A0007116

I INTRODUCTION

The purpose of this study is to develop and evaluate possible interim methods of raising the elevation of the Seventeenth Street Outfall Canal flood protection to the elevation required by the U.S. Army Corps of Engineers' High Level Plan. The Army Corps of Engineers' Design Criteria is used in all analyses to ensure a "creditable" facility upon completion of construction. A "creditable" project, in this case, is one in which the cost incurred by the Orleans Levee Board will be creditable towards the Orleans Levee Board's contribution for the Lake Pontchartrain, Louisiana and Vicinity Hurricane Protection project.

A general plan of the existing canal is exhibited in Figure 1. The study of the canal flood protection is divided into two major areas: levees and bridges - each of which possesses a set of unique problems. Numerous alternatives have been developed and studied which provide solutions to these problems. The analyses of these alternatives include engineering considerations, methods of construction, and cost evaluations.

This report specifically addresses the potential contribution of the Orleans Levee Board in raising the flood protection from the existing level to an interim high level. Therefore, possible levee configurations were developed under two conditions. The first condition is presented in Section IV and assumes the canal is dredged by the Sewerage and Water Board of New Orleans from Pump Station No. 6 to the Lake, with the exception of areas under the bridges. The Sewerage and Water Board is also considered to contribute the necessary funds to repair the levees such that existing protection is maintained. The costs given in Section IV apply only to the difference in cost between constructing levees under existing and under high level criteria. The difference in cost is considered the Orleans Levee Board's contribution.

Although the dredging of the canal has become a necessity to relieve flooding in Orleans and Jefferson Parishes, a second levee condition is presented in Section V which assumes that the Sewerage and Water Board does not dredge the canal. The purpose of this analysis is simply to determine whether the Sewerage and Water Board's planned dredging will cause the Orleans Levee Board to expend more monies to provide interim high level protection than if the canal was not dredged. The existing undredged-canal levees in Section V are modified to meet U.S. Army Corps of Engineers' High Level Criteria. All costs for this levee condition are considered the sole responsibility of the Orleans Levee Board.

Section VI is devoted to the analysis of possible methods of preventing flood waters from escaping into residential areas via the existing, low bridges. Included in this section are analyses of sealing the bridges, floodgates, box culverts, and raised bridges.

Section VII of this report presents the recommended alternatives for interim high level protection while Section VIII addresses what must be done by the U.S. Army Corps of Engineers to take the recommended interim protection scheme and make it permanent.

All evaluations, quantities, and costs pertain only to the bridges and the Orleans Levee. Although only the Orleans Levee is presented in this report, the Jefferson Levee was also briefly evaluated to insure that these alternatives are applicable.

III DESIGN PARAMETERS

The design parameters listed below are those gathered from the U.S. Army Corps of Engineers. All of these parameters are to be complied with in order for the project to be considered creditable.

A. Design Water Elevation

1. High Water

   a. Station 545+87 to Station 625+00
      1) Elevation 11.5 MSL for design of levees.
      2) Elevation 13.5 MSL for design of sheet piling.
   b. Station 625+00 to Sta. 671+25
      1) Elevation 12.5 MSL for design of levees.
      2) Elevation 14.5 MSL for design of sheet piling.

2. Low Water: Elevation -5.0 MSL throughout the length of the canal.

B. Factors of Safety

1. Slope stability factor of safety of 1.3.

2. Sheet Pile Design

   a. Factor of safety of 1.5 applied to soil shear strength for penetration.
   b. Factor of safety of 1.0 to determine bending moment.
   c. Both "Q" and "S" soil shear strengths used.

3. A factor of safety against blow-out of 1.25.

4. No reductions in factors of safety are generally allowed regardless of load duration or likelihood of occurrence.

5. A coefficient of lateral pressure, K, for piles in tension of 0.75 for displacement piles and 0.5 for nondisplacement piles.

6. Piles in tesion

   a. Factor of safety of 2.0 with a pile load test.
   b. Factor of safety of 3.0 without a pile load test.

C. Method of Stability Analysis - In the slope stability analysis, the method of planes is used in accordance with Army Corps of Engineers'criteria.

D. Soils Investigation

1. The first in-depth soils investigation and analyses were performed by consultants to the New Orleans Sewerage and Water Board and submitted to the Army Corps of Engineers in November, 1981.

17TH ST. CANAL - PROJECT COSTS

LEVEE WORK

LAKE TO RAILROAD (ALTERNATIVE 2) :

ITEM	COST ORLEANS LEVEE OLB	COST ORLEANS LEVEE USCE	COST JEFFERSON LEVEE JLB	COST JEFFERSON LEVEE USCE
Sheet Pile	$5,844,400	------	$5,680,350	------
Degrading	92,300	------	104,800	------
Fill	9,900	------	------	------
Matting	520,500	------	527,750	------
Coal Tar Epoxy	261,700	------	248,150	------
Sand Blasting	65,450	------	62,050	------
Concrete	------	$3,080,000	------	$2,940,000
Reinforcing	------	388,000	------	368,000
Contingencies - 15%	1,019,150	520,200	993,500	496,200
Contributions*	(2,289,900)	------	(2,213,650)	------
TOTAL	$5,523,500	$3,988,200	$5,402,950	$3,804,200

* S&WB contribution for providing flood protection up to the authorized level.

RAILROAD TO PUMP STATION NO. 6 :

ITEM	COST ORLEANS LEVEE OLB	COST ORLEANS LEVEE SWB	COST JEFFERSON LEVEE JLB	COST JEFFERSON LEVEE SWB
Floodwalls	$20,000	$49,350	------	$34,350
Contingencies - 15%	3,000	7,450	------	5,200
TOTAL	$23,000	$56,800	------	$39,550

17TH ST. CANAL - PROJECT COSTS

BRIDGE WORK

BRIDGE/ALTERNATIVE	OLB	JLB	LaDOTD
Hammond Hwy - Sealing			$241,900
Veterans Hwy - Sealing	$1,304,900	$1,304,900	
Railroad - Floodgates	120,000	120,000	
TOTAL	1,424,900	1,424,900	$241,900

* The I-10/610 bridges are to be replaced by LaDOTD for structural and hydraulic reasons and thus are not included in the project costs.
The cost for sealing Veterans Hwy is a revised cost estimate based on a revised sealing scheme as discussed in the cover letter.
The cost for floodgates at the railroad is based on the actual contract price for work in progress to provide such protection.

PUMP STATION NO.6 WORK

ITEM	USCE	SWB
Sliding Gates	$2,700,000	
Butterfly Valves	375,000	
Electrical Service	90,000	
Work Platform	100,000	
Floodwalls	147,050	$67,400
Contingencies - 15%	511,850	10,150
TOTAL	$3,923,900	$77,550

17TH ST. CANAL - PROJECT COSTS

TOTAL COSTS

	OLB	JLB	USCE	OTHERS
Levee Work: Lake to RR	$5,523,500	$5,402,950	$7,792,400	$96,350
Levee Work: RR to PS 6	23,000	-------	-------	241,900
Bridge Work	1,424,900	1,424,900	-------	77,550
Pump Station No. 6 Work	-------	-------	3,923,900	-------
TOTAL	$6,971,400	$6,827,850	$11,716,300	$415,800

TOTAL PROJECT COST = $25,931,350