Lakefront Capital Improvements Program

PONTCHARTRAIN BEACH FLOOD PROTECTION

PRELIMINARY DESIGN REPORT

For

THE BOARD OF LEVEE COMMISSIONERS

Of The

ORLEANS LEVEE DISTRICT

December 1985

URS Company

URS
AN INTERNATIONAL PROFESSIONAL SERVICES ORGANIZATION

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December 1, 1985

Mr. C. E. Bailey, Chief Engineer
Board of Levee Commissioners
Orleans Levee District
Suite 202, Administrative Building
New Orleans Lakefront Airport
New Orleans, Louisiana 70126

Dear Mr. Bailey:

Subject: Pontchartrain Beach Flood Protection Project
Lakefront Capital Improvements Program
OLB Project No. 2040-0204
DEI Project No. 1008
URS Project No. 565-04-73

In accordance with our engineering agreement dated October 1, 1985, URS is pleased to submit our preliminary phase report of the Pontchartrain Beach Flood Protection Project. URS presents this document for the review of the OLB prior to our proceeding with the final design of the project. The reviewer should be aware that several items are yet unresolved and that the geotechnical analyses are not yet complete although all available results, though preliminary pending the complete investigation, have been incorporated into this preliminary design.

URS will now transmit copies of this report to the other affected agencies for their review and comment. Please review the report and contact us with your comments as soon as possible so as to enable us to meet our final design completion date of February 1, 1986. Should you have any questions or comments, please call.

Sincerely,

URS COMPANY

Bruce H Adams

Bruce H. Adams, P.E.

Enclosures

cc: DEI

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PONTCHARTRAIN BEACH FLOOD PROTECTION PROJECT

Preliminary Design Report
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1.0 INTRODUCTION

On October 1, 1985, the Orleans Levee District entered into an agreement with URS Company for engineering design services related to the construction of the Pontchartrain Beach Flood Protection Project (Orleans Levee District Project No. 2040-0204) based upon the conceptual design provided in the design memorandum prepared by Design Engineering, Incorporated (DEI - also acting as the Board's representative). The reach of the project as understood by URS includes the area along the old Pontchartrain Beach Amusement Park between and including the levee crossings of the roadways at the east and west ends of the site. With every effort being made to provide flood protection across this reach by July 1, 1986, URS began work on the project immediately in order to meet the required preliminary design and final design completion dates of December 1, 1985, and February 1, 1986, respectively. While it is the intention of the project to ultimately provide "final" flood protection, it is recognized that due to the above time constraints, immediate attention will be given to providing increased protection in this area by scheduling the construction phase so as to first construct the portions of the project which will immediately afford increased main-line levee protection along this reach.

Also, inasmuch as it is intended that this project will be eligible for 70/30 cost sharing for Federal funding (based upon the overall best and least cost plan) every attempt has been made to work within the design guidelines predicated for such funding.

2.0 PURPOSE AND SCOPE

In developing this preliminary phase for the flood protection project, URS coordinated design efforts with DEI in meeting with and contacting the following public agencies:

A) Orleans Levee Board
B) U.S. Army Corps of Engineers
C) New Orleans Public Service, Inc.
D) City of New Orleans Department of Streets
E) Sewerage and Water Board of New Orleans

In addition, utilizing the information developed during the original Pontchartrain Beach Floodwall Project of 1984, URS updated applicable information from that project and incorporated it into the preliminary design of this project.

Survey information for this project was provided to URS by DEI. Information from their surveyor, Roy Anslem, indicates that his base line was based upon the base line of the former condominum project as established by J. J. Krebs and Sons dated November 10, 1983 and later revised on January 12, 1984, and accepted by the OLB on January 17, 1984.

Geotechnical investigations, although coordinated by URS, were provided by Eustis Engineering Company through the Orleans Levee District. The scope of the geotechnical analyses was basically directed toward verifying the stability of and estimating the potential for settlement of and seepage through the proposed facility as identified in DEI's design memorandum. In addition to the above design information, foundation design criteria necessary to the design of pile-supported structures (i.e., gated structures) and spread footings (for retaining walls) was also included in the scope of the geotechnical analyses. At the time of this preliminary design report, the geotechnical investigation has not been completed. However, preliminary information has been obtained from the geotechnical consultant and included in the recommendations of this report as discussed in Section 4.0.

As a result of the above-described efforts, URS has considered the available information and developed a preliminary layout and preliminary details and sections of the main-line flood protection including earthen levees, combination earthen levees/concrete-capped I-Walls, gated vehicle-pedestrian levee crossings and retaining walls as well as the roadway raisings at the east and west ends of the project including their adjacent levee connections.

3.0 PROJECT DESIGN CRITERIA

3.1 General

In meetings and contacts with the OLB, DEI, and the Corps of Engineers, information was made available concerning the height of the flood protection, openings, access, connections to existing levees, esthetics, and roadway raisings necessary to the project. Also, information was obtained from other agencies necessary for the design of utility modifications.

3.2 Flood Protection and Facility Features

In URS' meetings with the OLB, DEI and the Corps, the following flood protection criteria was determined for this project:

A) Minimum net elevation along the main flood protection directly fronting Lake Pontchartrain = 20.0 ft NGVD.

B) At the eastern and western ends of the project's reach, this 20.0 ft elevation would transition down to 17.5 ft at Lakeshore Drive.

C) The full levee sections with crown elevations of 20.0 ft would be constructed with 5 on 1 slopes.

D) The minimum elevation of combination earthen levee/I-walls fronting Lake Pontchartrain would be 20.0 ft with a levee crown elevation of 13.0 ft. Along with this combination section, a 100' wide run-up berm would have to be provided. At the eastern and western ends of the project's reach, the 13.0 ft crown elevation of the earthen portion of the combination section would transition down to 10.0 ft, paralleling the top of the I-wall which transitions from 20.0 ft to 17.5 ft.

E) At locations where the two floodside buildings exist, vertical concrete retaining walls will be provided along the run-up berm in lieu of the full run-up berm to maintain the buildings' existence.

F) Three gated vehicle-pedestrian ramps would be provided in the project, one at each end and a third near the center of the project's reach facing Lake Pontchartrain.

G) Gated openings will be 30 ft wide (clear opening) with gate monoliths founded upon precast prestressed concrete piling (both vertical and batter piling).

3.3 Foundation and Structural Design Criteria

Foundation and structural design will be in accordance with the Corps of Engineers' design requirements and will include information provided to URS by the Corps. As confirmed by URS' October 1, 1985 letter to the Corps of Engineers, URS was directed by the Corps to utilize the design criteria provided by them on July 20, 1984 for the then Pontchartrain Beach Floodwall Project.

Concerning foundation design, that letter directed use of the following criteria:

A) I-Walls. A factor of safety of 1.5 is applied to the design shear strength as follows: for a cohesive soil (ϕ=0) the cohesion developed = cohesion/factor of safety; for a cohesionless soil (C=0), ϕ developed = $\tan^{-1}$ (tan ϕ available/factor of safety). Using the resulting shear strengths, net lateral water and earth pressure diagrams are determined for movement toward each side of the sheet pile. Using these distributions of pressure, the summation of horizontal forces is equated to zero for various tip penetrations. At these penetrations summations of overturning moments about the tip of the sheet pile are determined. The required depths of penetrations to satisfy the stability criteria are determined as those where the summation of moments is equal to zero.

B) T-Walls and Gates.

1) Steel Sheet Pile Cutoff. A steel sheet pile cutoff will be used beneath the gates and T-walls to provide protection against seepage during a hurricane. The sheet pile penetration is based on an acceptable seepage analysis.

2) Deep seated Stability Analysis. A conventional stability analysis utilizing a 1.30 factor of safety incorporated into the soil parameters is performed for a pile supported floodwall or gate as explained in the Corps' publication, "Deep Seated Stability Analysis".

3) Pile Capacities. For pile supported structures where no pile tests are anticipated, a safety factor of 3.0 will be applied to ultimate calculated capacities to determine actual service pile lengths. For jobs where pile tests are anticipated, a safety factor of 2.0 will be used to determine actual service pile lengths, based on the results of the pile tests.

Concerning structural design criteria for reinforced concrete, the Corps' letter further directed the use of their Engineering Technical Letter, ETL 1110-2-265, "Strength Design Criteria for Reinforced Concrete Hydraulic Structures", with the exception that a load factor of 1.9 be used for all loads.

For the structural design of floodgates, direction was also given to design the gates by the working stress method using an allowable bending stress of $F_b = 0.55 F_y$, using A36 steel. The following two load cases should be used in the gates' design:

A) Water to top of the gate.

B) Wind load of 50 pounds per square foot (psf) on the gate.

Also, on October 9, 1985, the Corps provided URS with the high water design cases to be utilized in the design of this project. Enclosed with that October 9, 1985 directive were four wave force diagrams based upon the following conditions:

Condition	Wall Top Elevation (ft. NGVD)	Ground Elevation at the Wall (ft. NGVD)
1	+20	+10.5
2	+17.5	+10.5
3	+20	+13
4	+17.5	+13

It should be noted that the letter originally included wall top elevations of +18.0 for conditions 2 and 4, but during a meeting among the Corps, DEI and URS of October 22, 1985, they were verified to be +17.5 ft NGVD.

Concerning pile foundation design, during the above-mentioned October 22, 1985 meeting, it was also further mentioned by the Corps that all lateral loads transmitted by the gate shall be from the gate to the gate's bearing columns comprising part of the gate monolith. The entire gate monolith will be designed as one "monolithic" section with vertical piles only beneath the clear opening of the gated structure. Batter piles will be located as required beneath the adjacent bearing column sections of the gate monolith structure. It was further suggested by the Corps during the above meeting that URS use their computer-aided pile design analysis which is based upon the Hrenicoff design program. As soon as the geotechnical investigation is completed to the point where sufficient information pertinent to this design analysis is available, this work will be performed.

3.4 Interim Flood Protection

In accordance with the OLB's desire to provide increased flood protection along this project's reach by July 1, 1985, it is recognized that the first portions of the project to be constructed should be the full earthen levee sections and the combination earthen levee/I-wall sections. The concrete I-wall caps would not now be constructed in consideration of both time of construction and potential settlement (as the geotechnical analyses have preliminarily determined that to be a problem). DEI and URS have concurred in recommending that this "interim" protection be provided to elevation 16.0 ft NGVD which would provide 4.5 ft above the Corps' design still water elevation of 11.5 ft. It is also recommended that all piling (structural concrete piling and steel sheet piling) be installed at the project's initial construction in advance of the subsequent gate monolith construction in order to minimize pile driving mobilization costs.

At locations where gated structures are proposed, if scheduling necessitates, structural steel sheet piling will be provided at these sections which can later be cut to the proper grade for construction of the gate monoliths. In light of the necessity of providing a temporary structural steel sheet pile section for this "interim" protection rather than the ultimate flatter section required for seepage control below the gate monoliths, it is proposed to install PZ-27 sections at these gates for the "interim" protection and later incorporate them as the seepage control beneath the gate monoliths.

Also, as mentioned above, the potential for settlement is being investigated for the project. The geotechnical investigations have revealed this to be a consideration, and the earthen levees, combination earthen levees/I-walls, and roadway raisings may all, or in part, have to be overbuilt in anticipation of such settlement. Previous preliminary soil investigations made by the Corps for the original Pontchartrain Beach Floodwall project indicated that as much as one foot of settlement would occur at the roadway raisings at the east end of the project. For additional comments concerning settlement, see the discussion of the geotechnical analyses in Section 4.0 of this report.

3.5 Roadway Raisings

As a part of the Pontchartrain Beach Flood Protection Project the roadway ramps at the east and west ends of the project will be raised where the levees intersect them to provide a net flood protection elevation of 14.5 ft. NGVD. Beyond the 14.5 ft. elevation, a gross elevation of 15.5 ft. is presently recommended based upon information from the Corps which suggests the possibility of up to one foot of settlement at the east roadway raising. Should the geotechnical investigation contracted by the OLB to Eustis Engineering Company reveal that the expected settlements will not be as severe when that investigation is completed, URS will reduce the amount of overbuild and adjust the vertical curve geometry accordingly to reduce the amount of work and cost associated with this portion of the project. Roadway design criteria for this project is generally based upon AASHTO and the City of New Orleans Department of Streets requirements. In reviewing the recommended roadway sections, it should be noted that URS has investigated the feasibility of providing superelevated roadway sections as would be necessary if strict accordance with AASHTO would be required. As now proposed, the proposed vertical curves for each of the roadway raisings are within tangent sections of the existing roadway (based upon the Krebs' survey and baseline information) except for portions of some of the sag vertical curves at the base of each roadway raising. At some of these locations, these sag vertical curves extend slightly beyond the tangent roadway sections into the existing adjacent curves. If these roadway raisings were to now be designed with superelevated curves in these instances, the entire adjacent curves would have to be superelevated to be in accordance with AASHTO. This would involve significant work beyond the scope of simply raising the roadway sections to provide higher flood protection. This additional work would also be expensive. Therefore, due to the minimal distance which these sag vertical curves extend into the existing adjacent curves, it is not thought that the OLB would desire to superelevate these curves. However, should this not be the case, URS will adjust the roadway raisings during the design phase.

3.6 Pedestrian/Vehicle Ramps

Access over the flood protection system will be provided at three locations along the project. One will be provided at each of the approximate mid-points of the curved end sections of the system where the combination earthen section/I-walls are proposed between the mainline protection fronting along Lake Pontchartrain and Lakeshore

Drive. The third ramp is proposed to be located at the approximate center of the project east of and adjacent to the existing sales office building. The design of these ramps will be based upon the general layout as proposed by DEI's design memorandum for this project.

4.0 GEOTECHNICAL INVESTIGATIONS

The Corps of Engineers has to date through the previous Pontchartrain Beach Floodwall Project provided preliminary geotechnical information upon which the Corps' original design was founded. Whenever applicable to the present project, this information was used also. In particular, it was of use in the areas of the roadway raisings. However, a more extensive geotechnical investigation is necessary to the design of the current project with its different general alignment. To this end, proposals were solicited by URS of Eustis Engineering Company and McClelland Engineers, Inc. with the result of Eustis eventually being contracted by the OLB for the geotechnical work. The scope of their work included the following:

A) A total of 10 undisturbed sample soil test borings as follows:

1) Six (6) - 55 ft deep, 3 inch diameter borings with continuous samples to the 15 ft depth and then at 5 ft intervals or change in stratum.
2) Two (2) - 80 ft deep, 3 inch diameter borings with continuous samples to the 40 ft depth and then at 5 ft intervals or change in stratum.
3) One (1) - 80 ft deep, 5 inch diameter boring sampled as in (2), above.
4) One (1) - 100 ft deep, 5 inch diameter boring sampled in accordance with Corps of Engineers standards sampled with Corps' tubes for their exclusive analytical work.

B. Four (4) piezometers will be installed in permeable strata around the site with field permeability tests performed at each piezometer.

C. Soil mechanics laboratory tests on representative samples taken from the borings principally of natural water content, unit weight, grain size analyses, either unconfined compression or unconsolidated undrained triaxial compression shear test (3-point test), permeability, Atterberg liquid and plastic limits and consolidation. Should they be required, consolidated undrained triaxial shear and consolidated drained triaxial shear tests will be performed. (However, the Corps of Engineers may have already performed sufficient consolidated triaxial shear tests for verification of these parameters for this project.) These above-described tests are necessary to determine permeability, relative compressibility and shear strength characteristics of the encountered soils.

D) Preparation of an engineering report with findings and recommendations including boring location plan, boring logs, lab test data, ground water conditions, allowable pile load capacities in tension and compression for various types and embedments of piles, slope stability and settlement analyses, sheet pile analyses, seepage analyses, unbalanced water load analyses for the stability of gated structures and soil pressure differential for the stability of the retaining walls. Also included in the report will be settlement analyses particular to the fill materials along and adjacent to the existing seawall with recommendations relative to the need of a cutoff wall in front of the seawall or removal of the seawall.

Whatever of the results of the above work which were available at the date of the preliminary design report were included (although those results will be preliminary pending completion of the entire investigation). However, some of the work will not be completed in time to be considered for the December 1, 1985 date for preliminary design submittal and may require changes to some of the preliminary recommendations during the final design phase of the project. Preliminary information now available indicates the following may be in the results of the final geotechnical report (and have now been incorporated into URS' preliminary design):

A) Use of a factor of 4 (approximate) for the total length of steel sheet pile I-walls based upon the height of exposed wall above the earthen levee section.

B) PZ-27 sections for I-wall construction (See section 3.4 for additional comments).

C) Retaining walls will probably not require foundation piling but will probably require a 15' deep steel sheet pile wall for seepage control. PZ-22 sections will be used for seepage control along the retaining walls. (Availability and cost dictate use of PZ-22's rather than flatter sections for seepage.)

D) Seepage control along I-walls will not be required beyond the main I-wall sheeting.

E) Seepage control along full earthen sections will consist of toe drains along the protected side levee toe within the top step of the existing seawall. These toe drains will consist of gravel beds wrapped with filter fabric with an embedded PVC perforated drain pipe.

F) Seepage control beneath gate monoliths could consist of flat steel sheet piles (PSA 23's) embedded in the gate monolith structure and driven down to 20' below existing grade at each gate. (However, See B, above, and Section 3.4 for additional comments concerning "interim" protection).

G) 3:1 side slopes appear adequate along combination earthen levee/I-wall sections.

H) Settlement of the full earthen section has been estimated at 12"± at its centerline with settlement along the centerline of the combination I-walls estimated at 6"±. Also, when the ramps are to be constructed over the levee system, drag loads on the piles may prove to be a problem. Therefore, it is recommended to construct the earthen levees, and ramps and combination I-walls without the gates and concrete caps with overbuilt (gross) sections and allow the settlement to occur by "pre-loading" the area. This would coordinate well with the intended "interim" protection being in place by July 1, 1986, with the subsequent work being performed after the hurricane season (and concurrently, the preload period).

I) Combination I-walls located along the seawall appear to now be a potential problem which may require removal of the seawall in these areas or relocation of the I-wall itself away from the seawall.

J) Full earthen levee sections constructed as shown on DEI's plan may also be a problem, however, it now appears to not be as significant as with the I-walls in (I) above. Should the factor of safety without the resisting forces of the soil wedge behind the critical failure path remain above 1.3, the seawall should not pose a problem in this instance.

5.0 SURVEYING

As discussed earlier in this preliminary design report, DEI contracted the services of Roy Anslem for both property and topographic surveying. URS was directed to utilize

this survey in the project's design. As it has become available, DEI has provided URS with the survey information. Also, for the purposes of the preliminary design other topographic information was utilized. Preliminary information on ground contours was provided to URS by Design Consortium, LTD, from recent aerial mapping work done for them by Gulf Coast Aerial Photography.

As of the December 1 preliminary design phase contract date, URS will compile a list of any survey information still pending (if any) and provide this list to DEI for their coordination with the surveyor.

6.0 OTHER PROJECT CONSIDERATIONS

6.1 General

Several of the recommended improvements shown on the preliminary project drawings require some explanation as well as some potential problems which have yet to be resolved. The following paragraphs discuss such particulars of this project.

6.2 Esthetics

As this project is proposed in an area of high visibility, with potential for a high degree of public use as well as private development, the OLB's wish to make the improvements as esthetically-pleasing as possible is well understood. While no final recommendations are made herein and will probably involve more input from DEI and the OLB, URS suggests that there are several types of architectural finishes which could prove satisfactory but will involve varying degrees of cost.

One of the more prevalent applications to date within the OLB's flood protection system is an exposed-aggregate finish created by "bush hammering" the concrete I-wall after the forms are removed with hand-held power equipment. This is labor intensive and costly. Another method is form lining which has been used elsewhere to produce figures which might reflect the area's general use such as sailing vessels and sea gulls. This has been incorporated into other projects along with the fractured fin finish discussed below.

A third method currently in use involves utilizing a form liner to produce a rough-finished vertically ribbed effect known as a "fractured fin finish". This could be provided as easily as any other type of form liner-produced finish and is the least expensive of the three finishes herein discussed. However, whatever type of esthetics the OLB desires will be included in the final design. See the Preliminary Phase drawings for examples of each.

6.3 Electrical Utilities

The existing electrical systems which will be affected by this project are minimal. The most major are the street lighting systems along Lakeshore Drive which will have to be relocated along the roadway raisings. Other distribution system conflicts appear to be minor and will be relocated if their continued service is necessary or terminated if no longer in use.

6.4 Drainage

The drainage system will have to be modified along Lakeshore Drive where the roadway raisings are constructed. Whenever possible, catch basins will be raised and

existing drainage pipes will be maintained. Where necessary, new drainage catch basins and pipes will be constructed and connected to the existing system where appropriate.

Two I-wall penetrations are now proposed for the projects - one at each end of the project where the I-wall crosses the old Beach midway (old Lakeshore Drive). Drain valves and manholes will be provided at each of these penetrations. Only one other drainage wall penetration is possibly thought to be necessary. Along the eastern side of the project a drainage manhole exists which conflicts with the proposed combination earthen levee/I-wall. If it is necessary to maintain this drain manhole, a wall penetration will be made for the drain pipes and the manhole raised to grade and a drain valve and manhole provided for flood protection. This will be verified during the final design phase.

6.5 Gas Distribution

A six (6) inch high pressure gas distribution line runs along the south edge of Lakeshore Drive (back of curb) for the entire reach of this project. Depending upon the recommendations of the geotechnical report pertaining to settlement, the pipe may have to be relocated or re-supported. Also depending upon the present location of the gas pipe relative to the steel sheet pile cutoff walls at each end of the project, they may have to be penetrated.

6.6 Water Distribution

Two water distribution lines exist which will remain in service following completion of this project. One is a 12 inch line located parallel to the above gas line along the west side of the project which will be handled similarly to the gas line except that a water valve and valve box will be provided when it crosses the levee system. The other is a 12 inch line which is a loop to the above 12 inch water line and runs across the west side of the old amusement park site to the north side of the midway (old Lakeshore Drive). From there it parallels the midway on the south side of the seawall toward the east to Franklin Avenue and beyond. This line will penetrate the combination earthen levee/I-wall and a water valve and valve box will be provided at the penetration of the wall. Also, one fire hydrant will have to be relocated at this location. Abandoned water lines which are encountered will be cut and plugged on both open ends.

6.7 Sewerage System Modifications

The only apparent sewer service along the project which will require any modification is that to the existing sales office building. It will be maintained and a sewerage valve installed in-line and a valve manhole provided. Also along the eastern end of the project there exists a restroom facility (see Section 6.12) which will be removed. The 8" sewer service to this building will be plugged. Other miscellaneous service lines appear to exist which at one time served the swimming pool facility and other amusement park facilities on the lake side of the seawall which are now abandoned. These, if encountered, will be cut and plugged at each open end.

6.8 Seawall

As a minimum, the existing seawall will have to be removed in the two locations where the combination earthen levee/I-wall crosses it. Another potential problem with the seawall concerns the presently proposed alignment of the levee system which is partially over the seawall. Should the geotechnical investigation reveal that differential settlement will be a problem, significant project changes may be necessary due to the cost of removing the seawall and then backfilling the area and/or revising the presently proposed alignment. See Section 4.0.

Also, the wall is scheduled to be investigated for settlement of the pumped fill beneath the wall. This may require filling along the project if the geotechnical analyses determine the voids (if any) to be a problem. Any voids which exist when the wall is removed for the I-wall will have to be filled. URS recommends filling these particular voids by grouting the immediate area with a light-weight concrete grout. Should any other voids exist which require filling, it is recommended that sand be washed into such voids.

6.9 Swimming Pool

If the existing swimming pool at the former amusement park was filled with material other than suitable fill, it may have to be excavated and at least backfilled. Analyses may show that the entire pool will have to be removed and backfilled, but it is now recommended that the concrete deck areas be removed at least. Information concerning the pool's foundation needs to be provided to complete the analysis.

6.10 UNO Entrance

The UNO entrance plan provided to URS by DEI on October 15, 1985 is the basis for the proposed relocation plan shown on the preliminary design drawings except that Lakeshore Drive will not be widened as shown. A three-lane turn-out (entrance, left-turn and right-turn lanes) will be provided and constructed to the UNO propety line in this project. Coordination will be required between the OLB and UNO for construction of UNO's portion of the work and to minimize the time of the entrance closure.

6.11 Gate Selection

URS has investigated the feasibility of roller gates versus swing gates for this project's gated structures and has determined that swing gates would be more practical for this project and DEI has concurred. The basis for this is as follows:

A) The three roller gates proposed for this project would cost approximately $100,000 more than the swing gates.
B) Operation of the swing gates is more quickly and easily accomplished than roller gates. Swing gates can be operated manually while roller gates require mechanical assistance.
C) The esthetics of both gates in the open position is the same as only the steel skin plate of both is visible while in the open position.
D) Roller gates have proven to be difficult to operate and service. Swing gates have proven to be relatively easier to secure and seal.
E) Swing gates only require a hinged support column while roller gates require a storage monolith in addition to the gate monolith (therefore more piling and heavy structure), rollers and a track system.

In light of the above, swing gates are recommended for this project.

6.12 Demolition

Throughout the site demolition of existing facilities will have to be done prior to constructing the proposed flood protection system. This includes the following:

1) Extreme amounts of paved surfaces beneath the path of the levee system.

2) At least the deck of the swimming pool, but the entire structure might have to be removed pending the results of the geotechnical investigation.

3) Miscellaneous buildings around the site including an abandoned electrical transformer vault and an old restroom facility.

4) As a minimum, the seawall will have to be broken where the toe drains will penetrate the wall. Also, should the geotechnical investigations determine it necessary, the seawall itself may have to be entirely removed beyond the two obvious locations when the I-wall crosses it. This is probably not the case along the full earthen sections, however, along the I-walls a problem may exist. See Section 4.0.

7.0 PROJECT COST ESTIMATES

The project cost estimates are presented in the following pages of this report. In developing these costs, recent construction project bids and Corps of Engineers' costs data were utilized as well as cost information provided by general contractors and information from URS' construction experience. The below prices are "complete-in-plan" and include allowances for ancillary work related to the main work items and include contractor's profit. The engineering fee is that of URS' contract agreement for this project. The percentage utilized for resident project representation is 2.5% and 1% allowed for testing. Contingencies were allowed as 10%.

PONTCHARTRAIN BEACH FLOOD PROTECTION IMPROVEMENTS
ORLEANS LEVEE BOARD
PRELIMINARY PHASE
COST ESTIMATE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	Mobilization	Lump Sum	L.S.	---	$65,000.00
2	Clearing and Grubbing	Acre	8	2,000.00	16,000.00
3	Removal of Structures and Obstructions	Lump Sum	L.S.	---	10,000.00
4	Removal of Seawall	Cu. Yds.	1,500	300.00	450,000.00
5	Removal of Concrete	Sq. Yds.	13,488	7.00	94,416.00
6	Removal of Concrete Curbs	Lin. Ft.	1,760	3.00	5,280.00
7	Excavation	Cu. Yds.	17,350	4.00	69,400.00
8	Backfill (Seawall)	Cu. Yds.	10,900	5.00	54,500.00
9	Embankment	Cu. Yds	78,500	12.00	942,000.00

PONTCHARTRAIN BEACH FLOOD PROTECTION IMPROVEMENTS
ORLEANS LEVEE BOARD
PRELIMINARY PHASE
COST ESTIMATE
(Cont'd)

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
10	Concrete "I" Wall	Cu. Yds.	1,326	350.00	464,100.00
11	Architectural Finish	Lump Sum	L.S.	---	45,000.00
12	Concrete Retaining Wall	Cu. Yds	307	350.00	107,450.00
13	Steel Sheet Piling (PZ-27)	Sq. Ft.	58,422	14.00	817,908.00
14	Steel Sheet Piling (PZ-22)	Sq. Ft.	10,575	13.00	137,475.00
15	Swing Gates	Each	3	27,500.00	82,500.00
16	12" Prestressed Concrete Piles (Vertical)	Each	12	500.00	6,000.00
17	12" Prestressed Concrete Piles (Batter)	Each	24	750.00	18,000.00
18	Asphaltic Concrete	Tons	1,972	42.00	82,824.00
19	Base Course (1'-0" Sand-Shell)	Cu. Yds.	2,815	44.00	123,860.00
20	Combination Curb and Gutter (6" Barrier Type)	Lin. Ft.	2,976	14.00	41,664.00
21	Standard Catch Basin	Each	6	1,400.00	8,400.00
22	Standard Manhole	Each	1	3,000.00	3,000.00
23	Valved Manholes and Wall Penetrations	Lump Sum	L.S.	---	38,000.00
24	12" RCP	Lin. Ft.	250	25.00	6,250.00
25	Toe Drains	Lin. Ft.	1,100	15.00	16,500.00
26	Adjusting Catch Basins	Each	7	1,200.00	8,400.00
27	Adjusting Manholes	Each	2	1,200.00	2,400.00
28	Seeding and Fertilizing	Lump Sum	L.S.	---	7,500.00

PONTCHARTRAIN BEACH FLOOD PROTECTION IMPROVEMENTS
ORLEANS LEVEE BOARD
PRELIMINARY PHASE
COST ESTIMATE
(Cont'd)

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
29	4" Plastic Pavement Striping	Lin. Ft.	800	1.00	800.00
30	Street Lighting Relocation	Lump Sum	L.S.	---	21,000.00
	Sub Total - Construction Cost				$3,745,627.00
	Contingencies 10%				374,563.00
	Total Construction Cost				$4,120,190.00
	Engineering				290,000.00
	Testing 1%				41,202.00
	Inspection 2.5%				103,005.00
	Geotechnical Investigation				16,650.00
	Surveying				15,000.00
					$4,586,047.00

8.0 SUMMARY

In reviewing this preliminary design report, several items will be noted which will require further action, including (but not limited to:)

A) Esthetics
B) Potential seawall conflicts, remedial action, removal and/or alignment revisions.
C) Relocation of water and gas lines.
D) Maintenance of the east-side parking lot drainage.
E) Approval of the UNO entrance plan.
F) Extent of the roadway raisings.

Upon completion of the geotechnical analyses some of the above will be addressed, however, some decisions are necessary of the OLB for the above items in particular as well as the review of preliminary drawings in general. As soon as the geotechnical report is available, copies will be made available to all concerned agencies for inclusion in their review.