------|------|-----|-----|
| 1933998 | Structural | Engineering Appendix | n/a' | n/a | n/a |
|---------|------------|----------------------|------|-----|-----|

(Document Reference: APPENDIX B)  
Coordinating Discipline(s): Structural

On the drawing, it says "SUBMITTAL BY: HARTMAN ENGINEER. INC." It should be an engineer not a company.

Submitted By: [Gerard Giroir](#) (504-862-2701) Submitted On: 02-Jun-08

|                                        |                                                                                                                                                                                                                                                                                                                                                                |  |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>1-0</b>                             | Evaluation Check and Resolve<br>We assumed the company was submitting it. The box already lists the design Engineer and the Engineer who checked the plans. Should the "submittal by" Engineer be the Engineer who designed it, checked it, or some other Engineer?<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 09-Jun-08 |  |
| <b>1-1</b>                             | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Gerard Giroir</a> (504-862-2701) Submitted On: 19-Jun-08                                                                                                                                                                                                    |  |
| Current Comment Status: Comment Closed |                                                                                                                                                                                                                                                                                                                                                                |  |

|         |            |                      |      |     |     |
|---------|------------|----------------------|------|-----|-----|
| 1934001 | Structural | Engineering Appendix | n/a' | n/a | n/a |
|---------|------------|----------------------|------|-----|-----|

(Document Reference: APPENDIX B, Dwg. C-105-T)  
Coordinating Discipline(s): Structural

The railroad monolith should have "Structural Superiority" (2 feet).

Submitted By: [Gerard Giroir](#) (504-862-2701). Submitted On: 02-Jun-08

|                                               |                                                                                                                                                                                         |                      |      |     |     |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------|-----|-----|
| 1-0                                           | Evaluation <b>Concurred</b><br>we agree and will make the adjustment for the next submittal.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08 |                      |      |     |     |
| 1-1                                           | Backcheck Recommendation <b>Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Gerard Giroir</a> (504-862-2701) Submitted On: 19-Jun-08                      |                      |      |     |     |
| Current Comment Status: <b>Comment Closed</b> |                                                                                                                                                                                         |                      |      |     |     |
| 1934018                                       | Structural                                                                                                                                                                              | Engineering Appendix | n/a' | n/a | n/a |

(Document Reference: APPENDIX B, Dwg. C-301-T)

Coordinating Discipline(s): Structural

Why add fill? Remove and replaced so that the fill is not needed. See attach 1. Then, the structure is lighter with height and drag. Also, In the typical section for the T-walls, consider vertical piles or 1:10 batter or 1:5 batter but should not be 1:2. Then, the T-walls are already in the right-of-way.

(Attachment: [200806WBV-47-01.pdf](#))

Submitted By: [Gerard Giroir](#) (504-862-2701). Submitted On: 02-Jun-08

|                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                      |      |     |     |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------|-----|-----|
| 1-0                                           | Evaluation <b>Non-concurred</b><br>a) it was required by the SOW that..."The existing levee shall remain at its existing grade and fill brought in to fill the void left between the floodside face of the wall and the landside slope of the levee." b) Batter piles at 1:10 or 1:5 will not work. The steep batters are necessary to reduce deflections.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08 |                      |      |     |     |
| 1-1                                           | Backcheck Recommendation <b>Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Gerard Giroir</a> (504-862-2701) Submitted On: 19-Jun-08                                                                                                                                                                                                                                                                                    |                      |      |     |     |
| Current Comment Status: <b>Comment Closed</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                      |      |     |     |
| 1934021                                       | Structural                                                                                                                                                                                                                                                                                                                                                                                                                                            | Engineering Appendix | n/a' | n/a | n/a |

(Document Reference: APPENDIX B, Dwg. S-101-T and S-102-T)

Coordinating Discipline(s): Structural

The sheet piles on deep monolith are 60 feet (or  $-7.5+0.75-60=-66.75$ ) and the sheet piles on the shallow monolith are 30 feet (or  $-5.0+0.75-30=-34.25$ ). There are 2.5 feet between the two bottom monoliths, El. -7.5 and El. -5. Why? We have to look at the geotechnical report.

Submitted By: [Gerard Giroir](#) (504-862-2701). Submitted On: 02-Jun-08

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0 | Evaluation <b>Concurred</b><br>Per the scope of work, the sheet tip shall be the deeper of the tip elevation required for seepage or 10 feet past the critical failure plane. In Reach 1 and 3 the critical failure plane is -62 thus the tip elevation should be -72. Our sheet pile should actually be 65-feet for this area in lieu of the 60-feet. In Reach 2, seepage governs, thus the elevation is based on the information in App D of the geotech report. The actual length of the sheet pile in this area will be 52-feet. |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|     |                                                                                                                                                             |  |  |  |  |  |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
|     | Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08                                                                         |  |  |  |  |  |
| 1-1 | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Gerard Giroir</a> (504-862-2701) Submitted On: 19-Jun-08 |  |  |  |  |  |
|     | Current Comment Status: <a href="#">Comment Closed</a>                                                                                                      |  |  |  |  |  |

|         |            |                      |      |     |     |
|---------|------------|----------------------|------|-----|-----|
| 1934022 | Structural | Engineering Appendix | n/a' | n/a | n/a |
|---------|------------|----------------------|------|-----|-----|

(Document Reference: APPENDIX D, Pg. 1 thru 3)

Coordinating Discipline(s): Structural

Add "Falsework" for railroad.

Submitted By: [Gerard Giroir](#) (504-862-2701). Submitted On: 02-Jun-08

|     |                                                                                                                                                             |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0 | Evaluation Concurred<br>We will show this.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 09-Jun-08                       |
| 1-1 | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Gerard Giroir</a> (504-862-2701) Submitted On: 19-Jun-08 |
|     | Current Comment Status: <a href="#">Comment Closed</a>                                                                                                      |

|         |            |                      |      |     |     |
|---------|------------|----------------------|------|-----|-----|
| 1934025 | Structural | Engineering Appendix | n/a' | n/a | n/a |
|---------|------------|----------------------|------|-----|-----|

(Document Reference: APPENDIX J, Pg. 7)

Coordinating Discipline(s): Structural

In the IMG79586\_2457.jpg, the aerial electric line is very close to the toe of the levee. See dwg. C-101-R. May be T-wall in this reach??

Submitted By: [Gerard Giroir](#) (504-862-2701). Submitted On: 02-Jun-08

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0 | Evaluation Concurred<br>It was our understanding that there were to be 3 alternatives. One for all unreinforced levee, one for all reinforced levee, and one for all t-wall. This proved impossible since we needed T-wall for tie-ins on the levees and at the bridges so we did so. Improvising to put T-wall in preferential locations did not meet the scope of the 3 alternatives. For the final report, we will address a 4th alternative that combines the various alternatives using levee where vacant land is available and using T-wall to avoid relocating massive transmission towers and hundreds of residences.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 09-Jun-08 |
| 1-1 | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Gerard Giroir</a> (504-862-2701) Submitted On: 19-Jun-08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|     | Current Comment Status: <a href="#">Comment Closed</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

|         |             |       |      |     |     |
|---------|-------------|-------|------|-----|-----|
| 1937082 | Real Estate | Other | n/a' | n/a | n/a |
|---------|-------------|-------|------|-----|-----|

Real Estate costs could be significant for either of the earthen levee options, there should probably be a cost estimate provided by RE-E. The T-Wall option may require the existing ROW to be required depending on whether or not our existing easement will allow a concrete floodwall.

Submitted By: [Louis Cheek](#) (504-862-1563). Submitted On: 03-Jun-08

|     |                                                                                                                                                                                                                                                                                                                                      |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0 | <b>Evaluation Check and Resolve</b><br>a) we will include real estate costs in the cost estimate. b) what is an RE-E? c) We assume determining whether the existing ROW needs to be re-acquired for a T-Wall option will be the COE's responsibility.                                                                                |
|     | Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 09-Jun-08                                                                                                                                                                                                                                                  |
| 1-1 | <b>Backcheck Recommendation Close Comment</b><br>a) Who will be preparing the real estate costs estimates? b) RE-E = Real Estate Appraising and Planning Branch. c) If it is determined that the existing ROW needs to be re-acquired for the construction of a floodwall, this could add considerable time and cost to the project. |
|     | Submitted By: <a href="#">Louis Cheek</a> (504-862-1563) Submitted On: 19-Jun-08                                                                                                                                                                                                                                                     |

Current Comment Status: **Comment Closed**

1937354

Cost Engineering

Cost Estimate

Appendix D of EAR

n/a

n/a

The bid schedule shows only one fabric strength for the geotextile option. It was determined that there were two fabric strengths which should be included in the cost estimate. Reach 1W and 3W are 1450 lbs and reach 2W is 250 lbs for the reinforcement levee alternative. 1450 lb strength should be an item and 250 lb strength should be another item.

Submitted By: [Steven Lowrie](#) (504-862-1302). Submitted On: 03-Jun-08

|     |                                                                                     |
|-----|-------------------------------------------------------------------------------------|
| 1-0 | <b>Evaluation Concurred</b><br>We will break these into two items.                  |
|     | Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 09-Jun-08 |
| 1-1 | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.            |
|     | Submitted By: <a href="#">Steven Lowrie</a> (504-862-1302) Submitted On: 12-Jun-08  |

Current Comment Status: **Comment Closed**

1937356

Cost Engineering

Cost Estimate

Appendix D of EAR

n/a

n/a

Recommend an additional item for splicing due to the length of the 24" dia. steel pipe pile.

Submitted By: [Steven Lowrie](#) (504-862-1302). Submitted On: 03-Jun-08

|     |                                                                                                                                               |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0 | <b>Evaluation Concurred</b><br>We will look into this though it does not seem necessary if the cost is included in the overall cost per foot. |
|     | Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08                                                           |
| 1-1 | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.                                                                      |
|     | Submitted By: <a href="#">Steven Lowrie</a> (504-862-1302) Submitted On: 12-Jun-08                                                            |

Current Comment Status: **Comment Closed**

1937361

Cost Engineering

Cost Estimate

Appendix D of EAR

n/a

n/a

Verify the price of the pipe pile because it appears to be low.

Submitted By: [Steven Lowrie](#) (504-862-1302). Submitted On: 03-Jun-08

|                                               |                                                                                                                                                             |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0                                           | Evaluation Concurred<br>We will check into this.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08                 |
| 1-1                                           | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Steven Lowrie</a> (504-862-1302) Submitted On: 12-Jun-08 |
| Current Comment Status: <b>Comment Closed</b> |                                                                                                                                                             |

1937364

Cost Engineering

Cost Estimate

Appendix D of EAR

n/a

n/a

Please confirm that only fertilizing and seeding is required. The unit price provided looks more like a price for fertilizing, seeding and mulching.

Submitted By: [Steven Lowrie](#) (504-862-1302). Submitted On: 03-Jun-08

|                                               |                                                                                                                                                             |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0                                           | Evaluation Concurred<br>We will verify the price used.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 09-Jun-08           |
| 1-1                                           | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Steven Lowrie</a> (504-862-1302) Submitted On: 12-Jun-08 |
| Current Comment Status: <b>Comment Closed</b> |                                                                                                                                                             |

1937365

Cost Engineering

Cost Estimate

Appendix D of EAR

n/a

n/a

Recommend that Item 9 is changed into separate items for h-piles, sheet pile, and pipe piles.

Submitted By: [Steven Lowrie](#) (504-862-1302). Submitted On: 03-Jun-08

|                                               |                                                                                                                                                             |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0                                           | Evaluation Concurred<br>we will separate.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 09-Jun-08                        |
| 1-1                                           | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Steven Lowrie</a> (504-862-1302) Submitted On: 12-Jun-08 |
| Current Comment Status: <b>Comment Closed</b> |                                                                                                                                                             |

1937369

Cost Engineering

Cost Estimate

Appendix D of EAR

n/a

n/a

Please explain what is being excavated on the unreinforced levee option. The quantity is almost as much as the reinforced levee option.

Submitted By: [Steven Lowrie](#) (504-862-1302). Submitted On: 03-Jun-08

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0 | Evaluation Concurred<br>The excavation and embankment quantities for the two levee options account for settlement and the fact that the project will be built in 4 lifts over an approximate 50-year time period. Each time a new lift is constructed, it was assumed that the top 6" of material had to be excavated for the entire length of the levee and berm in areas where it was being raised. This accounts for the majority of the |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | <p>excavation on both alternatives. The additional excavation on the reinforced levee alternative is removing a portion of the existing levee during the first lift.</p> <p>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08</p>                                                                                                                                                                                                                                                                                                                                                                                                     |
| 1-1 | <p><b>Backcheck Recommendation Open Comment</b><br/>Please clarify what the reasoning is behind your assumption of removing the top 6". Is it strictly for clearing of existing grass vegetation, which we typically see only 2-3 inches removed, or are you removing the top soil needed for grass growth issues and you intend to re-use on the new levee? Due to funding reasons, a separate bid schedule for each lift will be required and also needs to include the approximate year of construction for each lift for the reinforced levee and unreinforced levee.</p> <p>Submitted By: <a href="#">Steven Lowrie</a> (504-862-1302) Submitted On: 12-Jun-08</p> |

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2-0 | <p><b>Evaluation Concurred</b><br/>1) 6" was for grass and vegetation and this is the assumption we used and had no comments for previous COE studies/reports. We can use 3" at your suggestion. 2) We can break down the cost estimate into multiple projects. 3) The approximate year of construction was included in the geotech report lift schedules.</p> <p>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 20-Jun-08</p> |
| 2-1 | <p><b>Backcheck Recommendation Close Comment</b><br/>Corrections will be verified in 95% EAR</p> <p>Submitted By: <a href="#">Steven Lowrie</a> (504-862-1302) Submitted On: 02-Jul-08</p>                                                                                                                                                                                                                                                                |

Current Comment Status: **Comment Closed**

|                                                   |            |                  |      |     |     |
|---------------------------------------------------|------------|------------------|------|-----|-----|
| 1937533                                           | Hydraulics | Technical Report | n/a' | n/a | n/a |
| The 2057 hydraulic design floodside slope is 1:5. |            |                  |      |     |     |

Submitted By: [Keely Crowder](#) (504-862-2114) Submitted On: 03-Jun-08

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0 | <p><b>Evaluation Check and Resolve</b><br/>The SOW calls for 1:4, and it was designed as such.</p> <p>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 09-Jun-08</p>                                                                                                                                                                                                                                                                                                 |
| 1-1 | <p><b>Backcheck Recommendation Close Comment</b><br/>For 2011 and the near future, minimum hydraulic requirements are levee height of 10.5 ft with 1:4 slope. This will meet near term certification requirements. Alternative means will need to be investigated at some time in the future to determine what changes may be needed to achieve/maintain future requirements for certification.</p> <p>Submitted By: <a href="#">Keely Crowder</a> (504-862-2114) Submitted On: 12-Jun-08</p> |

Current Comment Status: **Comment Closed**

|                                   |       |       |      |     |     |
|-----------------------------------|-------|-------|------|-----|-----|
| 1937595                           | Civil | Other | n/a' | n/a | n/a |
| Coordinating Discipline(s): Civil |       |       |      |     |     |

In the 2nd paragraph of 4.0 Description of Existing Protection the second sentence is incorrect. This levee was raised to elevation 9.5 in 2003-2004. Contract was completed in June 2004.

Submitted By: [Ellsworth Pilie](#) ((504) 862-2768) Submitted On: 03-Jun-08

|     |                                                                                                                                                    |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0 | <p><b>Evaluation Concurred</b><br/>We will correct.</p> <p>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 09-Jun-08</p> |
| 1-1 | <p><b>Backcheck Recommendation Close Comment</b><br/>concur</p>                                                                                    |

|                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |      |     |     |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------|-----|-----|-----|
|                                                                                                                                                                                                                              | Submitted By: <a href="#">Ellsworth Pilie</a> ((504) 862-2768) Submitted On: 12-Jun-08                                                                                                                                                                                                                                                                                                                                                                                                                               |               |      |     |     |     |
|                                                                                                                                                                                                                              | Current Comment Status: <a href="#">Comment Closed</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |      |     |     |     |
| 1937605                                                                                                                                                                                                                      | Civil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Other         | n/a' | n/a | n/a | n/a |
| <b>Coordinating Discipline(s): Civil</b>                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |      |     |     |     |
| In paragraph 5.2 Reinforced Levee Section, why is the landward shift of the reinforced section more than the shift for the unreinforced section?                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |      |     |     |     |
| Submitted By: <a href="#">Ellsworth Pilie</a> ((504) 862-2768). Submitted On: 03-Jun-08                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |      |     |     |     |
| 1-0                                                                                                                                                                                                                          | <b>Evaluation Concurred</b><br>The analysis for the reinforced levee without the shift shows that the slopes are not stable (floodside). The levee was therefore shifted by 50 ft to make it stable. The results (safety factors) of the analysis with and without the reinforcement once the levee is shifted are presented in the tables shown in plates G-27 and G-28, found in Appendix D of the geotechnical report.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08 |               |      |     |     |     |
| 1-1                                                                                                                                                                                                                          | <b>Backcheck Recommendation Close Comment</b><br>Concur.<br><br>Submitted By: <a href="#">Ellsworth Pilie</a> ((504) 862-2768) Submitted On: 12-Jun-08                                                                                                                                                                                                                                                                                                                                                               |               |      |     |     |     |
| Current Comment Status: <a href="#">Comment Closed</a>                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |      |     |     |     |
| 1937608                                                                                                                                                                                                                      | Civil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Cost Estimate | n/a' | n/a | n/a | n/a |
| <b>Coordinating Discipline(s): Civil</b>                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |      |     |     |     |
| Did the cost estimate for the Railroad Gate in all the alternatives include the cost for constructing the falsework needed to maintain track operations during the construction of the floodgate?                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |      |     |     |     |
| Submitted By: <a href="#">Ellsworth Pilie</a> ((504) 862-2768). Submitted On: 03-Jun-08                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |      |     |     |     |
| 1-0                                                                                                                                                                                                                          | <b>Evaluation Concurred</b><br>For the 65% submittal the cost was not refined since the design had not been completed yet. It will be refined for the next submittal.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 09-Jun-08                                                                                                                                                                                                                                                     |               |      |     |     |     |
| 1-1                                                                                                                                                                                                                          | <b>Backcheck Recommendation Close Comment</b><br>Concur.<br><br>Submitted By: <a href="#">Ellsworth Pilie</a> ((504) 862-2768) Submitted On: 12-Jun-08                                                                                                                                                                                                                                                                                                                                                               |               |      |     |     |     |
| Current Comment Status: <a href="#">Comment Closed</a>                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |      |     |     |     |
| 1937622                                                                                                                                                                                                                      | Civil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Cost Estimate | n/a' | n/a | n/a | n/a |
| <b>Coordinating Discipline(s): Civil</b>                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |      |     |     |     |
| In the cost estimates for the unreinforced and reinforced sections a unit price of \$75,000 is shown for "Removal of Existing Structures and Obstructions". This seems too low for the unreinforced and reinforced sections. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |      |     |     |     |
| Submitted By: <a href="#">Ellsworth Pilie</a> ((504) 862-2768). Submitted On: 03-Jun-08                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |      |     |     |     |
| 1-0                                                                                                                                                                                                                          | <b>Evaluation Concurred</b><br>Will review and adjust.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 09-Jun-08                                                                                                                                                                                                                                                                                                                                                                    |               |      |     |     |     |
| 1-1                                                                                                                                                                                                                          | <b>Backcheck Recommendation Close Comment</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |      |     |     |     |

|  |                                                                                        |
|--|----------------------------------------------------------------------------------------|
|  | Concur                                                                                 |
|  | Submitted By: <a href="#">Ellsworth Pilie ((504) 862-2768)</a> Submitted On: 12-Jun-08 |
|  | Current Comment Status: <b>Comment Closed</b>                                          |

|         |              |                      |      |     |     |
|---------|--------------|----------------------|------|-----|-----|
| 1937648 | Geotechnical | Engineering Appendix | n/a' | n/a | n/a |
|---------|--------------|----------------------|------|-----|-----|

(Document Reference: EAR, Geot App, Write-up, Pg 4, Section 1.5 Regional Geology)

This should be titled "Site Geology" because it describes the deposits at this site as determined from the geologic profiles, not the regional geology.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

|     |                                                                                                                                                               |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0 | Evaluation Concurred<br>Will modify text.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08                             |
| 1-1 | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 12-Jun-08 |
|     | Current Comment Status: <b>Comment Closed</b>                                                                                                                 |

|         |              |                      |      |     |     |
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| 1937650 | Geotechnical | Engineering Appendix | n/a' | n/a | n/a |
|---------|--------------|----------------------|------|-----|-----|

(Document Reference: EAR, Geot App, Write-up, Pg 6, 3rd Par, 1st Sent)

It states "The limits of Reach 1W are between...894+00 to 935+00." The limits stated here from 894+00 to 935+00 do not match what is depicted on the Subsurface Profiles in Appendix B. Also, Appendix B shows Reach 1 covering approximate stations 934+00 to 961+50 and 971+00 to an undefined station, but the write-up doesn't mention this. Therefore, the write-up and the Subsurface Profiles need to agree.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

|     |                                                                                                                                                                                            |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0 | Evaluation Concurred<br>Will revise text to ensure it matches with the applicable appendix sheets.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08 |
| 1-1 | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 12-Jun-08                              |
|     | Current Comment Status: <b>Comment Closed</b>                                                                                                                                              |

|         |              |                      |      |     |     |
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| 1937653 | Geotechnical | Engineering Appendix | n/a' | n/a | n/a |
|---------|--------------|----------------------|------|-----|-----|

(Document Reference: EAR, Geot App, Write-up, Pg 7, 1st Par, 1st Sent)

It states "The limits of Reach 2W are approximately between stations 935+00 to 975+00." The limits stated here do not match what is depicted on the Subsurface Profiles in Appendix B. Again, the write-up and the Subsurface Profiles need to agree.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

|     |                      |
|-----|----------------------|
| 1-0 | Evaluation Concurred |
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|         |                                                                                      |                      |      |     |     |     |
|---------|--------------------------------------------------------------------------------------|----------------------|------|-----|-----|-----|
|         | Will revise text to ensure it matches with the applicable appendix sheets.           |                      |      |     |     |     |
|         | Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08     |                      |      |     |     |     |
| 1-1     | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.             |                      |      |     |     |     |
|         | Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 12-Jun-08 |                      |      |     |     |     |
|         | Current Comment Status: <b>Comment Closed</b>                                        |                      |      |     |     |     |
| 1937655 | Geotechnical                                                                         | Engineering Appendix | n/a' | n/a | n/a | n/a |

(Document Reference: EAR, Geot App, Write-up, Pg 7, 2nd Par, 1st Sent)

It states "The limits of Reach 3W are approximately between stations 776+00 to 802+00, 832+00 857+00; 875+00 to 893+00." The limits stated here do not match what is depicted on the Subsurface Profiles in Appendix B. What is stated here conflicts with what is stated for Reach 1W and thus creates overlaps and leaves gaps in accounting for the soil.

Submitted By: [Leeland Richard](#) (504-862-2397) Submitted On: 03-Jun-08

|         |                                                                                                           |                      |      |     |     |     |
|---------|-----------------------------------------------------------------------------------------------------------|----------------------|------|-----|-----|-----|
| 1-0     | <b>Evaluation Concurred</b><br>Will revise text to ensure it matches with the applicable appendix sheets. |                      |      |     |     |     |
|         | Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08                          |                      |      |     |     |     |
| 1-1     | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.                                  |                      |      |     |     |     |
|         | Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 12-Jun-08                      |                      |      |     |     |     |
|         | Current Comment Status: <b>Comment Closed</b>                                                             |                      |      |     |     |     |
| 1937658 | Geotechnical                                                                                              | Engineering Appendix | n/a' | n/a | n/a | n/a |

(Document Reference: EAR, Geot App, Write-up, Pg 7, 3rd Par)

It states "Reach 4W is located...based on boring ACW-40CU the closest to this station." The station stated here needs to be depicted as such on the Subsurface Profiles in Appendix B. Again, there are recent borings that sequentially coincide with the borings contained in this report that cover through the limits of the project that need to be used.

Submitted By: [Leeland Richard](#) (504-862-2397) Submitted On: 03-Jun-08

|         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |      |     |     |     |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------|-----|-----|-----|
| 1-0     | <b>Evaluation Concurred</b><br>Will add stations to the limits of each reach for ease of viewing and understanding. Per the data provided to us, the last boring to fall within the project limits is ACW 40CU, located at station 974+40. This is the closest boring to the railroad track (station 975+60), which is also the limits of the project as well as Reaches 2 and 4. The geotechnical data used for the analyses was made available to us on April 8th, 2008. |                      |      |     |     |     |
|         | Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08                                                                                                                                                                                                                                                                                                                                                                                           |                      |      |     |     |     |
| 1-1     | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.                                                                                                                                                                                                                                                                                                                                                                                                   |                      |      |     |     |     |
|         | Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08                                                                                                                                                                                                                                                                                                                                                                                         |                      |      |     |     |     |
|         | Current Comment Status: <b>Comment Closed</b>                                                                                                                                                                                                                                                                                                                                                                                                                              |                      |      |     |     |     |
| 1937661 | Geotechnical                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Engineering Appendix | n/a' | n/a | n/a | n/a |

(Document Reference: EAR, Geot App, Write-up, Pg 10, 1st Par (T-wall Backside Embankment Slope))

Is El+8.5 at the flood side of the levee crest the elevation required for protection against barge impact? If not, the levee (and thus the backfill) could be degraded to a lower elevation that would still provide barge impact protection and drainage away from the T-wall but would help to reduce the tremendous unbalanced loads that have resulted (and have been reported on Pg 14).

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

**1-0 Evaluation Concurred**

The elevations of the modified levee behind the T-wall were provided to us by the USACE MVN. Also, agree with comment that a smaller levee will reduce the UBL.

Submitted By: [Carlos Cepero](#) (9046411834) Submitted On: 10-Jun-08

**1-1 Backcheck Recommendation Close Comment**

Closed without comment.

Submitted By: [Leeland Richard](#) (504-862-2397) Submitted On: 12-Jun-08

Current Comment Status: **Comment Closed**

1937664

Geotechnical

Engineering Appendix

n/a'

n/a

n/a

(Document Reference: EAR, Geot App, Write-up, Pg 10, 2nd Par, 1st Sent)

It states "The T-Wall geometries analyzed were based on wall heights between 15 and about 19 feet and wall base widths of 0.7 times the wall height." Since the 2057 elevation for which the wall is designed to is El+14.0 (as stated in your Table 10 on Pg 9 of the write-up), suggest clarifying that you chose wall heights between 15 and 19 feet because the base would be between El-1 and El-5 to avoid confusion, if this is the case. Otherwise, an explanation is needed why these heights were analyzed.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

**1-0 Evaluation Concurred**

Will modify text for ease of understanding.

Submitted By: [Carlos Cepero](#) (9046411834) Submitted On: 10-Jun-08

**1-1 Backcheck Recommendation Close Comment**

Closed without comment.

Submitted By: [Leeland Richard](#) (504-862-2397) Submitted On: 12-Jun-08

Current Comment Status: **Comment Closed**

1937665

Geotechnical

Engineering Appendix

n/a'

n/a

n/a

(Document Reference: EAR, Geot App, Write-up, Pg 11, 2nd Par, 4th – 6th Sents)

It states "We note however that the SlopeW program has an optimization tool...applicable for the purposes of comparison for Algiers West also)." It is worth noting that USACE-MVN-ED-F recently verified and reported that SlopeW does not follow the standard USACE procedures with regard to linear interpolation of cohesions for soil strata that have varying cohesions both horizontally (say, between toe and centerline) and vertically (say, from top to bottom of a stratum) within that stratum, even when using the latest version of SlopeW, regardless if the optimization tool is used or not.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

**1-0 Evaluation For Information Only**

Noted. Not aware when the USACE-MVN completed its report, but GeoSlope recently (as of April 2008) introduced an add-in feature in which vertical and horizontal variations can be simultaneously included.

|         |                                                                                                                                                             |                      |      |     |     |     |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------|-----|-----|-----|
|         | Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08                                                                            |                      |      |     |     |     |
| 1-1     | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08 |                      |      |     |     |     |
|         | Current Comment Status: Comment Closed                                                                                                                      |                      |      |     |     |     |
| 1937668 | Geotechnical                                                                                                                                                | Engineering Appendix | n/a' | n/a | n/a | n/a |

(Document Reference: EAR, Geot App, Write-up, Pg 12, 3rd Par, 3rd Sent)

It states "Note that where berms are required, the berm height given is the height at the interface with the levee slope or T-Wall stem, and the berm slopes at 1:40 (vertical to horizontal) for drainage." Stating that berms will all slope at 1V:40H and only differ in their interface height with the levee or T-Wall does not appear to result in the most optimized berm design. Berms should be optimized for each reach. Furthermore, there are many slopes steeper than 1V:40H that can be used for optimized berm design that would still allow for drainage, but I do concur that 1V:40H is the shallowest slope to use for optimized berm design if a particular reach requires such.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

|         |                                                                                                                                                                                                                                                                                                                                                                                           |                      |      |     |     |     |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------|-----|-----|-----|
| 1-0     | Evaluation For Information Only<br>Noted. Berms were optimized unless rendered un-necessary given the site/civil and cost estimating work also part of the EAR, or by inspection. The optimization was performed by modifying the levee height and width as needed while maintaining a 1V on 40H.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08 |                      |      |     |     |     |
| 1-1     | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08                                                                                                                                                                                                                               |                      |      |     |     |     |
|         | Current Comment Status: Comment Closed                                                                                                                                                                                                                                                                                                                                                    |                      |      |     |     |     |
| 1937671 | Geotechnical                                                                                                                                                                                                                                                                                                                                                                              | Engineering Appendix | n/a' | n/a | n/a | n/a |

(Document Reference: EAR, Geot App, Write-up, Pg 12, 4th Par (1.7.4.1 Unreinforced Earthen Levees))

According to Table 7 on Pg 8, the HWL case is not required for the unreinforced earthen levee, but your performing the analyses and including its results in the write-up is much appreciated.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

|         |                                                                                                                                                               |                      |      |     |     |     |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------|-----|-----|-----|
| 1-0     | Evaluation Concurred<br>Noted. Thank you.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08                             |                      |      |     |     |     |
| 1-1     | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 12-Jun-08 |                      |      |     |     |     |
|         | Current Comment Status: Comment Closed                                                                                                                        |                      |      |     |     |     |
| 1937674 | Geotechnical                                                                                                                                                  | Engineering Appendix | n/a' | n/a | n/a | n/a |

(Document Reference: EAR, Geot App, Write-up, Pg 13, 2nd Par)

It states "The analyses of the flood side levee...potentially contributes to the driving forces when analyzing the protected

side slopes." Though increasing the flood side berm is not desirable, some form of remediation needs to be analyzed and included that would make the flood side analyses for Reaches 1 and 3 meet the required factor of safety. (If this involves the protected side shift mentioned in Section 1.7.4.2, then this analysis needs to be included.) Otherwise, the EAR seems incomplete with respect to completely defining this alternative and comparing it to the other alternatives to determine a preferred alternative.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

|                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0                                           | <b>Evaluation Concurred</b><br>Will include MOP analyses for the shifted levee for Reach 1. Reach 3, analyses has already been performed (plates G-27 and G-28) except for TOL water level. Also, by inspection, it was determined that increasing the height of the flood side berm would not be an alternative, as this would contribute to the driving forces. The failure surfaces were extending into the canal, therefore, the solution was to shift the alignment, as a lesser floodside slope would not be advantageous.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08 |
| 1-1                                           | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 12-Jun-08                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Current Comment Status: Comment Closed</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

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|---------|--------------|----------------------|------|-----|-----|
| 1937676 | Geotechnical | Engineering Appendix | n/a' | n/a | n/a |
|---------|--------------|----------------------|------|-----|-----|

(Document Reference: EAR, Geot App, Write-up, Pg 13, 3rd Par, 3rd – 5th Sent)

It states "For reaches 1 and 3 with the inadequate LWL factors of safety...as the failure surfaces with the lowest factors of safety were occurring with depth." This either needs to be copied or moved to the end of Section 1.7.4.1 in the write-up since it directly applies to this section and addresses the previous comment.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

|                                               |                                                                                                                                                                                                                     |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0                                           | <b>Evaluation Concurred</b><br>Will include some of the text in section 1.7.4.1, although proper references have been made.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08 |
| 1-1                                           | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 12-Jun-08                                                |
| <b>Current Comment Status: Comment Closed</b> |                                                                                                                                                                                                                     |

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| 1937678 | Geotechnical | Engineering Appendix | n/a' | n/a | n/a |
|---------|--------------|----------------------|------|-----|-----|

(Document Reference: EAR, Geot App, Write-up, Pg 13, 4th Par, 6th Sent)

It states "With the shifted levee, LWL factors of safety for the flood side slopes were in the range of 1.46 and 2.15 for the case with berm." The geotextile reinforced levee alternative should have been analyzed to determine if a levee shift was needed since you can possibly take advantage of the reinforcement, instead of just shifting it the same for the unreinforced earthen levee alternative, since this is a completely different alternative.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

|     |                                                                                                                                                                                                                                                                              |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0 | <b>Evaluation For Information Only</b><br>The levee shift is needed mainly to satisfy the Low Water (flood side) stability criteria. It was determined that the shift was still required even when using a geotextile with a strength of 1450 lb/in, as shown in plate G-27. |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|         |                                                                                                                                                             |                      |      |     |     |     |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------|-----|-----|-----|
|         | Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08                                                                            |                      |      |     |     |     |
| 1-1     | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08 |                      |      |     |     |     |
|         | Current Comment Status: Comment Closed                                                                                                                      |                      |      |     |     |     |
| 1937681 | Geotechnical                                                                                                                                                | Engineering Appendix | n/a' | n/a | n/a | n/a |

(Document Reference: EAR, Geot App, Write-up, Pg 13, 5th Par)

It states "The MOP analyses were performed...respectively indicate that no berm is required for Reach 2." Since you only use reinforcement with tensile strengths of 1400-1450 ppi, it seems that re-analyzing the geotextile alternatives using higher strength geotextiles and/or possibly longer widths could reduce the length of the berms required, provided that proper cover is maintained.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

|         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |      |     |     |     |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------|-----|-----|-----|
| 1-0     | <b>Evaluation For Information Only</b><br>The 1450 ppi reinforcement was selected based on readily available products and since in the 30% submittal, the USACE-MVN had recommended using a geotextile with an approximate strength of 1250 ppi. The required geotextile length is dependent upon the location of the failure surface, but in most cases, they were extended to near the edges of the levee.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08 |                      |      |     |     |     |
| 1-1     | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08                                                                                                                                                                                                                                                                                                                                          |                      |      |     |     |     |
|         | Current Comment Status: Comment Closed                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      |      |     |     |     |
| 1937683 | Geotechnical                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Engineering Appendix | n/a' | n/a | n/a | n/a |

(Document Reference: EAR, Geot App, Write-up, Pg 14, 4th Par, 4th Sen)

It states "Note that the desired factor of safety for these analyses is 1.0 and when the input strengths are factored by 1.3, is equivalent to the required 1.3 stated in HSDRSDG." Though factoring the strengths by 1.3 is appropriate with respect to USACE guidelines, it is not common to correlate this to the factor of safety then being equaled to 1.0. Therefore, it is recommended to reword this to simply focus on the strengths being factored by 1.3 to determine if UBLs are present.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

|         |                                                                                                                                                               |                      |      |     |     |     |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------|-----|-----|-----|
| 1-0     | <b>Evaluation Concurred</b><br>Will reword the sentence.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08              |                      |      |     |     |     |
| 1-1     | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 12-Jun-08 |                      |      |     |     |     |
|         | Current Comment Status: Comment Closed                                                                                                                        |                      |      |     |     |     |
| 1937684 | Geotechnical                                                                                                                                                  | Engineering Appendix | n/a' | n/a | n/a | n/a |

(Document Reference: EAR, Geot App, Write-up, Pg 15, Table 11)

There are several comments regarding the analyses and results, so I have broken them out below for convenience: a) the remediation (i.e. shift) to meet the required factor of safety for the MOP LWL unreinforced levee for Reaches 1-3 needs to be analyzed and included in this report b) the berms for the reinforced levee for Reaches 1 and 2 do not appear to be optimized, so an explanation or re-analysis is needed c) the Spencer's Method analysis for Reach 2W T-Wall results in a factor of safety of 1.33 with a 7-ft high, 28-ft wide berm but doesn't meet the required factor of safety of 1.40; furthermore, there is no unbalanced loads reported under the appropriate columns on this table for this case. This is not acceptable.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

|                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0                                           | <b>Evaluation Concurred</b><br>a) Will include the MOP analyses of the unreinforced levee and LWL. b) The stability of the lifts is controlling the berm size; this will be shown in the final submittal. c) Correct. Keeping the berm within the existing ROW, as instructed by the USACE MVN, yielded a stability FS of 1.33 based on Spencer's method, which is shy of the required 1.4. When analyzing the same geometry with MOP, the resultant FS met the minimum criteria and no UBLs were present. Results of MOP and Spencer's will differ slightly, this case scenario being an example of that.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08 |
| 1-1                                           | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Current Comment Status: Comment Closed</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

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|---------|--------------|----------------------|------|-----|-----|
| 1937685 | Geotechnical | Engineering Appendix | n/a' | n/a | n/a |
|---------|--------------|----------------------|------|-----|-----|

(Document Reference: EAR, Geot App, Write-up, Pg 15, Note 3)

It states "MOP T-wall required factors of safety...input strengths by a factor of 1.3." Again, though factoring the strengths by 1.3 is appropriate with respect to USACE guidelines, it is not common to correlate this to the factor of safety then being equaled to 1.0. Therefore, it is recommended to reword this to simply focus on the strengths being factored by 1.3 to determine if UBLs are present.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

|                                               |                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0                                           | <b>Evaluation For Information Only</b><br>Noted. We believe that an explanation needs to be provided in the text describing the above so that an outside reader unfamiliar with the USACE-MVN procedures understands such.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08 |
| 1-1                                           | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 12-Jun-08                                                                                                                                               |
| <b>Current Comment Status: Comment Closed</b> |                                                                                                                                                                                                                                                                                                                    |

|         |              |                      |      |     |     |
|---------|--------------|----------------------|------|-----|-----|
| 1937688 | Geotechnical | Engineering Appendix | n/a' | n/a | n/a |
|---------|--------------|----------------------|------|-----|-----|

(Document Reference: EAR, Geot App, Write-up, Pgs 16-17, Section 1.7.5 (Lift Construction Schedule and Levee Settlement))

Need to include natural subsidence rate of 0.5 feet per century as part of the settlement calculations.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

|     |                             |
|-----|-----------------------------|
| 1-0 | <b>Evaluation Concurred</b> |
|-----|-----------------------------|

|         |                                                                                                                                                                                                                                                                                                          |                      |      |     |     |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------|-----|-----|
|         | Using the provided rate, for the year 2057 (48 years from present), the subsidence will be 0.22 ft or about 3 inches, therefore settlement calculations considered 3 inches of subsidence over that time period.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08 |                      |      |     |     |
| 1-1     | Backcheck Recommendation Close Comment<br><br>Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08                                                                                                                                                                         |                      |      |     |     |
|         | Current Comment Status: <b>Comment Closed</b>                                                                                                                                                                                                                                                            |                      |      |     |     |
| 1937689 | Geotechnical                                                                                                                                                                                                                                                                                             | Engineering Appendix | n/a' | n/a | n/a |

(Document Reference: EAR, Geot App, Write-up, Pg 17, 4th Par, 3rd & 4th Sent)

It states "For both lifts factors of safety of 1.30 or greater were obtained. These analyses are included as part of Appendix E." Performing these analyses using the Spencer Method but for a factor of safety of 1.30 does not appear to be correct. Also, the analyses that are shown in Appendix E have the flood side water at El-1; protected side analyses need to be performed on both of these cases to ensure the sections are stable as well. Also, Pg 18 shows Reach 1W being built to El+19.9 instead of El+19.2; thus the stability should have been performed to this.

Submitted By: [Leeland Richard](#) (504-862-2397) Submitted On: 03-Jun-08

|         |                                                                                                                                                                                                                                      |                      |      |     |     |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------|-----|-----|
| 1-0     | Evaluation Concurred<br>The water level will be adjusted to +14 ft. and the new lifts stability provided in the next geotechnical submittal.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08 |                      |      |     |     |
| 1-1     | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 12-Jun-08                                                                        |                      |      |     |     |
|         | Current Comment Status: <b>Comment Closed</b>                                                                                                                                                                                        |                      |      |     |     |
| 1937690 | Geotechnical                                                                                                                                                                                                                         | Engineering Appendix | n/a' | n/a | n/a |

(Document Reference: EAR, Geot App, Write-up Pg 18-20, Lift Construction Schedule Curves)

The lift construction schedules should use true settlement curves instead of straight lines between construction crown and settled elevations. The settlement curves should also be allowed to come as close to the required net elevation (or even cross it) and this would dictate when the lifts are required instead of just picking arbitrary years to have lifts.

Submitted By: [Leeland Richard](#) (504-862-2397) Submitted On: 03-Jun-08

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0 | Evaluation Concurred<br>Will revise curves to have them come closer to the "required net elevation". Also, true settlements were estimated for all lifts, and intermediate settlements estimated depending on the time interval selected. Given the 120 ft profile which encompasses several layers, it is not possible to select one curve to represent all the sub-strata. Instead, the settlement that would take place within the selected lifts time schedule (for all layers) was estimated and plotted, as presented in the report.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08 |
| 1-1 | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|     | Current Comment Status: <b>Comment Closed</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

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|---------|--------------|----------------------|------|-----|-----|
| 1937691 | Geotechnical | Engineering Appendix | n/a' | n/a | n/a |
|---------|--------------|----------------------|------|-----|-----|

(Document Reference: EAR, Geot App, Appendices A and B)

Geologic profiles in App. A and subsurface profiles in App. B need a horizontal scale. The vertical scale for the profiles in App. A should be feet NAVD.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0                                    | <b>Evaluation For Information Only</b><br>Stations for each boring are provided in the subsurface profiles in Appendix B. For visual inspection, will include a plan with the all boring locations depicted. Also, elevations (vertical scale) of the geologic profiles were provided in NGVD, but are shown in NAVD in the subsurface profiles, which were used for analyses purposes.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08 |
| 1-1                                    | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08                                                                                                                                                                                                                                                                                                              |
| Current Comment Status: Comment Closed |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

|         |              |                      |      |     |     |
|---------|--------------|----------------------|------|-----|-----|
| 1937693 | Geotechnical | Engineering Appendix | n/a' | n/a | n/a |
|---------|--------------|----------------------|------|-----|-----|

(Document Reference: EAR, Geot App, Appendix B, Pg 3-6 of 13)

The label "New Earthen Levee" needs to be better defined because from the settlement you may be overbuilding to approximately El+19 and in some cases, you call for a landside shift of the levee; therefore, the dotted line doesn't seem to make sense with everything taken into account.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

|                                        |                                                                                                                                                                                                                                                                                        |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0                                    | <b>Evaluation Concurred</b><br>Label will be changed to "new net earthen levee". Also, the cross sections provide an ideal representation of what the levee geometry should look like in 2057.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08 |
| 1-1                                    | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 12-Jun-08                                                                                                                   |
| Current Comment Status: Comment Closed |                                                                                                                                                                                                                                                                                        |

|         |              |                      |      |     |     |
|---------|--------------|----------------------|------|-----|-----|
| 1937695 | Geotechnical | Engineering Appendix | n/a' | n/a | n/a |
|---------|--------------|----------------------|------|-----|-----|

(Document Reference: EAR, Geot App, Appendix B, Plate G-06, Subsurface Profile)

How can you select "Reaches 1 and 2" at the top of this plate if you claim there is "no borings close to [the] structure" at Station 975+00 (EAR, Geot App, Write-up, Pg 4, 2nd Par.) to base this selection on? Shouldn't there be a "Reach 4" labeled on this plate as stated on Pg 4, 2nd Par? It is worth noting that boring information was provided by MVN-ED-F via an ftp site that should have been downloaded by the A/E and that would have covered the entire limits of this project, instead of having a section without borings as you have indicated.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

|     |                             |
|-----|-----------------------------|
| 1-0 | <b>Evaluation Concurred</b> |
|-----|-----------------------------|

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | The labels along the top of the subsurface profiles will be modified to reflect the text in the body of the report, which itself will be modified to incorporate other USACE-MVN comments part of the review of the 65% submittal. The geotechnical data used was made available to us on April 8, 2008 and downloaded on April 9th, 2008. The data covered the project limits, but no one boring was located at the location of the railroad swing gate (approximately station 975+60), which coincidentally is at the end of the project. Any subsequent/more recent data would require our re-evaluation. |
|  | Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

|     |                                                                                                                                                             |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-1 | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08 |
|     | Current Comment Status: <b>Comment Closed</b>                                                                                                               |

|         |              |                      |      |     |     |
|---------|--------------|----------------------|------|-----|-----|
| 1937696 | Geotechnical | Engineering Appendix | n/a' | n/a | n/a |
|---------|--------------|----------------------|------|-----|-----|

(Document Reference: EAR, Geot App, Appendix D, Pg 29 of 98)

The MOP stability for Reach 1W has strata breaks at approx Elevations -20, -23, -49, -62, etc., but the strength line and unit weight plates in Appendix C have the strata breaks at -18.5, -21.5, -47.5, -60.5, etc. respectively. This is imperative to perform stability analyses with the same strata breaks that were selected for the soil parameters. Therefore, this and all reaches stabilities need to be checked for this error.

Submitted By: [Leeland Richard](#) (504-862-2397) Submitted On: 03-Jun-08

|     |                                                                                                                                                                                    |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0 | Evaluation Concurred<br>Will adjust elevations accordingly so that there is no difference.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08 |
| 1-1 | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 12-Jun-08                      |
|     | Current Comment Status: <b>Comment Closed</b>                                                                                                                                      |

|         |              |                      |      |     |     |
|---------|--------------|----------------------|------|-----|-----|
| 1937698 | Geotechnical | Engineering Appendix | n/a' | n/a | n/a |
|---------|--------------|----------------------|------|-----|-----|

(Document Reference: EAR, Geot App, Appendix D)

Input files for both the MOP and Spencer's analyses need to be included in this appendix for a complete ITR to take place.

Submitted By: [Leeland Richard](#) (504-862-2397) Submitted On: 03-Jun-08

|     |                                                                                                                                                                                                                                            |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0 | Evaluation Concurred<br>Input files for both the MOP and Spencer's analyses need to be included in this appendix for a complete ITR to take place.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08 |
|     | Backcheck not conducted                                                                                                                                                                                                                    |
| 2-0 | Evaluation Concurred<br>Will include with next geotechnical submittal.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08                                                                             |
| 2-1 | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 12-Jun-08                                                                              |

|         |                                        |                      |      |     |     |
|---------|----------------------------------------|----------------------|------|-----|-----|
|         | Current Comment Status: Comment Closed |                      |      |     |     |
| 1937701 | Geotechnical                           | Engineering Appendix | n/a' | n/a | n/a |

(Document Reference: EAR, Geot App, Appendix D)

For the T-Wall alternative with backfilling between the proposed T-Wall and the existing levee, stability needs to be performed going from P/S to F/S but having the active wedges on the F/S of the T-Wall as is done, neglecting the effects of the T-Wall, meaning is just placing the proposed fill stable with respect to MOP and Spencer without factoring the strengths.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0                                    | <b>Evaluation For Information Only</b><br>By inspection, it can be concluded that having the active wedge originate in the protected side when analyzing the stability of the floodside will yield lower safety factors. This is so because the driving forces will be reduced in both Method of Slices and Method of Planes. Also, most of the levee would fall under the central block, when worst case scenario is that it falls within the driving/active wedge.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08 |
| 1-1                                    | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08                                                                                                                                                                                                                                                                                                                                                                                           |
| Current Comment Status: Comment Closed |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

|         |              |                      |      |     |     |
|---------|--------------|----------------------|------|-----|-----|
| 1937705 | Geotechnical | Engineering Appendix | n/a' | n/a | n/a |
|---------|--------------|----------------------|------|-----|-----|

(Document Reference: EAR, Geot App, Appendix D, Reach 3, Unreinforced Alternative)

If the remediation is to shift the levee by 50 feet, then the MOP analyses showing this for all three loading conditions needs to be included.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

|                                        |                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0                                    | <b>Evaluation Concurred</b><br>Will provide results of analysis for TOL water level. For the other two water levels, the analysis is presented in plates G-27 and G-28 where the reader can observe safety factors with and without geotextile reinforcement.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08 |
| 1-1                                    | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 12-Jun-08                                                                                                                                                                                  |
| Current Comment Status: Comment Closed |                                                                                                                                                                                                                                                                                                                                                       |

|         |              |                      |      |     |     |
|---------|--------------|----------------------|------|-----|-----|
| 1937708 | Geotechnical | Engineering Appendix | n/a' | n/a | n/a |
|---------|--------------|----------------------|------|-----|-----|

(Document Reference: EAR, Geot App)

There doesn't seem to be any mention within the Geot App as to what the recommended alternative is based on these designs.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 03-Jun-08

|            |                                                                                                                                                                                                                                  |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1-0</b> | <b>Evaluation For Information Only</b><br>The recommended alternative is discussed in the EAR, not the geotech report, as it is cost driven.<br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 10-Jun-08 |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|            |                                                                                                                                                                                                                           |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1-1</b> | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 12-Jun-08<br><br>Current Comment Status: <b>Comment Closed</b> |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|         |                         |                   |      |     |     |
|---------|-------------------------|-------------------|------|-----|-----|
| 1938285 | Construction Management | Feasibility Study | n/a' | n/a | n/a |
|---------|-------------------------|-------------------|------|-----|-----|

Construction Div has no comments at this time.

|                                                                                   |
|-----------------------------------------------------------------------------------|
| Submitted By: <a href="#">Donald Davis</a> (504-862-2861) Submitted On: 04-Jun-08 |
|-----------------------------------------------------------------------------------|

|            |                                                                                                                                                                                                                        |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1-0</b> | <b>Evaluation Concurred</b><br>No comment<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 09-Jun-08                                                                                   |
| <b>1-1</b> | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Donald Davis</a> (504-862-2861) Submitted On: 12-Jun-08<br><br>Current Comment Status: <b>Comment Closed</b> |

|         |          |       |      |     |     |
|---------|----------|-------|------|-----|-----|
| 1948924 | Customer | Plans | n/a' | n/a | n/a |
|---------|----------|-------|------|-----|-----|

1. Sht G-002- What is happening at LA 23 at tunnel? Next project?

|                                                                                      |
|--------------------------------------------------------------------------------------|
| Submitted By: <a href="#">Ennis Johnson</a> (1-504-816-7311) Submitted On: 11-Jun-08 |
|--------------------------------------------------------------------------------------|

|            |                                                                                                                                                                                                                           |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1-0</b> | <b>Evaluation Concurred</b><br>This project ends north of the tunnel. The tunnel area will be addressed under another project.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08 |
| <b>1-1</b> | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08<br><br>Current Comment Status: <b>Comment Closed</b>   |

|         |          |       |      |     |     |
|---------|----------|-------|------|-----|-----|
| 1948925 | Customer | Plans | n/a' | n/a | n/a |
|---------|----------|-------|------|-----|-----|

2. Sht. V-101- U- Outside the limits of this project, but what is happening at the Algiers lock? Is the structure being raised in another project? Does it provide same level of protection and under same criteria?

|                                                                                      |
|--------------------------------------------------------------------------------------|
| Submitted By: <a href="#">Ennis Johnson</a> (1-504-816-7311) Submitted On: 11-Jun-08 |
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|            |                                                                                                                                                                                                                                                                                                                                           |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1-0</b> | <b>Evaluation Concurred</b><br>This is more likely a question better explained by the COE; however, it is my understanding that the structure at the lock is already high enough. We will tie into that structure with the new T-wall section.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08 |
| <b>1-1</b> | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08                                                                                                                                                                        |

Current Comment Status: Comment Closed

|                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |      |     |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|-----|-----|
| 1948927                                                                                                                                                                                          | Customer                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Plans | n/a' | n/a | n/a |
| 3. Sht V-105-U- What is happening at the bridge and the tunnel?                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |      |     |     |
| Submitted By: <a href="#">Ennis Johnson</a> (1-504-816-7311). Submitted On: 11-Jun-08                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |      |     |     |
| 1-0                                                                                                                                                                                              | <b>Evaluation Concurred</b><br>A t-wall section will pass beneath the bridge, but this project will stop short of the tunnel.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08                                                                                                                                                                                                                                      |       |      |     |     |
| 1-1                                                                                                                                                                                              | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08                                                                                                                                                                                                                                                                                            |       |      |     |     |
| Current Comment Status: Comment Closed                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |      |     |     |
| 1948930                                                                                                                                                                                          | Customer                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Plans | n/a' | n/a | n/a |
| 4. Sht. C-101-U- Outside of this project but profile doesn't show what existing elevations are at Algiers lock? Sta 770+70 ties into lock structure? Will show what adjacent protection will be? |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |      |     |     |
| Submitted By: <a href="#">Ennis Johnson</a> (1-504-816-7311). Submitted On: 11-Jun-08                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |      |     |     |
| 1-0                                                                                                                                                                                              | <b>Evaluation Concurred</b><br>As of the date of this response, detail drawings of the Lock had not been provided by the COE and were not included in the survey. It has been indicated to us that the existing structure is high enough already for us to tie into. For the purposes of this EAR, it was not imperative to have all of those specifics available.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08 |       |      |     |     |
| 1-1                                                                                                                                                                                              | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08                                                                                                                                                                                                                                                                                            |       |      |     |     |
| Current Comment Status: Comment Closed                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |      |     |     |
| 1948931                                                                                                                                                                                          | Customer                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Plans | n/a' | n/a | n/a |
| 5. Sht C-102-U- Woodland Hwy bridge- new T-wall will need to get approval from DOTD bridge design? Location close to existing bridge piers?                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |      |     |     |
| Submitted By: <a href="#">Ennis Johnson</a> (1-504-816-7311). Submitted On: 11-Jun-08                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |      |     |     |
| 1-0                                                                                                                                                                                              | <b>Evaluation Concurred</b><br>Should the project enter into design, we understand that significant coordination with LDOTD would be required. Bridge piers were not located on the survey, but field site visits indicated that they are not directly in the way of the proposed t-wall alignment.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08                                                                |       |      |     |     |
| 1-1                                                                                                                                                                                              | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08                                                                                                                                                                                                                                                                                            |       |      |     |     |
| Current Comment Status: Comment Closed                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |      |     |     |
| 1948932                                                                                                                                                                                          | Customer                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Plans | n/a' | n/a | n/a |
| 6. Sht. C-105-U- LA 23 bridge - new T-wall will need to get approval from DOTD bridge design? Location close to existing                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |      |     |     |

bridge piers?

Submitted By: [Ennis Johnson](#) (1-504-816-7311). Submitted On: 11-Jun-08

**1-0 Evaluation Concurred**

Just as at the Woodland Highway, we understand that significant LDOTD coordination would be required to install the t-wall beneath the bridge at LA23.

Submitted By: [Scott Chehardy](#) (504-466-5667) Submitted On: 11-Jun-08

**1-1 Backcheck Recommendation Close Comment**

Closed without comment.

Submitted By: [Dwayne Bonner](#) (504-862-1167) Submitted On: 19-Jun-08

Current Comment Status: **Comment Closed**

1948934

Customer

Plans

n/a'

n/a

n/a

7. Sht. C-105-U- What is happening at LA 23 at tunnel?

Submitted By: [Ennis Johnson](#) (1-504-816-7311). Submitted On: 11-Jun-08

**1-0 Evaluation Concurred**

At station 973+00 the levee transitions into a t-wall. The t-wall stops short of the tunnel location.

Submitted By: [Scott Chehardy](#) (504-466-5667) Submitted On: 11-Jun-08

**1-1 Backcheck Recommendation Close Comment**

Closed without comment.

Submitted By: [Dwayne Bonner](#) (504-862-1167) Submitted On: 19-Jun-08

Current Comment Status: **Comment Closed**

1948936

Customer

Plans

n/a'

n/a

n/a

8. Where does this project stand with Sector gate south determination? Timing?

Submitted By: [Ennis Johnson](#) (1-504-816-7311). Submitted On: 11-Jun-08

**1-0 Evaluation Concurred**

This question needs a response by the COE.

Submitted By: [Scott Chehardy](#) (504-466-5667) Submitted On: 11-Jun-08

**1-1 Backcheck Recommendation Close Comment**

Closed without comment.

Submitted By: [Dwayne Bonner](#) (504-862-1167) Submitted On: 19-Jun-08

Current Comment Status: **Comment Closed**

1948937

Customer

Plans

n/a'

n/a

n/a

9. Does the required RW lines incorporate the 15' vegetation free zone from the toe that will be required for maintenance? Or will that be outside of the RW line?

Submitted By: [Ennis Johnson](#) (1-504-816-7311). Submitted On: 11-Jun-08

**1-0 Evaluation Concurred**

The ROW line is set at a minimum of 15-feet from the toe of the levee berm. My understanding is that this is the 15-foot vegetation free zone; however, the COE may have more input to this question.

|     |                                                                                                                                                             |  |  |  |  |  |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
|     | Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08                                                                         |  |  |  |  |  |
| 1-1 | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08 |  |  |  |  |  |
|     | Current Comment Status: <b>Comment Closed</b>                                                                                                               |  |  |  |  |  |

|                                                                                       |          |       |      |     |     |
|---------------------------------------------------------------------------------------|----------|-------|------|-----|-----|
| 1948939                                                                               | Customer | Plans | n/a' | n/a | n/a |
| 10. General note for final P&S- keep all state & Fed. Hwys clean during construction. |          |       |      |     |     |

|         |                                                                                                                                                             |       |      |     |     |     |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|-----|-----|-----|
|         | Submitted By: <a href="#">Ennis Johnson</a> (1-504-816-7311). Submitted On: 11-Jun-08                                                                       |       |      |     |     |     |
| 1-0     | Evaluation Concurred<br>Noted.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08                                   |       |      |     |     |     |
| 1-1     | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08 |       |      |     |     |     |
|         | Current Comment Status: <b>Comment Closed</b>                                                                                                               |       |      |     |     |     |
| 1948941 | Customer                                                                                                                                                    | Plans | n/a' | n/a | n/a | n/a |

|     |                                                                                                                     |  |  |  |  |  |
|-----|---------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| 11. | General note for final P&S- contractor shall clean and remove all trash in project limits prior to end of contract. |  |  |  |  |  |
|-----|---------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|

|         |                                                                                                                                                             |       |      |     |     |     |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|-----|-----|-----|
|         | Submitted By: <a href="#">Ennis Johnson</a> (1-504-816-7311). Submitted On: 11-Jun-08                                                                       |       |      |     |     |     |
| 1-0     | Evaluation Concurred<br>Noted.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08                                   |       |      |     |     |     |
| 1-1     | Backcheck Recommendation Close Comment<br>Closed without comment.<br><br>Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08 |       |      |     |     |     |
|         | Current Comment Status: <b>Comment Closed</b>                                                                                                               |       |      |     |     |     |
| 1948942 | Customer                                                                                                                                                    | Plans | n/a' | n/a | n/a | n/a |

|     |                                                                                 |  |  |  |  |  |
|-----|---------------------------------------------------------------------------------|--|--|--|--|--|
| 12. | General note- DOTD project permits will be required for work under the bridges. |  |  |  |  |  |
|-----|---------------------------------------------------------------------------------|--|--|--|--|--|

|         |                                                                                                                                  |                      |      |     |     |     |
|---------|----------------------------------------------------------------------------------------------------------------------------------|----------------------|------|-----|-----|-----|
|         | Submitted By: <a href="#">Ennis Johnson</a> (1-504-816-7311). Submitted On: 11-Jun-08                                            |                      |      |     |     |     |
| 1-0     | Evaluation Concurred<br>Noted.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 11-Jun-08        |                      |      |     |     |     |
| 1-1     | Backcheck Recommendation Close Comment<br><br>Submitted By: <a href="#">Dwayne Bonner</a> (504-862-1167) Submitted On: 19-Jun-08 |                      |      |     |     |     |
|         | Current Comment Status: <b>Comment Closed</b>                                                                                    |                      |      |     |     |     |
| 1966102 | Geotechnical                                                                                                                     | Engineering Appendix | n/a' | n/a | n/a | n/a |

(This is a backcheck to Cmt # 1937665.) MVN completed its study and released its findings on 30 May 2008. GeoSlope's

fix (i.e. Beta Version) for this issue should be out, but you may have to check.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 20-Jun-08

|                                        |                                                                   |                                                                                      |
|----------------------------------------|-------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 1-0                                    | Evaluation Concurred<br>Noted                                     | Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 20-Jun-08     |
| 1-1                                    | Backcheck Recommendation Close Comment<br>Closed without comment. | Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 20-Jun-08 |
| Current Comment Status: Comment Closed |                                                                   |                                                                                      |

1966109

Geotechnical

Engineering  
Appendix

n/a'

n/a

n/a

(This is a backcheck to Cmt #1937668.) Modifying the levee height and width while maintaining the 1V:40H is not truly optimizing the berm. The optimized berm may not need the 1V:40H slope.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 20-Jun-08

|                                        |                                                                   |                                                                                      |
|----------------------------------------|-------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 1-0                                    | Evaluation For Information Only<br>Noted                          | Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 20-Jun-08     |
| 1-1                                    | Backcheck Recommendation Close Comment<br>Closed without comment. | Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 20-Jun-08 |
| Current Comment Status: Comment Closed |                                                                   |                                                                                      |

1966312

Geotechnical

Engineering  
Appendix

n/a'

n/a

n/a

(This is a backcheck to Cmt #1937701.) Your evaluation of the original comment is correct; that is why the analysis needs to be performed.

Submitted By: [Leeland Richard](#) (504-862-2397). Submitted On: 20-Jun-08

|                                        |                                                                                                                                                                             |                                                                                      |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 1-0                                    | Evaluation Concurred<br>Will analyze the most critical of the four cross sections (Reaches 1W and 3W) without factoring the strengths (using actual strengths). Flood side. | Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 20-Jun-08     |
| 1-1                                    | Backcheck Recommendation Close Comment<br>Closed without comment.                                                                                                           | Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 24-Jun-08 |
| Current Comment Status: Comment Closed |                                                                                                                                                                             |                                                                                      |

1966319

Geotechnical

Engineering  
Appendix

n/a'

n/a

n/a

(This is a backcheck to Cmt #1937681.) I don't recall the 1250 ppi being recommended. Nevertheless, high-strength geotextile with strengths of approximately 2000-2200 ppi are readily available on the market and should be used in your analyses if needed.

Submitted By: [Leeland Richard](#) (504-862-2397), Submitted On: 20-Jun-08

|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1-0 | <b>Evaluation For Information Only</b><br>During a teleconference on 29 March 2008 between HPA and the USACE-MVN (present were Leeland Richard, Brian Bonanno, Shung Chiu and Mark Woodward), we were given a directive to use a strength of 1250 ppi for the geotextile with one of the purposes of the meeting being to establish a uniform geotextile strength. All our work effort and analysis has since been based on this directive. Any additional analysis based on different strengths would deviate from this. Furthermore, it would result in additional engineering effort which will require formal notification and approval by Contracting.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 20-Jun-08                                                                                                                                                                                                                                                                                             |
| 1-1 | <b>Backcheck Recommendation Open Comment</b><br>You were not given a directive to use an allowable of 1250 ppi, either during the meeting or following it. You were provided an example and an equation that showed how to calculate the T-force and length of the fabric after the meeting. Therefore, we feel that this should not require approval via changes to the contract.<br><br>Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 25-Jun-08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 2-0 | <b>Evaluation Potential Cost Impact Potential Time Impact For Information Only</b><br>It has been concluded that a higher strength fabric placed at the given elevation (floodside berm elev.) does not have any impact on the size of the protected-side berm. This conclusion was reached after observing that the failure surface originates at or beyond the floodside limit of the fabric. To resolve this, the fabric would have to be extended (widened) on the floodside. However, this is not practical at the given elevation because the fabric will be left exposed (without cover) at its ends. In order to extend the geotextile (into the floodside berm) and provide proper cover, the fabric's placement elevation would have to be lowered. This will intersect the failure surface, making it practical to use a higher strength fabric. However, we understand that excavating into the floodside berm is not desired by the USACE.<br><br>Submitted By: <a href="#">Carlos Cepero</a> (9046411834) Submitted On: 09-Jul-08 |
| 2-1 | <b>Backcheck Recommendation Close Comment</b><br>Closed without comment.<br><br>Submitted By: <a href="#">Leeland Richard</a> (504-862-2397) Submitted On: 09-Jul-08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|     | Current Comment Status: Comment Closed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

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**95% ITR Comments**

Comment Report: All Comments

Project: WBV-47.2, Algiers Lock to Hwy 23

Review: ITR for the 95% EAR WBV-47.2 Algiers Lock to Hwy. 23

Displaying 13 comments for the criteria specified in this report.

360 ms to run this page

| <a href="#">Id</a> | <a href="#">Discipline</a> | <a href="#">Section/Figure</a> | <a href="#">Page Number</a> | <a href="#">Line Number</a> |
|--------------------|----------------------------|--------------------------------|-----------------------------|-----------------------------|
| 2029145            | Structural                 | n/a'                           | n/a                         | n/a                         |

The Type 1 T-Wall has 4 rows of 24" diameter pipe piles spaced 6 feet on centers. The tip elevation of the piles is at -110 and there are 40 piles in a 60 ft. monolith-a total of 4560 LF. The estimated cost of these piles is \$160 per linear ft.-\$729,000 per 60 ft monolith. Given the geotech design assumptions that the first 60 feet of pile embeddment offers no support, a more economical design would be to use longer piles. For instance a pile with a tip elevation of -110 which was used yields about 110 tons of capacity in reach 1, or a cost of about \$160 per ton of capacity. A pile driven to a tip elevation of -150 yields about 190 tons of capacity or a cost of \$126 per ton. By using the longer piles the cost of piling for a 60 ft monolith is reduced by about \$150,000.

Submitted By: [Dan Marsalone](#) (504-887-3702). Submitted On: 31-Jul-08

*Evaluation not conducted*

|         |            |                  |     |     |
|---------|------------|------------------|-----|-----|
| 2029146 | Structural | Drawing S-104-T. | n/a | n/a |
|---------|------------|------------------|-----|-----|

A diagonal C12x25 is used on the swing gate. This channel should be replaced by cross diagonal tie-rods and turnbuckles connected to the corners. This will allow for the removal of gate warping deflections which are caused by the dead load of the gate being not centered at the shear center of the gate. Also on this same drawing the lower hinge assembly is actually pintle. These corrections should be made if this project ever advances to plans and specifications.

Submitted By: [Dan Marsalone](#) (504-887-3702). Submitted On: 31-Jul-08

*Evaluation not conducted*

|         |            |      |     |     |
|---------|------------|------|-----|-----|
| 2029147 | Structural | n/a' | n/a | n/a |
|---------|------------|------|-----|-----|

(Document Reference: Cost Estimates)

Items in the tabulations that are not used in the individual estimates should be removed. For instance, the second, third, and fourth lifts of levees do not include any T-Wall items, and these should be removed from the tabulations.

Submitted By: [Dan Marsalone](#) (504-887-3702). Submitted On: 31-Jul-08

**1-0 Evaluation Concurred**

We left these items in to try and avoid comments such as, "you had \_\_\_\_\_ on the 1st lift, did you consider whether you need this for the other lifts". The T-wall items are a bit more obvious than others that they are not needed on subsequent lifts. The tabulation layout now allows the reviewer to compare the estimates easier since the same item number and layout is used on each. We would like to leave it like this for the COE 95% review and clean up the cost tables as you suggest at the 100% submittal.

Submitted By: [Scott Chehardy](#) (504-466-5667) Submitted On: 01-Aug-08

*Backcheck not conducted*

Current Comment Status: **Comment Open**

|         |       |         |     |     |
|---------|-------|---------|-----|-----|
| 2029351 | Civil | 5.1&5.2 | n/a | n/a |
|---------|-------|---------|-----|-----|

Shouldn't something be said about anticipated number of lifts and time between lifts.

|                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                         |      |     |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|-----|
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129). Submitted On: 01-Aug-08                                                                                                                                                         |                                                                                                                                                                                                                                                                                         |      |     |     |
| 1-0                                                                                                                                                                                                                                            | <b>Evaluation Concurred</b><br>We have added a discussion of this and referenced the tables located in Appendix A.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 01-Aug-08                                                                           |      |     |     |
|                                                                                                                                                                                                                                                | <i>Backcheck not conducted</i>                                                                                                                                                                                                                                                          |      |     |     |
|                                                                                                                                                                                                                                                | Current Comment Status: <b>Comment Open</b>                                                                                                                                                                                                                                             |      |     |     |
| 2029355                                                                                                                                                                                                                                        | Civil                                                                                                                                                                                                                                                                                   | 7-3  | n/a | n/a |
| Confirm that batter piles can be driven beneath an existing structure with just an easement and not fee title.                                                                                                                                 |                                                                                                                                                                                                                                                                                         |      |     |     |
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129). Submitted On: 01-Aug-08                                                                                                                                                         |                                                                                                                                                                                                                                                                                         |      |     |     |
| 1-0                                                                                                                                                                                                                                            | <b>Evaluation Concurred</b><br>We will discuss this with real estate.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 01-Aug-08                                                                                                                        |      |     |     |
|                                                                                                                                                                                                                                                | <i>Backcheck not conducted</i>                                                                                                                                                                                                                                                          |      |     |     |
|                                                                                                                                                                                                                                                | Current Comment Status: <b>Comment Open</b>                                                                                                                                                                                                                                             |      |     |     |
| 2029356                                                                                                                                                                                                                                        | Civil                                                                                                                                                                                                                                                                                   | 9-5  | n/a | n/a |
| Does the 549 calendar days include all lifts or just the 1st lift?                                                                                                                                                                             |                                                                                                                                                                                                                                                                                         |      |     |     |
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129). Submitted On: 01-Aug-08                                                                                                                                                         |                                                                                                                                                                                                                                                                                         |      |     |     |
| 1-0                                                                                                                                                                                                                                            | <b>Evaluation Concurred</b><br>This is the first lift only. We have clarified this in the write up.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 01-Aug-08                                                                                          |      |     |     |
|                                                                                                                                                                                                                                                | <i>Backcheck not conducted</i>                                                                                                                                                                                                                                                          |      |     |     |
|                                                                                                                                                                                                                                                | Current Comment Status: <b>Comment Open</b>                                                                                                                                                                                                                                             |      |     |     |
| 2029362                                                                                                                                                                                                                                        | Civil                                                                                                                                                                                                                                                                                   | 9-9  | n/a | n/a |
| Move "The estimated construction....." to p.9-8. Does this include settlement? 467 calendar days ( including days/years between lifts)                                                                                                         |                                                                                                                                                                                                                                                                                         |      |     |     |
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129). Submitted On: 01-Aug-08                                                                                                                                                         |                                                                                                                                                                                                                                                                                         |      |     |     |
| 1-0                                                                                                                                                                                                                                            | <b>Evaluation Concurred</b><br>Adjusted the spacing. The 467 days is only the fist lift. We have added this information along with some discussion on lifts and required time between lifts.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 01-Aug-08 |      |     |     |
|                                                                                                                                                                                                                                                | <i>Backcheck not conducted</i>                                                                                                                                                                                                                                                          |      |     |     |
|                                                                                                                                                                                                                                                | Current Comment Status: <b>Comment Open</b>                                                                                                                                                                                                                                             |      |     |     |
| 2029366                                                                                                                                                                                                                                        | Civil                                                                                                                                                                                                                                                                                   | 11-1 | n/a | n/a |
| 2nd para. Where did the phrase "benefit of being constructed in phases over a 40 to 50 yr. time period" come from. If this is the case for the two levee alts. then a benefit of the "T-wall" is immediate protection to project flood height. |                                                                                                                                                                                                                                                                                         |      |     |     |

|                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|-----|
| Submitted By: <a href="#">Silas Cunningham</a> (504-468-6129). Submitted On: 01-Aug-08                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |     |
| 1-0                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Evaluation Concurred</b><br>The phrase is based upon the year 2057 build out date and the lift schedule. We added the fact that this is a benefit.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 01-Aug-08                                                                                                                                                                       |      |                  |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                  | <i>Backcheck not conducted</i>                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                  | Current Comment Status: <b>Comment Open</b>                                                                                                                                                                                                                                                                                                                                                                            |      |                  |     |
| 2029397                                                                                                                                                                                                                                                                                                                                                                                                          | Civil                                                                                                                                                                                                                                                                                                                                                                                                                  | n/a' | C-301-T          | n/a |
| Sheet C-301-T shows the existing levee to be cut to grade, whereas Page 5-3 and 6-10 call for this existing levee to be used as a barge barrier. Please clarify                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |     |
| Submitted By: <a href="#">Frank Liang</a> (504-438-6129). Submitted On: 01-Aug-08                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |     |
| 1-0                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Evaluation Concurred</b><br>This has been clarified. SOW called for existing levee to be barge barrier. Under the type 2 T-wall, this criteria was met. For the type 1 T-wall, there was a slight offset in the T-wall so the existing levee was degraded and a berm was constructed to replace it as the barge barrier.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 01-Aug-08 |      |                  |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                  | <i>Backcheck not conducted</i>                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                  | Current Comment Status: <b>Comment Open</b>                                                                                                                                                                                                                                                                                                                                                                            |      |                  |     |
| 2029398                                                                                                                                                                                                                                                                                                                                                                                                          | Civil                                                                                                                                                                                                                                                                                                                                                                                                                  | n/a' | Page 5-1 and 5-3 | n/a |
| Page 5-1 and 5-3 gives a description of the limits of the reinforced and un-reinforced levee sections. In these descriptions there is a mention of a T-wall at the beginning and end of the earthen levee sections. A description of the type of T-wall should be included in the description and a reference to the T-wall (Section 5-3) should be made to explain the reasoning behind the two types of walls. |                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |     |
| Submitted By: <a href="#">Frank Liang</a> (504-438-6129). Submitted On: 01-Aug-08                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |     |
| 1-0                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Evaluation Concurred</b><br>A brief T-wall discussion was added along with a reference to the other section.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 01-Aug-08                                                                                                                                                                                                             |      |                  |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                  | <i>Backcheck not conducted</i>                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                  | Current Comment Status: <b>Comment Open</b>                                                                                                                                                                                                                                                                                                                                                                            |      |                  |     |
| 2029401                                                                                                                                                                                                                                                                                                                                                                                                          | Civil                                                                                                                                                                                                                                                                                                                                                                                                                  | n/a' | Page 9-5 and 9-9 | n/a |
| Page 9-5 and page 9-9 denotes an estimated construction time. Is this time for all lifts or just the first one. A comment should be made to address the time frame between the different lifts for the levee alternatives.                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |     |
| Submitted By: <a href="#">Frank Liang</a> (504-438-6129). Submitted On: 01-Aug-08                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |     |
| 1-0                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Evaluation Concurred</b><br>This is for 1st lift only. We have clarified this and discussed the time between lifts.<br><br>Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 01-Aug-08                                                                                                                                                                                                      |      |                  |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                  | <i>Backcheck not conducted</i>                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |     |
|                                                                                                                                                                                                                                                                                                                                                                                                                  | Current Comment Status: <b>Comment Open</b>                                                                                                                                                                                                                                                                                                                                                                            |      |                  |     |

|                                                                                                                                                                               |                                                                                     |      |     |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|-----|-----|
| 2029402                                                                                                                                                                       | Civil                                                                               | n/a' | n/a | n/a |
| In the construction cost estimates, please clarify whether the cost for the pile load test covers both the H-Piles and the pipe piles.                                        |                                                                                     |      |     |     |
| Submitted By: <a href="#">Frank Liang</a> (504-438-6129). Submitted On: 01-Aug-08                                                                                             |                                                                                     |      |     |     |
| 1-0                                                                                                                                                                           | Evaluation Concurred<br>We will note this in the calculations appendix.             |      |     |     |
|                                                                                                                                                                               | Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 01-Aug-08 |      |     |     |
|                                                                                                                                                                               | <i>Backcheck not conducted</i>                                                      |      |     |     |
|                                                                                                                                                                               | Current Comment Status: <a href="#">Comment Open</a>                                |      |     |     |
| 2029404                                                                                                                                                                       | Civil                                                                               | n/a' | n/a | n/a |
| A line item in the cost estimates for the earthen levee sections should be included to address the drainage required for the rainfall runoff from the earthen levee sections. |                                                                                     |      |     |     |
| Submitted By: <a href="#">Frank Liang</a> (504-438-6129). Submitted On: 01-Aug-08                                                                                             |                                                                                     |      |     |     |
| 1-0                                                                                                                                                                           | Evaluation Concurred<br>This has been added.                                        |      |     |     |
|                                                                                                                                                                               | Submitted By: <a href="#">Scott Chehardy</a> (504-466-5667) Submitted On: 01-Aug-08 |      |     |     |
|                                                                                                                                                                               | <i>Backcheck not conducted</i>                                                      |      |     |     |
|                                                                                                                                                                               | Current Comment Status: <a href="#">Comment Open</a>                                |      |     |     |

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**ALGIERS CANAL LEVEE WEST, ALGIERS LOCK TO HWY. 23, WBV-47.2  
B/L STA. 770+70 TO STA. 978+18  
ORLEANS AND PLAQUEMINES PARISHES, LOUISIANA  
CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5**

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**APPENDIX 'H'**

**UTILITY QUESTIONNAIRES**

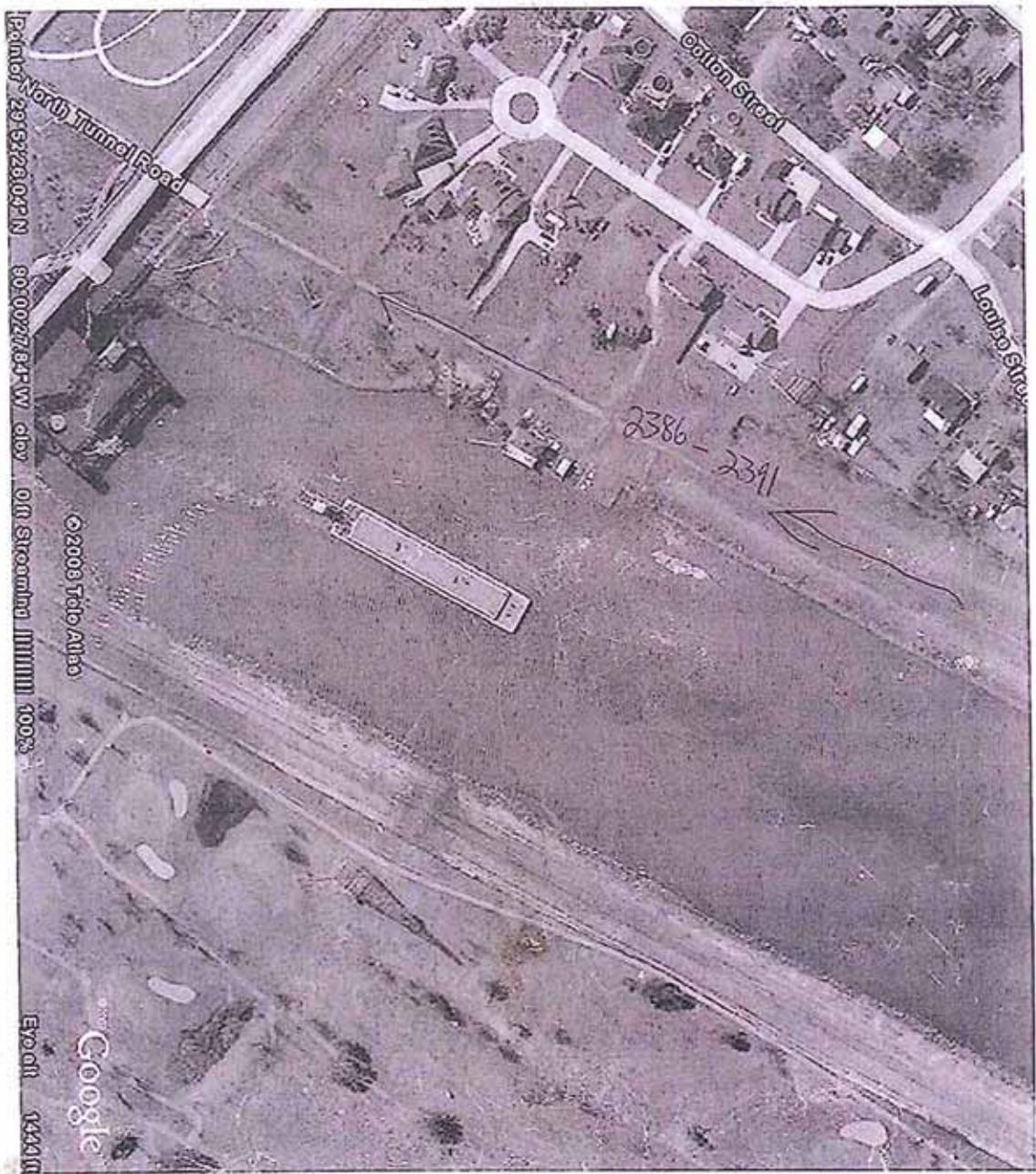
**West Bank and Vicinity Hurricane Protection Project  
Phase 2 Hurricane Protection  
Algiers Canal Levee West. Algiers Lock to Hwy 23 (WBV 47.2)  
B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana  
Contract No. W912P8-08-D-0002-Task Order 0005**

## Field and Phone Log

**West Bank and Vicinity Hurricane Protection Project Phase 2 Hurricane Protection Algiers Canal Levee West, Algiers Lock to Hwy 23 (NYBV 47.2) R/L Sta. 770+70 to Sta. 978+18 Orleans and Plaquemines Parishes, Louisiana Contract No. W912P8-08-D-0002-Task Order 0005**

**UTILITY CONTACTS**

| Utility Company                      | Contact                                         | Phone Number                            | Mailing Address                                                                                  | Description                                |
|--------------------------------------|-------------------------------------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------|
| Atmos Gas                            | Brian Blum                                      | 504-362-5258                            |                                                                                                  |                                            |
| Bellsouth                            | Mike Waguestock                                 | 504-289-6633                            | 840 Poydras St.<br>Room 1419<br>New Orleans, LA 70112                                            | near bridge 3 - 7" communication lines     |
| Entergy (Transmission Lines)         | Lee Vincent                                     | 504-343-1809                            | 1000 W. Hariman Court<br>Metairie, LA 70001                                                      |                                            |
| Entergy (Distribution Lines)         | Glen Scorzene                                   | 504-640-2513                            | 4809 Jefferson Hwy.<br>Jefferson, LA 70121                                                       | 4 transmission line crossings              |
| Gulf South Pipeline                  | Gerald Roser                                    | 504-469-5903 ext 236                    | 520 Alliance Street<br>LA 70062                                                                  | possible distribution lines feeding bridge |
| New Orleans Sewerage and Water Board | Jack Hurkamp                                    | 504-985-0412                            | 8800 S. Claiborne Ave.<br>New Orleans, LA 70118                                                  | 12" water main & 42" sewer force main      |
| Bridgeline Holdings, L.P. (Chevron)  | Steven Davis<br>Jeff Pendleton (local engineer) | 713-432-6174 Bridgeline<br>985-898-1012 | 100 Northpark Blvd.<br>Suite N110A<br>Covington, LA 70433<br>mail steven.davis@chevron.com<br>E- | 22" gas main                               |



(1)



(2)



Poinier 29°52'51.10"N

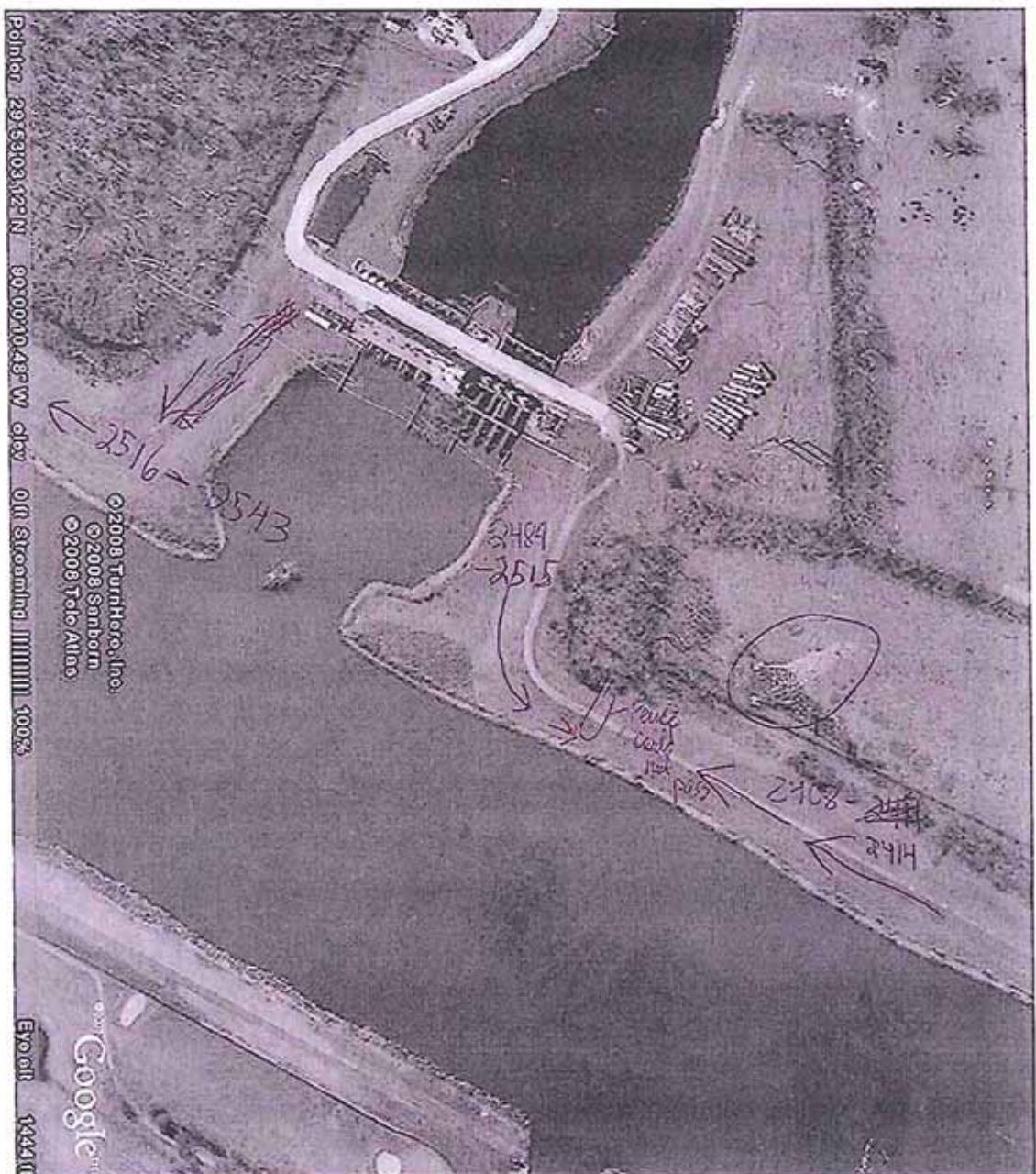
80°00'14.66"W elev

Off Streaming 111111 10025

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©2008 TerraMetrics

Google Earth

(3)



(4)

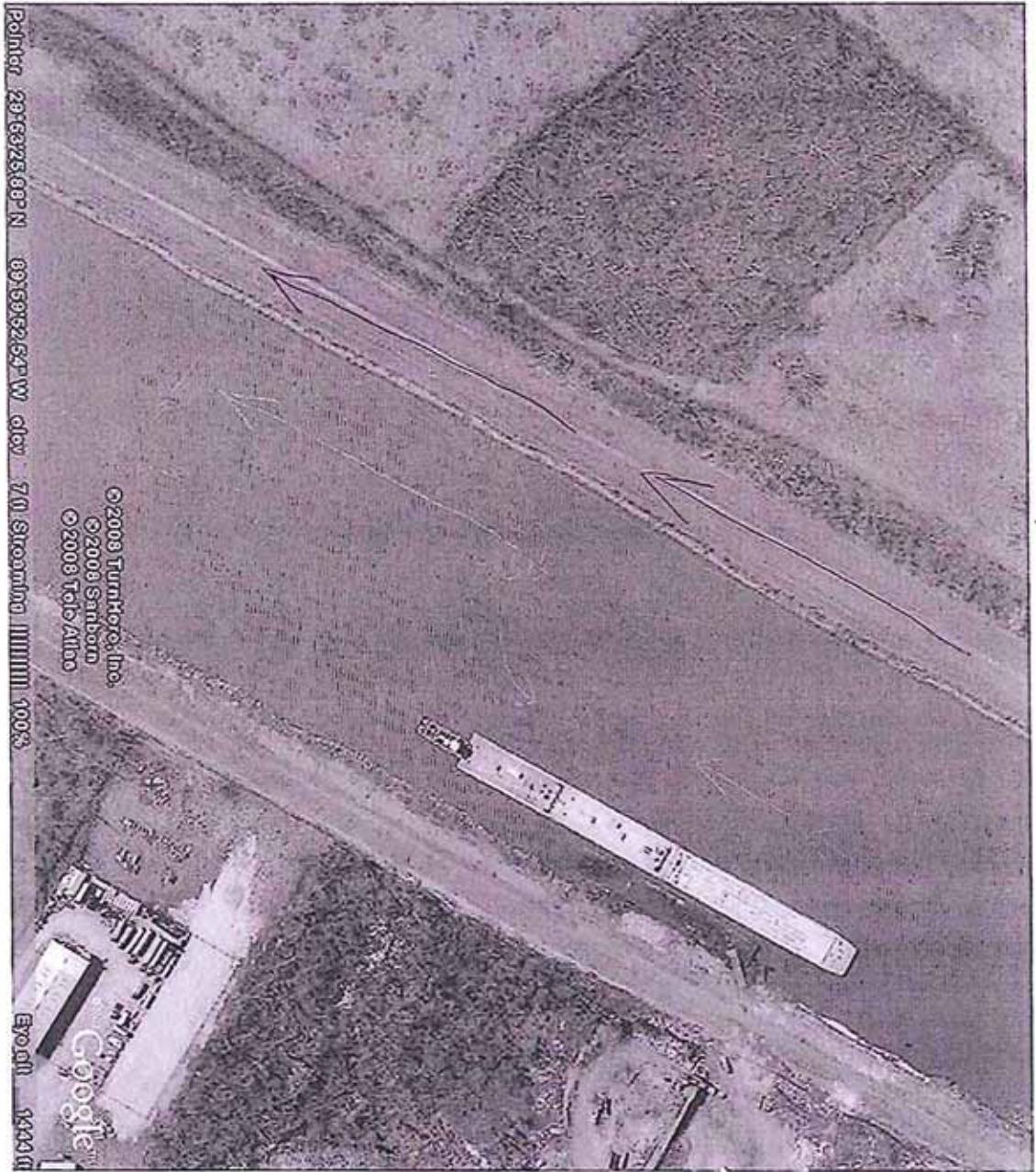


[Point] 2953N1403W

9010002007W clay 10 streaming 111111 100%

Google  
Elev. 1444ft

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©2008 Tele Atlas

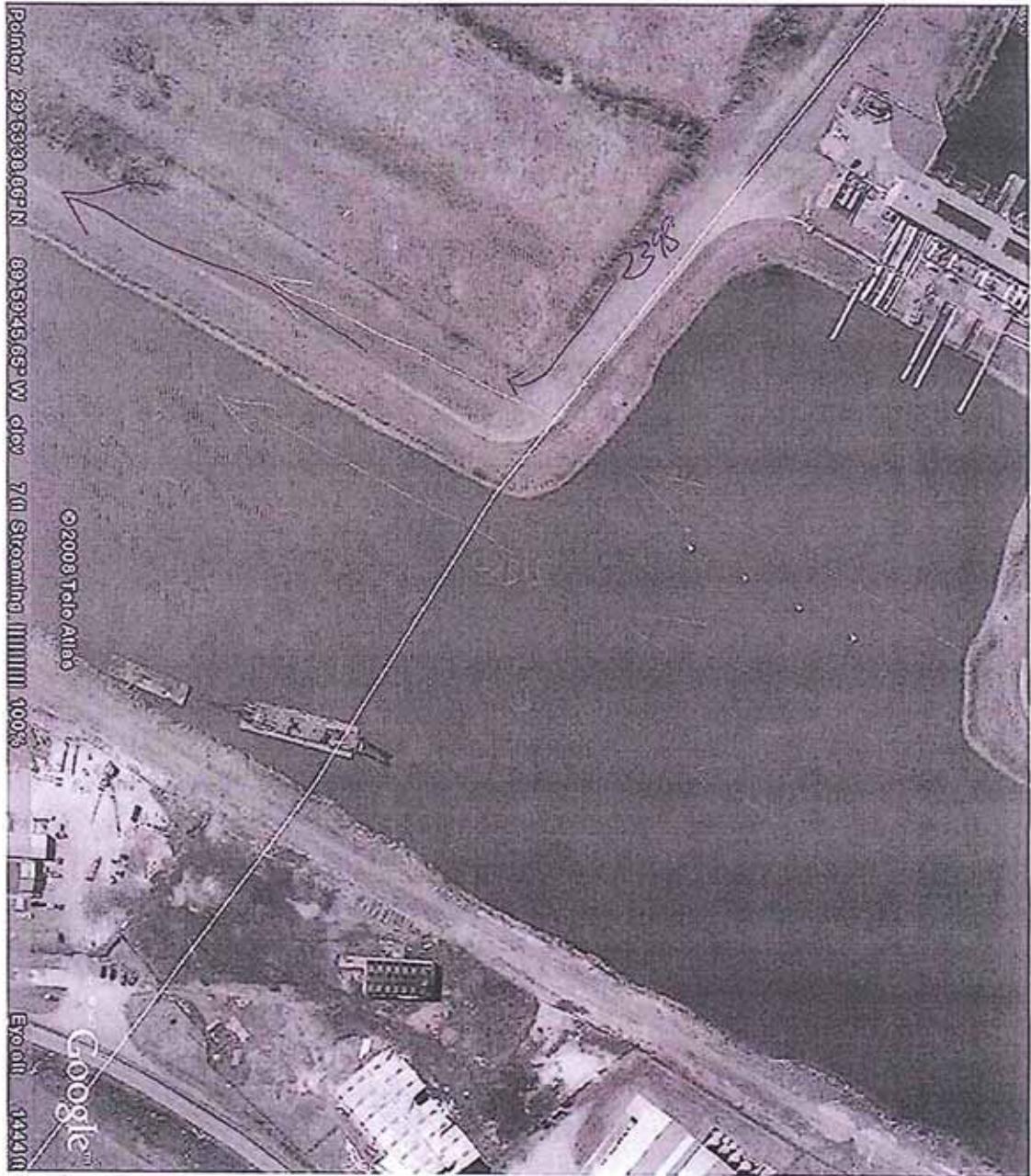


[Pointer] 29°56'32.5"N

89°58'52.54"W elev 7.01 Screenshot 111111 100%

© 2008 TurnHove, Inc.  
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© 2008 Tele Atlas

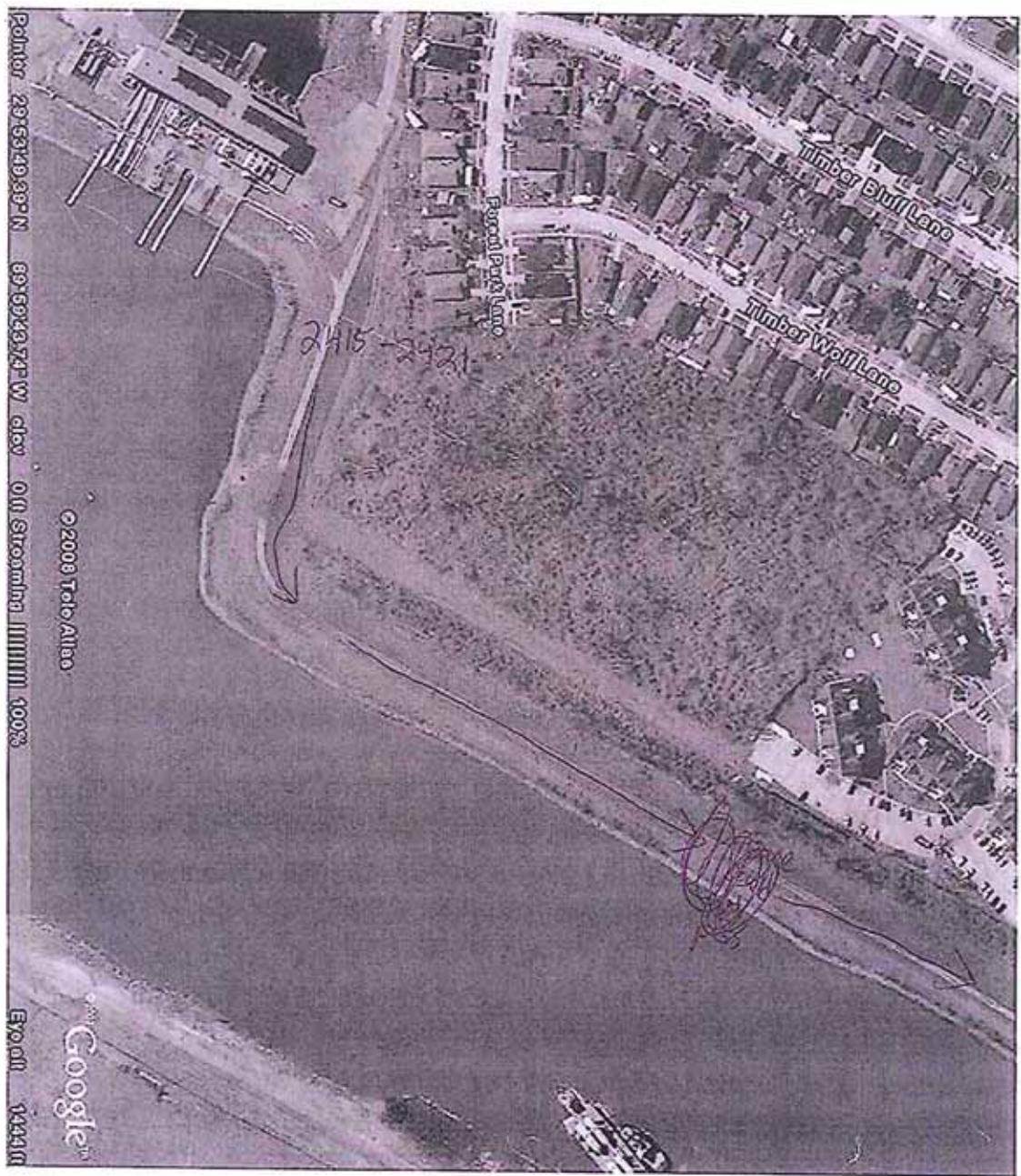
Google  
Earth



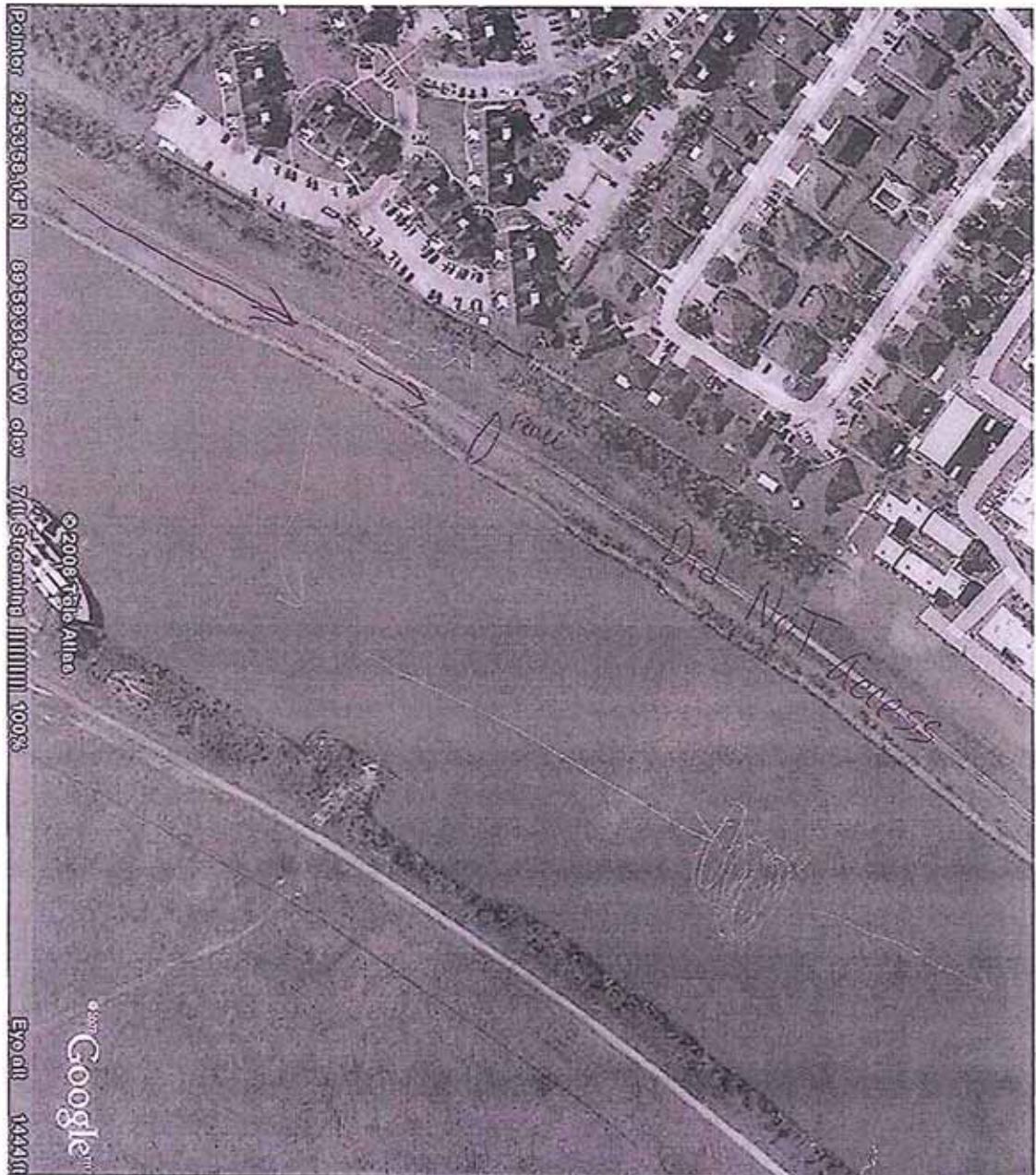
Pointer 29°53'38.66"N 89°59'45.65"W elev 7.01 Screening 11111111100%

©2008 Tele Atlas

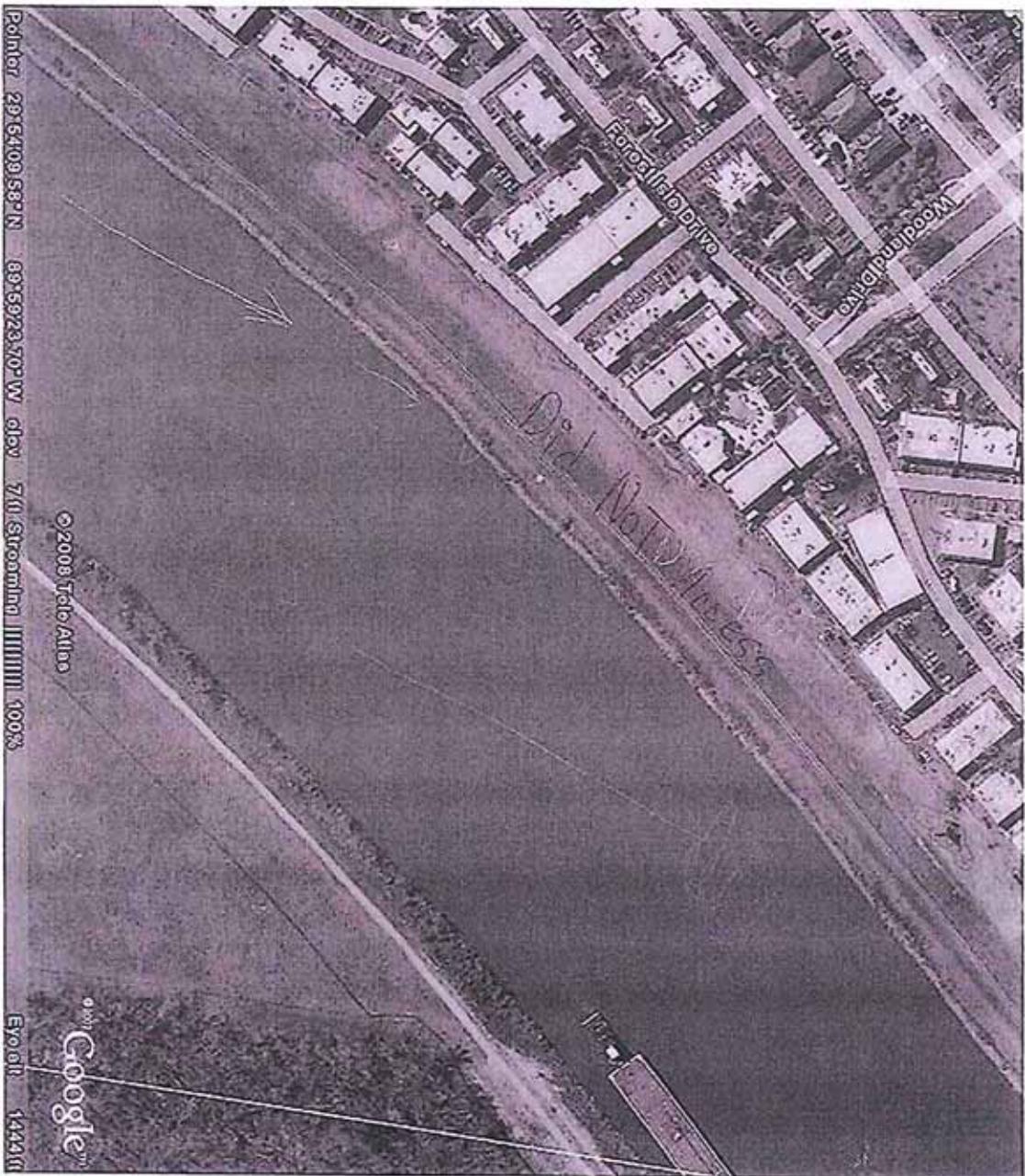
Google  
Elev 6ft 14440



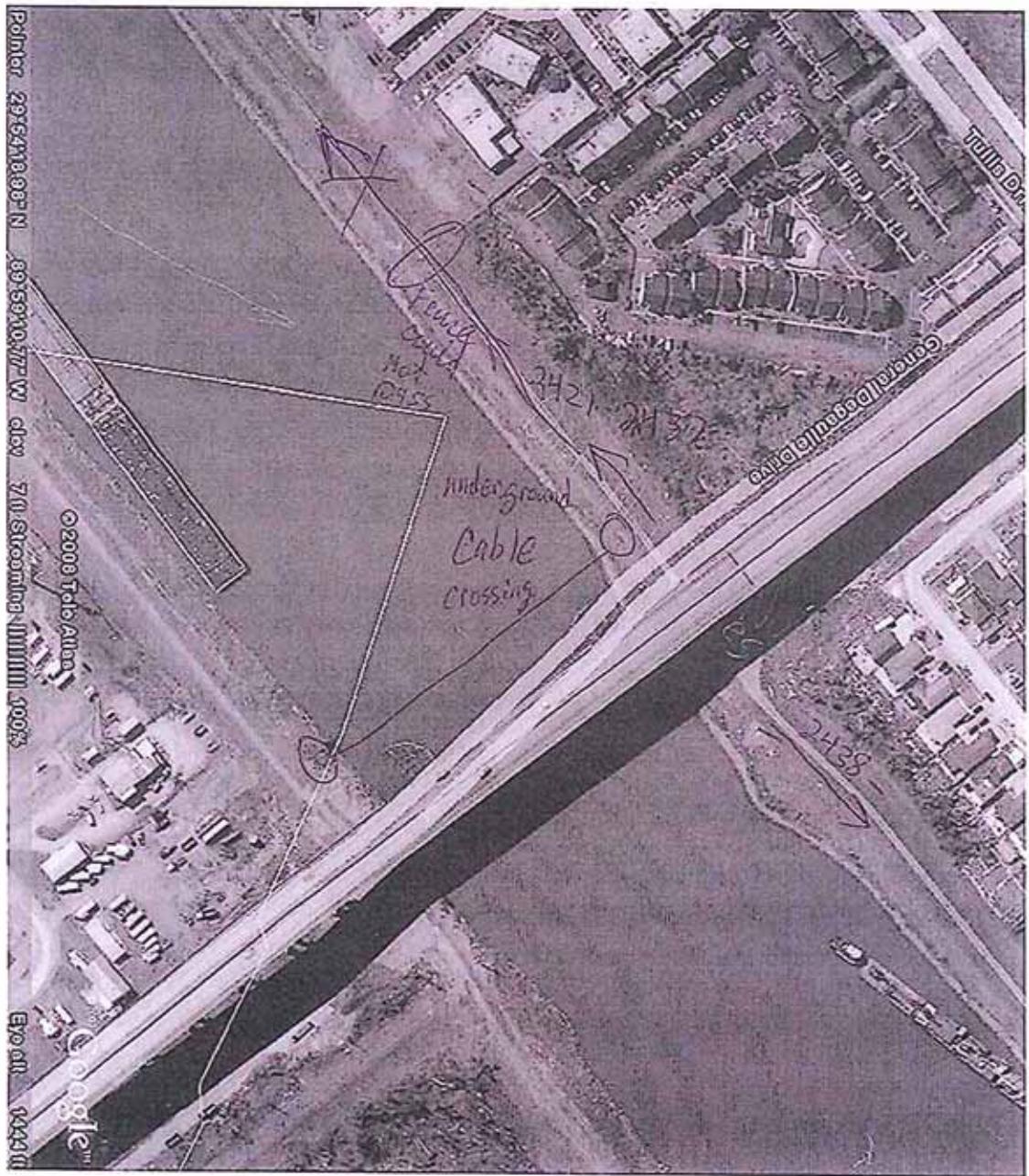
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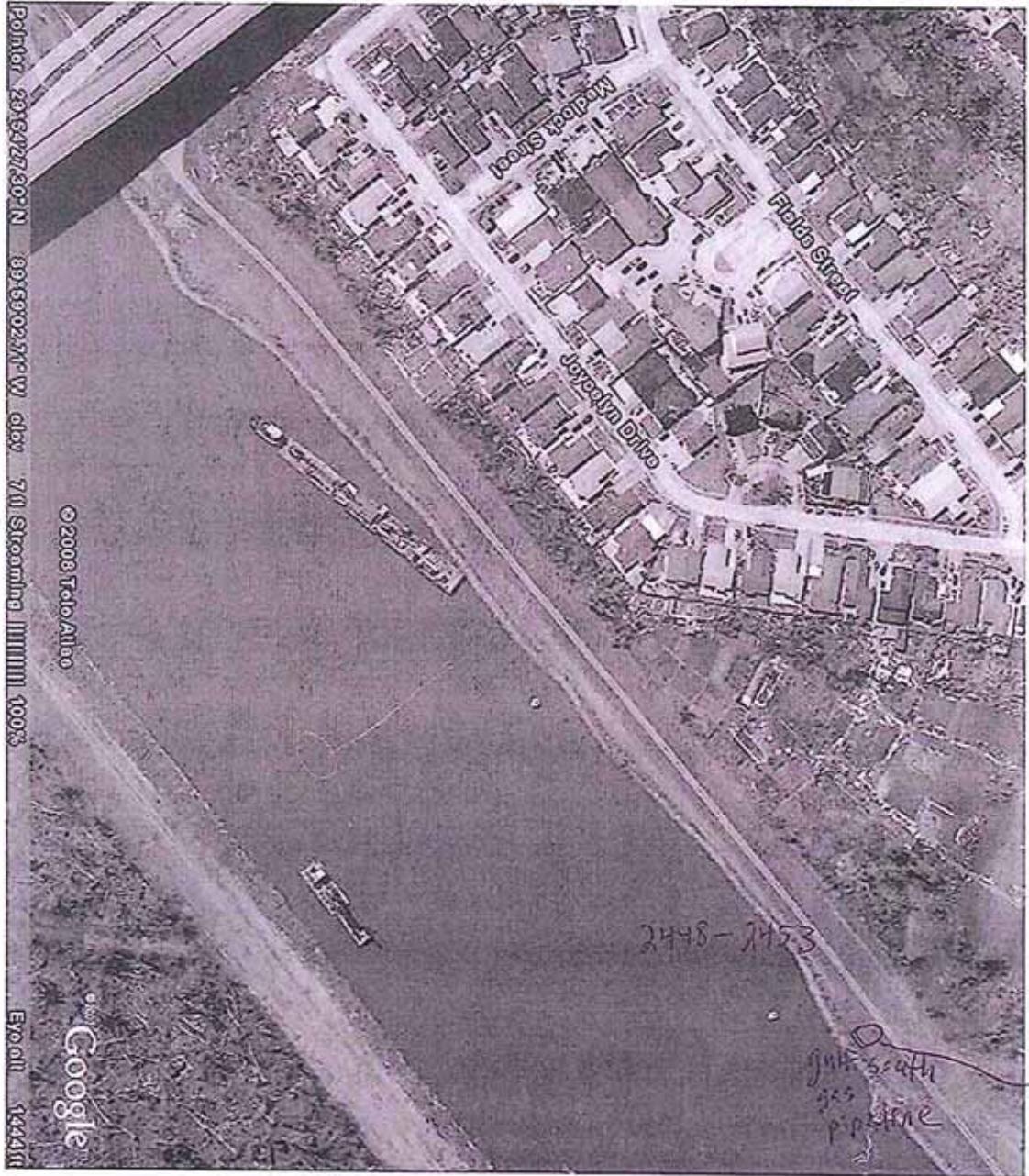
9



10



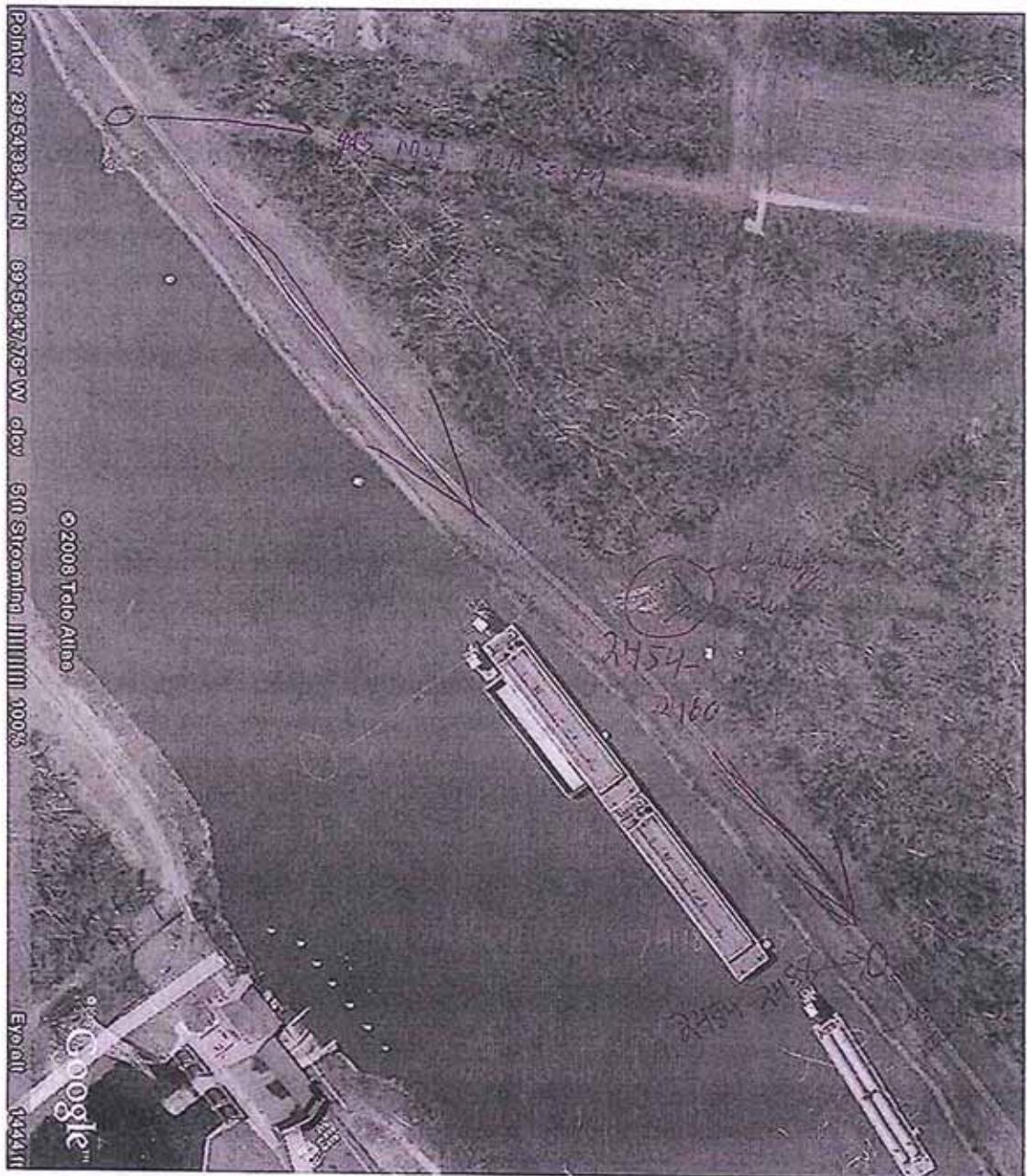
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Pointer 29°54'22.302N 89°46'02.713W elev 7.0 Screenshot 111111 100%

©2008 Tele Atlas  
Google

Event 14445



(13)

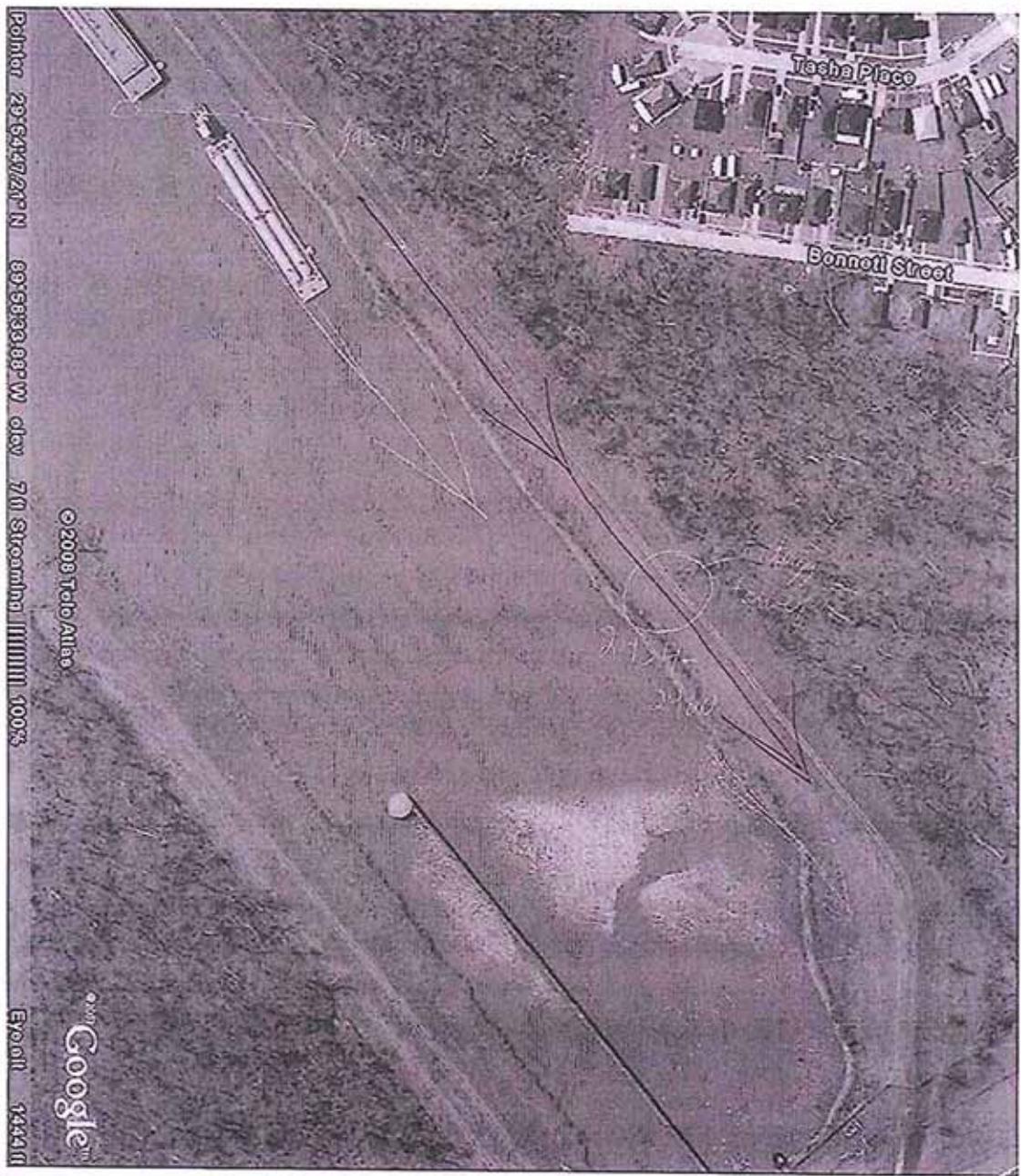
Pointer 29°54'38.41"N

89°58'47.76"W elev 5ft Streaming 111111 100%

©2008 Tele Atlas

Elevation 1343ft

Google™



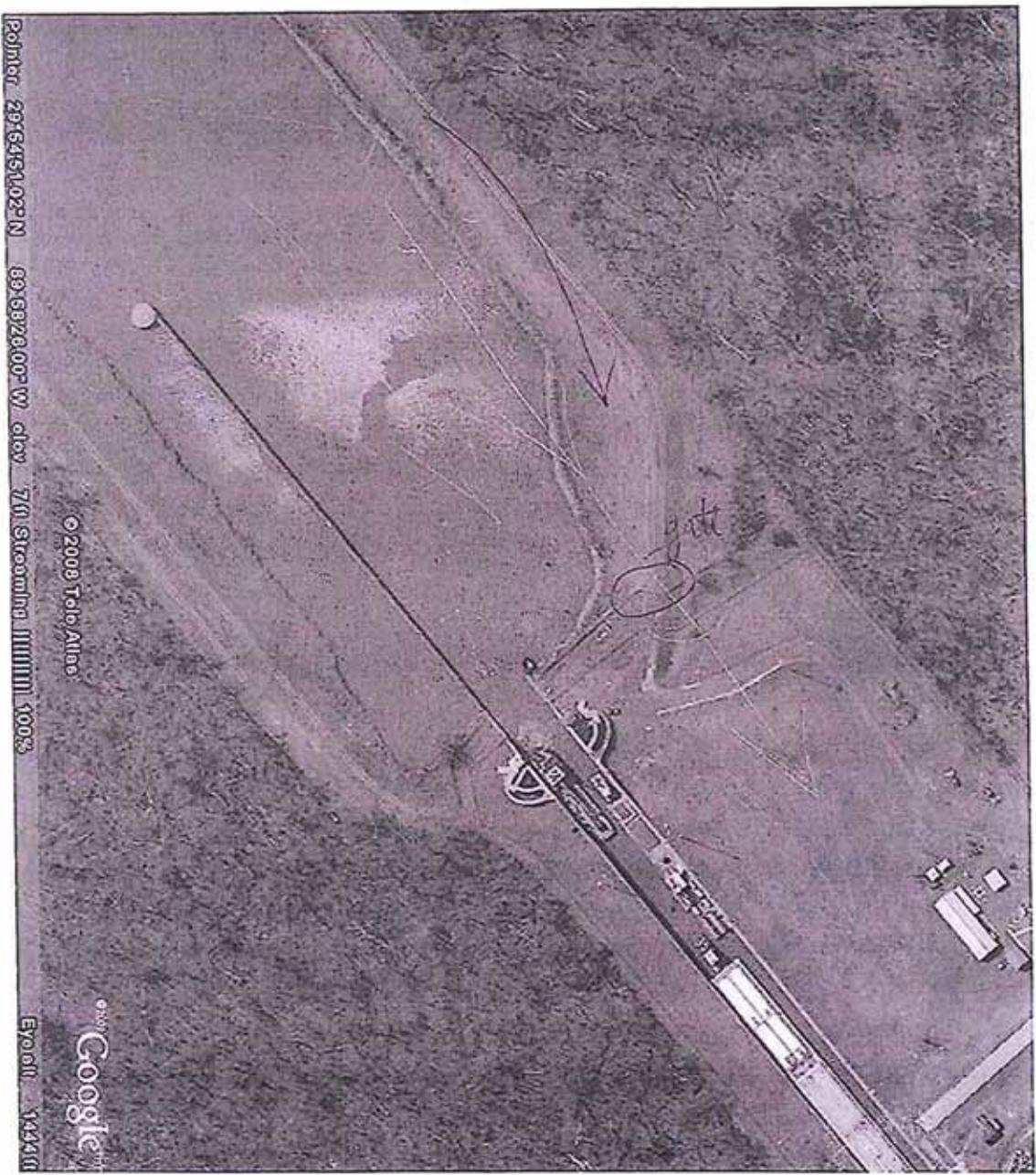
Pointer 29°54'47.2"N 09°59'33.0"E elev. 70 Streaming 111111 100%

©2008 Tele Atlas

Google™

Elevation: 1444 ft

(14)



Point A 29°56'51.022"N

89°59'26.007"W elev. 761 Streaming 111111 100%

© 2008 Tele Atlas

Elevation 1444ft

Google Earth

(15)

# Hartman Engineering, Inc.

Consulting Engineers

April 28, 2008

Mr. Gerald Roser  
Gulf South Pipeline  
520 Alliance Street  
Kenner, LA 70062

Subject: West Bank and Vicinity Hurricane Protection Project  
Phase 2 Hurricane Protection  
Algiers Canal Levee West. Algiers Lock to Hwy 23 (WBV 47.2)  
B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana  
Contract No. W912P8-08-D-0002-Task Order 0005

Dear Mr. Roser:

On behalf of the US Army Corps of Engineers, we are in the process of performing an engineering alternative study to determine the best method for raising the levee located on the west side of the Algiers Canal from the Algiers Lock to LA Hwy 23. This expedited study covers approximately four miles of levee and will evaluate at least three alternatives.

One important feature of the project is identifying existing utilities that may be impacted by raising the levee. Any utilities crossing the Algiers Canal within the boundary of this project will definitely be impacted in some manner and are of interest to us. Additionally, any utilities paralleling the canal on the west side will be of interest to us if they are within 300-feet of the levee (excluding the east side of the canal).

This is a fast track study with a very tight schedule. It is our understanding that the results of the report, which includes preliminary design, will lead very quickly to preparation of plans and specs followed by construction. Your prompt attention to this request is greatly appreciated.

We ask that you complete the enclosed questionnaire for all utilities you own within the boundaries of this project. Basic plan and profile sheets with the USACE baseline has been provided. Should you have any questions, please feel free to contact me.

Sincerely,  
**Hartman Engineering, Inc.**



Ryan Foster, E.I.

Enclosure

# Hartman Engineering, Inc.

Consulting Engineers

April 28, 2008

Mr. Jack Hurkamp  
New Orleans Sewerage and Water Board  
8800 S. Claiborne Ave.  
New Orleans, LA 70118

Subject: West Bank and Vicinity Hurricane Protection Project  
Phase 2 Hurricane Protection  
Algiers Canal Levee West. Algiers Lock to Hwy 23 (WBV 47.2)  
B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana  
Contract No. W912P8-08-D-0002-Task Order 0005

Dear Mr. Hurkamp:

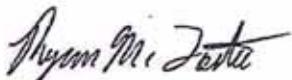
On behalf of the US Army Corps of Engineers, we are in the process of performing an engineering alternative study to determine the best method for raising the levee located on the west side of the Algiers Canal from the Algiers Lock to LA Hwy 23. This expedited study covers approximately four miles of levee and will evaluate at least three alternatives.

One important feature of the project is identifying existing utilities that may be impacted by raising the levee. Any utilities crossing the Algiers Canal within the boundary of this project will definitely be impacted in some manner and are of interest to us. Additionally, any utilities paralleling the canal on the west side will be of interest to us if they are within 300-feet of the levee (excluding the east side of the canal).

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Sincerely,  
**Hartman Engineering, Inc.**



Ryan Foster, E.I.

Enclosure

# Hartman Engineering, Inc.

*Consulting Engineers*

April 28, 2008

Mr. Glenn Scorsone  
Entergy (Distribution Line Division)  
4809 Jefferson Hwy.  
Jefferson, LA 70121

Subject: West Bank and Vicinity Hurricane Protection Project  
Phase 2 Hurricane Protection  
Algiers Canal Levee West. Algiers Lock to Hwy 23 (WBV 47.2)  
B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana  
Contract No. W912P8-08-D-0002-Task Order 0005

Dear Mr. Scorsone:

On behalf of the US Army Corps of Engineers, we are in the process of performing an engineering alternative study to determine the best method for raising the levee located on the west side of the Algiers Canal from the Algiers Lock to LA Hwy 23. This expedited study covers approximately four miles of levee and will evaluate at least three alternatives.

One important feature of the project is identifying existing utilities that may be impacted by raising the levee. Any utilities crossing the Algiers Canal within the boundary of this project will definitely be impacted in some manner and are of interest to us. Additionally, any utilities paralleling the canal on the west side will be of interest to us if they are within 300-feet of the levee (excluding the east side of the canal).

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We ask that you complete the enclosed questionnaire for all utilities you own within the boundaries of this project. Basic plan and profile sheets with the USACE baseline has been provided. Should you have any questions, please feel free to contact me.

Sincerely,  
**Hartman Engineering, Inc.**



Ryan Foster, E.I.

Enclosure

# Hartman Engineering, Inc.

Consulting Engineers

April 28, 2008

Mr. Lee Vincent  
Entergy (Transmission Line Division)  
1000 W. Harimaw Court  
Metairie, LA 70001

Subject: West Bank and Vicinity Hurricane Protection Project  
Phase 2 Hurricane Protection  
Algiers Canal Levee West. Algiers Lock to Hwy 23 (WBV 47.2)  
B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana  
Contract No. W912P8-08-D-0002-Task Order 0005

Dear Mr. Vincent:

On behalf of the US Army Corps of Engineers, we are in the process of performing an engineering alternative study to determine the best method for raising the levee located on the west side of the Algiers Canal from the Algiers Lock to LA Hwy 23. This expedited study covers approximately four miles of levee and will evaluate at least three alternatives.

One important feature of the project is identifying existing utilities that may be impacted by raising the levee. Any utilities crossing the Algiers Canal within the boundary of this project will definitely be impacted in some manner and are of interest to us. Additionally, any utilities paralleling the canal on the west side will be of interest to us if they are within 300-feet of the levee (excluding the east side of the canal).

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We ask that you complete the enclosed questionnaire for all utilities you own within the boundaries of this project. Basic plan and profile sheets with the USACE baseline has been provided. Should you have any questions, please feel free to contact me.

Sincerely,  
**Hartman Engineering, Inc.**



Ryan Foster, E.I.

Enclosure

# Hartman Engineering, Inc.

Consulting Engineers

May 6, 2008

Mr. Steven Davis  
Chevron  
100 Northpark Blvd.  
Suite N1110A  
Covington, LA 70433

Subject: West Bank and Vicinity Hurricane Protection Project  
Phase 2 Hurricane Protection  
Algiers Canal Levee West. Algiers Lock to Hwy 23 (WBV 47.2)  
B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana  
Contract No. W912P8-08-D-0002-Task Order 0005

Dear Mr. Davis:

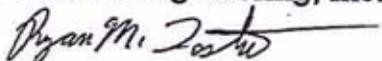
On behalf of the US Army Corps of Engineers, we are in the process of performing an engineering alternative study to determine the best method for raising the levee located on the west side of the Algiers Canal from the Algiers Lock to LA Hwy 23. This expedited study covers approximately four miles of levee and will evaluate at least three alternatives.

One important feature of the project is identifying existing utilities that may be impacted by raising the levee. Any utilities crossing the Algiers Canal within the boundary of this project will definitely be impacted in some manner and are of interest to us. Additionally, any utilities paralleling the canal on the west side will be of interest to us if they are within 300-feet of the levee (excluding the east side of the canal).

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We ask that you complete the enclosed questionnaire for all utilities you own within the boundaries of this project. Basic plan and profile sheets with the USACE baseline has been provided. Should you have any questions, please feel free to contact me.

Sincerely,  
**Hartman Engineering, Inc.**



Ryan Foster, E.I.

Enclosure

PF

# Hartman Engineering, Inc.

Consulting Engineers

April 28, 2008

G. M. Waguespack  
Specialist - OSP Facility Design  
840 Poydras St.  
Room 1419  
New Orleans, LA 70112

Subject: West Bank and Vicinity Hurricane Protection Project  
Phase 2 Hurricane Protection  
Algiers Canal Levee West. Algiers Lock to Hwy 23 (WBV 47.2)  
B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana  
Contract No. W912P8-08-D-0002-Task Order 0005

Dear Mr. Waguespack:

On behalf of the US Army Corps of Engineers, we are in the process of performing an engineering alternative study to determine the best method for raising the levee located on the west side of the Algiers Canal from the Algiers Lock to LA Hwy 23. This expedited study covers approximately four miles of levee and will evaluate at least three alternatives.

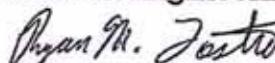
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We ask that you complete the enclosed questionnaire for all utilities you own within the boundaries of this project. Basic plan and profile sheets with the USACE baseline has been provided. Should you have any questions, please feel free to contact me.

Sincerely,

**Hartman Engineering, Inc.**



Ryan Foster, E.I.

Enclosure

**U.S. ARMY CORPS OF ENGINEERS  
NEW ORLEANS DISTRICT  
DESCRIPTIVE INFORMATION FOR COMMUNICATION LINES**

1. Company Name:

2. Description (trunk, primary, etc. ) :

3. Size (pair, gauge, etc. ) :

4. Type (aerial, buried, submerged, etc. ) :

5. Location

USACE Project Baseline Station:

Longitude, Latitude Coordinates:

6. Function Served:

7. Date Installed:

8. Design Life:

9. Total Length of Facility :

10. Current Status of Facility (active, inactive, abandoned, etc.)

11. Clearance (height from lowest line crossing over project to top elevation of project) :

12. Other Pertinent Data (manholes, towers, etc) :

(revised 9/04)

**U.S. ARMY CORPS OF ENGINEERS  
NEW ORLEANS DISTRICT  
COMPANY INFORMATION**

**West Bank and Vicinity Hurricane Protection Project**  
**Phase 2 Hurricane Protection**  
**Algiers Canal Levee West. Algiers Lock to Hwy 23 (WBV 47.2)**  
**B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana**  
**Contract No. W912P8-08-D-0002-Task Order 0005**

1. Official Name of Facility/Utility Owner, as reflected in the records of the Louisiana Secretary of State:

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2. Type of Business Entity (check one):

- Limited Liability Company (LLC)**  
 **Corporation**  
 **Partnership**  
 **Other (define):**

3. Provide name of state of incorporation:

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4. If the state of incorporation is not Louisiana, has the corporation registered with the Louisiana Secretary of State as a foreign corporation?

- YES**  
 **NO**

5. Provide information about nature of work or corporate purpose:

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6. Provide name, address, telephone number and e-mail address of person available for contact by Corps of Engineers:

Right-of-Way Department \_\_\_\_\_

Legal Department \_\_\_\_\_

Other \_\_\_\_\_

7. Provide information about real property upon which facilities are located.

Is it owned in fee, servitude, or leased?

\_\_\_\_\_

8. If facility owner has written recorded rights-of-way and/or lease, provide a copy of rights-of-way document and/or lease, and if the document is recorded, provide the recordation information.

9. Please explain any and all predecessor(s) in interest:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

10. Indicate width of right-of-way.

\_\_\_\_\_

11. If facility is a pipeline, is it a common carrier?

\_\_\_\_\_

12. If facility was placed pursuant to a permit, provide the name of agency that issued permit (including, but not limited to, permits for Section 10 of The Rivers and Harbors Act of 1899 and permits from municipalities or local governments), the permit number, and the date on which the permit was issued. Please attach a copy of the permit or the Corps of Engineers letter explaining that no permit was needed, if the company had applied for such a permit.

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13. The date the facility was first installed: \_\_\_\_\_

**U.S. ARMY CORPS OF ENGINEERS  
NEW ORLEANS DISTRICT  
DESCRIPTIVE INFORMATION FOR PIPELINES**

1. Company Name:

2. Size (Diameter) and Type of Facility:

3. Type of Construction (Steel, cast iron, etc):

4. Function Served (oil, gas, water, etc):

5. Location

USACE Project Baseline Station:

Longitude, Latitude Coordinates:

6. Date Installed:

7. Design Life:

8. Total Length of Facility:

10. Current Status of Facility (active, inactive, abandoned, etc.)

11. Other Pertinent Data (Manholes, Valves, etc) :

12. Depth of pipeline beneath levee or channel

**U.S. ARMY CORPS OF ENGINEERS  
NEW ORLEANS DISTRICT  
DESCRIPTIVE INFORMATION FOR POWERLINES**

1. Company Name:
2. Description (transmission, primary, distribution, etc.):
3. Size (voltage, gauge, etc.):
4. Type (aerial, buried, submerged, etc.):
5. Location of utility pole(s) supporting powerline.
  - a. USACE Project Baseline Station
  - b. Offset from levee centerline

5. Location (where line crosses levee centerline)

USACE Project Baseline Station:

Longitude, Latitude Coordinates:

6. Function Served:

7. Date Installed:

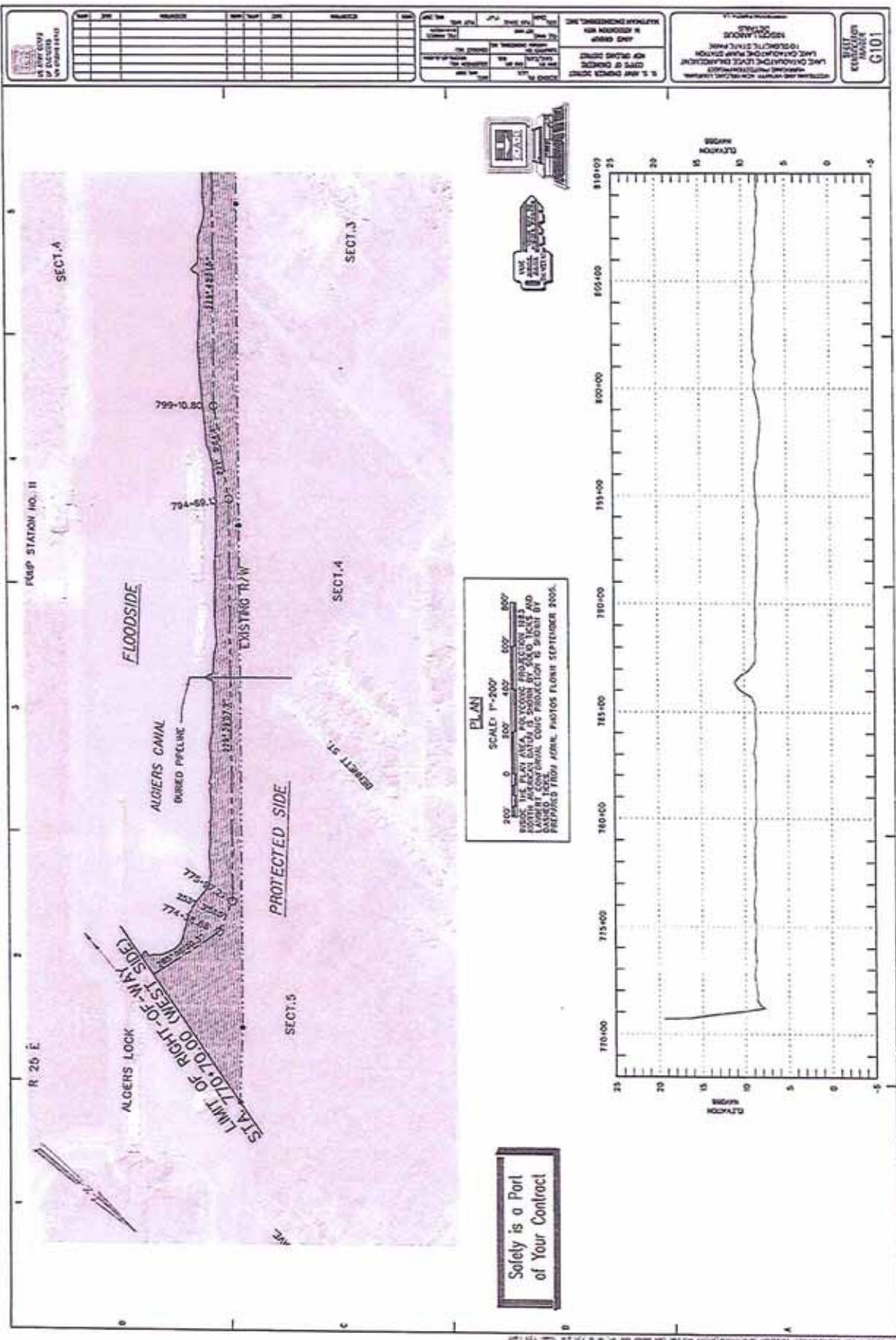
8. Design Life:

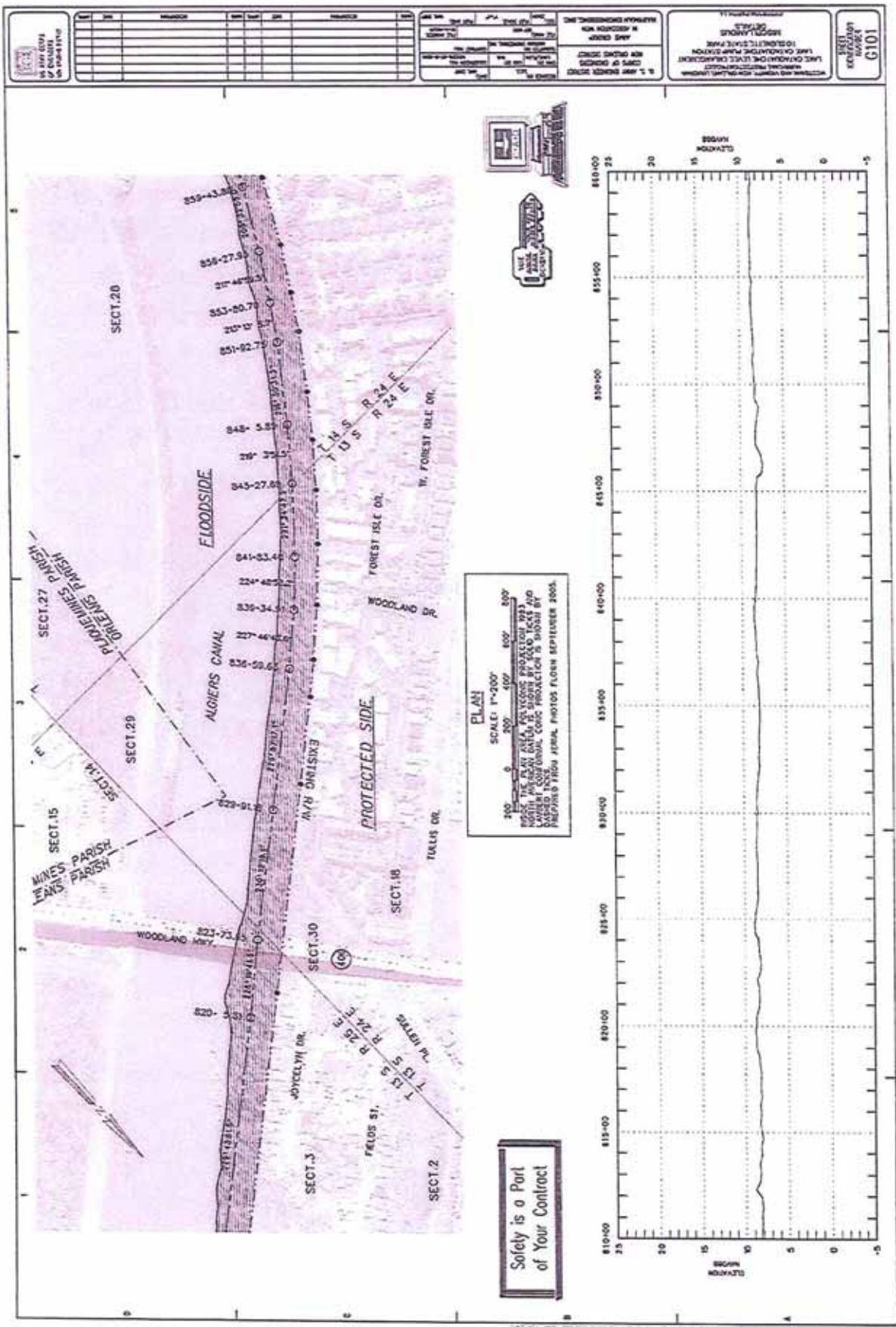
9. Total Length of Facility:

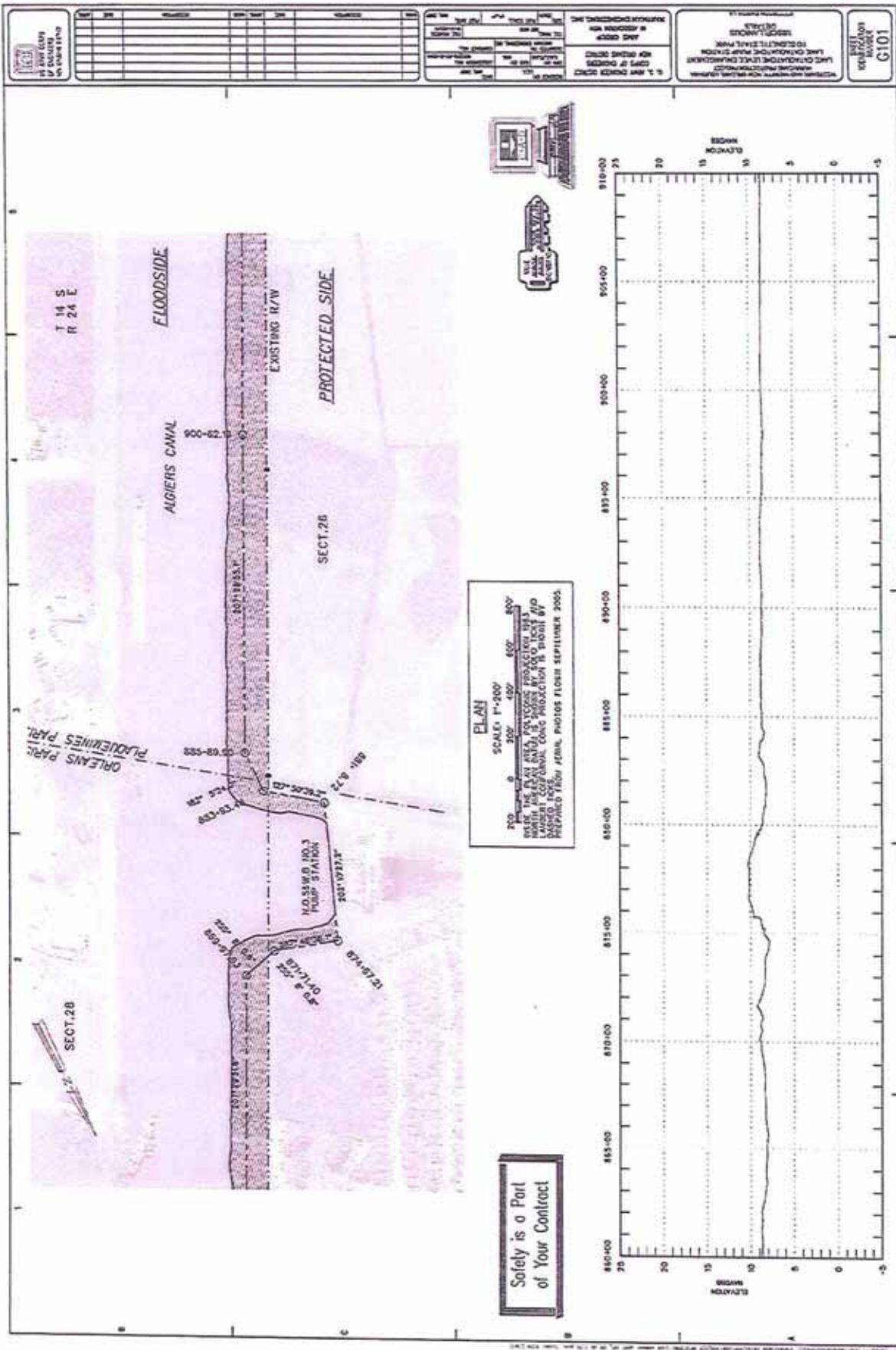
10. Current Status of Facility (active, inactive, abandoned, etc.):

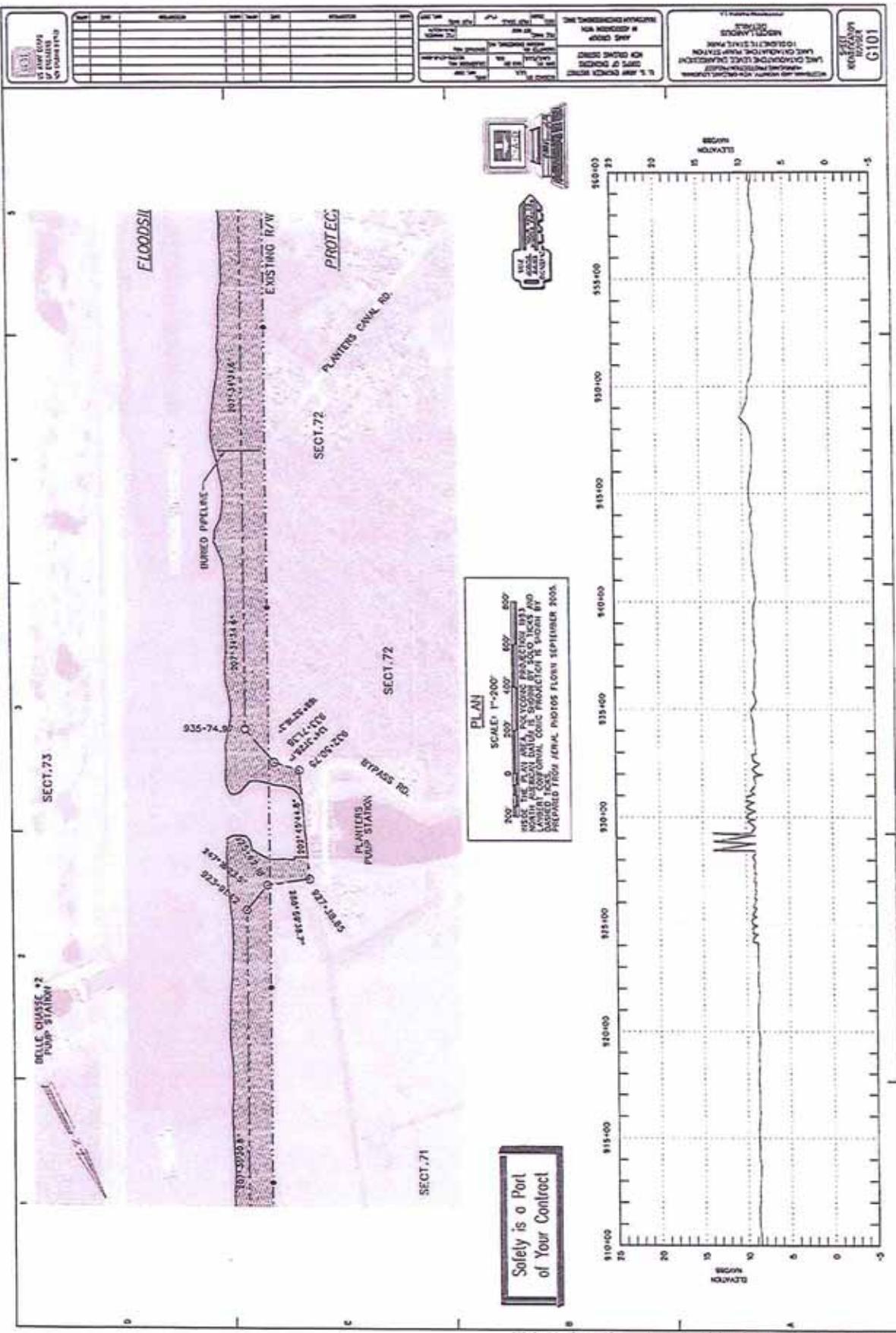
11. Clearance (height from lowest line crossing over project to top elevation of project):

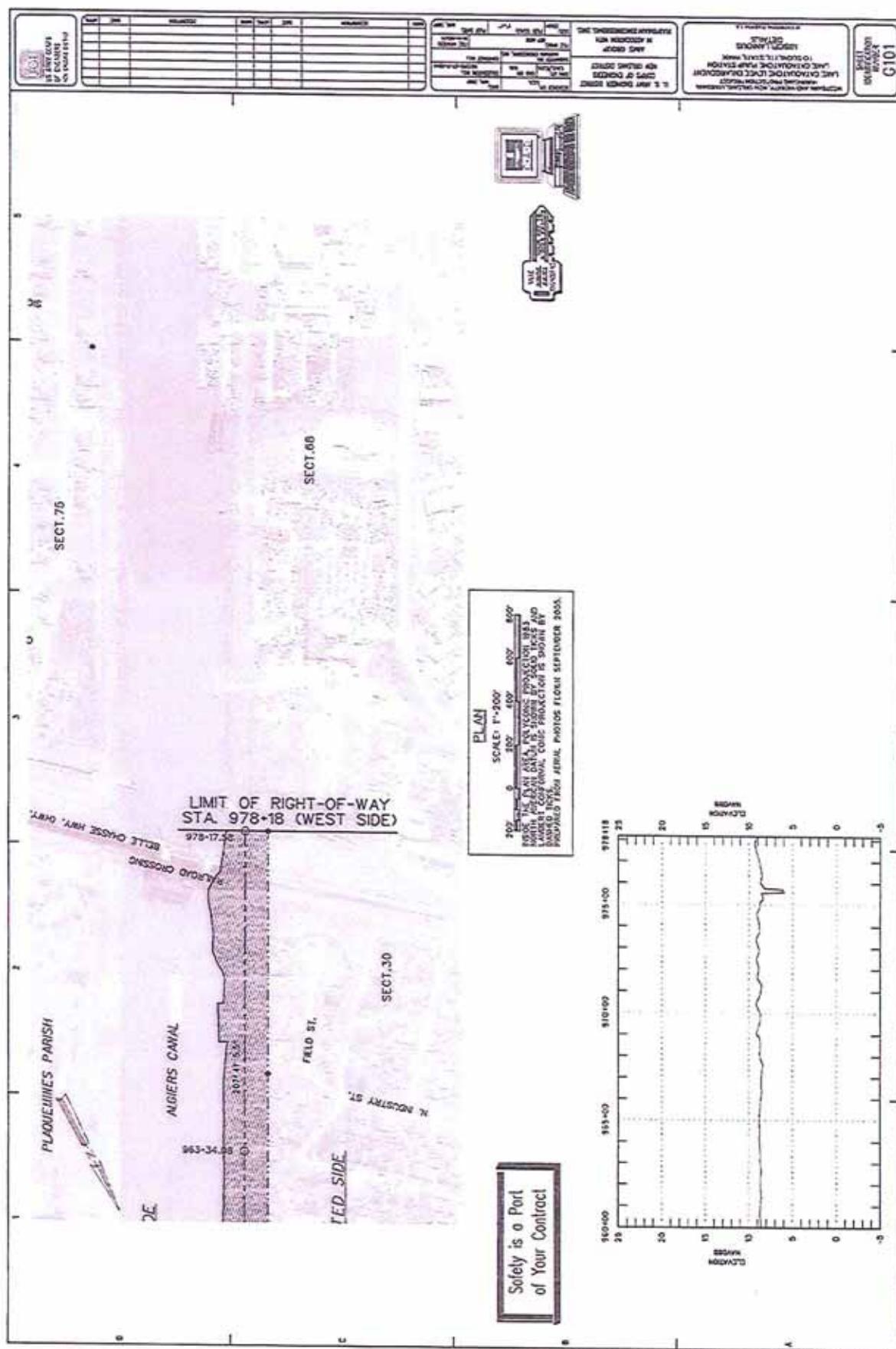
12. Other Pertinent Data (manholes, towers, etc.):



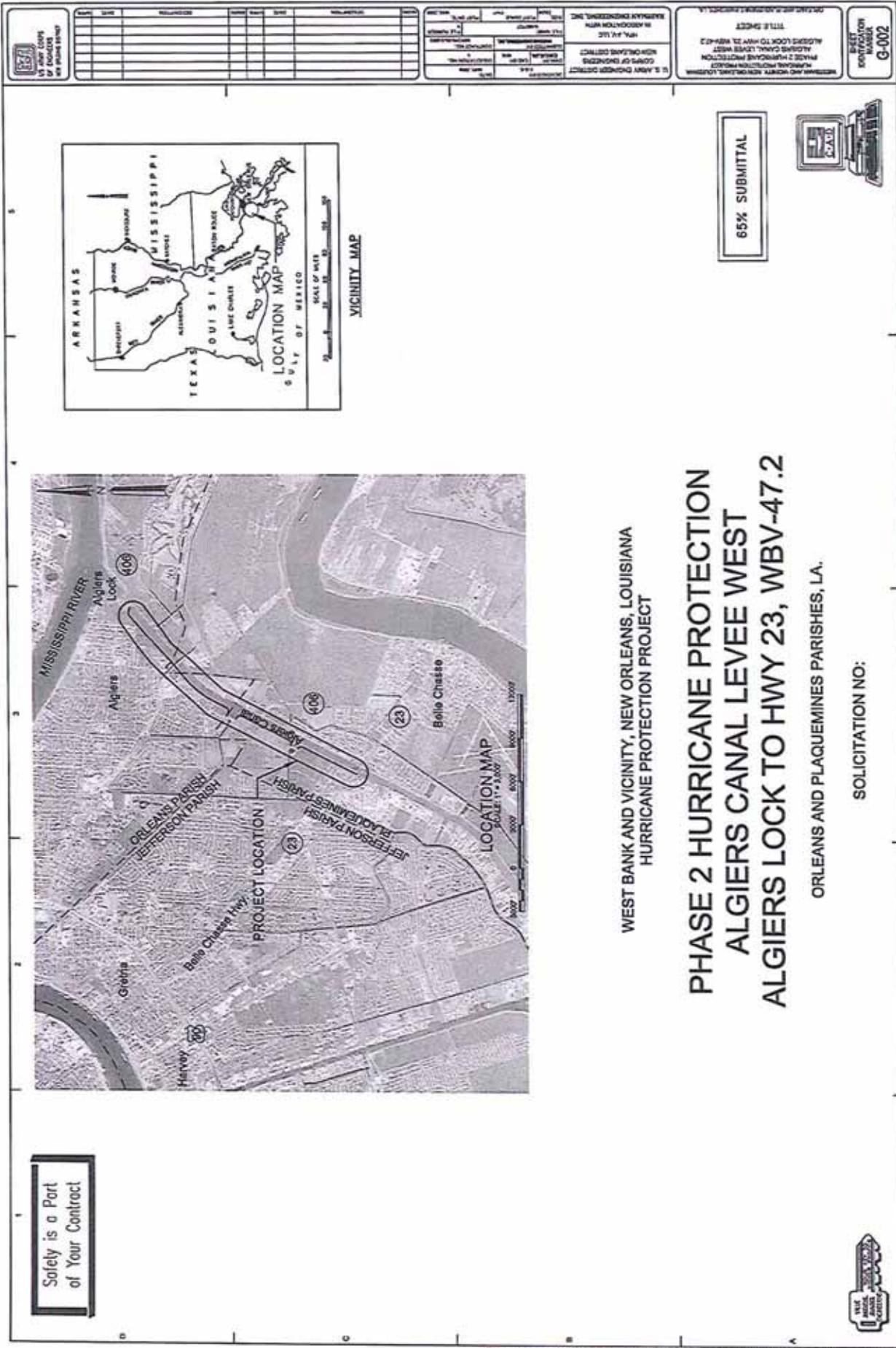








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"RE-BUILDING THE CITY'S WATER SYSTEMS FOR THE 21<sup>ST</sup> CENTURY"

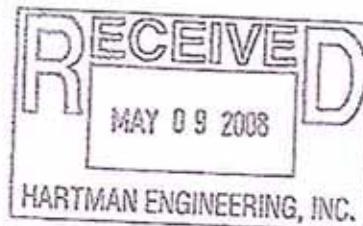
## Sewerage & Water Board of NEW ORLEANS

C. RAY NAGIN, President  
TOMMIE A. VASSEL, President Pro-Tem

625 ST. JOSEPH STREET  
NEW ORLEANS, LA 70165 • 504-529-2837 OR 52WATER  
[www.swbnoa.org](http://www.swbnoa.org)

May 8, 2008

Ryan Foster, E.I.  
Hartman Engineering, Inc.  
527 W. Esplanade Avenue  
Suite 300  
Kenner, LA 70065



RE: West Bank & Vicinity Hurricane Protection Project  
Phase 2 Hurricane Protection, Algiers Canal Levee West

Dear Mr. Foster:

The Sewerage and Water Board has identified two major lines within Orleans Parish for the referenced project. There is a 42-inch steel sewer force main crossing over the levee at approximately USACE Baseline Station 786+00. This sewer force main is the sole source for sewage to get from the west side of the Algiers Canal to our West Bank Sewerage Treatment Plant located off Highway 406. At approximately USACE Baseline Station 872+00 there is a 12-inch ductile iron water main crossing over the levee. This water line is only one of two feeds servicing the entire Lower Coast Algiers area.

Enclosed please find the U.S. Army Corps. of Engineers Company Information form and Descriptive Information for Pipelines for each of our utilities.

If you have any questions or require any additional information, please contact me at 865-0671.

Very truly yours,

*Brian K. Jones*  
Brian K. Jones, E.I.  
Network Engineering

BKJ  
Enclosure

cc Johan Barrios, Corps of Engineers (Enclosure)  
Jack Huerkamp, Chief of Engineering (S&WB)  
M. Ron Spooner, Principal Engineer, (S&WB)

Members of the Board: BENJAMIN L. EDWARDS, SR. • SIDNEY H. EVANS, JR. • ARNIE FIELKOW • NORMA E. GRACE • BARBARA LAMONT • ALEX I. LEWIS, III  
C. RAY NAGIN • PENELOPE RANDOLPH • FLORENCE W. SCHORNSTEIN • GARY N. SOLOMON • OLIVER M. THOMAS, JR. • TOMMIE A. VASSEL • CYNTHIA WILLARD-LEWIS  
"An Equal Opportunity Employer"

**U.S. ARMY CORPS OF ENGINEERS  
NEW ORLEANS DISTRICT  
COMPANY INFORMATION**

(revised 9/04)

West Bank and Vicinity Hurricane Protection Project  
Phase 2 Hurricane Protection  
Alqiars Canal Levee West, Alqiars Lock to Hwy 23 (WBV 47.2)  
B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana  
Contract No. W912P8-08-D-0002-Task Order 0005

1. Official Name of Facility/Utility Owner, as reflected in the records of the Louisiana Secretary of State:

SEWERAGE & WATER BOARD OF NEW ORLEANS

2. Type of Business Entity (check one):

Limited Liability Company (LLC)  
 Corporation  
 Partnership  
 Other (define): CITY/STATE

3. Provide name of state of incorporation:

N/A

4. If the state of incorporation is not Louisiana, has the corporation registered with the Louisiana Secretary of State as a foreign corporation?

YES  
 NO

5. Provide information about nature of work or corporate purpose:

---

---

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6. Provide name, address, telephone number and e-mail address of person available for contact by Corps of Engineers:

Right-of-Way Department \_\_\_\_\_

Legal Department GERARD VICTOR      625 ST. JOSEPH (504) 585-2236

NEW ORLEANS, LA 70165

Other ENGINEERING BRIAN JONES      8800 S. CLAIBORNE AVE. (504) 865-0652

NEW ORLEANS, LA. 70118

7. Provide information about real property upon which facilities are located.

Is it owned in fee, servitude, or leased?

SERVITUDE

8. If facility owner has written recorded rights-of-way and/or lease, provide a copy of rights-of-way document and/or lease, and if the document is recorded, provide the recordation information. N/A

9. Please explain any and all predecessor(s) in interest:

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10. Indicate width of right-of-way.

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11. If facility is a pipeline, is it a common carrier?

YES

12. If facility was placed pursuant to a permit, provide the name of agency that issued permit (including, but not limited to, permits for Section 10 of The Rivers and Harbors Act of 1899 and permits from municipalities or local governments), the permit number, and the date on which the permit was issued. Please attach a copy of the permit or the Corps of Engineers letter explaining that no permit was needed, if the company had applied for such a permit.

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13. The date the facility was first installed: 12" WATER LINE JULY 1976 (SewB 6896-W)  
42" SEWER FORCE MAIN JUNE 1968 (SewB 6365-G-13)

42" SEWER FORCE MAIN  
U.S. ARMY CORPS OF ENGINEERS  
NEW ORLEANS DISTRICT  
DESCRIPTIVE INFORMATION FOR PIPELINES

1. Company Name: SEWERAGE & WATER BOARD OF NEW ORLEANS

2. Size (Diameter) and Type of Facility: 42" SEWER FORCE MAIN

3. Type of Construction (Steel, cast iron, etc): STEEL

4. Function Served (oil, gas, water, etc): SEWER

5. Location

USACE Project Baseline Station:  $\pm$  786 +00

Longitude, Latitude Coordinates:  $\pm$   $29^{\circ} 54' 45.8'' N$   
 $\pm$   $89^{\circ} 58' 38.9'' W$

6. Date Installed: JUNE 1968 (SEWB 6365-G-13)

7. Design Life: 50 YEARS

8. Total Length of Facility: THIS LINE RUNS FROM SPS "C" TO THE WBSTP.  
(DIAWA & PACIFIC) (OFF HWY 406)

10. Current Status of Facility (active, inactive, abandoned, etc.) ACTIVE!  
THIS LINE MUST REMAIN IN SERVICE.

11. Other Pertinent Data (Manholes, Valves, etc): AIR RELEASE VALVE LOCATED IN THE  
CENTER LINE OF LEVEE.

12. Depth of pipeline beneath levee or channel    42" STEEL MAIN CROSSES OVER EARTHEN LEVEE.

12" WATER MAIN

U.S. ARMY CORPS OF ENGINEERS  
NEW ORLEANS DISTRICT  
DESCRIPTIVE INFORMATION FOR PIPELINES

1. Company Name: SEWERAGE & WATER BOARD OF NEW ORLEANS

2. Size (Diameter) and Type of Facility: 12" DUCTILE IRON

3. Type of Construction (Steel, cast iron, etc): DUCTILE IRON

4. Function Served (oil, gas, water, etc): WATER

5. Location

USACE Project Baseline Station: ± 878 + 00

Longitude, Latitude Coordinates: ± 29° 53' 46.88" N  
± 89° 59' 43.46" W

6. Date Installed: July 1976

7. Design Life: 50 YEARS

8. Total Length of Facility:

10. Current Status of Facility (active, inactive, abandoned, etc.) ACTIVE!  
THIS LINE MUST REMAIN IN SERVICE.

11. Other Pertinent Data (Manholes, Valves, etc):

12. Depth of pipeline beneath levee or channel

12" DUCTILE IRON MAIN CROSSES OVER EARTHEN SECTION.

**U.S. ARMY CORPS OF ENGINEERS  
NEW ORLEANS DISTRICT  
DESCRIPTIVE INFORMATION FOR PIPELINES**

1. Company Name: *Bridgeline Holdings, L.P.*

2. Size (Diameter) and Type of Facility: *30" pipeline*

3. Type of Construction (Steel, cast iron, etc): *Steel*

4. Function Served (oil, gas, water, etc): *Natural Gas*

5. Location *Section 28, Township 14 South, Range 24 East, Orleans Parish, Louisiana*

USACE Project Baseline Station: *870+00 to 884+00*

Longitude, Latitude Coordinates: *29° 53' 40" North , 89° 59' 45" West*

6. Date Installed: *1965 - 1966*

7. Design Life: *100+ years with cathodic protection and routine maintenance*

8. Total Length of Facility: *Entire Pipeline System - 56.78 miles ; affected area ≈ 1000'*

10. Current Status of Facility (active, inactive, abandoned, etc.) *Active*

11. Other Pertinent Data (Manholes, Valves, etc): *Levee Penetration Boxes Were installed on each side of the N.O.S & W.B. No. 3 Pump Station in June 2005.*

12. Depth of pipeline beneath levee or channel

pipeline penetrates through the levee

(revised 9/04)

**U.S. ARMY CORPS OF ENGINEERS  
NEW ORLEANS DISTRICT  
COMPANY INFORMATION**

West Bank and Vicinity Hurricane Protection Project  
Phase 2 Hurricane Protection  
Algiers Canal Levee West. Algiers Lock to Hwy 23 (WBV 47.2)  
B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana  
Contract No. W912P8-08-D-0002-Task Order 0005

1. Official Name of Facility/Utility Owner, as reflected in the records of the Louisiana Secretary of State:

Bridgeline Holdings, L.P.

2. Type of Business Entity (check one):

Limited Liability Company (LLC)  
 Corporation  
 Partnership  
 Other (define):

3. Provide name of state of incorporation:

Delaware

4. If the state of incorporation is not Louisiana, has the corporation registered with the Louisiana Secretary of State as a foreign corporation?

YES  
 NO

5. Provide information about nature of work or corporate purpose:

Natural Gas Transmission

6. Provide name, address, telephone number and e-mail address of person available for contact by Corps of Engineers:

Right-of-Way Department Sandra Sims-Glorioso; 4800 Furnace Place,  
Room C320A, Bellaire, TX 77401-2324; (713) 432-3540; s.simsglorioso@chevron.com

Legal Department Tara Daughtrey; 4800 Furnace Place Room W736 F  
Bellaire, TX 77401-2324; (713) 432-3734; tdaughtrey@chevron.com

Other \_\_\_\_\_

7. Provide information about real property upon which facilities are located.

Is it owned in fee, servitude, or leased?

30' ROW and easement

8. If facility owner has written recorded rights-of-way and/or lease, provide a copy of rights-of-way document and/or lease, and if the document is recorded, provide the recordation information.

9. Please explain any and all predecessor(s) in interest:

N/A

10. Indicate width of right-of-way.

30'

11. If facility is a pipeline, is it a common carrier?

No

12. If facility was placed pursuant to a permit, provide the name of agency that issued permit (including, but not limited to, permits for Section 10 of The Rivers and Harbors Act of 1899 and permits from municipalities or local governments), the permit number, and the date on which the permit was issued. Please attach a copy of the permit or the Corps of Engineers letter explaining that no permit was needed, if the company had applied for such a permit.

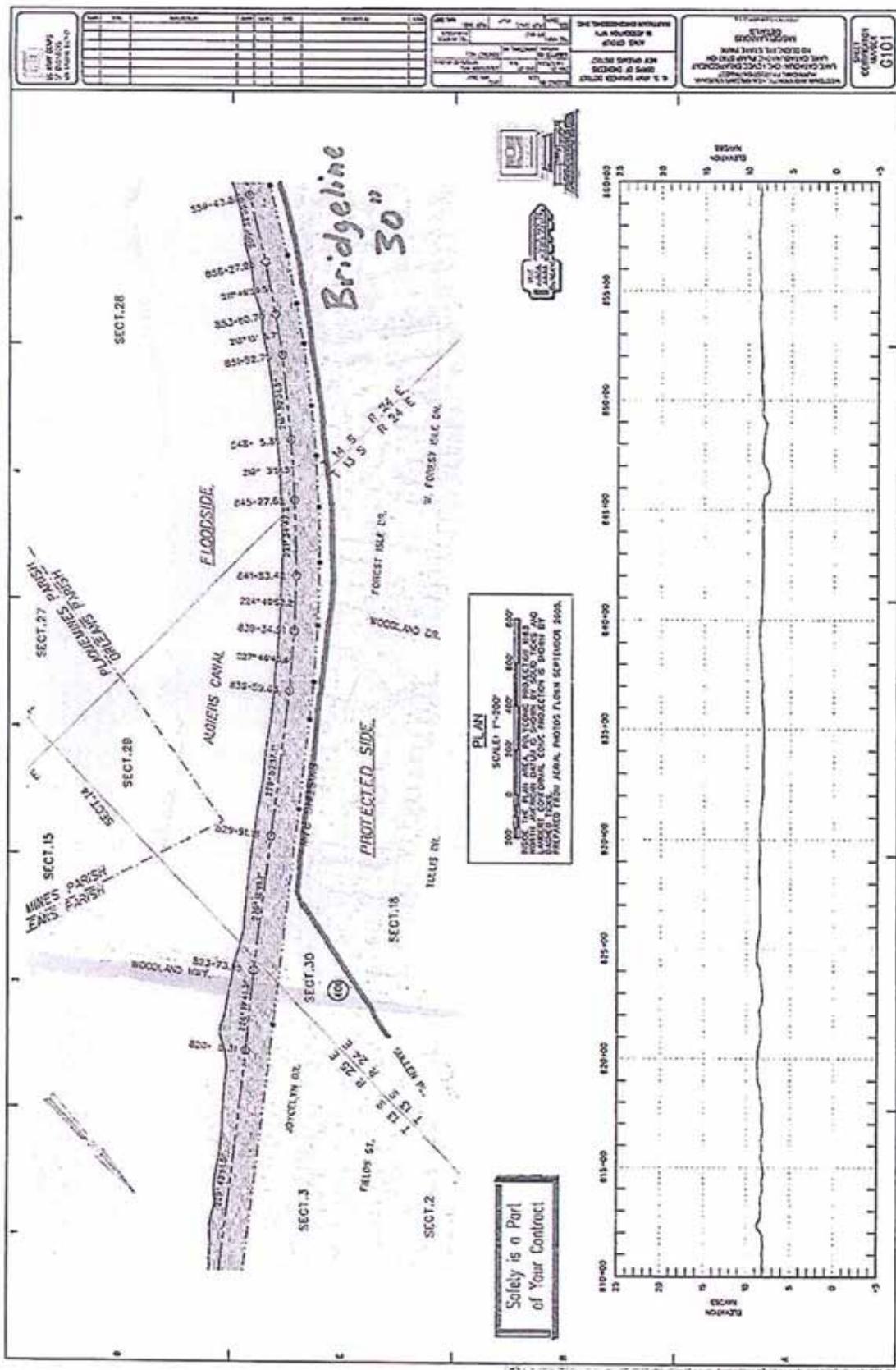
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13. The date the facility was first installed: 1965 - 1966





**U.S. ARMY CORPS OF ENGINEERS  
NEW ORLEANS DISTRICT  
COMPANY INFORMATION**

**West Bank and Vicinity Hurricane Protection Project**  
**Phase 2 Hurricane Protection**  
**Algiers Canal Levee West. Algiers Lock to Hwy 23 (WBV 47.2)**  
**B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana**  
**Contract No. W912P8-08-D-0002-Task Order 0005**

1. Official Name of Facility/Utility Owner, as reflected in the records of the Louisiana Secretary of State: Entergy Louisiana, LLC

2. Type of Business Entity (check one):

- Limited Liability Company (LLC)**  
 **Corporation**  
 **Partnership**  
 **Other (define):**

3. Provide name of state of incorporation:

Louisiana

4. If the state of incorporation is not Louisiana, has the corporation registered with the Louisiana Secretary of State as a foreign corporation?

- YES**  
 **NO**

5. Provide information about nature of work or corporate purpose:

Entergy serves electric power to its customers

6. Provide name, address, telephone number and e-mail address of person available for contact by Corps of Engineers:

Right-of-Way Department      Noel Coari 3734 Tulane Ave, New Orleans, LA 70113  
(504) 595-3812 ncoari@entergy.com

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Legal Department Joseph Cerise 639 Loyola Ave., New Orleans, LA 70113 (504) 576-4257  
jcerise@entergy.com

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Other \_\_\_\_\_  
\_\_\_\_\_

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7. Provide information about real property upon which facilities are located.

Is it owned in fee, servitude, or leased?

Some right of way, some USACE permit, no fee

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8. If facility owner has written recorded rights-of-way and/or lease, provide a copy of rights-of-way document and/or lease, and if the document is recorded, provide the recordation information. To be provided as is necessary

9. Please explain any and all predecessor(s) in interest: To be provided as is necessary

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10. Indicate width of right-of-way. generally 10' 5' on either side of facility

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11. If facility is a pipeline, is it a common carrier? commonly carries 13.8KV three phase line

12. If facility was placed pursuant to a permit, provide the name of agency that issued permit (including, but not limited to, permits for Section 10 of The Rivers and Harbors Act of 1899 and permits from municipalities or local governments), the permit number, and the date on which the permit was issued. Please attach a copy of the permit or the Corps of Engineers letter explaining that no permit was needed, if the company had applied for such a permit.

To be provided as is necessary

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13. The date the facility was first installed: Various

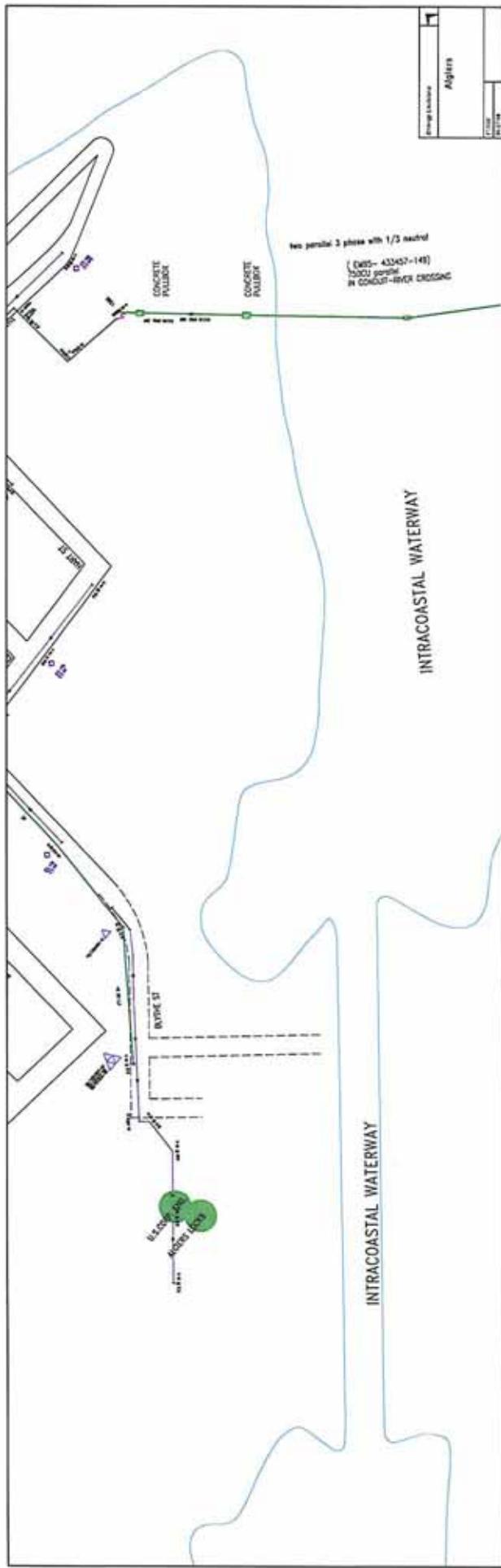
**U.S. ARMY CORPS OF ENGINEERS  
NEW ORLEANS DISTRICT  
COMPANY INFORMATION**

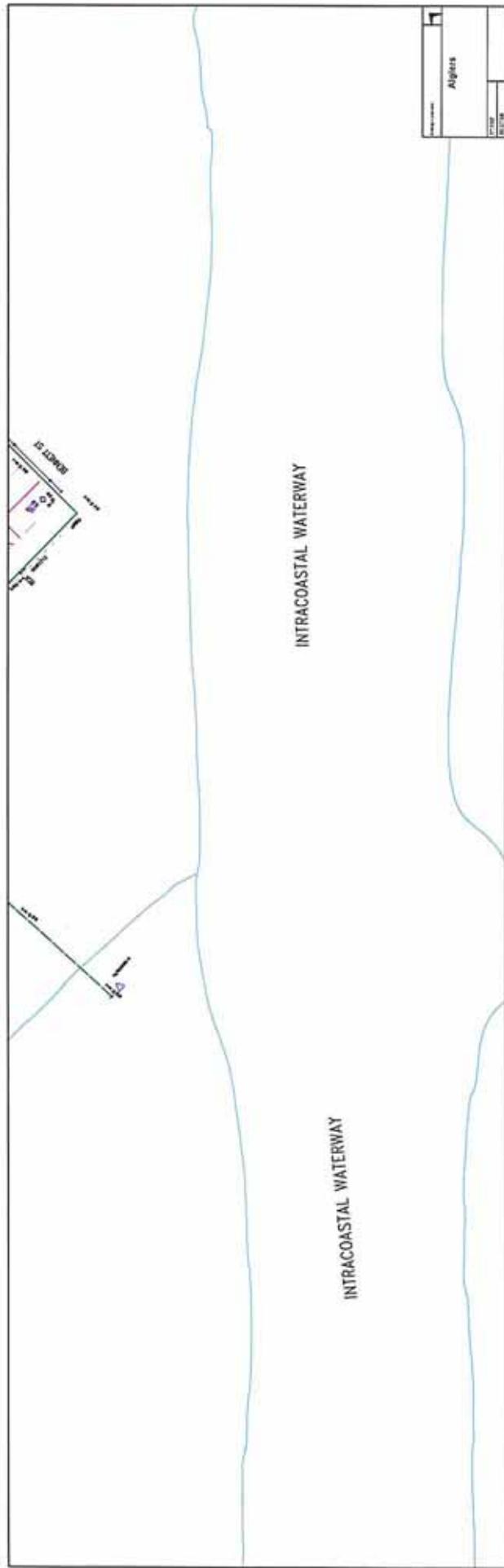
**West Bank and Vicinity Hurricane Protection Project  
Phase 2 Hurricane Protection  
Algiers Canal Levee West. Algiers Lock to Hwy 23 (WBV 47.2)  
B/L Sta. 770+70 to Sta. 978+18, Orleans and Plaquemines Parishes, Louisiana  
Contract No. W912P8-08-D-0002-Task Order 0005**

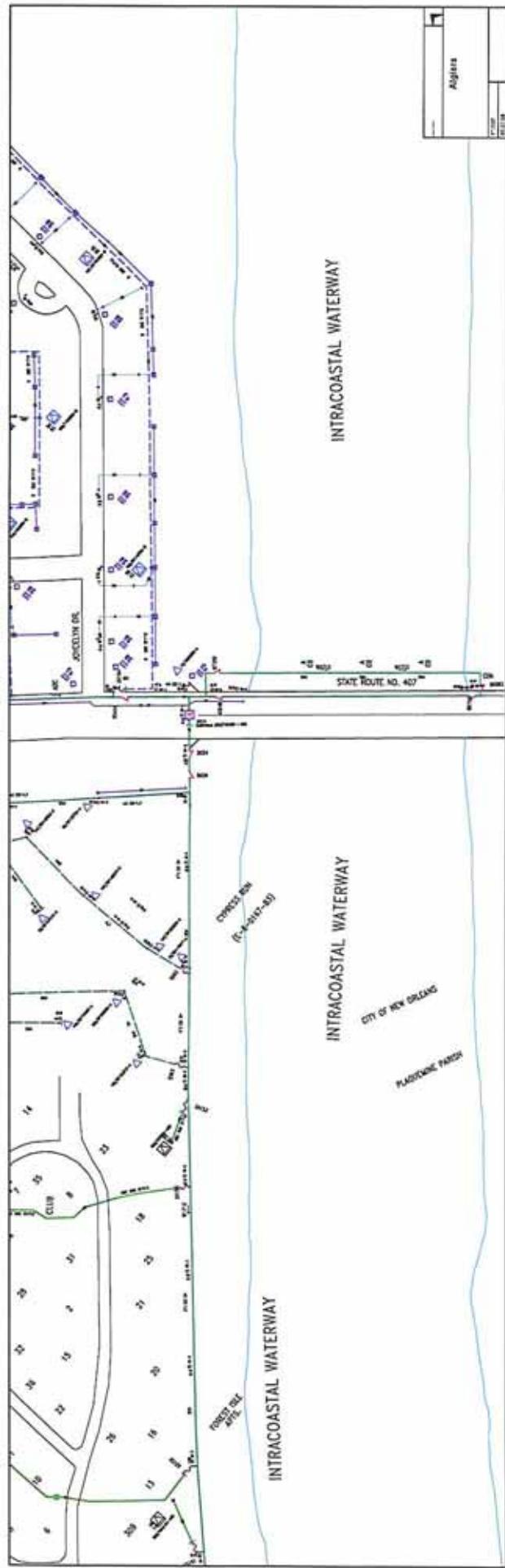
1. Company Name: Entergy Louisiana, LLC
2. Description (transmission, primary, distribution, etc.): Distribution
3. Size (voltage, gauge, etc.): Generally 13.8KV/8KV grnd Y primary overhead and underground conductors of various sized listed on attached drawings
4. Type (aerial, buried, submerged, etc.): As shown on attached drawings
5. Location of utility pole(s) supporting powerline.  
Numerous locations As shown on attached drawings
5. Location (where line crosses levee centerline)  
Numerous locations As shown on attached drawings
6. Function Served: Power for meter customers
7. Date Installed: Various
8. Design Life: Maintained as necessary for continued and reliable service

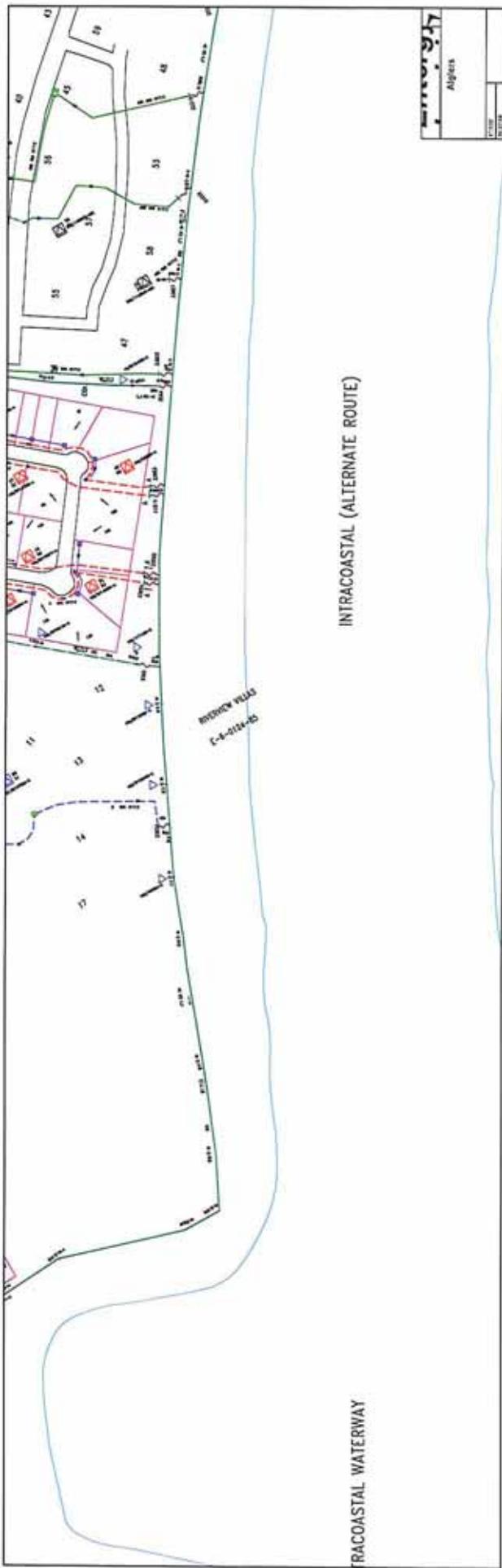
9. Total Length of Facility: As shown on attached drawings
10. Current Status of Facility (active, inactive, abandoned, etc.): Active
11. Clearance (height from lowest line crossing over project to top elevation of project): Various heights to be determined by physical measurement as is necessary
12. Other Pertinent Data (manholes, towers, etc): Underground facilities in levee serving English

Turn



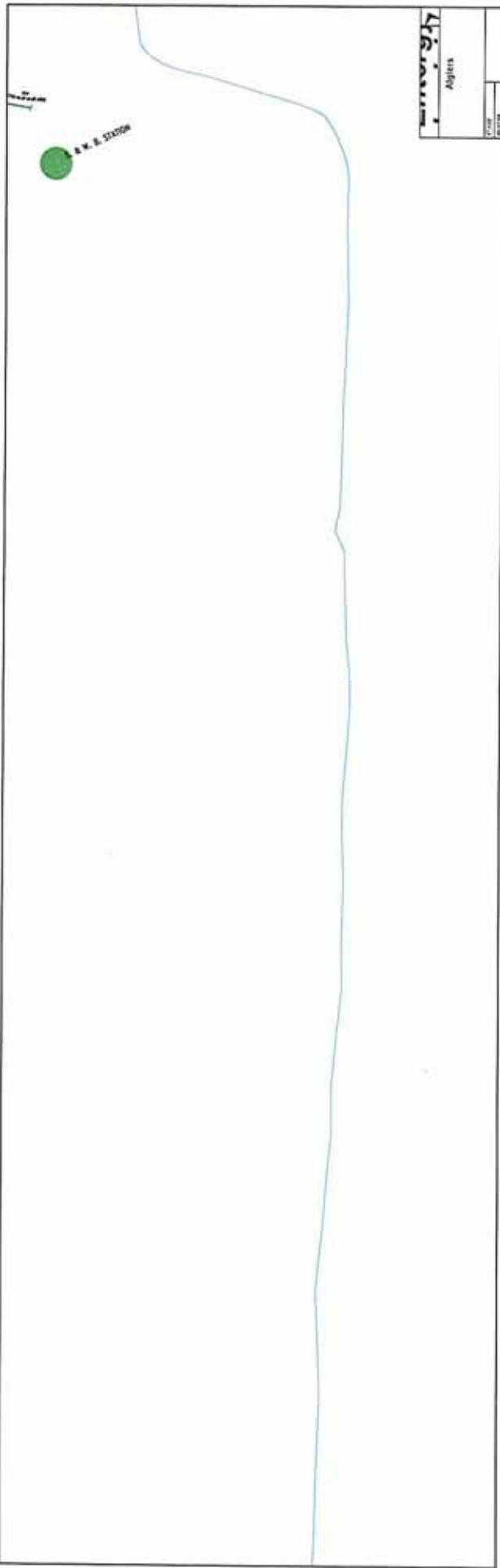


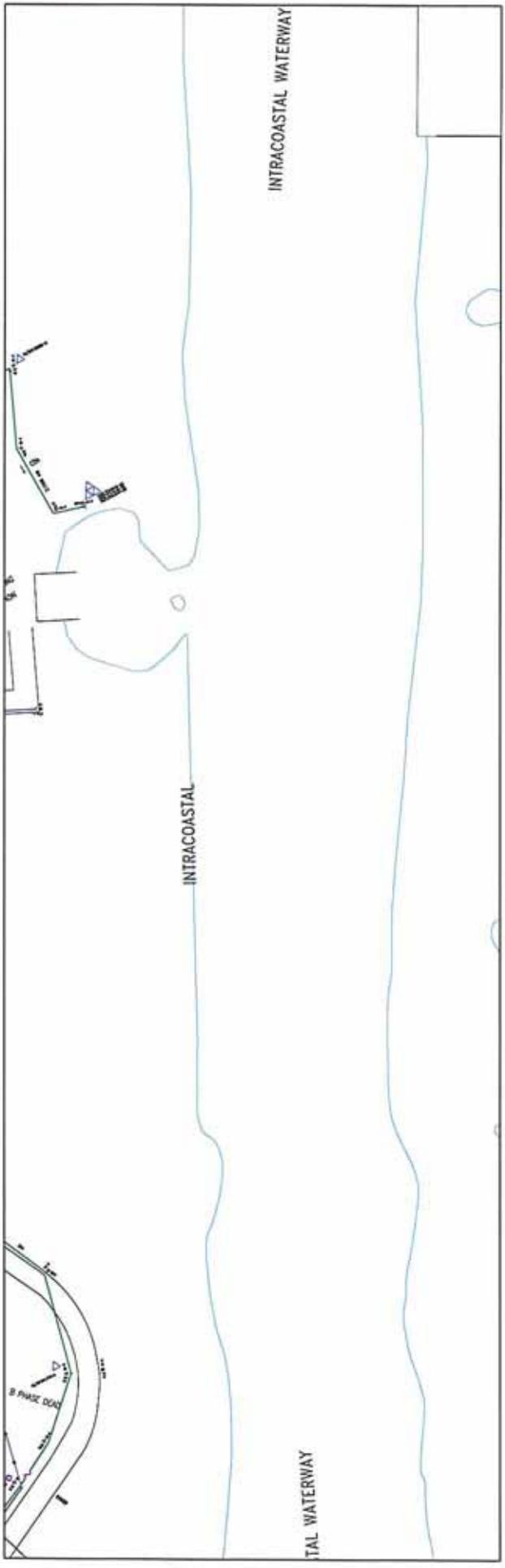


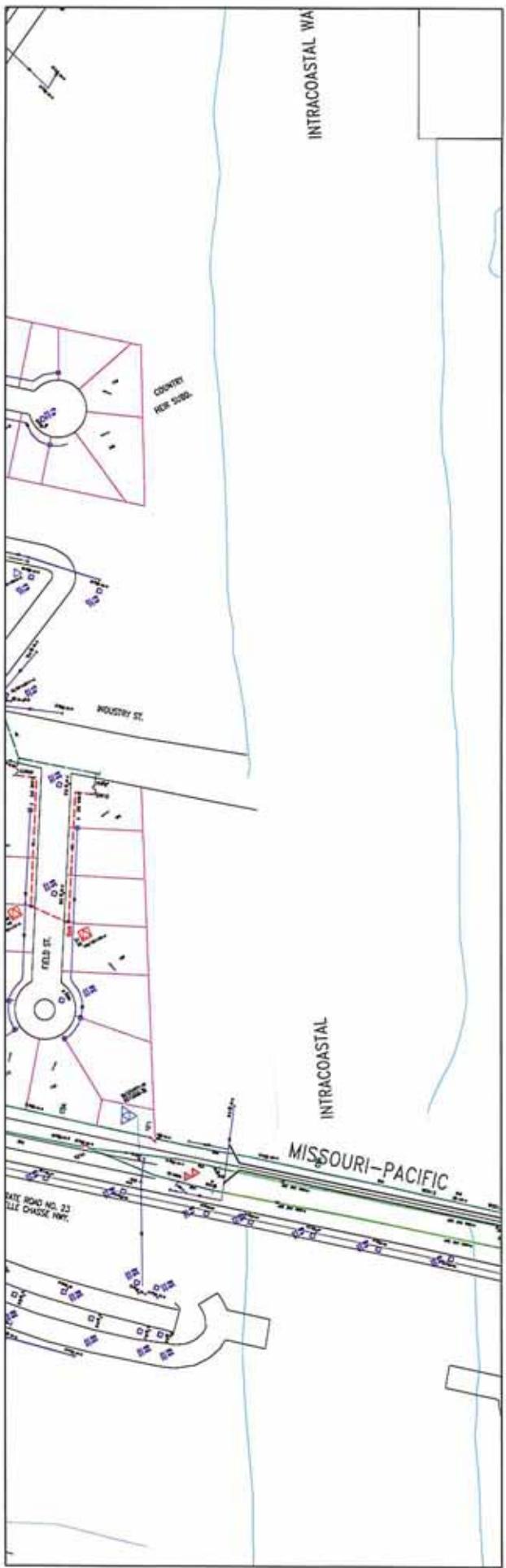


INTRACOASTAL (ALTERNATE ROUTE)

INTRACOASTAL WATERWAY







**ALGIERS CANAL LEVEE WEST, ALGIERS LOCK TO HWY. 23, WBV-47.2  
B/L STA. 770+70 TO STA. 978+18  
ORLEANS AND PLAQUEMINES PARISHES, LOUISIANA  
CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5**

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**APPENDIX 'I'**

**SURVEY CONTROL**



**VICINITY MAP** Scale: 1" = 4000'

Reproduced from USGS "Bertrandville" 24k Quadrangle

**Station Name: BEL 1**

**Monument Location:** From the intersection of Hwy 23 and Lapalco Blvd. near Terrytown, LA, go 1.4 miles south on Hwy 23 to Barriere Road and take a right. Go 1.4 miles SW on Barriere Road to the monument on the right.

**Monument Description:** Monument is a  $\frac{3}{4}$ " iron rod set flush with the ground. It is located 5.9' SE of a railroad iron, 25' NE of another railroad iron, and 116' east of a gate post at the pump station area.

Date: October 2006

**Monument Established By:**  
N/A

**NOCOE Provided Grid**  
**Position LSZ (1702) feet**

|   |             |
|---|-------------|
| N | 494282.410  |
| E | 3697937.750 |
| Z | -3.42       |

**Surveyed NAD 83\***

**Geodetic Position**

|         |                          |
|---------|--------------------------|
| Lat.    | 29°51'09.34356"N         |
| Long.   | 90°01'03.05942"W         |
| Ell Ht. | -87.923sft (constrained) |

**Surveyed Grid Position\***

**LSZ (1702) feet**

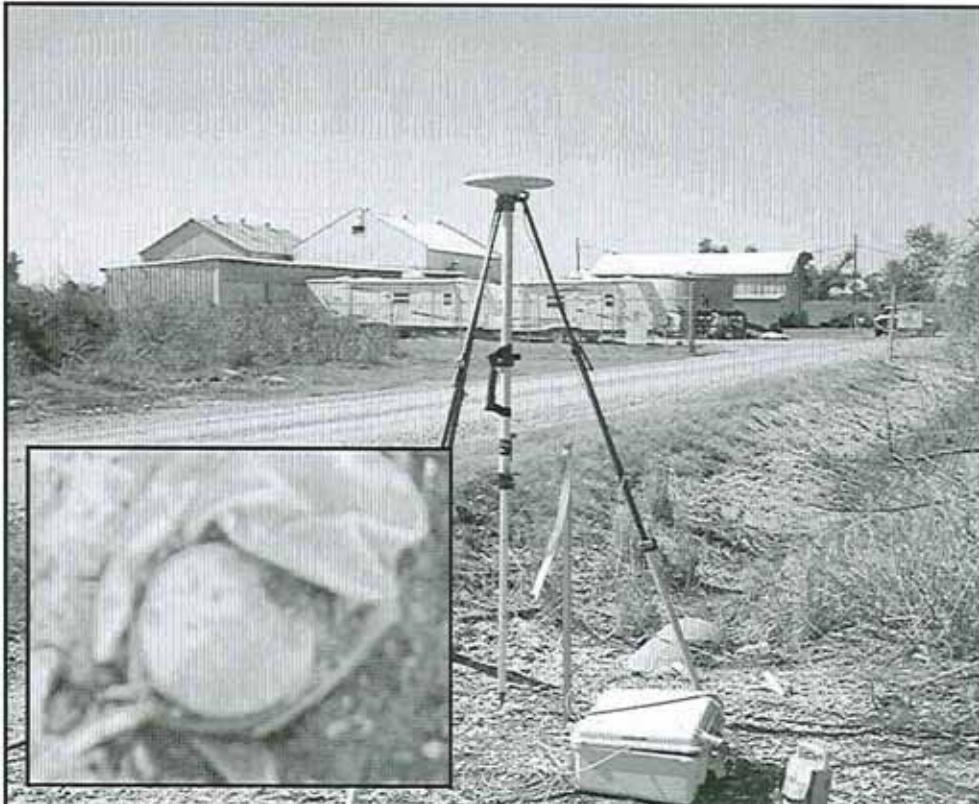
|   |             |
|---|-------------|
| N | 494282.403  |
| E | 3697937.708 |

**Surveyed NAVD 88 Elev\***

**(epoch 2004.65) feet**

**Geoid 03/05**

Elev = -3.42 (constrained)



\*As surveyed for N.O.C.O.E. job no: 07002C by Chustz Surveying, Inc.

**ALGIERS CANAL LEVEE WEST, ALGIERS LOCK TO HWY. 23, WBV-47.2  
B/L STA. 770+70 TO STA. 978+18  
ORLEANS AND PLAQUEMINES PARISHES, LOUISIANA  
CONTRACT NO. W912P8-08-D-0002, TASK ORDER 5**

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**APPENDIX 'J'**  
**PHOTOGRAPHS**



File Name : IMG77320\_2472.JPG  
Shooting Date/Time : 4/23/2008 11:25:08 AM  
Comment : Facing East, Algiers Lock,  
[STA 773+20]



File Name : IMG77320\_2474.JPG  
Shooting Date/Time : 4/23/2008 11:25:43 AM  
Comment : Facing West, [STA 773+-  
20]



File Name : IMG77320\_2476.JPG  
Shooting Date/Time : 4/23/2008 11:25:54 AM  
Comment : Facing SW, Woodlawn  
HWY, [STA 773+20]



File Name : IMG77320\_2482.JPG  
Shooting Date/Time : 4/23/2008 11:26:32 AM  
Comment : Facing NE, Algiers Lock,  
[STA 773+20]



File Name : IMG77550\_2471.JPG  
Shooting Date/Time : 4/23/2008 11:25:03 AM  
Comment : Facing East, Algiers Lock,  
[STA 775+50]



File Name : IMG77600\_2464.JPG  
Shooting Date/Time : 4/23/2008 11:23:38 AM  
Comment : Facing NE, [STA 776+00]



File Name : IMG77600\_2466.JPG  
Shooting Date/Time : 4/23/2008 11:24:32 AM  
Comment : Facing SW, Woodlawn HWY, [STA 776+00]



File Name : IMG77600\_2468.JPG  
Shooting Date/Time : 4/23/2008 11:24:42 AM  
Comment : Facing SE, [STA 776+00]



File Name : IMG78985\_2484.JPG  
Shooting Date/Time : 4/23/2008 11:31:40 AM  
Comment : Facing SW, [STA 789+8-5]



File Name : IMG78985\_2486.JPG  
Shooting Date/Time : 4/23/2008 11:31:55 AM  
Comment : Facing SW, [STA 789+8-5]



File Name : IMG78985\_2487.JPG  
Shooting Date/Time : 4/23/2008 11:32:22 AM  
Comment : Facing North, [STA 789-  
+85]



File Name : IMG78985\_2488.JPG  
Shooting Date/Time : 4/23/2008 11:32:45 AM  
Comment : Facing North, [STA 789-  
+85]



File Name : IMG79000\_2461.JPG  
Shooting Date/Time : 4/23/2008 11:21:39 AM  
Comment : Facing NE, [STA 790+00]



File Name : IMG79586\_2457.JPG  
Shooting Date/Time : 4/23/2008 11:17:52 AM  
Comment : Facing North, [STA 795+-86]



File Name : IMG80050\_2454.JPG  
Shooting Date/Time : 4/23/2008 11:15:08 AM  
Comment : Facing NE, [STA 800+50]



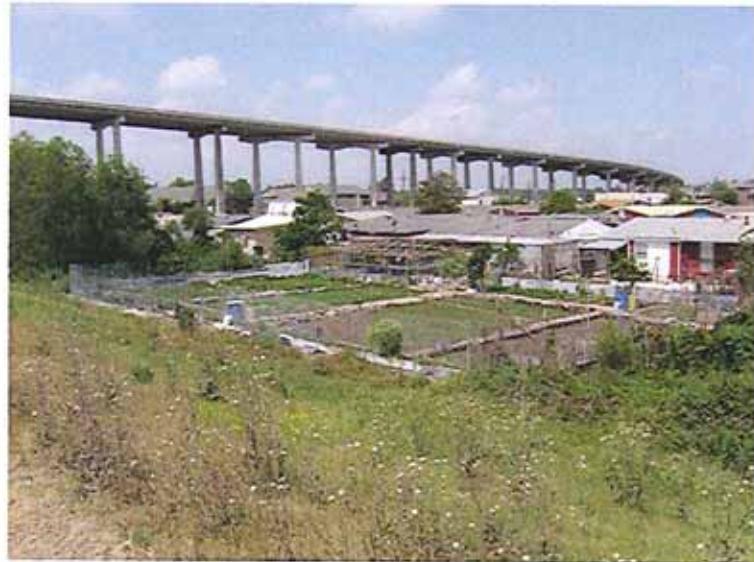
File Name : IMG80562.31\_2448.JPG  
Shooting Date/Time : 4/23/2008 11:09:49 AM  
Comment : Facing East, Gas Pipeline,  
[STA 805+62.31]



File Name : IMG80562.31\_2449.JPG  
Shooting Date/Time : 4/23/2008 11:10:04 AM  
Comment : Facing North, Gas Pipeline, [STA 805+62.31]



File Name : IMG80562.31\_2451.JPG  
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Comment : Facing East, [STA 805+62.31]



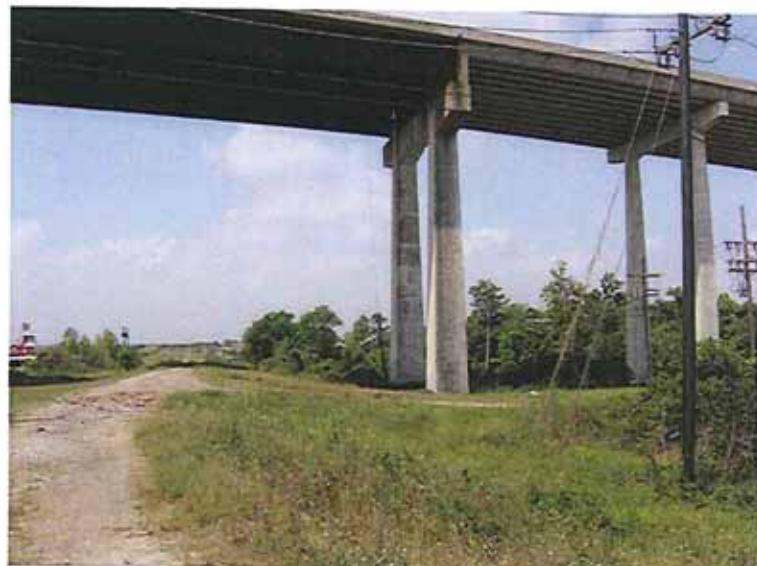
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Comment : Facing West, Woodlawn HWY, [STA 817+00]



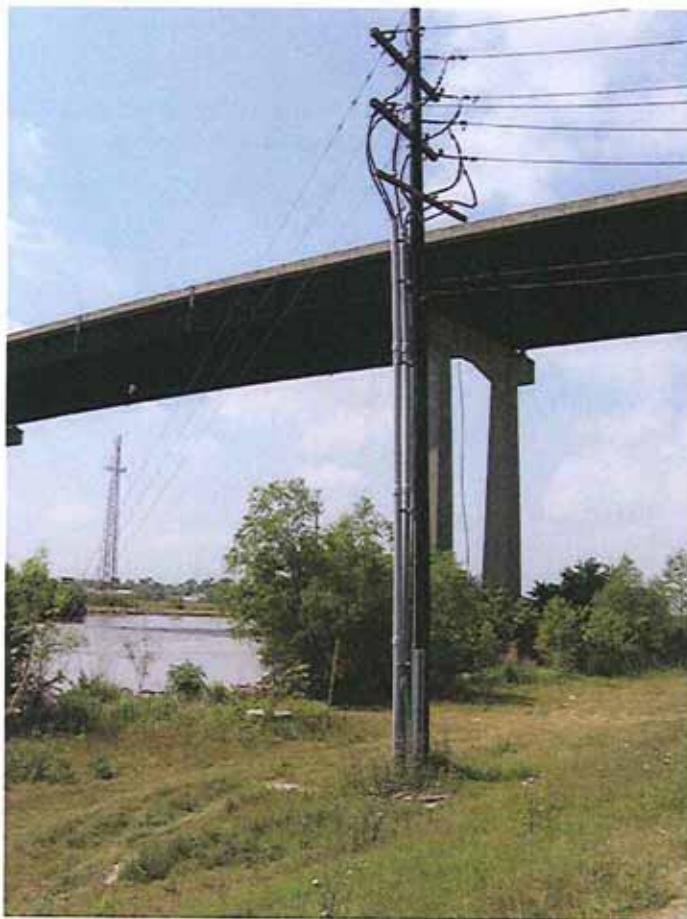
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Comment : Facing NE, [STA 817+00]



File Name : IMG82302\_2438.JPG  
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Comment : Facing NE, [STA 823+02]



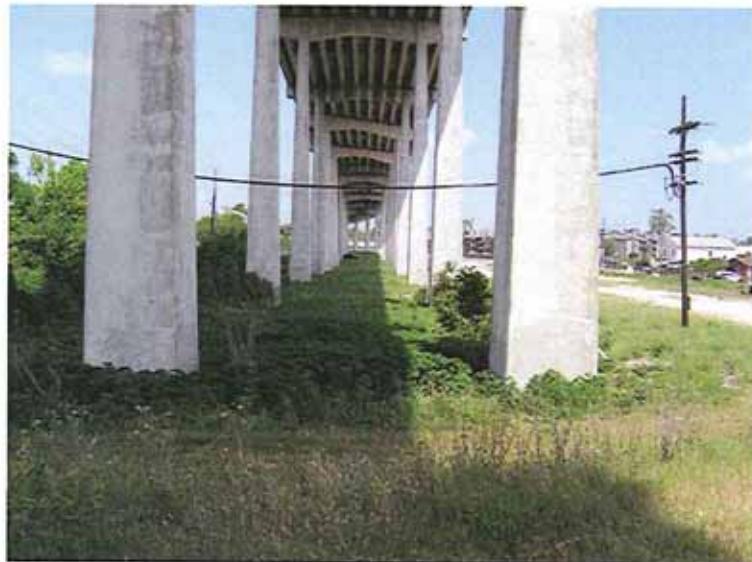
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Comment : Facing SW, Woodlawn HWY, [STA 823+02]



File Name : IMG82302\_2442.JPG  
Shooting Date/Time : 4/23/2008 11:03:36 AM  
Comment : Facing South, Woodlawn HWY, [STA 823+02]



File Name : IMG82360\_2219.JPG  
Shooting Date/Time : 3/28/2008 10:52:27 AM  
Comment : Facing South, Woodlawn HWY, [STA 823+60]



File Name : IMG82373.55\_2422.JPG  
Shooting Date/Time : 4/23/2008 10:52:18 AM  
Comment : Facing NW, Woodlawn HWY, [STA 823+73.55]



File Name : IMG82373.55\_2424.JPG  
Shooting Date/Time : 4/23/2008 10:52:32 AM  
Comment : Facing SW, [STA 823+73-.55]



File Name : IMG82385\_2427.JPG  
Shooting Date/Time : 4/23/2008 10:54:18 AM  
Comment : Facing SE, [STA 823+85]



File Name : IMG82385\_2430.JPG  
Shooting Date/Time : 4/23/2008 10:55:31 AM  
Comment : Facing NE, Woodlawn HWY, [STA 823+85]



File Name : IMG82975\_2421.JPG  
Shooting Date/Time : 4/23/2008 10:21:21 AM  
Comment : Facing SW, [STA 829+7-5]



File Name : IMG82991.18\_2432.JPG  
Shooting Date/Time : 4/23/2008 10:56:32 AM  
Comment : Facing SW, [STA 829+91-.18]



File Name : IMG82991.18\_2437.JPG  
Shooting Date/Time : 4/23/2008 10:58:41 AM  
Comment : Facing SE, [STA 829+91.-  
18]



File Name : IMG87000\_1797.JPG  
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Comment : Facing West, Pumpstation  
NO. 13, [STA 870+00]



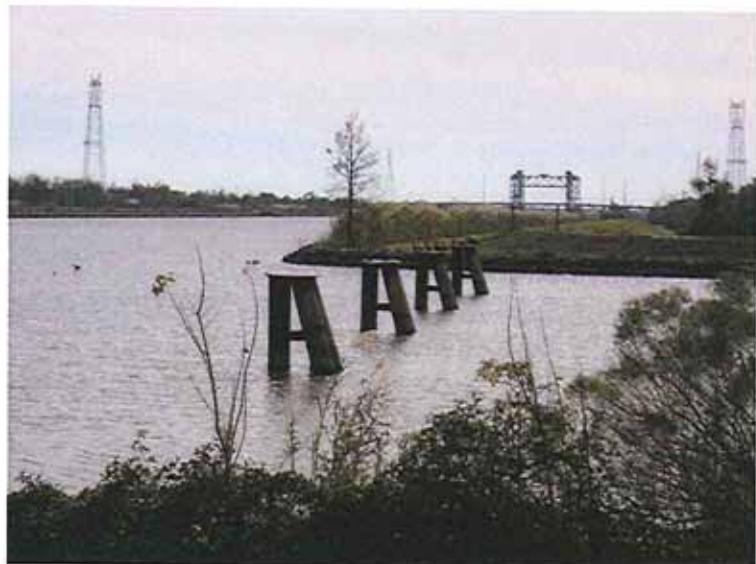
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Comment : Facing NE, Woodlawn HWY, [STA 870+00]



File Name : IMG87400\_1793.JPG  
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Comment : Facing NE, Woodlawn H-WY, [STA 874+00]



File Name : IMG87400\_1796.JPG  
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Comment : Facing South, Pumpstation NO.13, [STA 874+00]



File Name : IMG87467\_2415.JPG  
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Comment : Facing SE, Pumpstation NO. 13, [STA 874+67]



File Name : IMG87530\_2215.JPG  
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Comment : Facing South, Pumpstation NO. 13, [STA 875+30]



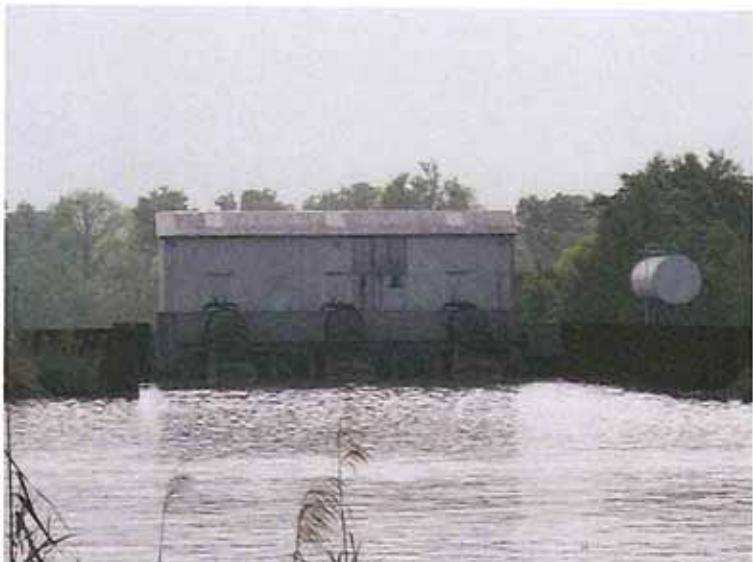
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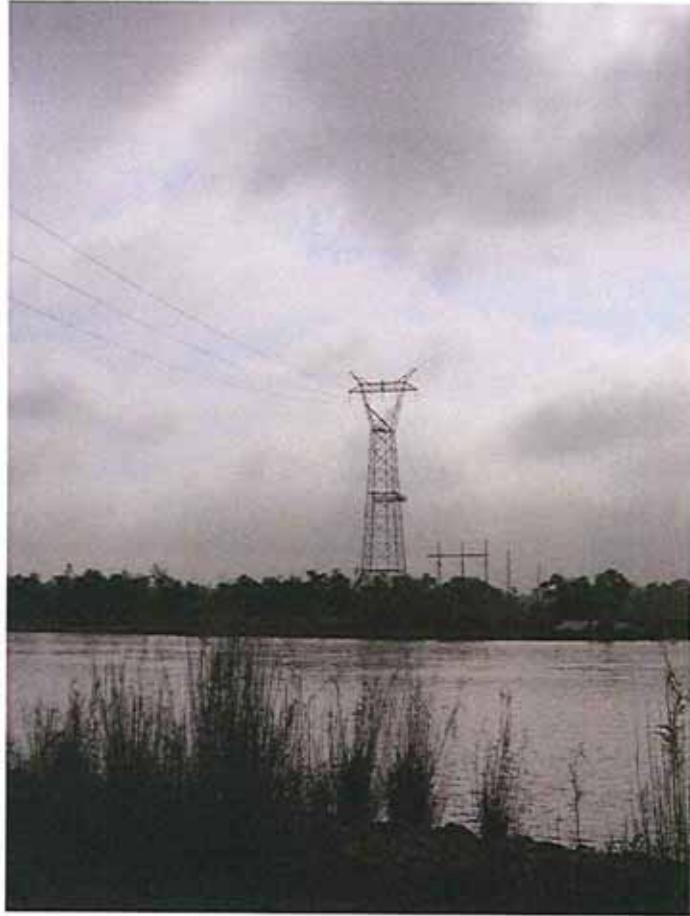
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Comment : Facing SW [STA 875+50]



File Name : IMG92090\_2409.JPG  
Shooting Date/Time : 4/23/2008 9:09:48 AM  
Comment : Facing SW, [STA 920+90]



File Name : IMG92090\_2414.JPG  
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Comment : Facing SE, Belle Ch. PS.  
NO. 2, [STA 920+90]



File Name : IMG92250\_2413.JPG  
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Comment : Facing East, [STA 922+5-0]



File Name : IMG92275\_2500.JPG  
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Comment : Facing NE, [STA 922+75]



File Name : IMG92325\_2497.JPG  
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Comment : Facing NE, [STA 923+25]



File Name : IMG92325\_2499.JPG  
Shooting Date/Time : 4/23/2008 12:18:34 PM  
Comment : Facing North, [STA 923+25]



File Name : IMG92390\_2501.JPG  
Shooting Date/Time : 4/23/2008 12:19:04 PM  
Comment : Facing SW, [STA 923+9-0]



File Name : IMG92433\_2503.JPG  
Shooting Date/Time : 4/23/2008 12:19:38 PM  
Comment : Facing SW, Planters PS., [STA 924+33]



File Name : IMG92550\_2506.JPG  
Shooting Date/Time : 4/23/2008 12:20:13 PM  
Comment : Facing SW, Planters PS.,  
[STA 925+50]



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Shooting Date/Time : 4/23/2008 12:15:40 PM  
Comment : Facing SW, Planters PS.,  
[STA 927+75]



File Name : IMG92775\_2490.JPG  
Shooting Date/Time : 4/23/2008 12:15:45 PM  
Comment : Facing East, Planters PS.,  
[STA 927+75]



File Name : IMG92790\_2511.JPG  
Shooting Date/Time : 4/23/2008 12:21:12 PM  
Comment : Facing SW, Planters PS.,  
[STA 927+90]



File Name : IMG92790\_2512.JPG  
Shooting Date/Time : 4/23/2008 12:21:16 PM  
Comment : Facing East, [STA 927+9-0]



File Name : IMG92790\_2514.JPG  
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Comment : Facing SW, Planters PS., [STA 927+90]



File Name : IMG92820\_2495.JPG  
Shooting Date/Time : 4/23/2008 12:16:06 PM  
Comment : Facing West, Planters PS.,  
[STA 928+20]



File Name : IMG92820\_2496.JPG  
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Comment : Facing NW, Planters PS.,  
[STA 928+20]



File Name : IMG93240\_2404.JPG  
Shooting Date/Time : 4/23/2008 9:03:10 AM  
Comment : Facing SE, [STA 932+40]



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. [STA 932+50.75]



File Name : IMG93250\_2527.JPG  
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Comment : Facing North, Planters PS-  
., [STA 932+50]



File Name : IMG93250\_2528.JPG  
Shooting Date/Time : 4/23/2008 12:25:27 PM  
Comment : Facing NW, Planters PS.,  
[STA 932+50]



File Name : IMG93250\_2535.JPG  
Shooting Date/Time : 4/23/2008 12:30:56 PM  
Comment : Facing SW, [STA 932+5-0]



File Name : IMG93325\_2530.JPG  
Shooting Date/Time : 4/23/2008 12:28:54 PM  
Comment : Facing NW, Planters PS., [STA 933+25]



File Name : IMG93370\_2520.JPG  
Shooting Date/Time : 4/23/2008 12:24:55 PM  
Comment : Facing SW, [STA 933+7-0]



File Name : IMG93400\_2406.JPG  
Shooting Date/Time : 4/23/2008 9:04:22 AM  
Comment : Facing SW, HWY 23, [- STA 934+00]



File Name : IMG93425\_2531.JPG  
Shooting Date/Time : 4/23/2008 12:29:08 PM  
Comment : Facing SW, [STA 934+2-5]



File Name : IMG93425\_2533.JPG  
Shooting Date/Time : 4/23/2008 12:29:20 PM  
Comment : Facing North, [STA 934+25]



File Name : IMG95200\_2539.JPG  
Shooting Date/Time : 4/23/2008 12:34:52 PM  
Comment : Facing SW, [STA 952+0-0]



File Name : IMG95200\_2541.JPG  
Shooting Date/Time : 4/23/2008 12:35:00 PM  
Comment : Facing South, [STA 952+00]



File Name : IMG95200\_2543.JPG  
Shooting Date/Time : 4/23/2008 12:35:13 PM  
Comment : Facing NE, [STA 952+00]



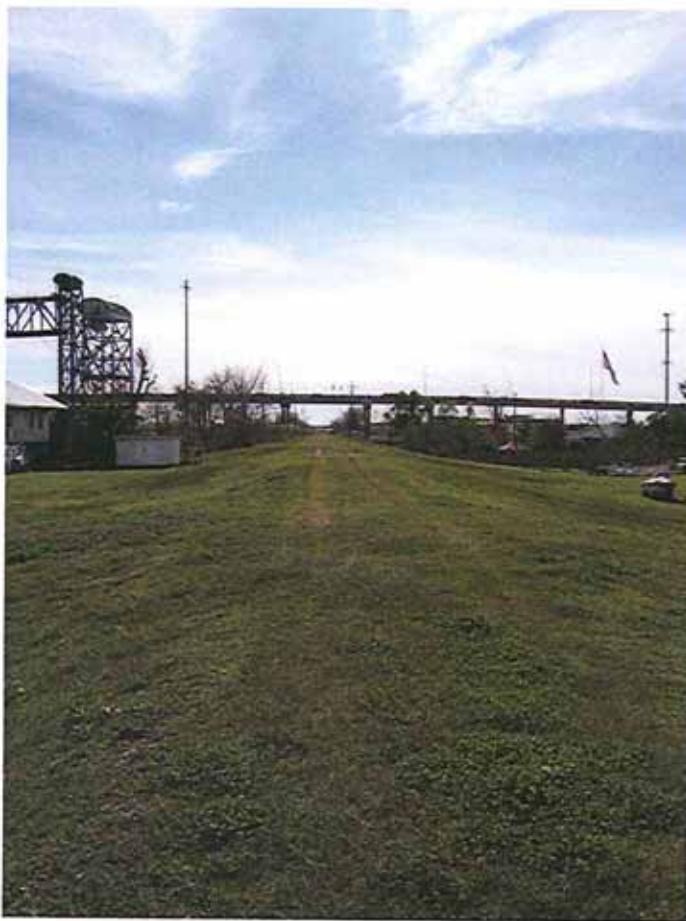
File Name : IMG95233\_2394.JPG  
Shooting Date/Time : 4/23/2008 8:24:00 AM  
Comment : Facing NE, [STA 952+33]



File Name : IMG95233\_2398.JPG  
Shooting Date/Time : 4/23/2008 8:26:12 AM  
Comment : Facing SW, HWY 23, [STA 952+33]



File Name : IMG96600\_2392.JPG  
Shooting Date/Time : 4/23/2008 8:20:49 AM  
Comment : Facing South [STA 966+0-0]



File Name : IMG96650\_1790.JPG  
Shooting Date/Time : 1/3/2008 3:01:48 PM  
Comment : Facing SW, HWY 23, [STA 966+50]



File Name : IMG96650\_1791.JPG  
Shooting Date/Time : 1/3/2008 3:01:57 PM  
Comment : Facing NE, [STA 966+50]



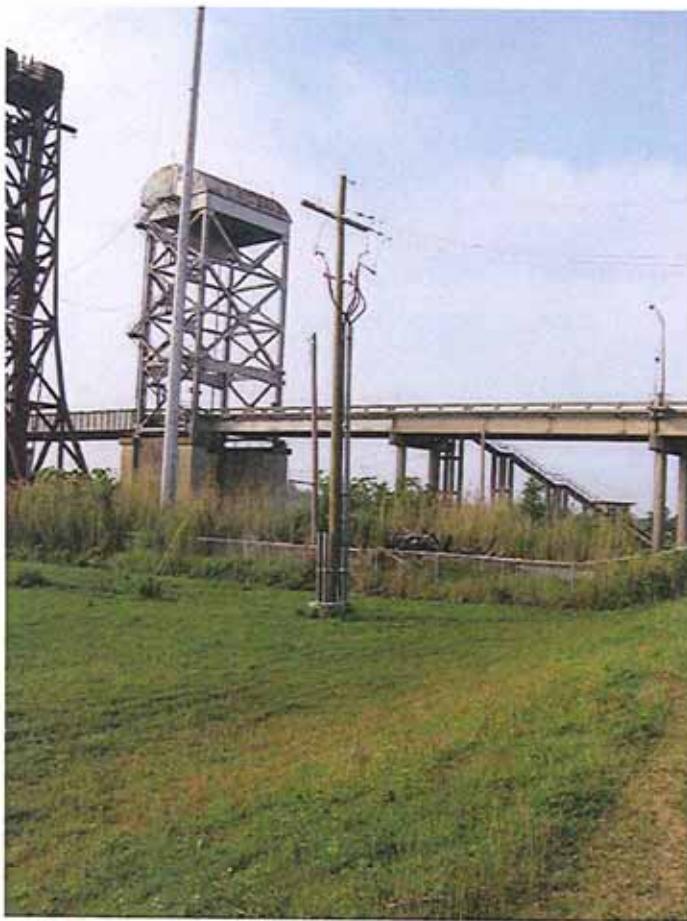
File Name : IMG97000\_2205.JPG  
Shooting Date/Time : 3/28/2008 10:16:11 AM  
Comment : Facing SW, [STA 970+00]



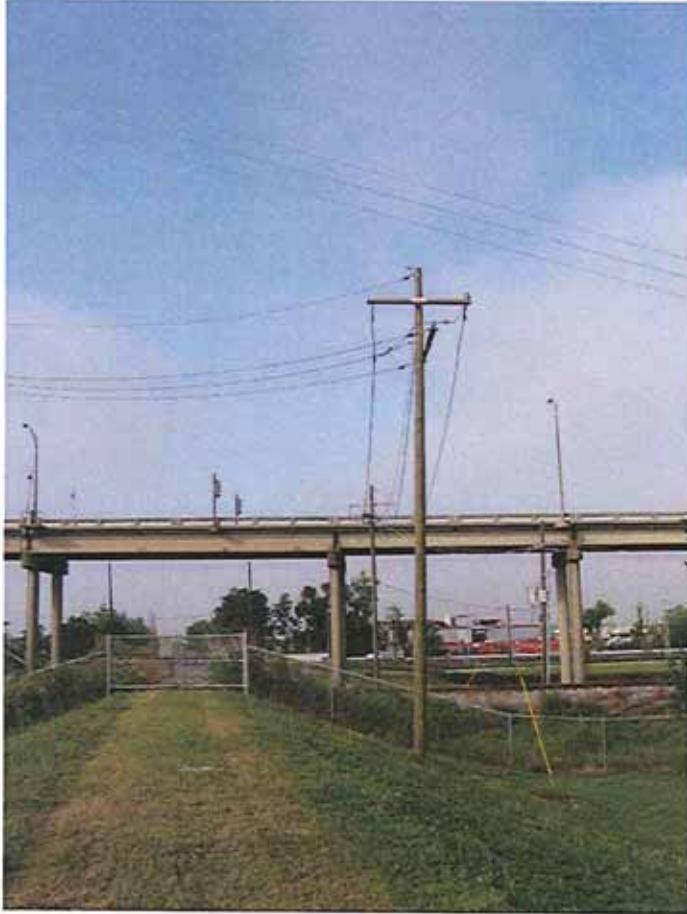
File Name : IMG97400\_2197.JPG  
Shooting Date/Time : 3/28/2008 10:12:31 AM  
Comment : Facing NE, [STA 974+00]



File Name : IMG97400\_2201.JPG  
Shooting Date/Time : 3/28/2008 10:14:42 AM  
Comment : Facing SW, Railroad X & HWY 23, [STA 974+00]



File Name : IMG97450\_2390.JPG  
Shooting Date/Time : 4/23/2008 8:19:20 AM  
Comment : Facing SE, [STA 974+50]



File Name : IMG97450\_2391.JPG  
Shooting Date/Time : 4/23/2008 8:19:25 AM  
Comment : Facing SW, [STA 974+50]



File Name : IMG97475\_2192.JPG  
Shooting Date/Time : 3/28/2008 10:12:08 AM  
Comment : Facing South, Railroad X & HWY 23, [STA 974+75]



File Name : IMG97475\_2195.JPG  
Shooting Date/Time : 3/28/2008 10:12:22 AM  
Comment : Facing South, Railroad X & HWY 23, [STA 974+75]



File Name : IMG97475\_2206.JPG  
Shooting Date/Time : 3/28/2008 10:16:58 AM  
Comment : Facing North, Campgrounds, [STA 974+75]



File Name : IMG97475\_2399.JPG  
Shooting Date/Time : 4/23/2008 9:02:30 AM  
Comment : Facing NE, Pumpstation NO.13, [STA 974+75]



File Name : IMG97475\_2405.JPG  
Shooting Date/Time : 4/23/2008 9:04:18 AM  
Comment : Facing NE, Woodlawn HWY, [STA 974+75]



File Name : IMG97528\_2389.JPG  
Shooting Date/Time : 4/23/2008 8:18:03 AM  
Comment : Facing SE, Existing Utility, [STA 975+28]



File Name : IMG97650\_2386.JPG  
Shooting Date/Time : 4/23/2008 8:17:40 AM  
Comment : Facing SE, HWY 23, [STA 976+50]