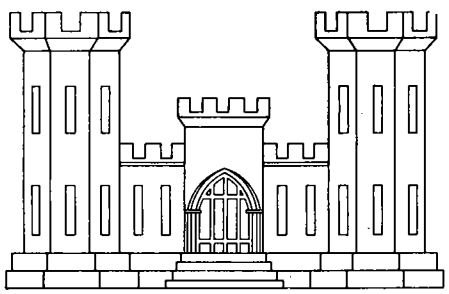
MISSISSIPPI RIVER OUTLETS VICINITY OF VENICE, LA.

GENERAL DESIGN MEMORANDUM



DEPARTMENT OF THE ARMY

NEW ORLEANS DISTRICT, CORPS OF ENGINEERS

NEW ORLEANS, LOUISIANA

DECEMBER 1974

LMVED-TD (NOD 8 Jan 75) 5th Ind
SUBJECT: Mississippi River Outlets, Vicinity of Venice, La., General Design Memorandum

DA, Lower Mississippi Valley Division, Corps of Engineers, Vicksburg, Miss. 39180 31 Dec 75

TO: District Engineer, New Orleans, ATTN: LMNED-MP

The information furnished and action described in the 4th Ind are satisfactory.

FOR THE DIVISION ENGINEER:

for Robert J Kaufman
R. H. RESTA
Chief, Engineering Division

wd incl

CF:
DAEN-CWE-B (14 cy)
w/14 cy 3d & 4th Ind

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

IN REPLY REFER TO
LMNED-MP

8 January 1975

SUBJECT: Mississippi River Outlets, Vicinity of Venice, La., General Design Memorandum

Division Engineer, Lower Mississippi Valley
ATTN: LMVED-TD

1. The subject general design memorandum (GDM) is submitted herewith for review and approval. It has been prepared generally in accordance with the provisions of ER 1110-2-1150 exclusive of the Phase 1 - Phase II planning procedure.

2. It is noted that the Plaquemines Parish Commission Council, the agency responsible for fulfilling local cooperation requirements, objects to the requirement that they provide the necessary retaining dikes, bulkheads and embankment therefor, or the costs of such retaining works.

3. Approval of this GDM is recommended.

E. R. HEIBERG III
Colonel, CE
District Engineer

1 Incl (16 cys) fwd sep
GDM

LMVED-TD (NOD 8 Jan 75) 1st Ind
SUBJECT: Mississippi River Outlets, Vicinity of Venice, La., General Design Memorandum

DA, Lower Mississippi Valley Division, Corps of Engineers, Vicksburg, Miss. 39180 6 Mar 75

TO: HQDA (DAEN-CWE-B) WASH DC 20314

1. Subject DM is forwarded for review and approval pursuant to para 21 ER 1110-2-1150. Approval is recommended as a basis for preparation of plans and specifications subject to the comments below.

2. Five copies of the Draft EIS are furnished herewith. Based on the Draft EIS, we consider that probable adverse environmental effects of the project will be minimal. The Final EIS is scheduled for submission in June 1975.

3. Comments which should be resolved by indorsement on this DM are as follows;

a. Para 21c, page 8. In the fourth sentence a statement is made that waste water control structures will be placed in the dredged material retention dikes. A description of these structures and how they will be operated should be furnished.

b. Para 26, page 13. The rationale used to arrive at sediment deposition rates for various reaches of both Baptiste Collette Bayou and Tiger Pass should be included.

c. Para 26, Hydrology, Page 13. The report should discuss the extent to which the proposed enlargements will increase flow in these distributary channels and in turn, reduce flow in South and Southwest Passes, and any additional maintenance dredging and/or requirement for additional contraction structures resulting from this project. Retaining a status quo or reducing flow in the subject channels was discussed in para 1c of the 1st Ind to LMNED-DG letter, dated 16 Aug 74, subject: Mississippi River, Baton Rouge to the Gulf of Mexico - Completion of Project.

d. Para 26d(2), page 15 and Plate 21. With the predominant direction of littoral drift towards the north, the reason for disposing of dredged material on the south side of the channel, as shown on Plate 21, where it could drift back into the channel should be discussed.

e. Para 39c(2), page 21 and Plates 11 and 20. Plate 11 shows some crude oil and gas pipelines crossing the area designated for disposal of dredged material on Plate 20. To prevent damage to these and any other such pipelines due to settlement from the imposed dredged material load, disposal should be restricted for some appropriate distance on each side of the pipes.

f. Para 41, page 24. This para notes that increased volumes of Mississippi River water will occur in the channels concerned as a result of this channel enlargement, and that present bacteria counts in the river are sufficiently high to affect oyster growing waters of the east and west delta areas. The probable extent of such polution, etc., should be discussed.

g. Para 44, page 24. Table 1 is not a summary of impacts; but a listing of land requirements for different alternatives. Other factors included in decisions, such as impact on oyster leases, would be included in a complete listing of impacts.

h. Table 1, page 25. The Grand-Tiger Passes cubic yards of dredged material figure as presented in this table is not in agreement with the figure quoted in para 21a(2) on page 8. This discrepancy should be corrected and cost modifications made, if warranted.

i. Para 48a, page 26. Since this project encounters possible alteration to oyster beds, those beds located in the vicinity of the project should be included on a plate.

j. The cost estimates should be verified. Table 3 (page 31) shows, as a Federal Cost, $9,000 hired labor. In addition, Table 4 shows a non-Federal cost of $11,000 as acquisition cost by others. Tables 6 & 7 (pages 34 & 35) show $15,000 as a Federal cost for real estate hired labor and $30,000 for PL 91-646. The cost of PL 91-646 is clearly a right-of-way cost on local interest, and the real estate hired labor costs in both instances are considered excessive.

k. Paras 55 & 57, pages 33 & 37. These paras should be revised to explain the decrease in Federal costs and increase in non-Federal costs over the latest approved estimate. Also, the adjustments to the E & D and S & A should be discussed.

l. Comparison of Cost Tables for "Jetties for Baptiste Collette Bayou" and "Jetties for Grand-Tiger Passes" similar to Tables 5 & 9 and Comparison of Cost paras should be provided.

m. Para 74, page 53. The Federal cost of $3,230,400 does not agree with Federal costs shown in Tables 16 and 17, pages 50 & 51, which total $3,208,000. Annual cost, $889,200, does not agree with annual costs in Tables 16 and 17 which total $886,800. (Also see Pertinent Data sheet which uses the figure $3,208,000 and $886,800). These should be reconciled.

n. Paras c(1) & c(2), pages 8 & 9, and Plates 1-21. Examination of these references indicates that substantial areas are presently below the high-water mark and under the navigation servitude, in which case no acquisition would be required. The limits of the navigation servitude should be defined and the areas thereunder should be eliminated from required rights-of-way in cost estimates. Also, the portions of relocations within the limits of navigation servitude should be borne by the owners of the facilities.

o. Page A-4, Table A-4. The Mississippi River mileages for Venice, Head of Passes, and East Jetty are 10.7, -0.6, and -19.6 A.H.P., respectively. In LMNED-HH, 4th Ind, dated 18 Aug 70, subject: FC, MR&T, Levee Freeboard, the flowline was raised from 2 feet at Venice (Mile 10.7) to 1 foot at Mile 50 and permitted to continue upstream on the same slope until it intersects the present authorized flowline. Since the above referenced correspondence does not address the modification to the MR&T flowline downstream of Venice, the procedure utilized to derive the flowline on Table A-4 should be described.

p. Minor annotations in red on pages 3, 6, 8, 11-14, 16, 21, 31, 33, & A-4, and Plates 7-13, 22 & 23.

4. Comments which may be resolved during preparation of plans and specifications are as follows:

a. Para 21b, page 8. This paragraph defines the required clearing limits as extending from the centerline of the channel to the edge of the theoretical top of cut. This may be satisfactory over much of the project where there is not much growth; however, where there are trees, growth and debris landward of the limits as defined, clearing should extend sufficiently landward of the theoretical top of cut to reduce the possibility of growth or debris falling into the channel.

b. Para 21c, page 8. The dredged material disposal methods could be considered as experimental in an attempt to build new marshlands of value to fish and wildlife. This is a positive effort and is encouraged. In view of Fish and Wildlife Service and Louisiana Wildlife and Fisheries' apparent cooperative attitude toward this experiment, a more definitive approach to cooperative effort with these agencies in the establishment of vegetation on the disposed material and follow-up analysis should be established.

c. Para 43, page 24. This para states that there are no known impacts on the archeological resources; a recent draft ER on cultural resources

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SUBJECT: Mississippi River Outlets, Vicinity of Venice, La., General Design Memorandum

requires a reconnaissance study at the Phase I GDM stage and an intensive study at the Phase II stage. There should be a reconnaissance by qualified personnel to assess the value of cultural resources, if any, prior to initiation of construction.

FOR THE DIVISION ENGINEER:

R. H. RESTA
Chief, Engineering Division

2 Incl
wd 2 cy Incl 1
Added 1 incl
2. Draft EIS (5 cy)

CF:
LMNED-MP
w/Marked cy Incl 1

GD-T

40-12

DAEN-CWE-B (LMNED-MP, 8 Jan 75) 2nd Ind
SUBJECT: Mississippi River Outlets, Vicinity of Venice, La., General Design Memorandum

DA, Office of the Chief of Engineers, Washington, D.C. 20314 29 May 1975

TO: Division Engineer, Lower Mississippi Valley, ATTN: LMVED-TD

1. The subject design memorandum is approved, subject to the comments of the Division Engineer; to filing the final EIS with CEQ; and to the following comments.

2. Paragraph 39b. If erosion of the channel banks is expected due to wave action and no channel protection is provided, a real loss will occur. This loss should be included in the economics of the project. Also, mitigation for this loss should be provided in some manner since the loss is a direct result of the project. Fee purchase or erosion easements along the channel are examples of mitigation in this case.

3. Paragraph 40. The spoil areas should be revegetated as a part of the project.

4. Paragraph 41 and 1st indorsement, paragraph f. The effect of water pollution on the oyster growing waters was not considered in the environmental impact statement. If significant, it should be included both as an economic cost and an environmental impact.

5. Paragraph 48. Damage to the oyster beds by spoil materials is a loss and the cost should be considered in the project economics.

6. Environmental Impact Statement.

a. Paragraph 2.08. The effect of the project on the land loss should be discussed.

b. Paragraph 4.02a(3). If, as indicated, the marsh building program is experimental, a monitoring system should be set up.

c. Paragraph 4.02b(3). The bacterial problem mentioned in paragraph 41 of the design memorandum and paragraph f of the 1st Indorsement should be discussed here.

FOR THE CHIEF OF ENGINEERS:

wd all incl

For E. E. Slayton
HOMER B. WILLIS
Chief, Engineering Division
Directorate of Civil Works

LMVED-TD (NOD 8 Jan 75) 3d Ind
SUBJECT: Mississippi River Outlets, Vicinity of Venice, La., General Design Memorandum

DA, Lower Mississippi Valley Division, Corps of Engineers, Vicksburg, Miss. 39180 30 Jun 75

TO: District Engineer, New Orleans, ATTN: LMNED-MP

1. Referred to note approval subject to comments in the 1st and 2d Inds.

2. Para 2, 2d Ind. Para 39b of the GDM should have referred to the requirements of local cooperation stated in the authorizing document; however, these requirements are included in para 6 on page 3 of the GDM. Para 6c states that local interests will "Hold and save the United States free from damages due to the construction and maintenance of the project, including but not limited to erosion beyond the rights-of-way furnished, and damages to oyster beds and other fisheries." In view of this requirement, mitigation of losses attributed to erosion of the channel banks is not considered a responsibility of the Federal Government.

FOR THE DIVISION ENGINEER:

R. H. RESTA
Chief, Engineering Division

CF:
DAEN-CWE-B

LMNED-MP (8 Jan 75) 4th Ind
SUBJECT: Mississippi River Outlets, Vicinity of Venice, La., General Design Memorandum

DA, New Orleans District, Corps of Engineers, P.O. Box 60267, New Orleans, Louisiana 70160 21 Nov 75

TO: Division Engineer, Lower Mississippi Valley, ATTN: LMVED-TD

1. The following paragraphs are in response to the 1st Ind of this chain of correspondence and are correspondingly numbered.

a. Para 3a. Final design on waste water control structures will be made in the plans and specifications (P&S) stage. At that time, we will have the benefit of all environmental input resulting from Section 404 procedures. Furthermore, elevations on existing pass dikes and oil-field canal disposal banks will not be known until detailed surveys for P&S are made. Only then can design of waste water weirs be determined.

b. Para 3b. Total suspended loads entering both Baptiste Collette and Tiger Passes were based on average discharges of 19,000 c.f.s. and 23,000 c.f.s., respectively. Suspended concentration loads were used along with duration data to arrive at total suspended loads in cubic yards per year. Distributions of flow from previous observations were then used to route percentage of the total sediment load from the heads of these passes to the lower reaches. Velocities within the channel, bank elevations, cross-sectional areas, and the number of existing outlets were investigated in order to assign annual sediment deposition rates for various reaches for each channel.

The inland reach mile 1.6 to mile 6.0 of Baptiste Collette is generally self-maintaining. The relatively high banks act to confine the flows and maintain velocities in a range of 1.8 to 3.5 ft per second. The velocities near the overbanks of the channel tend to be lower and during high flows the banks themselves are inundated with significant amounts of sediments being deposited in the overbanks and the adjacent marshes. Based on previous estimates, bank elevations, cross-sectional areas, and five existing outlets, 14 percent of the total sediment flowing down Baptiste Collette is estimated to be lost or deposited in the inland reaches of Main Pass (Baptiste Collette) from mile 1.6 to mile 6.0. The remaining sediments (86 percent) stay in suspension until the channel intersects the shallow bay on Breton Sound where velocities approach zero or become insufficient to keep the sediments from settling to the bottom. Analysis of limited hydrographic data in the offshore reaches indicate that the bulk of the sediments reaching the offshore reaches falls within 2 miles from the land. Sand bars form within this reach and restrict navigation. Barge groundings are common within this reach. Continuous maintenance dredging (as indicated in the report) will have

to be scheduled to keep the pass open. Increased conveyance of Main Pass of Baptiste Collette will increase the existing flow distribution from 25 percent of the total flow entering the head of Baptiste Collette from the Mississippi River to 33.5 percent of the total. Flow from the Mississippi River will not change significantly. The increased conveyance of the project channel accounts for the 800,000 cubic yards per year of sediment estimated to flow down Main Pass (Baptiste Collette). The remaining sediments depositing in the offshore reaches were determined by considering littoral drift and tidal currents.

In the inland reaches of Tiger Pass more sediments are lost from the main channel due to the greater number of outlets, approximately 15, and the lower bank elevations in the lower reaches of Tiger Pass. Velocities are slightly lower in Tiger Pass than Baptiste Collette and normally range between 1.6 to 2.5 feet per second. These factors combine to allow more sediments, 45 percent, to be lost or deposited in the inland reaches. The remaining sediments, 55 percent stay in suspension until the channel intersects the shallow offshore reaches where velocities approach zero or become insufficient to keep the sediments from settling to the bottom. Analysis of limited hydrographic data indicate that the bulk of the sediments reaching the offshore reaches is estimated to settle within a 2-mile offshore reach. To keep the offshore reaches open, maintenance dredging will be necessary on a continuous basis, at intervals as indicated in the report. Shallow offshore bars form within this reach and obstruct navigation.

Increased conveyance of Tiger Pass will increase the existing flow distribution from 13 percent of the total flow entering Grand-Tiger Pass from the Mississippi River to 17 percent of the total. The total flow from the Mississippi River will not change significantly. The increased conveyance of the project channel accounts for the 492,000 cubic yards per year of sediment that is estimated to flow down Tiger Pass. The remaining sediments depositing in the offshore reaches were determined by considering littoral drift and tidal currents.

c. Para 3c. The distribution of flow at the heads of Baptiste Collette and Grand-Tiger Passes will not change significantly as a result of this project. The entrances of both passes from the Mississippi River have cross-sectional areas that far exceed the project dimensions of the proposed channels. The main effects of channelization or increased dimensions for both Baptiste Collette and Tiger Pass will be felt in the lower reaches.

The total flow entering Baptiste Collette will remain the same. At the junction with Emeline Pass at mile 1.6, 50 percent is routed into Emeline Pass and the remaining 50 percent is equally distributed under existing conditions at the lower junction of Main Pass and Kimbel Pass.

Below the junction with Kimbel Pass, the conveyance of Main Pass (Baptiste Collette) will essentially be twice as much as the existing channel due to the new project dimensions. This increased conveyance will redistribute the flow so that 33.5 percent will flow through Main Pass (Baptiste Collette) and 16.5 percent will flow through Kimbel Pass.

Under existing conditions, Grand Pass carries 75 percent of the total flow at the entrance from the Mississippi River. Tiger Pass from its head down to the junction of the connecting canal of Red Pass and Pass Tante Phine, mile 2.7, carries 25 percent of the total flow. This distribution of flow remains the same down to mile 2.7. From this junction to mile 12.2 of Tiger Pass, the conveyance will be essentially twice that of the existing cross-sectional area. The distribution of flow between Tiger Pass and the canal under existing conditions is 13 percent for Tiger Pass and 12 percent for the canal at mile 2.7. The increased conveyance of Tiger Pass due to the project dimensions will redistribute this flow so that 17 percent flows down Tiger Pass and 8 percent will flow through the canal at mile 2.7.

In summary, this project will not change the hydraulic regime nor increase the annual maintenance dredging in the Mississippi River shipping outlets. Consequently, there is no need for contraction structures or other control devices.

d. Para 3d. The orientation of the proposed Tiger Pass is in a southwest direction. See page A-9 and plate 13. Waves approaching from deep water from the southeast are screened out by Southwest Pass of the Mississippi River and the general configuration of the shoreline. Waves can approach the jetties from four possible directions: south, southwest, west, and northwest. The littoral current is towards a north or west direction 39 percent of the time. An equivalent percent of the time (38 percent) there is a component of littoral current towards the south or east. Since there is no predominant littoral current direction, dredged material may be deposited on either side of the channel. The reason for disposing of material on the south side of the channel is that there would be slightly less impact to oyster leases. See inclosure 4, plate I-2.

e. Para 3e. Dredged material will be placed no closer than 100 feet from the top of active pipeline canal banks.

f. Para 3f. Approximately 5 percent of the Mississippi River is diverted on the average down Grand Pass. Of this 5 percent, 25 percent is diverted down Tiger Pass and the remaining 75 percent goes down Grand Pass. Of the 25 percent down Tiger Pass, 12 percent works its way through canals to Red Pass and Pass Tante Phine. The remaining 13 percent goes down Tiger Pass. Upon completion of the dredging, the total flow diverted from the river will remain the same, about on the

average, 5 percent. The distribution of the flows will, however, change slightly. Grand Pass will still carry 75 percent of the flow and Tiger Pass the remaining 25 percent. Instead of Tiger Pass carrying 13 percent of that 25 percent all the way to the gulf, after dredging Tiger Pass will carry 17 percent. For an average flow of 23,000 c.f.s. in Grand- Tiger Pass, this amounts to an increase in flow through Tiger Pass from 2,990 c.f.s. to 3,910 c.f.s. with a corresponding decrease in flow through Red Pass and Pass Tante Phine from 2,760 c.f.s. to 1,840 c.f.s. The flow through Grand Pass before and after dredging will be 17,250 c.f.s. Since Tiger Pass, Red Pass, and Pass Tante Phine empty into the gulf in the same general vicinity, and since the total flow from the river will remain the same, the impact on oyster leases in the area of Tiger and Grand Passes should be negligible when compared to existing conditions.

Approximately 4 percent of the Mississippi River is diverted on the average down Baptiste Collette Bayou. Of this 4 percent, 50 percent is diverted down Emeline Pass, the remaining 50 percent is divided equally between Main Pass and Kimbel Pass. Upon completion of the dredging, the total flow diverted from the river will remain the same, about 4 percent on the average. The distribution of the flows will, however, change. The flow down Main Pass will increase from 25 percent to 33.5 percent with a corresponding decrease in flow of Kimbel Pass from 25 percent to 16.5 percent. Emeline Pass will continue to handle 50 percent of the flow from Baptiste Collette Bayou. For an average flow of 19,000 c.f.s. in Baptiste Collette Bayou, this amounts to an increase in flow through Main Pass from 4,750 c.f.s. to 6,370 c.f.s. with a corresponding decrease in flow through Kimbel Pass from 4,750 c.f.s. to 3,130 c.f.s. The flow through Emeline Pass before and after dredging will be 9,500 c.f.s. Since the flow from the river will remain the same, and since the water is all flowing into Breton Sound, the impact of the dredging on oysters should again be minor.

g. Para 3g. It is agreed that table 1 is not a summary of impacts; the title should be changed to "Alternate Alinement Plans." The last two sentences in para 24a, on page 11, should be deleted. Concerning oyster lease impacts: the 55-acre Fernandes oyster lease located near the mouth of Tiger Pass, would be destroyed. This statement should be added to para 42, "Fishing Resources."

h. Para 3h. The figure in the table (4,410,000 cubic yards) is in error and should be changed to 4,694,000 cubic yards.

i. Para 3i. Oyster beds located in the vicinity of the project are shown on plates 1 and 2--see inclosures 3 and 4.

j. Para 3j. The hired labor costs are considered to be adequate and not excessive. It is agreed that the PL 91-646 cost is a local interest cost and should be included under local costs instead of Federal.

k. Para 3k. Para 55, page 33 is revised as follows:

a. 55. Baptiste Collette Bayou comparison of current estimate, latest approved estimate, and project document estimate. The total Federal first cost estimate presented in this general design memorandum (GDM) of $1,282,000 is a decrease of $207,000 from the latest approved estimate of $1,489,000 (PB-3 estimate dated 26 January 1974, effective 1 July 1974). This decrease is due mainly to the practice of updating the PB-3 year by year since July 1967 by the ENR index. This method of updating resulted in a higher estimated Federal first cost than the GDM estimate, which is considered to be more accurate than the ENR index updating method. The total GDM non-Federal first cost estimate of $1,400,000 is an increase of $490,700 over the latest approved PB-3 estimate of $909,300. This increase is due mainly to an increase in the cost of lands and damages and in the amount of linear feet of dredged material dikes.

b. The words "relocations and" in the 6th line should be deleted.

Para 57, page 37 is revised as follows:

c. 57. Grand-Tiger Passes comparison of current estimate, latest approved estimate, and project document estimate. The total Federal first cost estimate of $1,926,000 presented in this general design memorandum (GDM) is a decrease of $307,000 from the latest approved estimate of $2,233,000 (PB-3 estimate dated 26 January 1974, effective 1 July 1974). The reason for this decrease is the same as for the Baptiste Collette Federal first cost estimate decrease. (See para 1k.) The total GDM non-Federal first cost estimate of $1,080,000 is an increase of $129,300 over the latest approved PB-3 estimate of $950,700. This increase is due mainly to an increase in the cost of lands and damages.

d. The adjustments to E&D and S&A as shown in tables 5 and 9 are discussed as follows: All comments apply to both tables. The project document E&D and S&A estimates were over estimated and were therefore scaled down to the amounts shown for the PB-3 estimate. For the GDM estimate, the E&D percentage was increased over the PB-3 estimate due to salary increases and extra work required for environmental considerations. This resulted in only a slight increase in the dollar amounts because the estimated cost of work was reduced by the deletion of jetties from the project. The GDM estimate S&A percentage was increased over the PB-3 estimate due to salary increases. This resulted in a slight decrease in the dollar amounts because the estimated cost of work was reduced by the deletion of jetties from the project.

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1. Para 31. Comparison of cost paragraphs and tables are provided as follows:

a. Jetties for Baptiste Collette Bayou comparison of current estimate, latest approval estimate and project document estimate. The main reason for the increase of the PB-3 total Federal first cost over the project document cost was the rise in price levels. The GDM total Federal first cost estimate increased significantly over the PB-3 estimate because of a more detailed design analysis which called for increased quantities of shell and stone. Also, there was a slight increase due to the inclusion in the design analysis of plastic filter cloth and timber spur dikes; two items that were not included in the project document and PB-3 estimates. A comparison of cost estimates is shown in table 1.

TABLE 1

JETTIES
FOR
BAPTISTE COLLETTE BAYOU

Comparison of Estimates

	Item	Project Document Jul 67 Prices	PB-3 dtd 26 Jan 74 effective 1 Jul 74	GDM	Difference between PB-3 and GDM
	FEDERAL	$	$	$	$
10	Breakwaters and seawalls	1,120,000	2,460,000	4,000,000	+1,540,000
30	Engineering and design	20,000	143,000	320,000	+ 177,000
31	Supervision and administration	70,000	107,000	432,000	+ 325,000
	Total Federal first cost-deferred construction	1,210,000	2,710,000	4,752,000	+2,042,000

b. Jetties for Grand-Tiger Passes comparison of current estimate, latest approved estimate and project document estimate. The reasons for changes in these cost estimates are the same as for Baptiste Collette Bayou. A comparison of cost estimates is shown in table 2.

TABLE 2

JETTIES
FOR
GRAND-TIGER PASSES

Comparison of Estimates

	Item	Project Document Jul 67 Prices	PB-3 dtd 26 Jan 74 effective 1 Jul 74	GDM	Difference between PB-3 and GDM
	FEDERAL	$	$	$	$
10	Breakwaters and seawalls	1,110,000	1,770,000	2,875,000	+1,105,000
30	Engineering and design	20,000	103,000	230,000	+ 127,000
31	Supervision and administration	70,000	77,000	311,000	+ 234,000
	Total Federal first cost-deferred construction	1,200,000	1,950,000	3,416,000	+1,466,000

m. Para 3m. The Federal cost in para 74, page 53, should be changed to $3,208,000; the annual cost should be changed to $886,800. The figures on the pertinent data sheet are correct.

n. Para 3n. This district concurs with para 3n. It is estimated that the areas subject to the navigation servitude will be determined by mid-December 1975; therefore, it is recommended that appropriate adjustments in the cost estimates be made at that time.

o. Para 3o. The MR&T flow line officially ends at Venice, La. However, in order to show the effects of the MR&T project flood flow in the passes area, the stage obtained at Venice was stage related to Head of Passes and to East Jetty, Southwest Pass.

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p. Para 3p. Concur with minor annotations marked in red. They are listed as follows:

(1) Page 3, para 6a, line 9. Delete the word "material."

(2) Page 6, para 16. Add to the list of offshore petroleum producing areas: Grand Isle and South Timbalier.

(3) Page 8, para 21a(1). Change 622,000 to 620,000. Change 620,000 to 622,000.

(4) Page 11, para 25a, line 5. There should be a space between the words "the" and "length."

(5) Page 12, para 25c, line 11. After the word "levee" add the phrase "with openings for drainage."

(6) Page 13, para 26b(1), line 3. Delete "m.s.l."

(7) Page 14, para 26c(1), line 2. Change the word "of" to "or."

(8) Page 16, para 26f, line 11. There should be a space between the words "along" and "shore."

(9) Page 21, para 39a, lines 6 and 7. After the term "elevation +4" add "from sta. 125+00;" after the word "elevations" add "+2 from station."

(10) Page 31, Table 3. Under the "Quantity column" the numbers 622,000 and 620,000 cubic yards should be exchanged.

(11) Page 33, para 55, line 6. The term "increase in the amount of relocations" was questioned. This paragraph has been revised and is presented in para 1k of this indorsement.

(12) Page A-4, table A-4, 7th column. The second letter of the word "High" should not be capitalized.

(13) Plates 7-13, 22 and 23. In the profile of these plates the "material to be excavated" and the "2-foot advanced maintenance" portions of the profile should be cross-hatched.

LMNED-MP (8 Jan 75) 4th Ind 21 Nov 75
SUBJECT: Mississippi River Outlets, Vicinity of Venice, La., General Design Memorandum

2. The following paragraphs are in response to the 2d Ind of this chain of correspondence and are correspondingly numbered.

a. Para 2. Erosion of the channel banks from wave action is expected to occur at an annual rate of 1.0 foot and 0.3 foot along the banks of Baptiste Collette Bayou and Grand-Tiger Passes, respectively. The estimated annual cost for induced erosion loss is estimated to be $100 and $200 for Baptiste Collette Bayou and Grand-Tiger Passes, respectively. Additionally, loss of land through erosion will cause annual losses of marshland production valued at $10.60 per acre. When amortized over the 50-year project life, production losses will be approximately $300 and $200 for Baptiste Collette Bayou and Grand-Tiger Passes, respectively. Therefore, total annual induced erosion loss is estimated to be $800. Details are shown in the following table:

	Baptiste Collette Bayou	Grand-Tiger Passes	Total
Length of channel	8 mi.	14 mi.	22 mi.
Annual rate of erosion	1.0 ft.	0.3 ft.	1.3 ft.
Induced erosion rate	1.9 ac.	1.0 ac.	2.9 ac.
Average value of land	$ 67	$155	-
Average annual value of land lost (rounded)	$100	$200	$300
Production losses (rounded)	$300	$200	$500
TOTAL ANNUAL INDUCED EROSION LOSS	$400	$400	$800

Because of the above induced erosion losses, the following tables should be changed: tables 16 and 17--the annual induced erosion loss should be entered under non-Federal and total annual economic costs; tables 16, 17 and 18--the total annual economic costs/average annual charges should be adjusted in accord with the above table. These adjustments do not affect the project benefit/cost ratio.

An evaluation of the mitigation costs has not been undertaken due to the comment in para 2 of the 3d Ind.

b. Para 3. Delete the sentence, "The height of the new land will be about..." Insert in its place: "The height of this new land from spreading dredged material will vary from slightly elevated near the natural ridges of the passes to about sea level near its outer limits. The average maximum final height of the dredged material in these open disposal areas is expected to be 2.5 feet. Some plants are expected to become established naturally on this new land. Observations made on

species establishment on dredged material along Southwest Pass have revealed a rather slow invasion due possibly to the soil types, salinity, moisture content, season of the year when sites were visited, and age of the dredged material. In this experimental approach to marsh-building natural establishment of vegetation will be aided by the introduction of seed from other sources. Alternative methods of broadcasting these seeds and several different seed sources are currently being evaluated. The newly deposited dredged material will probably be seeded by airplane as soon as the ground conditions and weather permit. Rice hulls, containing a variety of seeds from the ricefields, will probably be used to seed the areas. The diversity of this freshwater seed source from the ricefields of southwest Louisiana would be advantageous over the use of only one species. Since the existing marshes along Baptiste Collette Bayou, and Tiger and Red Passes are of the intermediate type, salinity may be an important factor in germination and establishment of the freshwater species included with the rice hulls. Because of the essentially experimental nature of this marsh-building plan, results of revegetation will be studied carefully".

c. Para 4 and 5. Refer to para 1f of this indorsement. In this response, it was stated that water quality data indicated that impact of the dredging on oysters in the project area should be negligible. Accordingly, the economic cost would be insignificant.

d. Response to comments on the environmental impact statement (EIS) will be furnished in the chain of correspondence associated with the EIS.

3. It is recommended that the above responses be approved.

FOR THE DISTRICT ENGINEER:

FREDERIC M. CHATRY
Chief, Engineering Division

2 Incl
Added 2 Incl
3-4
as

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

21-12

IN REPLY REFER TO
LMNED-MP

8 January 1975

SUBJECT: Mississippi River Outlets, Vicinity of Venice, La., General Design Memorandum

Division Engineer, Lower Mississippi Valley
ATTN: LMVED-TD

1. The subject general design memorandum (GDM) is submitted herewith for review and approval. It has been prepared generally in accordance with the provisions of ER 1110-2-1150 exclusive of the Phase 1 - Phase II planning procedure.

2. It is noted that the Plaquemines Parish Commission Council, the agency responsible for fulfilling local cooperation requirements, objects to the requirement that they provide the necessary retaining dikes, bulkheads and embankment therefor, or the costs of such retaining works.

3. Approval of this GDM is recommended.

1 Incl (16 cys) fwd sep
GDM

E. R. HEIBERG III
Colonel, CE
District Engineer

LMVED-TD (NOD 8 Jan 75) 1st Ind
SUBJECT: Mississippi River Outlets, Vicinity of Venice, La., General Design Memorandum

DA, Lower Mississippi Valley Division, Corps of Engineers, Vicksburg, Miss. 39180 6 Mar 75

TO: HQDA (DAEN-CWE-B) WASH DC 20314

1. Subject DM is forwarded for review and approval pursuant to para 21 ER 1110-2-1150. Approval is recommended as a basis for preparation of plans and specifications subject to the comments below.

2. Five copies of the Draft EIS are furnished herewith. Based on the Draft EIS, we consider that probable adverse environmental effects of the project will be minimal. The Final EIS is scheduled for submission in June 1975.

3. Comments which should be resolved by indorsement on this DM are as follows:

a. Para 21c, page 8. In the fourth sentence a statement is made that waste water control structures will be placed in the dredged material retention dikes. A description of these structures and how they will be operated should be furnished.

b. Para 26, page 13. The rationale used to arrive at sediment deposition rates for various reaches of both Baptiste Collette Bayou and Tiger Pass should be included.

c. Para 26, Hydrology, Page 13. The report should discuss the extent to which the proposed enlargements will increase flow in these distributary channels and in turn, reduce flow in South and Southwest Passes, and any additional maintenance dredging and/or requirement for additional contraction structures resulting from this project. Retaining a status quo or reducing flow in the subject channels was discussed in para 1c of the 1st Ind to LMNED-DG letter, dated 16 Aug 74, subject: Mississippi River, Baton Rouge to the Gulf of Mexico - Completion of Project.

d. Para 26d(2), page 15 and Plate 21. With the predominant direction of littoral drift towards the north, the reason for disposing of dredged material on the south side of the channel, as shown on Plate 21, where it could drift back into the channel should be discussed.

e. Para 39c(2), page 21 and Plates 11 and 20. Plate 11 shows some crude oil and gas pipelines crossing the area designated for disposal of dredged material on Plate 20. To prevent damage to these and any other such pipelines due to settlement from the imposed dredged material load, disposal should be restricted for some appropriate distance on each side of the pipes.

f. Para 41, page 24. This para notes that increased volumes of Mississippi River water will occur in the channels concerned as a result of this channel enlargement, and that present bacteria counts in the river are sufficiently high to affect oyster growing waters of the east and west delta areas. The probable extent of such polution, etc., should be discussed.

g. Para 44, page 24. Table 1 is not a summary of impacts; but a listing of land requirements for different alternatives. Other factors included in decisions, such as impact on oyster leases, would be included in a complete listing of impacts.

h. Table 1, page 25. The Grand-Tiger Passes cubic yards of dredged material figure as presented in this table is not in agreement with the figure quoted in para 21a(2) on page 8. This discrepancy should be corrected and cost modifications made, if warranted.

i. Para 48a, page 26. Since this project encounters possible alteration to oyster beds, those beds located in the vicinity of the project should be included on a plate.

j. The cost estimates should be verified. Table 3 (page 31) shows, as a Federal Cost, $9,000 hired labor. In addition, Table 4 shows a non-Federal cost of $11,000 as acquisition cost by others. Tables 6 & 7 (pages 34 & 35) show $15,000 as a Federal cost for real estate hired labor and $30,000 for PL 91-646. The cost of PL 91-646 is clearly a right-of-way cost on local interest, and the real estate hired labor costs in both instances are considered excessive.

k. Paras 55 & 57, pages 33 & 37. These paras should be revised to explain the decrease in Federal costs and increase in non-Federal costs over the latest approved estimate. Also, the adjustments to the E & D and S & A should be discussed.

l. Comparison of Cost Tables for "Jetties for Baptiste Collette Bayou" and "Jetties for Grand-Tiger Passes" similar to Tables 5 & 9 and Comparison of Cost paras should be provided.

m. Para 74, page 53. The Federal cost of $3,230,400 does not agree with Federal costs shown in Tables 16 and 17, pages 50 & 51, which total $3,208,000. Annual cost, $889,200, does not agree with annual costs in Tables 16 and 17 which total $886,800. (Also see Pertinent Data sheet which uses the figure $3,208,000 and $886,800). These should be reconciled.

n. Paras c(1) & c(2), pages 8 & 9, and Plates 1-21. Examination of these references indicates that substantial areas are presently below the high-water mark and under the navigation servitude, in which case no acquisition would be required. The limits of the navigation servitude should be defined and the areas thereunder should be eliminated from required rights-of-way in cost estimates. Also, the portions of relocations within the limits of navigation servitude should be borne by the owners of the facilities.

o. Page A-4, Table A-4. The Mississippi River mileages for Venice, Head of Passes, and East Jetty are 10.7, -0.6, and -19.6 A.H.P., respectively. In LMNED-HH, 4th Ind, dated 18 Aug 70, subject: FC, MR&T, Levee Freeboard, the flowline was raised from 2 feet at Venice (Mile 10.7) to 1 foot at Mile 50 and permitted to continue upstream on the same slope until it intersects the present authorized flowline. Since the above referenced correspondence does not address the modification to the MR&T flowline downstream of Venice, the procedure utilized to derive the flowline on Table A-4 should be described.

p. Minor annotations in red on pages 3, 6, 8, 11-14, 16, 21, 31, 33, & A-4, and Plates 7-13, 22 & 23.

4. Comments which may be resolved during preparation of plans and specifications are as follows:

a. Para 21b, page 8. This paragraph defines the required clearing limits as extending from the centerline of the channel to the edge of the theoretical top of cut. This may be satisfactory over much of the project where there is not much growth; however, where there are trees, growth and debris landward of the limits as defined, clearing should extend sufficiently landward of the theoretical top of cut to reduce the possibility of growth or debris falling into the channel.

b. Para 21c, page 8. The dredged material disposal methods could be considered as experimental in an attempt to build new marshlands of value to fish and wildlife. This is a positive effort and is encouraged. In view of Fish and Wildlife Service and Louisiana Wildlife and Fisheries' apparent cooperative attitude toward this experiment, a more definitive approach to cooperative effort with these agencies in the establishment of vegetation on the disposed material and follow-up analysis should be established.

c. Para 43, page 24. This para states that there are no known impacts on the archeological resources; a recent draft ER on cultural resources

LMVED-TD (NOD 8 Jan 75) 1st Ind 6 Mar 75
SUBJECT: Mississippi River Outlets, Vicinity of Venice, La., General Design Memorandum

requires a reconnaissance study at the Phase I GDM stage and an intensive study at the Phase II stage. There should be a reconnaissance by qualified personnel to assess the value of cultural resources, if any, prior to initiation of construction.

FOR THE DIVISION ENGINEER:

R. H. RESTA
Chief, Engineering Division

2 Incl
wd 2 cy Incl 1
Added 1 incl
2. Draft EIS (5 cy)

CF:
LMNED-MP
w/Marked cy Incl 1

Lo-12

DAEN-CWE-B (LMNED-MP, 8 Jan 75) 2nd Ind
SUBJECT: Mississippi River Outlets, Vicinity of Venice, La., General Design Memorandum

DA, Office of the Chief of Engineers, Washington, D.C. 20314 29 May 1975

TO: Division Engineer, Lower Mississippi Valley, ATTN: LMVED-TD

1. The subject design memorandum is approved, subject to the comments of the Division Engineer; to filing the final EIS with CEQ; and to the following comments.

2. Paragraph 39b. If erosion of the channel banks is expected due to wave action and no channel protection is provided, a real loss will occur. This loss should be included in the economics of the project. Also, mitigation for this loss should be provided in some manner since the loss is a direct result of the project. Fee purchase or erosion easements along the channel are examples of mitigation in this case.

3. Paragraph 40. The spoil areas should be revegetated as a part of the project.

4. Paragraph 41 and 1st indorsement, paragraph f. The effect of water pollution on the oyster growing waters was not considered in the environmental impact statement. If significant, it should be included both as an economic cost and an environmental impact.

5. Paragraph 48. Damage to the oyster beds by spoil materials is a loss and the cost should be considered in the project economics.

6. Environmental Impact Statement.

a. Paragraph 2.08. The effect of the project on the land loss should be discussed.

b. Paragraph 4.02a(3). If, as indicated, the marsh building program is experimental, a monitoring system should be set up.

c. Paragraph 4.02b(3). The bacterial problem mentioned in paragraph 41 of the design memorandum and paragraph f of the 1st Indorsement should be discussed here.

FOR THE CHIEF OF ENGINEERS:

wd all incl

HOMER B. WILLIS
Chief, Engineering Division
Directorate of Civil Works

LMVED-TD (NOD 8 Jan 75) 3d Ind
SUBJECT: Mississippi River Outlets, Vicinity of Venice, La., General Design Memorandum

DA, Lower Mississippi Valley Division, Corps of Engineers, Vicksburg, Miss. 39180 30 Jun 75

TO: District Engineer, New Orleans, ATTN: LMNED-MP

1. Referred to note approval subject to comments in the 1st and 2d Inds.

2. Para 2, 2d Ind. Para 39b of the GDM should have referred to the requirements of local cooperation stated in the authorizing document; however, these requirements are included in para 6 on page 3 of the GDM. Para 6c states that local interests will "Hold and save the United States free from damages due to the construction and maintenance of the project, including but not limited to erosion beyond the rights-of-way furnished, and damages to oyster beds and other fisheries." In view of this requirement, mitigation of losses attributed to erosion of the channel banks is not considered a responsibility of the Federal Government.

FOR THE DIVISION ENGINEER:

R. H. RESTA
Chief, Engineering Division

CF:
DAEN-CWE-B

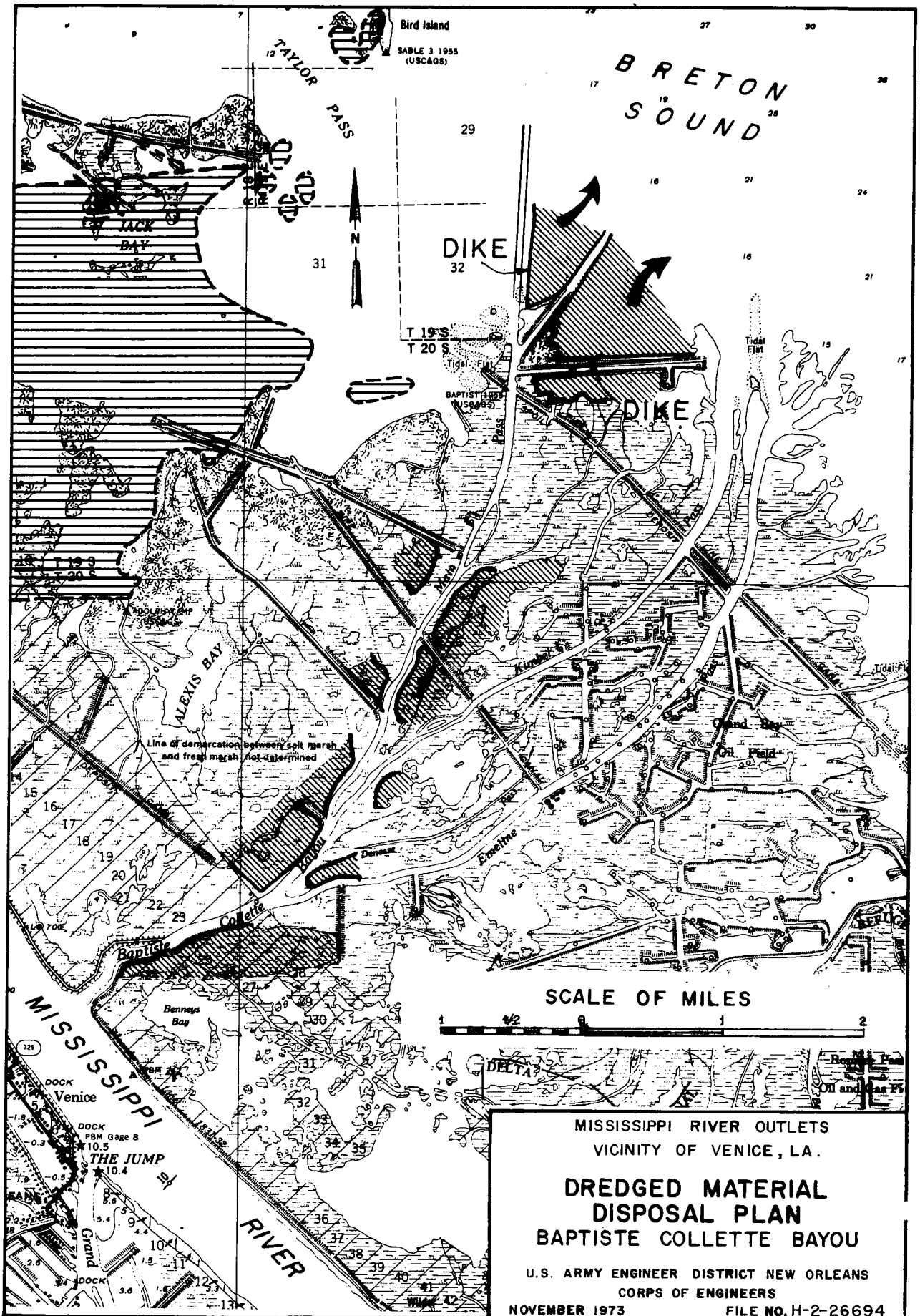
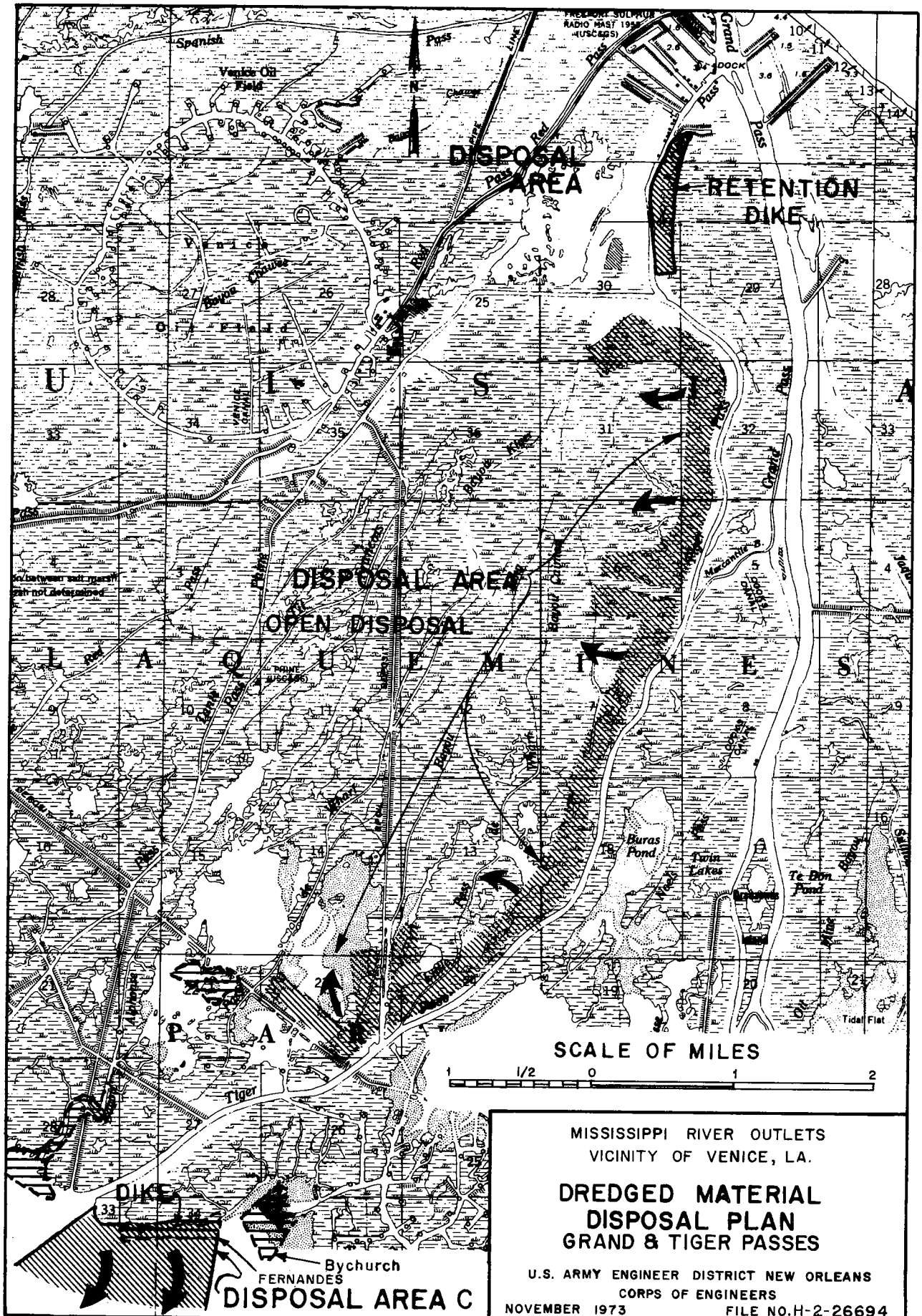

Bird Island
SABLE 3 1955 (USC&GS)
TAYLOR PASS
BRETON SOUND
DIKE
DIKE
JACK BAY
ALEXIS BAY
T 19 S
T 20 S
Tidal Flat
BAPTISTE PASS (USC&GS)
Line of demarcation between salt marsh and fresh marsh not determined
Grand Bay Oil Field
Baptiste Collette
Bennets Bay
MISSISSIPPI RIVER
DELTA
DOCK
Venice
PBM Gage 8
10.5
THE JUMP
10.4
SCALE OF MILES
1 ½ 0 1 2
MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
DREDGED MATERIAL DISPOSAL PLAN
BAPTISTE COLLETTE BAYOU
U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS
NOVEMBER 1973
FILE NO. H-2-26694
DISPOSAL AREA
OYSTER LEASES

PLATE II-1


DISPOSAL AREA
RETENTION DIKE
DISPOSAL AREA
OPEN DISPOSAL
DIKE
Bychurch
FERNANDES
DISPOSAL AREA C
Spanish Pass
Venice Oil Field
Grand Pass
Red Pass
Tiger Pass
Buras Pond
Twin Lakes
Te Bon Pond
Tidal Flat
SCALE OF MILES
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MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
DREDGED MATERIAL
DISPOSAL PLAN
GRAND & TIGER PASSES
U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS
NOVEMBER 1973
FILE NO.H-2-26694
DISPOSAL AREA
OYSTER LEASES

PLATE I-2

MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LOUISIANA
GENERAL DESIGN MEMORANDUM

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PLATES

PLATES
(cont'd)

APPENDIXES

MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LOUISIANA

GENERAL DESIGN MEMORANDUM

PERTINENT DATA

Project Purpose

Enlargement, for shallow draft navigation use, of the existing channels of Baptiste Collette Bayou and Grand-Tiger Passes to 14 feet mean low gulf (m.l.g.)[1] deep by 150 feet wide with offshore entrance channels that are 16 feet deep by 250 feet wide.

Location of Project

Extreme southeast Louisiana, Plaquemines Parish, Mississippi River Delta.

Cost Data		Baptiste Collette Bayou	Grand-Tiger Passes	Total Project
		$	$	$
1.	First costs			
	Federal	1,282,000	1,926,000	3,208,000
	Non-Federal	1,400,000	1,080,000	2,480,000
	Total	2,682,000	3,006,000	5,688,000
2.	Annual charges			
	Federal	545,400	341,400	886,800
	Non-Federal	153,000	64,000	217,000
	Total	698,400	405,400	1,103,800
3.	Annual benefits	1,411,100	693,500	2,104,600
4.	Benefit/cost ratio	2.0 to 1	1.7 to 1	1.9 to 1

[1]Elevations contained herein are in feet referred to mean low gulf datum unless otherwise noted. Zero m.l.g. (mean low gulf) equals -0.78 foot m.s.l. (mean sea level).

Physical Features

1. Channels

a. Baptiste-Collette Bayou

(1) Mississippi River to Baptiste Collette mouth

(a)	Length of channel	6.2 miles
(b)	Bottom width	150 feet
(c)	Bottom elevation	-14 feet
(d)	Side slopes	1 on 3
(e)	Excavation	2,250,000 c.y.
(f)	Advance maintenance excavation	2 feet
(g)	Allowable overdepth	2 feet
(h)	Annual maintenance dredging	112,000 c.y.

(2) Baptiste Collette Bayou mouth to 16-foot m.l.g. depth contour in Breton Sound

(a)	Length of channel	1.8 miles
(b)	Bottom width	250 feet
(c)	Bottom elevation	-16 feet
(d)	Side slopes	1 on 3
(e)	Excavation	925,000 c.y.
(f)	Advance maintenance dredging	2 feet
(g)	Allowable overdepth	2 feet
(h)	Annual maintenance dredging	1,236,000 c.y.

b. Grand-Tiger Passes

(1) Mississippi River to Tiger Pass mouth

(a)	Length of channel	11.7 miles
(b)	Bottom width	150 feet
(c)	Bottom elevation	-14 feet
(d)	Side slopes	1 on 3
(e)	Excavation	3,919,000 c.y.
(f)	Advance maintenance excavation	2 feet
(g)	Allowable overdepth	2 feet
(h)	Annual maintenance dredging	220,000 c.y.

(2) Tiger Pass mouth to 16-foot depth contour in Gulf of Mexico

(a)	Length of channel	2.3 miles
(b)	Bottom width	250 feet
(c)	Bottom elevation	-16 feet
(d)	Side slopes	1 on 3
(e)	Excavation	775,000 c.y.
(f)	Advance maintenance excavation	2 feet
(g)	Allowable overdepth	2 feet
(h)	Annual maintenance dredging	485,000 c.y.

MISSISSIPPI RIVER OUTLETS, VICINITY OF
VENICE, LOUISIANA
GENERAL DESIGN MEMORANDUM

PROJECT AUTHORIZATION

1. Authority. The Mississippi River Outlets, Vicinity of Venice, Louisiana, project was authorized by Public Law 90-483, 90th Congress, 2d Session, approved 13 August 1968, in accordance with the plans and subject to the conditions recommended by the Chief of Engineers in his report dated 3 June 1968 and contained in House Document No. 361, 90th Congress, 2d Session, Mississippi River Outlets, Vicinity of Venice, Louisiana.

2. Authorized improvement. The Chief of Engineers, in his report, concurred in the views and recommendations of the Board of Engineers for Rivers and Harbors which are as follows:

> " . . . Accordingly, the board recommends adoption of a project to provide for additional navigation outlets in the vicinity of Venice, Louisiana, by enlargement of the existing channels of Baptiste Collette Bayou and Grand-Tiger Passes to a depth of 14 feet over a bottom width of 150 feet, with entrance channels in open water 16 feet deep over a bottom width of 250 feet and jetties to the 6-foot depth contour, if and when justified, to reduce the cost of maintenance dredging, generally in accordance with the plan of the District Engineer and with such modifications thereof as in the discretion of the Chief of Engineers may be advisable; at an estimated cost to the United States, exclusive of aids to navigation, of $4,520,000 for construction and $368,000 annually for maintenance: Provided that, prior to initiation of construction, local interests agree to: . . ."

NEARBY CORPS OF ENGINEERS' PROJECTS

3. Completed and authorized projects. (See plate 1)

a. Mississippi River, Baton Rouge to the Gulf of Mexico, Louisiana. This project as authorized through the River and Harbor Act of 1962, provides for a -40-foot m.l.g. (mean low gulf)[1] by 500-foot channel from Baton Rouge to the lower limits of the Port of New Orleans; a -35-foot by 1,500-foot channel through the Port of New Orleans; a -40-foot by 1,000-foot channel from New Orleans to the Head of Passes; a channel -40-feet by 800 feet in Southwest Pass,

[1] Elevations contained herein are in feet referred to mean low gulf datum unless otherwise noted. Zero m.l.g. (mean low gulf) equals -0.78 foot m.s.l. (mean sea level).

and -40 feet by 600 feet through the Southwest Pass Bar; a channel -30 feet by 450 feet in South Pass, and -30-feet by 600 feet through the South Pass Bar (see House Document 215, 76th Congress and Senate Document 36, 87th Congress). The project is complete except for work in Southwest and South Passes. The improvements include jetties, bank nourishment and contraction works in South and Southwest Passes. Federal expenditures to 30 June 1974 were $34,916,997 for new work and $124,824,290 for maintenance.

b. Waterway from Empire, La. to the Gulf of Mexico. This project, authorized by the River and Harbor Act of 24 July 1946 provides for a channel -9 feet by 80 feet from the state-owned lock and canal at Empire to the Gulf of Mexico; for initial construction of stone jetties to the 6-foot depth contour; and for extension of the jetties to the 9-foot depth contour if and when it becomes apparent that such extension will be more economical than maintenance dredging. The Federal costs to 30 June 1974 were $1,068,142 for new work and $554,834 for maintenance. The project is complete.

c. New Orleans to Venice, Louisiana, Hurricane Protection. This project, as authorized by the Flood Control Act of 23 October 1962, provides for enlargement of the back levees from City Price to Venice (approximately 36 miles) on the west bank of the Mississippi River, including a new floodgate at Empire and construction of a new levee from Phoenix to Bohemia (approximately 16 miles) on the east bank. In addition, a barrier levee from Bohemia to 10 miles above the Head of Passes to protect the west bank of Plaquemines Parish from hurricane flooding from the east will be built. Drainage capability and roadway access will be maintained within the project area. Federal costs through 30 June 1974 were $13,239,200 for new work. The project is under construction.

INVESTIGATIONS

4. Investigations made in connection with project document. Studies and investigations made in connection with the project document (H. D. 361, 90th Congress, 2d Session) consisted of:

a. Research of information from previous reports and from existing projects in the area;

b. Aerial, topographic, and hydrographic surveys of the project area;

c. Soil borings and tests;

d. Hydraulic studies to determine future sedimentation and the effect of salt-water intrusion resulting from the proposed improvements;

e. An economic survey;

f. Design and cost estimates.

5. Investigations subsequent to project authorization. Studies and investigations made after project authorization include:

a. Aerial, topographic, and hydrographic surveys of the project area;

b. Soils investigations including general and undistrubed borings and associated laboratory tests and evaluations;

c. Detailed design studies and cost estimates for construction of channels and spoil dikes;

d. Determination of real estate requirements and costs;

e. Economic studies for evaluating benefits for the authorized works;

f. Hydraulic studies to determine the effects that the project will have on sedimentation and salt-water intrusion;

g. Development of alternative plans; and

h. Evaluation of environmental factors.

LOCAL COOPERATION AND VIEWS OF LOCAL INTERESTS

6. Requirements of local cooperation. Requirements of local cooperation are as follows:

"a. Provide without cost to the United States all lands, easements, and rights-of-way required for construction and subsequent maintenance of the project and for aids to navigation upon the request of the Chief of Engineers, including suitable areas determined by the Chief of Engineers to be required in the general public interest for initial and subsequent disposal of spoil material, and also necessary retaining dikes, bulkheads and embankment therefor or the costs of such retaining works;

"b. Accomplish without cost to the United States such alterations as required in pipelines, cables, and other improvements, as well as their maintenance; and

"c. Hold and save the United States free from damages due to the construction and maintenance of the project, including but not limited to erosion beyond the rights-of-way furnished, and damages to oyster beds and other fisheries."

7. Status of local cooperation. The Plaquemines Parish Commission Council furnished an acceptable "letter of intent" dated 8 December 1969 stating its capability and willingness to provide the requirements of local cooperation for the project. The Council also furnished an acceptable "formal assurance" of local cooperation dated 28 May 1970. On 30 January 1974 an "amended assurance" was requested which added the provisions of two new laws: the "Flood Control Act of 1970" (Public Law 91-611) and the "Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970" (Public Law 91-646). Based on present information there are no problems anticipated in obtaining the additional assurances required by these two new laws. The principal officer and representative responsible for fulfilling the requirements of local cooperation is as follows:

Mr. Chalin O. Perez, President
Plaquemines Parish Commission Council
Pointe-a-la-Hache, Louisiana 70082

8. Views of local interests. The Plaquemines Parish Commission Council objects to the requirement that they provide the necessary retaining dikes, bulkheads and embankment therefor, or the costs of such retaining works. They contend that there is no additional economic benefit to the Parish for such retaining dikes or other works and the cost of such dikes, bulkheads, and embankment could conceivably exceed the cost of the work to be done by the US Government. They stongly urge reconsideration of the requirement that local interests provide these retaining dikes, bulkheads and embankment. It is noted that the formal assurances were provided in spite of this objection.

9. Estimated cost of required local cooperation. The estimated total non-Federal first cost for rights-of-way, relocations and dredged material retaining dikes is $1,400,000 for Baptiste Collette Bayou and $1,080,000 for Grand-Tiger Passes. Detailed estimates are shown in tables 4 and 8, "Detailed Estimate of Non-Federal First Costs."

PROJECT AREA LOCATION AND DESCRIPTION

10. Project location. The project area is located in the vicinity of the Mississippi River near its mouth (see plate 1). This area is a prolific producing area for petroleum and commercial fishing. It is also a heavily used recreational area for sport fishing and hunting. Venice, Louisiana, is located in the coastal marsh area on the right descending bank of the Mississippi at about miles 10 to 11 above the Head of Passes (AHP) of the river and about 70 airline miles southeast of New Orleans. It is at the terminus of Louisiana Highway 23 on the right bank of the river. Venice is the most southerly point in the general area accessible by land transportation. Elevation

of the land in the Venice area is very low, varying from about 5 feet mean sea level (m.s.l.) near the river to near mean sea level a short distance from the river.

11. Mississippi River. The Mississippi River rises in Minnesota and flows in a generally southerly direction about 2,340 miles through the central United States to the Gulf of Mexico about 115 miles southeast of New Orleans. The river drains about 1,245,000 square miles, including all or parts of 31 states and two Canadian provinces. River stages vary greatly due to floods. In the lower reaches, the river is confined between levees or a levee and natural high ground. The right bank levee ends at Venice (mile 10 AHP); whereas, the left bank levee ends at Bohemia (mile 44 AHP). The Morganza, West Atchafalaya and Bonnet Carre Floodways have been constructed to divert a part of the floodflow of the river to the Gulf of Mexico via other routes to prevent stages at New Orleans exceeding 20 feet mean sea level. Beginning with Baptiste Collette Bayou, at about mile 11.5 AHP, and extending to the gulf, the Mississippi River has many distributary channels, including the major outlets of Southwest Pass, South Pass, Pass a Loutre, and Main Pass (see plate 1). During flood stages, the river carries a heavy sediment load, most of which is deposited at the mouths of its distributary channels. Deep-draft navigation channels are maintained through South (-30 feet by 450 feet) and Southwest (-40 feet by 800 feet) Passes and the bars at their mouths by dredging as required. Sediment deposits at the mouths of the other distributary channels prevent their use by any but very shallow-draft boats.

12. Baptiste Collette Bayou. This bayou is an east bank distributary of the Mississippi River just upstream of Venice. It extends about 6 miles in a northeasterly direction from the river to Breton Sound. The bayou is very large at the river and reduces in width and depth at each of its major distributaries, Emeline Pass and Kimbel Pass. It has a controlling depth of about -8 feet over a bottom width of 80 feet from the river to near its mouth. River sediments have formed a large bar at the mouth of the bayou which is exposed at extreme low tide. Channels dredged by the oil companies between the bayou and Breton Sound have been usable for only a short time. The inland channel is extensively used for the onshore oilfield operations and sports and commercial fishing.

13. Grand Pass. This stream is a west bank distributary channel of the Mississippi River at Venice. It extends about 15 miles generally southward to enter the Gulf of Mexico about 3 miles west of Southwest Pass. The stream provides a channel having a width of over 100 feet at a depth of -10 feet for approximately one-half of its length, after which it reduces rapidly in size as the flow is divided with its distributaries. A very large bar or mud flat exists at its mouth and the mouths of its distributary channels at the Gulf coastline.

14. Tiger Pass. This stream is a major distributary of Grand Pass about 1 mile south of the Mississippi River. It generally parallels Grand Pass for about 6 miles and then turns southwestward to enter the Gulf of Mexico approximately 7 miles northwest of the mouth of Grand Pass. The controlling dimensions from Grand Pass to mile 5 are about -10 feet over a width of 70 feet and -6 feet over a width of 60 feet to near the coastline. The depth over a large bar in the Gulf of Mexico at the mouth of Tiger Pass is about -1 foot.

PROJECT AREA RESOURCES

15. General. The tributary area is comprised of a portion of Plaquemines Parish and the adjacent offshore area in the vicinity of the Mississippi River. Principal communities are Venice, Buras, Empire, and Port Sulphur. The major industrial developments are those associated with the exploration, development, and production of the mineral resources of the area, which are predominately oil and gas. The area is also rich in seafood and wildlife resources.

16. Petroleum. The coastal marsh and adjacent offshore areas in the vicinity of the Lower Mississippi River are among the most prolific petroleum producing areas of the United States. The offshore area has been divided into blocks generally about 5,000 acres each. The areas which could best be served from Venice via either channel are:

Chandeleur Sound Area

Breton Sound Area

Main Pass Area

Main Pass Area South and East Addition

Chandeleur Area

Chandeleur Area East Addition

South Pass Area

South Pass Area East Addition

South Pass Area South Addition

West Delta Area

West Delta Area South Addition

The general locations of these areas are shown on plate 2.

17. Agriculture. The principal agricultural crops of Plaquemines Parish are citrus fruits, truck crops, and pasture for the production of beef cattle. This is one of the few parishes in Louisiana producing citrus crops.

18. Fishing and trapping. Extensive areas of marshlands in Plaquemines Parish contain many shallow bays and lakes with interconnecting bayous and canals. This area supports an extensive seafood industry and important trapping activities.

19. Transportation.

a. Land. Land transportation is available from New Orleans via Louisiana Highway 23 on the west bank of the Mississippi River to Venice, Louisiana Highway 39 on the east bank of the river to Bohemia, and the New Orleans and Lower Coast branch line railroad (freight only) to Buras on the west bank of the river. Three free ferries (see plate 1) in Plaquemines Parish provide for interchange of traffic between Louisiana Highways 23 on the west bank and 39 on the east bank of the Mississippi River.

b. Water. Water transportation from New Orleans to the Gulf of Mexico is available via the Mississippi River and South or Southwest Passes, the Mississippi River-Gulf Outlet, the Gulf Intracoastal Waterway and Barataria Bay Waterway, and from the Mississippi River through the state-owned lock at Empire, Louisiana and the waterway from Empire to the Gulf of Mexico. Inshore areas are usually reached from the Mississippi River by one of its distributary channels and/or dredged canals to reach a specific well or group of wells. Bars at the mouth of unimproved Mississippi River distributary channels prevent their use for reaching the offshore areas and one of the navigation project channels maintained by the US Army Corps of Engineers is generally used. These project channels entering the Gulf of Mexico in the Mississippi River Delta area are South and Southwest Passes; Mississippi River-Gulf Outlet; Waterway from Empire, Louisiana, to the Gulf of Mexico; and Barataria Bay Waterway (see plate 1).

20. Pipelines. Many gas and oil pipelines traverse the area for delivery of the petroleum production to markets in the northeast and west and to loading docks in the area.

PROJECT PLAN

21. General. The plan of improvement consists of the enlargement and maintenance of Baptiste Collette Bayou between the Mississippi River and Breton Sound, and Grand-Tiger Passes between the Mississippi River and the Gulf of Mexico, to a depth of -14 feet over a bottom width of 150 feet, with entrance channels in open water -16 feet over a bottom width of 250 feet and jetties to the -6-foot contour, if and when justified, to reduce the cost of maintenance dredging.

a. Excavation

(1) Baptiste Collette Bayou. The plan of improvement will require removal and disposal of an estimated 3,175,000 cubic yards of material for initial construction which includes 1,933,000 for the -14-foot by 150-foot (inland) and -16-foot by 250-foot (offshore) channel, 622,000 cubic yards of 2-foot advanced maintenance , and 620,000 cubic yards of 2-foot allowable overdepth. A typical section of the channel is shown on plate 23.

(2) Grand-Tiger Passes. The plan of improvement will require removal and disposal of an estimated 4,694,000 cubic yards of material for initial construction which includes 3,064,000 for the -14 by 150-foot (incland) and -16-foot by 250-foot (offshore channel, 814,000 cubic yards of 2-foot advanced maintenance, and 816,000 cubic yards of 2-foot allowable overdepth. A typical section of the channel is shown on plate 23.

b. Clearing. Required clearing within the channel rights-of-way consists of the removal and disposal of all trees, brush, fallen timber, and debris from the area extending from the centerline of the channel to the edge of the theoretical top of cut. All material resulting from the clearing operations will be buried or otherwise disposed of in a manner that will eliminate the possibility of its entering the channel.

c. Dredging. Inland dredging will be confined within the existing channels of Baptiste Collette Bayou and Grand-Tiger Passes. The areas for dredged material disposal are adjacent to the two channels. There are three kinds of disposal areas (see plates 14-21) that will accommodate disposal of the construction and annual maintenance dredged material. First, some areas along the existing channels will be inclosed with spoil retention dikes (maximum spoil elevation 2.5 feet) with waste water control structures. Second, some shallow water areas along Tiger Pass are suitable for allowing the dredged material to spread out and build new marshland (elevation: 2.5 feet). In these areas there are existing dikes along the channel to prevent return flows of dredged effluent. Third, dredged material from Breton Sound and gulf waters will be pumped to the shoreline areas, and over the life of the project will gradually build the existing shoreline outward at an elevation of about 2.5 feet. It is planned to monotor the physical and environmental changes caused by this marsh building process with aerial, topographic and hydrographic surveys and by environmental field trips of botanists and zoologists.

(1) Baptiste Collette Bayou. It is estimated that 950 acres for disposal areas will be required along Baptiste Collette. Additionally, near the mouth of Baptiste Collette, over the 50-year project life, about 1,800 acres of shallow water presently offshore

will be converted to land by placement of the spoil from offshore dredging. The initial and annual maintenance dredging is expected to ultimately require disposal areas on land and in water totaling 2,930 acres.

(2) Grand-Tiger Passes. It is estimated that 1,870 acres for disposal areas will be required along Tiger Pass. Additionally, near the mouth of Tiger Pass, over the 50-year life of the project, about 560 acres will be converted to land by placement of dredged material from offshore dredging. The initial and annual maintenance dredging is expected to ultimately require disposal areas on land and in water totaling 2,680 acres.

d. Dredging summary. The areas shown for dredged material disposal are approximate and can be altered as field conditions dictate. The acres required for dredged material disposal are based on sedimentation estimates as presented in the "HYDROLOGY" section, with allowances for shrinkage, settlement and littoral drift effects.

DEPARTURES FROM THE PROJECT DOCUMENT PLAN

22. Departures. There are no significant postauthorization changes recommended herein which are considered to be outside the discretionary authority of the Chief of Engineers and for which further congressional action would be required.

OTHER PLANS INVESTIGATED

23. Alternative alinements. Alternatives to the authorized plan such as rail, highway, and air transportation are not practical. Cargoes that would be moved over these waterways originate and terminate in marine areas. All nearby land areas are coastal marsh; land transportation alternatives would be very expensive in comparison with water transportation. Personnel and lighter oil field equipment could be moved by helicopter. Some of the oil and gas cargoes could be moved by pipelines. However, the bulk cargoes of oil and gas production and all the commercial fisheries traffic depend upon waterways. Therefore, various alternative alinements to the authorized Baptiste Collette Bayou and Grand-Tiger Passes alinements were considered. These alternatives are named Grand Bay, Kimbal Pass, Red Pass and Grand Pass. See plate 1 for their locations.

a. Grand Bay. This alinement traverses the Mississippi River, left descending Mississippi River levee, Valer Canal and Grand Bay to the -16-foot contour in the Gulf of Mexico. Grand Bay is a shallow (2 to 3 feet deep) body of water whose southwestern shore is near the Olga Light at mile 16.3 AHP on the left descending bank of the Mississippi River across from Boothville, Louisiana. In this same vicinity are the Olga Dock and Valer Canal. The Valer Canal begins on the eastern side of the Mississippi River levee and continues in a

northeasterly-easterly direction for about 1 mile before entering Grand Bay. This alternative route would originate in Venice (mile 10.5 AHP) and proceed up the Mississippi River to the Olga Dock where the Mississippi River levee would be breached and a 75- by 600- by 14-foot lock would be constructed. From this point, a -14-foot by 150-foot channel would advance for 1.6 miles; thence 5.7 miles of -16-foot by 250-foot channel would continue to the -16-foot contour in the Gulf of Mexico, about 1.2 miles east-southeast of Bird Island. The total length of the route would be 13.1 miles. The total estimated cost at July 1974 price levels is $10,817,000.

b. Kimbel Pass. This alinement traverses the Mississippi River, Baptiste Collette Bayou, Kimbel Pass and thence to the -16-foot contour in the Gulf of Mexico. Baptiste Collette Bayou is an east bank distributary of the Mississippi River about 1 mile upstream of Venice, Louisiana. Downstream 2.4 miles from the head of the bayou is a distributary named Kimbel Pass. From this point, the water flows over 5.4 miles to the -16-foot contour in the gulf. A -14-foot by 150-foot channel would be dredged from the head of Baptiste Collette Bayou, through Kimbel Pass, to the open waters of the gulf; from that point, a -16-foot by 250-foot channel would proceed to the -16-foot contour. The total length of this route would be 8.8 miles. At July 1974 price levels, the total estimated cost is $3,058,000.

c. Red Pass. From Venice, Louisiana, this alinement traverses Grand Pass, Tiger Pass, Pass Tante Phine, Red Pass, and thence to the -16-foot contour in the Gulf of Mexico. The alinement proceeds southward from Venice for 3.0 miles to a junction formed by Tiger Pass and Pass Tante Phine. From this point, it is 1.8 miles to Red Pass and thence 7.2 miles to the -16-foot contour in the Gulf of Mexico. A -14-foot by 150-foot channel would be dredged from Venice to the Gulf of Mexico and from that point, a -16-foot by 250-foot channel would be dredged to the -16-foot contour in the gulf. The total length of this route would be 12.0 miles. At July 1974 price levels, the total estimated cost is $4,027,000.

d. Grand Pass. This alinement traverses Grand Pass, Pass du Bois and thence to the -16-foot contour in the Gulf of Mexico. It is 10.1 miles from Venice to the Pass du Bois junction; thence 4.5 miles to the gulf and 2.4 miles to the -16-foot contour. Dredging would provide a -14-foot by 150-foot channel from Venice to the Gulf of Mexico and a -16-foot by 250-foot channel to the -16-foot contour. The total length of this route would be 17.0 miles. At July 1974 price levels, the total estimated cost is $3,931,000.

24. Discussion of alternative alinements.

a. General. Grand Bay and Kimbel Pass are alternatives to the authorized Baptiste Collette Bayou alinement. Red Pass and Grand Pass are alternatives to the authorized Grand-Tiger Passes alinement. The cost estimates for all these alternatives are in excess of the authorized alinement cost estimates. The estimated annual benefits of

the Kimbal Pass and Red Pass plans are slightly higher, respectively, than the Baptiste Collette Bayou and Grand-Tiger Passes estimate of annual benefits. The other alternative alinement annual benefits are less than the authorized alinements annual benefits. As shown in table 13, the benefit-cost ratios are most favorable for the authorized alinements. Significant environmental impacts for the authorized and alternative alinements are summarized in table 1. These impacts were considered in the elimination process.

b. Baptiste Collette Bayou alternatives.

(1) Grand Bay. Even though this alternative would disturb less open water bottoms and less surface areas, it would disturb about 1,800 acres of oyster leases in the vicinity. Also, it would be necessary to breach an existing Mississippi River levee and build a lock at Valer Canal. Annual economic benefits would be less and annual costs would be more than the recommended route. Therefore, this alternative was rejected.

(2) Kimbel Pass. This alternative was rejected because it would require more cubic yards of excavation and therefore more disposal areas than the recommended route.

c. Grand-Tiger Passes alternatives.

(1) Red Pass. This alternative was less favorable than the recommended route because it would require more initial and maintenance dredging; more pipeline relocations; and the excavation of a new channel in the vicinity of the junction of Pass Tante Phine and Tiger Pass to bypass the existing right angle junction.

(2) Grand Pass. This alternative was rejected because it would be 3 miles longer than the recommended route; require more excavation and therefore, more disposal area and would produce less economic benefits.

25. Alternative methods of dredged material disposal.

a. Dredge hydraulically onto adjacent areas. Excavate by hydraulic dredge only and release effluent onto adjacent land on both sides of the channels. Allow to flow unconfined into and over grassy prairie areas and spread out and build new marsh areas. There is a low mound along most of thelength of the authorized channels varying from a levee height at the river and decreasing toward the outlet. This dike would prevent return of effluent into the channel. Land on which dredged material would be placed is salt water marsh and small, shallow ponds. This method was selectively adopted along Grand-Tiger Passes.

b. Dredge hydraulically into diked areas. Excavate with hydraulic dredge for full length of channels. Place material on land in totally or partially inclosed diked areas. Control effluent returned from disposal areas using weirs (or spill boxes) for clarification prior to returning to the channels. Local interests are required to provide the disposal areas and build or reimburse the Government for the construction of the retaining dikes, bulkheads, and embankments. This applies for both initial construction and subsequent maintenance requirements. This method was selected as the most practical and least overall damaging for Baptiste Collette Bayou and portions of the Grand-Tiger Passes channels.

c. Dredge by casting and stacking. Excavate the entire channel using cast methods including casting into open water at the gulfward end. This method would require very large bucket dredging equipment. The largest machine available in the New Orleans District is the "Dredge Conical," capable of 180-degree swing movement of material of 490 feet, using a boom length of 230 feet and a 10-cubic-yard clamshell bucket. There is only one such machine available. The next smaller size machine is a barge-mounted 150-foot boom capable of 180-degree swing movement of material of 290 feet using a 5-cubic-yard clamshell bucket. There are six or seven such "next smallest" machines. This construction method would result in an artificial levee along both banks. There would be some increase in turbidity in the existing channel. Siltation of existing petroleum company channels would be slight. In open waters, waves and littoral drift would wash some of the spoil back into the channel. This method would be more costly than hydraulic dredging.

d. Sedimentation basins. A study was made to determine the merit of excavating large sedimentation basins at the headwaters of the Baptiste Collette Bayou and Grand-Tiger Passes. This would increase the cross-sectional area and cause a decrease in the velocity of these distributary waters and result in a possible significant amount of silt deposition. Then it would be less costly to dredge in these confined areas, and the need for jetties might be eliminated. Dredged material could be returned to the Mississippi River. However, sedimentation basins are not recommended for the following reasons:

(1) The major navigation problems are in the offshore reaches where littoral drift and tidal currents contribute significantly to the shoaling problem.

(2) A sedimentation basin may not work because the fall velocity of suspended sediments is so slow that they might float through the basin and still be transported to the lower reaches of the channels. However, even if a sediment basin were feasible, it is believed that jetties or maintenance dredging would still be required because it would take an undetermined number of years before the effects of the basin would be felt in the offshore reaches.

(3) A sedimentation basin would have to be wide and deep and would encroach on additional marsh adjacent to the channel. This feature would cause additional damage to the delta environment.

(4) Returning the trapped material in the basin to the Mississippi River would create additional maintenance in the major navigation outlets of the lower river.

(5) If sedimentation basins were effective at the suggested locations, they would make the problems of already-deteriorating delta areas more acute. Large amounts of sediments (67 percent for Baptiste Collette Bayou and 83 percent for Grand-Tiger Passes) never reach the offshore reaches of the proposed project. Instead, these diverted sediments flow into numerous distributary channels and tend to keep the delta system active and in a state of aggradation in the case of Baptiste Collette Bayou and in equilibrium in the case of Tiger Pass.

HYDROLOGY

26. Hydrology. The following section is extracted from the salinity and sedimentation sections in appendix A, Hydrology.

a. Salinity. Measurements taken in Grand Pass at Venice show chloride-ion concentrations as high as 7,500 parts per million (p/m) during low-flow periods on the river. The deepening of the channels in Baptiste Collette Bayou and Tiger Pass is not expected to significantly increase salinity in or below the project area. The results of an investigation of the possibility of salinity intrusion into the Mississippi River, caused by deepening of Baptiste Collette Bayou and Grand-Tiger Passes, indicate that a freshwater discharge with velocities of 1.0 ft/sec. would allow saltwater intrusion of 4 miles in either channel. This intrusion would be in the form of a saltwater prism, sloping from approximately 10 feet below the surface at the mouth of the channel to 18 feet below the surface 4 miles upstream.

b. Suspended sediment studies.

(1) Basic data. Observations in Southwest Pass indicate a suspended sediment concentration of 317 p/m within a zone from the surface to a depth of 20 feet m.s.l. for stages of 2 feet m.s.l. or above, and 50 p/m for stages below 2 feet m.s.l. at Venice, La. Average discharges for the headwaters of each project distributary were interpolated from stage-discharge curves and were 19,000 ft^3/s for Baptiste Collette and 23,000 ft^3/s for Grand-Tiger Passes.

(2) Methodology. Using the above data, computations of total sediment loads diverted by each pass were made based on the

flow duration relations for the Mississippi River at Red River Landing. These flow duration relations indicate that a flow corresponding to a stage of 2.0 feet m.s.l. or above at Venice, La., occurs 146 days per year. This flow carries a total suspended load of 1,757,000 yd^3 into Baptiste Collette Bayou and 2,127,000 yd^3 into Grand-Tiger Passes annually. Flows corresponding to a Venice stage lower than 2.0 feet m.s.l., which will occur the remainder of the year, carry 416,000 yd^3 and 503,000 yd^3 into Baptiste Collette Bayou and Grand-Tiger Passes, respectively. The high and low discharge sediment loads were combined to determine the total annual volume of suspended sediments in each channel alinement. The bed load contribution is estimated to be 10 percent of the suspended load. The total sediment transport diverted into the distributaries is 2,173,000 + 217,000 = 2,390,000 yd^3/yr into Baptiste Collette Bayou and 2,630,000 + 263,000 = 2,893,000 yd^3/yr into Grand-Tiger Passes.

c. Sedimentation and littoral drift into the Baptiste Collette Bayou navigation channel.

(1) Inland reach. Of the 2,390,000 yd^3/yr of sediment diverted into Baptiste Collette Bayou, 33.5 percent of 800,000 yd^3/yr will reach Main Pass due to the increased conveyance for the proposed channel. In the reach from mile 1.6 to mile 6.0 estimated deposits are 112,000 yd^3/yr for the proposed channel. This gives a rate of deposition of 0.6 ft/yr.

(2) Gulfward reach. In this reach, from mile 6.0 to mile 8.0, the estimated channel deposits are 688,000 yd^3/yr for the proposed channel. This gives a shoaling rate of 4.3 ft/yr. In addition to the suspended channel sediments in the gulfward reach, littoral drift contributes an estimated 548,000 yd^3/yr with a shoaling rate of 3.4 ft/yr. If jetties are not built at the gulfward terminus of Baptiste Collette Bayou, the annual dredging requirements will be 1,348,000 yd with most of the sediment, 1,236,000 yd^3/yr, depositing in the offshore reach. The combined shoaling rate for suspended sediments, bed load, and littoral drift in the gulfward reach will average 7.7 ft/yr. To keep the channel open at project navigation depths, dredging would be required at least twice every year.

(3) Considered jetty reach. A jetty built at the mouth of the proposed channel would in effect carry suspended channel sediments out into deeper water and prevent littoral drift from being deposited in the jetty reach (approximately mile 6.0 to mile 7.5). The sediment within the jetty channel is estimated to be 80,000 yd^3/yr. This gives a rate of shoaling of 0.7 ft/yr. In the gulfward reach beyond the jetty, channel sediments will be 304,000 yd^3/yr and the littoral drift will be 274,000 yd^3/yr; this gives shoaling rates of 0.8 and 0.7 ft/yr, respectively. The combined shoaling rate is 1.5 ft/yr and will require maintenance dredging at an interval of 2 years.

(4) Summary. The construction of the jetties will reduce the total quantities of annual deposits to be dredged from 1,348,000 yd^3/yr to 770,000 yd^3/yr and will cause 578,000 yd^3/yr to be carried into deep water.

d. Sedimentation and littoral drift in Grand-Tiger Passes navigation channel.

(1) Inland reach. Of the 2,893,000 yd^3/yr of sediment diverted into Grand-Tiger Passes, 25 percent or 723,000 yd^3/yr goes into Tiger Pass. Seventeen percent of this sediment load, or 492,000 yd^3/yr will reach the lower reaches of Tiger Pass due to increased conveyance of the proposed channel. The sediment deposition from mile 0.0 to mile 1.0 will be 15,000 yd^3/yr, and the associated shoaling rate is 0.3 ft/yr. In the inland reach from mile 1.0 to mile 5.5, deposits will be 84,000 yd^3/yr for the proposed channel with a shoaling rate of 0.4 ft/yr. In the remaining inland reach from mile 5.5 to mile 12.2 deposits will be 123,000 yd^3/yr for the proposed channel with a shoaling rate of 0.4 ft/yr.

(2) Gulfward reach. In this reach from mile 12.2 to mile 14.2, estimated channel deposits for the proposed channel will be 270,000 yd^3/yr. This gives a shoaling rate of 1.7 ft/yr. Littoral drift in the same gulfward reach will contribute 215,000 yd^3/yr which will give a shoaling rate of 1.3 ft/yr. The predominant direction of littoral drift is towards the north. If jetties are not built at Tiger Pass, the annual dredging requirement will be 707,000 yd^3/yr, with most of the sediment, 485,000 yd^3/yr, depositing in the offshore reach. The combined shoaling rate for suspended sediments, bed load, and littoral drift will average 3.0 ft/yr. In order to keep the channel open at navigation depths, dredging will be required on an annual basis.

(3) Considered jetty reach. A jetty built from mile 12.2 to mile 13.3 will carry most of the channel sediments gulfward of the jetty. The littoral drift will be trapped by the jetty and prevented from being deposited in the jetty reach. The channel sediment deposited within the jetty is estimated to be 49,000 yd^3/yr with a shoaling rate of 0.4 ft/yr. In the gulfward reach beyond the jetty, channel sediments will be 55,000 yd^3/yr with littoral drift contributing an additional 54,000 yd^3/yr. Respective shoaling rates are 0.2 and 0.2 ft/yr. The combined shoaling rate for suspended sediments and littoral drift gulfward of the jetties will be 0.4 ft/yr and will require maintenance dredging at intervals of 8 years.

(4) Summary. The construction of the jetties will reduce the total quantities of annual deposits to be dredged from 707,000 yd^3/yr to 380,000 yd^3/yr and will cause 327,000 yd^3/yr to be carried out into deep water.

e. Previous emergency maintenance dredging. In April 1972 and April 1973, due to emergency operations on the Inner Harbor Navigation Canal lock, it became necessary to dredge an alternate navigation channel of dimensions 9 feet by 125 feet through the gulfward reach of Baptiste Collette Bayou. The alinement followed a northerly direction through North Pass to avoid existing pipelines. The total dredging required in 1972 was 265,520 yd^3, and in 1973 was 395,916 yd^3 for an average of 330,718 yd^3. After one week had elapsed, the channel was no longer at project depth and consequently, navigation was very limited. During the 1973 emergency dredging, stong winds of approximately 40-45 mi/h were experienced from the north, northeast, and southeast. These winds are attributed with being the primary cause for the rapid shoals which occurred.

f. Navigation problems. The inland reaches of both Baptiste Collette Bayou and Tiger Pass are generally navigable to depths of at least 10 feet and some reaches exceed the project depths. However, there are some isolated reaches, such as in the vicinity of Mercantile Bayou on Tiger Pass, which have a controlling depth of only 6 feet. The major sedimentation and navigation problems are in the gulfward reaches. The velocities within the land cut are generally sufficient to keep most of the sediment load in suspension. As the flow enters the Gulf of Mexico the velocities approach zero and the sediments will settle out and combine with the littoral drift moving alongshore to cause restrictive navigational depths. Immediately gulfward of both Baptiste Collette Bayou and Tiger Pass, scour holes form relatively deep navigation depths. This condition is caused by the momentum of the flow as it enters the Gulf of Mexico. Jetties would trap littoral drift which would otherwise move into the channels and direct the flow and suspended sediments into deeper water.

GEOLOGY

27. Physiography. The project area is located within the deltaic plain of the Mississippi River. Dominant physiographic features of the area are the active and abandoned river channels, their respective natural levee ridges and interlevee basins, numerous inland bodies of water, marshlands and tidal streams which drain the limited land areas, and a few small sandy beach areas. Elevations range from a maximum of +5 feet mean sea level along the crests of the natural levees to a minimum approaching mean sea level in the marshlands between the natural levee ridges.

28. General geology. Geologic history of the last 5,000 years is significant for this project. At that time, the sea approached its present elevation after rising from a stage 400-450 feet below its existing level. The Mississippi River, through a series of migrations across the alluvial valley, began prograding the shoreline which was then located in the general latitude of Baton Rouge. As a result of

this gulfward advancement, vast amounts of sediments were deposited in the vicinity of New Orleans. Deposition in the project area began about 4,000 years ago. However, the greater portion of the sediments within the project area have been deposited in the last 900 to 1200 years since the Mississippi River began occupation of its present course. At present, there are four minor distributary networks actively carrying water from the main channel of the Mississippi River; Baptiste Collette Bayou, The Jump (including Grand-Tiger Passes), Cubits Gap, and Pass a Loutre Crevasse. All are thought to have been originally opened by man. Although Baptiste Collette Bayou and Grand-Tiger Pass are both actively advancing their deltaic lobes gulfward, the rate of progress has diminished considerably, especially at the mouth of Tiger Pass. The lands adjacent to the distributaries are still subject to inundation during high water when the natural levees are overtopped, and as a result, deposition continues on a limited basis in the low-lying interlevee areas.

29. Subsidence and erosion. Progressive subsidence and downwarping have been occurring in the project area for the past 5,000 years. The surface has been downwarped towards the south and west to a maximum of about 500 feet at the edge of the continental shelf about 25 to 30 miles south of the project area. Presently, the rate of subsidence varies from about 0.5 to 1.0 foot per century along the natural levee areas. The general pattern of shoreline change south of Baptiste Collette Bayou is one of advancement with some areas adjacent to the main passes recording gains of as much as 100 to 200 feet per year. However, the area north of the mouth of Baptiste Collette Bayou is experiencing some shoreline erosion, though not critical at the present time. The shoreline immediately northwest and southeast of Tiger Pass is relatively stable although some small beaches are forming in the area indicating at least some periodic accretion.

30. Investigations performed. General type borings to a maximum depth of 45 feet were made for this project. In addition, the logs of borings made in conjunction with other projects as well as geologic information were available for the interpretation of the surface and subsurface geologic conditions of the area.

31. Mineral resources. Extensive oil and gas production and exploration are found in the vicinity of the project area. Continued exploration and production of these natural resources will not be adversely affected by the project, nor will the project be adversely affected by oil and gas operations.

32. Foundation conditions. The subsurface along the project area is represented by the geologic profiles on plate 24. The legend on this plate describes the various geologic environments of deposition and the general nature of the soils contained in each environment. Generally, the area consists of Holocene deposits to a depth of about

250 feet, directly underlain by Pleistocene deposits. Although the project borings do not penetrate the Pleistocene, the depth to this formation was extrapolated from deeper borings taken along the banks and levees of the Mississippi River, and from a few isolated deep borings in the general area.

33. Conclusions. The geologic investigation and analyses of all existing and new data indicate that conditions for dredging the project channels are generally favorable. However, because of the very soft consistency of the marsh and some of the interdistributary materials encountered, some slope and dredged material bank stability problems may be anticipated. In addition, there is a definite lack of suitable land area for placing dredged material. No problems relative to future construction of economically justified jetty systems are anticipated. The materials deposited near the mouths of the distributaries should be of a granular nature, providing a sufficient foundation for jetty construction. However, in order to properly evaluate the foundation conditions, a boring and stability analysis program of the proposed jetty site would be necessary. Due to the state of maturity reached by the distributary systems, the deposition of large amounts of silty and sandy materials at the mouths of the channels can be expected during high water stages so that periodic dredging will be required to maintain the desired project channel dimensions.

SOILS

34. General. This section covers the soils and foundation investigation including design of channel slopes, dredged material stockpiles, retaining dikes and required borrow areas for channel improvements along Baptiste Collette Bayou and Grand-Tiger Passes.

35. Field investigation. In order to determine the stratification and engineering characteristics of soils along the proposed channel alinements, a total of 17 borings were made (boring locations are shown on plates 4-13; see plates 25 and 28 for boring logs). Along the proposed channel alinement for Baptiste Collette Bayou, two general type borings (BBC-5 and BBC-6) were made to depths of 45 feet; three 4-inch auger borings (BBC-1 thru BBC-3) were made to depths of 20 feet; and one hand driven piston boring (BBC-4) was made to a depth of 20 feet. Along the proposed channel alinement for Grand-Tiger Passes, three general type borings (BGT-9, BGT-10 and BGT-11) were made to a depth of 45 feet and eight 4-inch-diameter auger borings (BGT-1 thru BGT-8) were made to a depth of 20 feet.

36. Laboratory tests. Visual classifications were made on all soil samples obtained and water content determinations were made on all cohesive soil samples. Where possible unconfined compression (UC)

shear tests were performed on cohesive samples obtained from the general type borings. However, only a limited number of samples could be tested due to the unavoidable sample disturbance which occurs when sampling soils with very soft consistencies.

37. Soil conditions and shear strengths. The project areas were subdivided into reaches for stability analyses primarily based on soil conditions, i.e., soil strengths and soil stratifications; however, consideration was also given to study of other factors such as cross sections, aerial photos and site inspections. The following is a generalization of soil conditions encountered along the proposed channel alinement.

a. Baptiste Collette Bayou.

(1) Soil conditions. Borings taken along Baptiste Collette Bayou indicate that there are marsh deposits from ground surface to about elevation -14. These marsh deposits consist primarily of very soft clays with moisture contents ranging from about 40 percent to 80 percent. The project along Baptiste Collette Bayou was divided into two reaches primarily based on a silt layer (natural levee deposit) which was found to exist from ground surface to about elevation -3 over parts of the area. Reach I, which has this silt layer, extends from the beginning of the project to about station 200+00 and then again starts at about station 275+00 and goes to the end of this project area. Between stations 200+00 and 275+00 (Reach II) the above-mentioned silt layer was not present. Below the marsh deposits are interdistributary deposits consisting of two silt layers, one from elevation -14 to elevation -19 m.l.g. and one at elevation -38 and extending to below the depth of borings, and a layer of very soft to soft clay located between the two silt layers. Moisture content of the clay ranges from 45 percent to 75 percent.

(2) Shear strengths. Design shear strengths selected for each reach along Baptiste Collette Bayou were based on the very soft consistency of the fat clays from the marsh deposits and previous experience in the general area of this project. An average shear strength of 125 psf was used in the marsh clays with strengths of 100 psf at the ground surface, increasing to 150 psf at elevation -14. Unconfined compression tests performed on clays from the interdistributary deposits indicate an average shear strength of 250 psf with a strength increase from 200 psf at elevation -19 to 300 psf at elevation -38. A unit weight of 100 psf was assigned to the marsh clays and 105 psf to the interdistributary clays.

b. Grand-Tiger Passes.

(1) Soil conditions. Borings taken along Grand-Tiger Passes disclosed similar soil conditions to those found along Baptiste Collette Bayou. Based primarily on soil conditions, Grand-Tiger

Passes were divided into three separate reaches. In general, all three reaches contain very soft marsh clays at the surface with moisture contents ranging from about 50 percent to 130 percent, underlain by interdistributary and point bar deposits with a silt strata continuous over the project area below about elevation -36. The stratification of the various reaches differed as follows: Reach I (start of project to station 230+00) contains a layer of silt from about elevation -7 to elevation -14; Reach II (station 230+00 to 620+00) has a layer containing both lean clay and silt at about elevation -6 to elevation -14; and Reach III (station 620+00 to end of project) has very soft marsh clays extending from ground surface down to elevation -14. From elevation -14, very soft to soft interdistributary clays were generally present over the project area.

(2) Shear strengths. Based on the test values, classification data and previous experience, shear strengths were assigned to the two distinct clay strata encountered in each reach along Grand-Tiger Passes. The upper clays of Reach I (to sta 230+00) were assigned an average shear strength of 125 psf with a strength increase of from 100 psf at ground surface to 150 psf at elevation -7. The Reach I lower clays (elevation -14 to elevation -36 were assigned an average strength of 260 psf with a strength gain of about 5.5 psf/ft of depth. Both Reach II (sta 230+00 to 620+00) and Reach III (620+00 to end) had upper clay strata which were assigned to an average strength of 100 psf, and lower clay strata starting at elevation -14 with an assigned strength of 100 psf increasing with depth at about 7.7 psf/ft of depth. These two reaches, II and III, differ in that Reach II has a combination silt-lean clay strata from about elevation -6 to elevation -14. This mixed strata, which was not present in Reach III, was assigned a shear strength of 350 psf, as average for a silt and a lean clay at that depth, and a unit weight of 115 pcf. Unit weights of 100 pcf were given to all very soft upper clays (above elevation -14) and 105 pcf to the very soft to soft lower clays (below elevation -14 m.l.g.). A unit weight of 117 pcf and a shear strength of $\phi = 15$, $c = 200$ pcf was used for all silts.

38. Stability analyses. Stability analyses were performed using the method of planes to determine safe limits for the channel, dike, dredged material and borrow area slopes. For design purposes, elevation 0 m.l.g. was selected for low water plane, and a shear strength of 75 psf was used in the clay dikes. The existing bank along Baptiste-Collette Bayou was assumed to be at elevation +2, and along Grand-Tiger Passes at elevation +4 (Reach I); elevation +2 (Reach II); and elevation +1.5 (Reach III). All slopes were analysed based on a minimum factor of safety of 1.30 for channelside failure and 1.20 for landside failure. The exceptions to this are the channel slopes along Tiger Pass, where a minimum factor of safety of 1.25 is proposed due to the remoteness of the project area. The factor of safety allows

the use of a uniform channel slope throughout the Grand-Tiger Passes project and considerably reduces the amount of excavation required. The results of the stability analyses are shown on plates 26, 27, 29, 30 and 31.

39. Soils conclusions.

a. Construction criteria. Based on the results of the stability analyses, criteria for construction of dikes and channels were developed. Criteria on the following tables (see p 22 & 23) are based on the assumption that the existing banks along Baptiste Collette Bayou are at about elevation +2 or lower, and the banks along Tiger Pass are at or below elevation +4 to station 230+00; at or below elevations 230+00 to 620+00; and at or below elevation +1.5 from station 620+00 to the end of the project. Stockpiles of material along the channel banks which exceed the above-mentioned elevations should be degraded to the above bank elevations prior to any channel excavation.

b. Channel protection. No channel protection is recommended; however, some erosion due to wave action along the banks should be expected.

c. Dikes.

(1) Borrow material. Material for construction of front dikes will be obtained from the channel excavation or from within the limits of the borrow area designated on the stability sections (plates 26, 27, 29, 30 and 31). Lateral and rear dikes will be constructed of material from within the disposal area. Where these dikes may be adjacent to existing channels, the same dredged material setback distance will be used as for front dikes.

(2) Dikes adjacent to pipelines. No spoil will be placed on top of pipelines unless written permission is obtained from the owner.

ENVIRONMENTAL ANALYSIS

40. Land resources. Enlargement of the existing channels of Baptiste Collette Bayou and Grand-Tiger Passes will result in some marsh and ponds being covered with dredged material and thereby being temporarily lost to the ecosystem. The height of the new land will be about 1 foot and therefore it will revegetate as marsh within 6 months to 1 year and again produce detritus to the fisheries and provide wildlife habitat.

41. Water quality. Periods of induced turbidity through construction and maintenance will be temporary and localized in nature,

CONSTRUCTION CRITERIA

BAPTISTE COLLETTE BAYOU AND GRAND-TIGER PASSES
FOR (Hydraulic Case)

DIKE SIDESLOPES		BORROW AREA SLOPES
SPOIL SIDE	CHANNELSIDE	
1V ON 4H	1V ON 5H	1V ON 3H FOR 5 FT. THEN 1V ON 10H

BAPTISTE COLLETTE BAYOU (Hydraulic Case)

Station limits	Min Reqd Dist from C/L of dike to top of channel bank FT	Min Reqd Dist from C/L of dike to top of borrow pit FT	Max Ht of spoil (above ground surface) FT	Max Ht of dike (above ground surface) FT	Channel slopes
Reach I					
Sta 0-200					
Sta 275-End	104	67	5	6	IV on 3H
Reach II					
Sta 200-275	73	48	4	5	1V on 3H

GRAND-TIGER PASSES (Hydraulic Case)

Reach I					
Sta 125-230	80	42	4	5	1V on 3.5H
Reach II					
Sta 230-620	74	36	3	4	1V on 3.5H
Reach III					
Sta 620 to End	79	58	3	4	1V on 3.5H

BAPTISTE COLLETTE BAYOU (Cast Case)

	Min Reqd Dist from top of chnl bank to toe of spoil-ft	Max Ht of spoil-ft (above ground surface)	Spoil Slope	Channel Slopes
Reach I Sta 0 to 200	70	10	1V on 12H	1V on 3H
Reach II Sta 145 to 275	60	8	1V on 12H	1V on 3H

GRAND-TIGER PASSES (Cast Case)

Reach I	30	6	1V on 12H	1V on 3.5H
Reach II	50	5	1V on 12H	1V on 3.5H
Reach III	48	4.5	1V on 12H	1V on 3.5H

and of short duration. In those reaches where extensive dredging operations are required, uncontrolled dredged material flow and sediment drift will present problems to nursery areas used by marine fish and shellfish. Adequate control will help in minimizing these adverse conditions. Increased turbidity induced by wavewash from boat traffic will be the only significant long-term effect on the aquatic biota of the area insofar as water quality is concerned. Other long-term adverse effects of the project on the water quality depend, to some extent, on the future quality of water in the Mississippi River. Enlargement of the channels will result in some increase in the diversion of river flow through the channels, and concomitantly, to the areas adjacent to them and will allow increased volumes of Mississippi River water to flow in the channels. At present, bacteria counts in the river are sufficiently high to affect oyster growing waters of the east and west delta areas. Improvements in the river water quality can be expected as a result of new treatment facilities being planned for upstream discharges. Future Federal, state, and local pollution control regulations will doubtless engender progressive improvement in water quality conditions in the Mississippi River.

42. Fishery resources. There will be a temporary loss of fishery resources as shallow bays are filled with dredged material. These losses will be minimal because this area will revegetate as marsh and thus increase the detritus production which in turn will increase fishery production. Species composition of the population in the surrounding waters will not be altered by the proposed action. Species inhabiting the dredged channels will probably be different than those now found in these channels. Some shallow water nursery and spawning areas will be converted to deep-water channel as a result of the proposed action. Commercial fishing activities in the immediate project area will be interrupted during construction by dredging activity.

43. Archeological and historical resources. Fort Jackson, Fort St. Philip, and Fort de la Bouiaye, three historic sites on the Mississippi River in Plaquemines Parish, are outside the project area and would not be affected by the proposed project. There are no known impacts on archeological and historical resources.

44. Summary. Table 1 summarizes the environmental impacts for the authorized and considered alinements.

TABLE 1

MISSISSIPPI RIVER OUTLETS, VICINITY OF VENICE, LA.
ENVIRONMENTAL IMPACTS OF AUTHORIZED AND CONSIDERED ALINEMENTS

	EAST CHANNELS			WEST CHANNELS		
	Baptiste Collette Bayou (Authorized)	Alt #1 Grand Bay	Alt #2 Kimbel Pass	Grand-Tiger Passes (Authorized)	Alt #3 Red Pass	Alt #4 Grand Pass
Water requirements (Total)	1,980 acres	1,210 acres	2,000 acres	810 acres	780 acres	830 acres
(Channel bottom areas disturbed)	110 acres	20 acres	130 acres	180 acres	140 acres	230 acres
(Open water bottom areas disturbed)	1,870 acres	1,190 acres	1,870 acres	630 acres	640 acres	600 acres
Land Requirements (Surface areas disturbed)	950 acres	55 acres	1,080 acres	1,870 acres	1,900 acres	2,060 acres
Cubic Yards of Dredged Material (initial)	3,175,000 CY	6,245,000 CY	3,787,800 CY	4,410,000 CY	4,473,500 CY	4,902,900 CY
Total length	8.0 miles	13.1 miles	8.8 miles	14.0 miles	12.0 miles	17.0 miles

COORDINATION WITH OTHER AGENCIES

45. Environmental Protection Agency (EPA).

a. Views. The Environmental Protection Agency, Region VI, Dallas, Texas, in a letter dated 29 April 1974 made the following comments for consideration in developing the project plan: (1) dredged material disposal plans should be developed in consonance with the guidelines presently being developed by EPA under Section 404(b) of P.L. 92-500, (2) disposal of dredged material in the oyster producing areas could have adverse effects on this important resource, and (3) studies should be made to determine whether any changes in water circulation, salinity, and sedimentation will be caused by the project. Copies of the letter are inclosed in appendix b, Views of Other Agencies.

b. Response. The dredged material disposal plans were developed in consonance with guidelines developed by EPA, Region VI, Dallas, Texas, and furnished to the New Orleans District by letter dated 26 June 1973. See paragraph 48b for response concerning protection of oyster producing areas. There will be gradual changes in water circulation near the mouths of Baptiste Collette Bayou and Tiger Pass as the proposed disposal areas in open waters (see plates 16 and 21) are gradually built out from the existing shorelines with dredged material during periodic maintenance operations. The effects of salinity and sedimentation are presented in appendix A, Hydrology.

46. US Bureau of Sport Fisheries and Wildlife.

a. Views. The US Bureau of Sport Fisheries and Wildlife (USBSFW), Atlanta, Georgia, in a report dated 13 September 1974 made recommendations concerning the spoil disposal plan. (See plates 14-21 for the spoil disposal plan.) The New Orleans District generally concurs with those recommendations. The only exception to the USBSFW plan is along Baptiste Collette Bayou. There were not enough open water areas within close proximity of the channel to accommodate the expected construction and annual maintenance spoil. Therefore, about 160 acres of semi-vegetated area was retained in the spoil plan. This area would be used in the later years of the project, if and when needed. A copy of the USBSFW report is included in appendix B, Views of Other Agencies.

47. National Marine Fisheries Service. See the US Bureau of Sport Fisheries and Wildlife report in appendix B.

48. Louisiana Wildlife and Fisheries Commission.

a. Views. The Louisiana Wildlife and Fisheries Commission in New Orleans, Louisiana, in a letter dated 12 February 1974 made the following recommendations and statements: (1) recommended compensation to the lessees for any damage that might occur (maps which designated

oyster leases in the area were included), (2) stated that they had no objection to these navigation projects which should introduce fresh water into the oyster growing areas, and (3) recommended that money for evaluation of the marshland building be included in the project cost for a 3-year study. Copies of the letter and oyster lease maps are included in appendix B, Views of Other Agencies.

b. Response. There appears to be no reasonable way during dredged material dike construction to avoid disturbing the oyster lease which is located adjacent to the disposal area at the mouth of Tiger Pass (see plate 21). There may be partial damage to the Bychurch lease (see plate 21) because of its proximity to the spoil area. The extent of possible damages can be determined during initial construction and subsequent maintenance dredging. Then appropriate action will be taken by the local agency. Evaluation of the marsh building process will be accomplished by regular predredging contract surveys and environmentally oriented field trips which would be funded in the operations and maintenance program.

49. Louisiana Department of Public Works.

a. Views. The Louisiana Department of Public Works in Baton Rouge, in a letter dated 15 March 1974 made the following recommendation and suggestion: (1) recommended that in the actual dredging operations the dredged material not be allowed to enter any natural water courses and that retention dikes should be used when necessary to prevent damage to the oyster producing areas in the vicinity, and (2) suggested that due consideration be given for early construction of jetties at the mouth of Baptiste Collette Bayou to maintain its depth after enlargement.

b. Response. It is intended to place dredged material in such a manner that it will not drain into natural water channels. This will be accomplished by the use of retention dikes to contain the dredged material. See paragraph 48b for the response concerning protection of oyster producing areas and paragraph 50b for the response concerning early construction of jetties.

50. Plaquemines Parish Commission Council

a. Views. The Plaquemines Parish Commission Council in Pointe-a-la-Hache, Louisiana, in a letter dated 13 February 1974 made the following recommendation and statements: (1) recommended that the New Orleans District reconsider the plan of constructing jetties if and when justified, and use the first funds available for the construction of rock jetties and the dredging of the mouth of Baptiste Collette Bayou so that the channel might be utilized at the earliest possible time; (2) stated that the opening of Baptiste Collette Bayou would result in the saving of thousands of gallons of fuel daily for

the vessels used in the mineral industry; and (3) stated that the Council is in general agreement with the construction of the navigation channels and with respect to the proposed method of dredged material disposal, including the disposal of some of the material by allowing it to spread out in order to build new marshland. A copy of the letter is included in appendix B, Views of Other Agencies.

b. Response. The economic feasibility of constructing jetties has been reconsidered. The study is presented in the "JETTY ECONOMIC ANALYSIS" section. The conclusions of the study are that jetties are not presently justified, that experience with maintenance dredging will be the only way to show justification for jetties and that future justification appears doubtful.

ENVIRONMENTAL QUALITY ENHANCEMENT MEASURES

51. Marsh seeding. Initial construction dredging will create about 2400 acres of disposal areas along Baptiste Collette Bayou and Grand-Tiger Passes. In these areas a variety of grasses and sedges can be produced by seeding. Various seeds are being tested for viability. If the viability percentage is high, it is planned to sow (by plane with a seed dispensing hopper) rice hulls, which consist of seeds of extraneous plants. If rice hulls are not promising, millet is the most probable alternative. The seeded areas will be monitored quarterly under the operations and maintenance program to observe what plant species emerge and how well they become established. Some cover is expected during the first growing season. Estimated costs are included in tables 3 and 7. The cost of subsequent marsh seedings after maintenance dredging will be included in future operation and maintenance programs. Since the marsh seeding is basically an experimental effort, no benefits are claimed.

REAL ESTATE REQUIREMENTS

52. Real estate requirements. Local interests are required to provide without cost to the United States, all lands, easements and rights-of-way for initial construction and subsequent maintenance dredging disposal areas and aids to navigation. There will be no acquisition by the United States. It is planned to change a portion of the existing alinement in Tiger Pass (see plate 8, station 47+90 to 86+98) by moving it about 200 feet to the east to avoid costly commercial land on the west bank. This will be done in the plans and specifications stage.

RELOCATIONS

53. Relocations. All alterations and relocations of facilities required for the construction of this project are the responsibility of local interests. Since there is no Federal participation, betterments are not involved. Owners of the relocations were notified of

the project plans and no objections were expressed. The pipeline crossings will be relocated so as to provide at least 8 feet of clearance below the authorized -16-foot and -14-foot channels; hence, the top of the pipe is to be at or below -24 and -22 feet, respectively. The 8-foot clearance will apply to channel side slopes also. All future pipeline crossings will be required to meet this standard. The facilities requiring relocation are listed in tables 4 and 8 and shown on plates 4-13. There will be minor environmental effects.

COST ESTIMATES

54. Baptiste Collette Bayou summary of costs. The total estimated cost for construction of this portion of the authorized project based on July 1974 price levels is $2,682,000, of which $1,240,000 is U.S. Army Corps of Engineers cost, $42,000 is U.S. Coast Guard cost, and $1,400,000 is non-Federal cost. A summary of first costs by cost account numbers is shown in table 2. Details of the Federal first cost estimates are shown in table 3. Details of the non-Federal first cost estimates are shown in table 4.

TABLE 2

BAPTISTE COLLETTE BAYOU
SUMMARY OF FIRST COSTS*

(July 1974 Price Levels)

Cost Acct No.	Item	Cost
	FEDERAL FIRST COST	
09	Channels and canals	$1,111,000
30	Engineering and design	69,000
	Real Estate hired labor	9,000
31	Supervision and administration	51,000
	Total first cost, Corps of Engineers	$1,240,000
	Total first cost, US Coast Guard	42,000
	Total Federal first cost	$1,282,000
	NON-FEDERAL FIRST COST	
A	Lands and damages	$ 100,000
B	Relocations	520,000
C	Dredged material dikes	780,000
	Total non-Federal first cost	$1,400,000
	TOTAL FIRST COST	$2,682,000

*Excludes cost of jetties. See "JETTY ECONOMIC ANALYSIS" Section.

TABLE 3

BAPTISTE COLLETTE BAYOU
DETAILED ESTIMATE OF FEDERAL FIRST COSTS

(July 1974 Price Levels)

Acct No.	Item	Quantity	Unit	Estimated
	FEDERAL COSTS			
09	Channels and canals			
	Channel excavation	1,933,000 c.y.	$ .30	$ 579,000
	Advance maintenance	622,000 c.y.	.30	186,600
	Allowable overdepth	620,000 c.y.	.30	186,000
	Marsh seeding	700 ac.	17.00	11,900
	Subtotal			964,400
	Contingencies 15% ±			146,600
	Subtotal			$1,111,000
30	Engineering and design 6.2%			$ 69,000
	Real estate hired labor cost			9,000
	Subtotal			$1,189,000
31	Supervision and administration 4.3%			51,000
	TOTAL COST - INITIAL CONSTRUCTION			$1,240,000

TABLE 4

BAPTISTE COLLETTE BAYOU
DETAILED ESTIMATE OF NON-FEDERAL FIRST COSTS

(July 1974 Price Levels)

	Item	Quantity	Unit	Unit Price $	Total (Rounded) $
A	LANDS AND DAMAGES				
	Perpetual right-of-way easements				
	Semi-marsh	65	Ac.	90	5,850
	Marsh	52	Ac.	75	3,900
	Perpetual spoil easements				
	Semi-marsh	638	Ac.	70	44,660
	Marsh	308	Ac.	55	16,940
	Subtotal				71,350
	Contingencies 25% ±				17,650
	Acquisition costs by others				11,000
	TOTAL LANDS AND DAMAGES				100,000
B	RELOCATIONS (includes E&D, S&A, and contingencies)				
	Peoples Utilities, Inc. submarine cable	400	LF	LS	20,000
	Shell Pipe Line Corp 16" oil	400	LF	86	34,400
	Marathon Oil Co. 12" oil	400	LF	63	25,200
	Cal-Ky Oil Co. 16" oil	400	LF	86	34,400
	United Gas Co. 12" gas	400	LF	63	25,200
	Gulf Refining Co. 20-4" flowlines	8,000	LF	22	176,000
	Gulf Refining Co. 6-3" flowlines	2,400	LF	16	38,400
	Delta Development Corp. 2-2" flowlines	800	LF	10	8,000
	Southern Natural Gas 16" gas	400	LF	86	34,400
	Southern Natural Gas 26" gas	550	LF	140	77,000
	Dynamic Exploration 2" flowline	1,200	LF	10	12,000
	TOTAL RELOCATIONS				520,000
C	DREDGED MATERIAL DIKES				
	Spoil retaining dike	443,500	CY	1.40	620,900
	Contingencies 25%				159,100
	TOTAL DREDGED MATERIAL DIKES				780,000
	TOTAL NON-FEDERAL FIRST COST				1,400,000

55. Baptiste Collette Bayou comparison of current estimate, latest approved estimate, and project document estimate. The project cost estimate of $2,682,000 presented in this general design memorandum is an increase of $283,000 over the latest approved estimate of $2,399,000 (PB-3 estimate dated 26 January 1974, effective 1 July 1974). This increase is due mainly to an increase in the amount of relocations and spoil retaining dikes in the project cost estimate. The project cost estimate of $2,682,000 is an increase of $1,382,000 over the project document estimate of $1,300,000 (July 1967 price levels). This increase was due to higher price levels. A comparison of cost estimates is shown in table 5.

TABLE 5

BAPTISTE COLLETTE BAYOU
Comparison of Estimates

	Item	Project Document Jul 67 prices	PB-3 dtd 26 Jan 74 effective 1 Jul 74	GDM	Diff bet. PB-3 and GDM
	FEDERAL	$	$	$	$
09	Channels and canals	690,000	1,314,000	1,111,000	-203,000
30	Engineering and design and real estate hired labor	100,000	76,700	78,000	+ 1,300
31	Supervision & Admin.	60,000	57,000	51,000	- 6,000
	Subtotal (Corps of Engineers)	850,000	1,447,700	1,240,000	-207,700
	Aids to Navigation (US Coast Guard)	40,000	42,000	42,000	0
	Total Federal first cost	890,000	1,489,700	1,282,000	-207,700
	NON-FEDERAL				
A	Lands and damages	53,000	65,300	100,000	+ 34,700
B	Relocations	272,000	629,000	520,000	-109,000
C	Dredged material dikes	85,000	215,000	780,000	+565,000
	Total non-Federal first cost	410,000	909,300	1,400,000	+490,700
	Total project first cost	1,300,000	2,399,000	2,682,000	+283,000

56. Grand-Tiger Passes Summary of costs. The total estimated cost for construction of this authorized portion of the project based on July 1974 price levels is $3,006,000, of which $1,880,000 is U.S. Army Corps of Engineers cost, $46,000 is U.S. Coast Guard cost, and $1,080,000 is non-Federal cost. A summary of first costs by cost account numbers is shown in table 6. Details of the Federal first cost estimates are shown in table 7. Details of the non-Federal first cost estimates are shown in table 8.

TABLE 6

GRAND-TIGER PASSES
SUMMARY OF FIRST COSTS*

(July 1974 Price Levels)

Cost Acct No.	Item	Cost
	FEDERAL FIRST COST	
09	Channels and canals	$1,655,000
30	Engineering and design	103,000
	Real Estate hired labor	15,000
	Public Law 91-646 relocation assistance	30,000
31	Supervision and administration	77,000
	Total first, Corps of Engineers	1,880,000
	Total first cost, US Coast Guard	46,000
	Total Federal First Cost	$1,926,000
	NON-FEDERAL FIRST COST	
A	Lands and damages	$ 447,000
B	Relocations	525,000
C	Dredged material dikes	108,000
	Total non-Federal first cost	$1,080,000
	TOTAL FIRST COST	$3,006,000

*Excludes cost of jetties. See "JETTY ECONOMIC ANALYSIS" section.

TABLE 7

GRAND-TIGER PASSES
DETAILED ESTIMATE OF FEDERAL FIRST COSTS

(July 1974 Price Levels)

Cost Acct No.	Item	Quantity	Unit Cost	Estimated Cost
	FEDERAL COSTS			
09	Channels and canals			
	Channel excavation	3,064,000 c.y.	.30	$ 919,200
	Advanced maintenance	814,000 c.y.	.30	244,200
	Allowable overdepth	816,000 c.y.	.30	244,800
	Marsh seeding	1,700 ac.	17.00	28,900
	Subtotal			$1,437,100
	Contingencies 15%			217,900
	Subtotal			$1,655,000
30	Engineering and design 6.2%			103,000
	Real Estate hired labor cost			15,000
	P.L. 91-646 relocation assistance			30,000
	Subtotal			$1,803,000
	Supervision & Administration 4.3%			77,000
	TOTAL COST--INITIAL CONSTRUCTION			$1,880,000

TABLE 8

GRAND-TIGER PASSES
DETAILED ESTIMATE OF NON-FEDERAL FIRST COSTS
(July 1974 Price Levels)

	Item	Quantity	Unit	Unit Price $	Total (rounded) $
A	LANDS AND DAMAGES				
	Perpetual right-of-way easements				
	Potential commercial	16.74	Ac.	5,000	83,700
	Woodland	1.0	Ac.	4,600	4,600
	Swamp woodland	6.29	Ac.	2,500	15,725
	Semi-marsh	9.88	Ac.	300	2,964
	Marsh	182.15	Ac.	75	13,661
	Improvements				26,000
	Perpetual spoil easements				
	Potential commercial	54.6	Ac.	1,875	102,375
	Marsh	1,812.26	Ac.	55	96,674
	Subtotal (rounded)				345,700
	Contingencies 25% ±				86,300
	Acquisition cost by others				15,000
	TOTAL LANDS AND DAMAGES				447,000
B	RELOCATIONS (includes E&D, S&A, & contingencies)				
	Louisiana Power & Light cable	400	LF	LS	20,000
	South Central Bell cable	400	LF	LS	20,000
	Texas Eastern 24"	400	LF	128	51,200
	Gulf Refining Co. 8" oil	400	LF	42	16,800
	Texaco 8" gas	400	LF	42	16,800
	Gulf Refining Co. 10" crude	400	LF	53	21,200
	Southern Natural Gas 6" gas	400	LF	32	12,800
	Gulf Refining Co. 4" oil	400	LF	22	8,800
	Gulf Refining Co. 2 1/2" gas	400	LF	14	5,600
	Gulf Refining Co. 2 1/2" oil	400	LF	53	5,600
	United Gas Pipeline 10" gas	400	LF	LS	21,200
	Louisiana Power & Light cable	400	LF	107	20,000
	Tennessee Gas Transmission 20"	400	LF	140	42,800
	Tennessee Gas Transmission 26"	400	LF	14	56,000
	Unknown 2 1/2"	400	LF	LS	5,600
	Unknown	400	LF	LS	17,000
	Unknown	400	LF	14	20,000
	Gulf Refining Co. 18 2 1/2"	7,200	LF	14	100,800
	Gulf Refining Co. 6"	400	LF	32	12,800
	Unknown 12"	400	LF	63	25,200
	Tennessee Gas Trans. 12"	400	LF	63	25,200
	TOTAL RELOCATIONS				525,000

TABLE 8
(Continued)

	Item	Quantity	Unit	Unit Price	Total (rounded)
C	DREDGED MATERIAL DIKES				
	Dredged material dikes	62,150	c.y.	1.40	87,000
	Contingencies 25% ±				21,000
	TOTAL DREDGED MATERIAL DIKES				$108,000
	TOTAL NON-FEDERAL FIRST COST				$1,080,000

57. Grand-Tiger Passes comaprison of current estimate, latest approved estimate, and project document estimate. The project cost estimate of $3,006,000 presented in this general design memorandum is a decrease of $174,900 from the latest approved estimate of $3,180,900 (PB-3 estimate dated 26 January 1974, effective 1 July 1974). This decrease is due mainly to a decrease in the linear feet of required spoil disposal dikes. The project cost estimate of $3,006,000 is an increase of $1,086,000 over the project document estimate of $1,920,000 (July 1967 price levels). This increase was due to higher price levels and a more detailed estimate of real estate costs. A comparison of cost estimates is shown in table 9.

TABLE 9

GRAND-TIGER PASSES
Comparison of Estimates

	Item	Project Document Jul 67 prices	PB-3 dtd 26 Jan 74 effective 1 Jul 74	GDM	Diff bet. PB-3 and General Design Memo
	FEDERAL	$	$	$	$
09	Channels and canals	1,040,000	1,986,000	1,655,000	-331,000
30	Engineering and design and real estate hired labor	125,000	116,000	118,000	+ 2,000
	Public Law 91-646 relocations assistance			30,000	+ 30,000
31	Superivision & Admin.	95,000	82,200	77,000	- 5,200
	Subtotal (Corps of Engineers)	1,260,000	2,184,200	1,880,000	-304,200
	Aids to navigation (US Coast Guard)	40,000	46,000	46,000	0
	Total Federal first cost	1,300,000	2,230,200	1,926,000	-304,200
	NON-FEDERAL				
A	Lands and damages	106,000	138,700	447,000	+308,300
B	Relocations	394,000	640,000	525,000	-115,000
C	Spoil retaining dikes	120,000	172,000	108,000	- 64,000
	Total non-Federal first cost	620,000	950,700	1,080,000	+129,300
	TOTAL PROJECT FIRST COST	1,920,000	3,180,900	3,006,000	-174,900

CONSTRUCTION METHOD AND SCHEDULE

58. Method of construction. All channel work contemplated herein will be performed by contract after formal advertisement for bids. Due to the extent of dredging and location of disposal areas, hydraulic pipeline dredges will be the most practical means of excavating the channel. Marsh buggies and barge mounted equipment will be used for dike construction in the marsh areas of the inland reach. Material excavated in the offshore shallow waters of Breton Sound and the Gulf of Mexico will be pumped to shoreline spoil areas (see plates 16 and 21).

59. Baptiste Collette Bayou schedule of construction. The plans and specifications for the project are scheduled to be approved by May 1975. Channel improvements will be accomplished under one contract. A schedule of the contract is shown in table 10, Schedule for Design and Construction. Channel construction is scheduled to begin in April 1976 and be completed in February 1977 which is an estimated construction time of 11 months.

60. Grand-Tiger Passes schedule of construction. The plans and specifications for the project are scheduled to be approved by July 1975. Channel improvements will be accomplished under one contract. A schedule of the contract is shown on table 11, Schedule for Design and Construction. Channel construction is scheduled to begin in May 1976 and be completed in May 1977 which is an estimated construction time of 1 year and 1 month.

61. Fiscal year funding. To maintain the construction schedule shown in tables 10 and 11, the following Federal funds (excluding US Coast Guard cost--$88,000) by fiscal years will be required.

	YEAR	AMOUNT (Includes E&D, S&A, & Const. Costs)
Total thru	FY 75	$62,100
	FY 76	500,000
	FY 77	2,990,000
TOTAL		$3,552,100

TABLE 10

BAPTISTE COLLETTE BAYOU
Schedule for Design and Construction

Contract	Plans and Specifications Start	Plans and Specifications Approved	Construction* Advertise	Construction* Award	Construction* Complete	Estimated Construction Cost (incl. cont.)
Baptiste Collette Bayou	Jan 75	May 75	Feb 76	Apr 76	Feb 77	$1,314,000

TABLE 11
GRAND-TIGER PASSES
Schedule for Design and Construction

Contract	Plans and Specifications Start	Plans and Specifications Approved	Construction* Advertise	Construction* Award	Construction* Complete	Estimated Construction Cost (incl. cont.)
Grand-Tiger Passes	Jan 75	Jul 75	Mar 76	May 76	May 77	$1,986,000

*It is assumed there will not be a public meeting on the environmental impact statement. If a public meeting is required, 3 months should be added to the construction schedule dates.

OPERATION AND MAINTENANCE

62. Maintenance by the Corps of Engineers.

a. Baptiste Collette Bayou. The navigation channel will be maintained by the Federal Government at an estimated annual cost of $485,000. It is estimated that maintenance of the inland portion will be required 5 years after construction to the full project dimensions and every 5 years thereafter. Maintenance of the Breton Sound portion is estimated to be required 6 months after construction and every 6 months thereafter.

b. Grand-Tiger Passes. The navigation channel will be maintained by the Federal Government at an estimated annual cost of $255,000. It is estimated that maintenance of the inland portion will be required 7 years after construction to the full project dimensions and every 7 years thereafter. Maintenance of the Gulf of Mexico portion is estimated to be required 1 year after construction to the full project dimensions and every year thereafter.

c. General. Specific scheduling of maintenance dredging will be determined by soundings taken periodically by Government channel patrol crews. Contract pipeline dredges will be used for maintenance work. Relationship of the project to district organization for operation and maintenance is shown on figure 1.

63. Non-Federal maintenance. Non-Federal maintenance or the cost therefor will be required for any disposal area dike construction required for subsequent channel maintenance. The average annual cost for disposal area dike construction required for subsequent channel maintenance is estimated to be $96,000 for Baptiste Collette Bayou and $20,000 for Grand-Tiger Passes.

64. Maintenance by the US Coast Guard. The annual maintenance cost required for aids to navigation is estimated to be $7,800 for Baptiste Collette and $8,500 for Grand-Tiger Passes.

JETTY ECONOMIC ANALYSIS

65. Background. In the survey report, House Document No. 361, Mississippi River Outlets, Vicinity of Venice, Louisiana, the following quotations show that jetties were not considered to be economical and that experience with maintenance dredging was recommended as the way to determine if and when their construction would be justified.

> "Baptiste Collette Bayou and Grand and Tiger Passes are distributary channels of the Mississippi River. These channels carry heavy sediment loads during flood stages on the river. These sediments are deposited in open

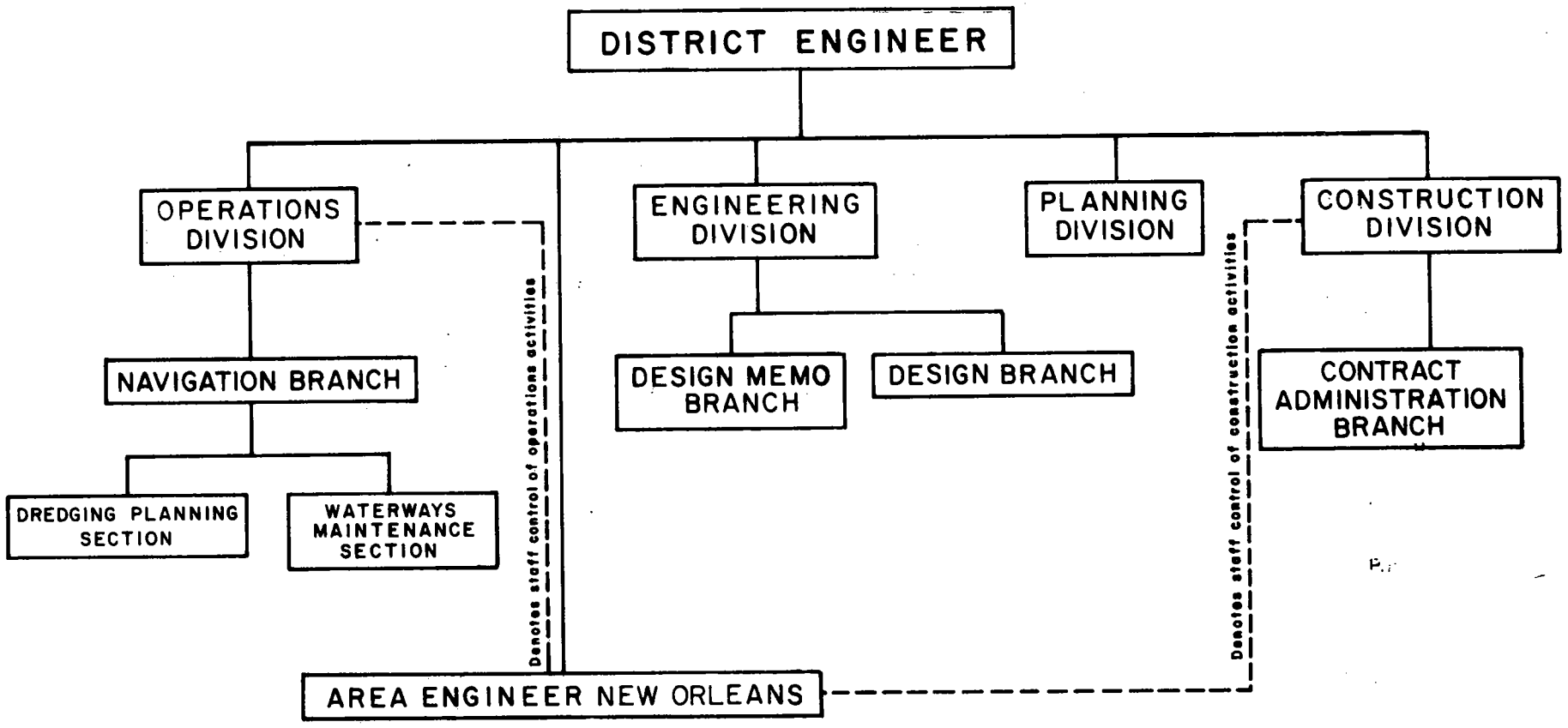


FIGURE 1

RELATION OF PROJECT TO DISTRICT ORGANIZATION FOR OPERATION AND MAINTENANCE

waters near the mouth of the distributary channels and form bars. Annual costs for maintaining channels through these bars will be extraordinarily high. It is not readily apparent that construction of jetties would reduce the cost for maintenance dredging to the extent of the annual charges for the jetties. However, it is deemed appropriate that the plan of improvement, and the cost estimate should provide for the future construction of jetties to the 6-foot depth contour, if and when experience with maintenance dredging indicates that their construction would be justified by savings in maintenance costs . . . . In view of the large amounts of deposits at the mouths of all of the existing distributary channels of the Mississippi River, it is very doubtful if the construction of jetties to the 6-foot depth contour, or to deeper water, would be justified by a saving in maintenance dredging. Jetties would be beneficial for a few years until the deposits had essentially created conditions at the ends of the jetties similar to those from the shoreline after the channel is dredged . . . . The discharge of sediments will be sufficient to create extensive bars at the outer end of jetties (if constructed) in a very short time. No savings from construction of jetties are apparent at this time."

66. Current evaluation.

a. Baptiste Collette Bayou. In the survey report it was estimated that without jetties the annual quantity of sediment to be dredged in order to maintain project depths was 500,000 cubic yards. The current estimate based on more detailed studies (see "Hydrology" section) is that annual maintenance dredging requirements without jetties will be 1,348,000 cubic yards, and with jetties, an estimated 770,000 cubic yards. The estimated annual cost of maintenance dredging without jetties is $485,000 (30¢/c.y. plus 20% contingency x 1,348,000 c.y.). The estimated annual cost of maintenance dredging and jetties is $651,000 (30¢/c.y. plus 20% contingency x 770,000 c.y. = $277,000 for maintenance dredging and $374,000 for jetties. See table 14). Therefore, since the annual cost of maintenance dredging without jetties ($485,000) is less than the annual cost of maintenance dredging and jetties ($651,000), it is concluded that jetties are not economically justified at this time.

b. Grand-Tiger Passes. In the survey report it was estimated that without jetties the annual quantity of sediment to be dredged was 400,000 cubic yards. The result of more detailed current studies (see "Hydrology" section) is that annual maintenance dredging requirements without jetties will be 707,000 cubic yards and with jetties, an estimated 380,000 cubic yards. The estimated annual cost of maintenance dredging without jetties is $255,000 (30¢ c.y. plus 20% contingency x 707,000 c.y.). The estimated annual cost of maintenance

dredging and jetties is $396,000 (30¢/c.y. plus 20% contingency x 380,000 c.y. = $137,000 for maintenance dredging and $259,000 for jetties--see table 15). Therefore, since the annual cost of maintenance dredging without jetties ($255,000) is less than the annual cost of maintenance dredging and jetties ($396,000), it is concluded that jetties are not economically justified at this time.

c. Cost estimates. The total first costs and associated annual charges for jetties on Baptiste Collette Bayou and Grand-Tiger Passes are shown in tables 12, 13, 14 and 15.

TABLE 12

JETTIES FOR BAPTISTE COLLETTE BAYOU
(to the 6-foot depth)
DETAILED ESTIMATE OF FEDERAL FIRST COSTS
(July 1974 Price Levels)

Cost Acct No.	Item	Quantity		Unit Cost	Estimated Cost
10	Breakwaters and seawalls				
	Jetties to 6-foot depth (deferred construction)				
	Plastic filter cloth	115,000	sq yd	$2.00	$ 230,000
	Clam shells	250,950	c.y.	4.25	1,066,550
	Quarry stone	80,000	tons	8.00	640,000
	Riprap	128,250	tons	9.00	1,154,250
	Timber spur dikes	1,560	LF	70.00	109,200
	Subtotal				3,200,000
	Contingencies 25%				800,000
	Subtotal				4,000,000
30	Engineering and design 8%				320,000
	Subtotal				4,320,000
31	Supervision & admin. 10%				432,000
	Total cost--deferred construction				$4,752,000

TABLE 13
JETTIES FOR GRAND-TIGER PASSES
(to the 6-foot depth)
DETAILED ESTIMATE OF FEDERAL FIRST COSTS
(July 1974 Price Levels)

Cost Acct No.	Item	Quantity	Unit Cost	Estimated Cost
10	Breakwaters and seawalls			
	Jetties to 6-foot depth (deferred construction)			
	Plastic filter cloth	81,000 sq yd	$2.00	$ 162,000
	Clam shells	175,240 c.y.	4.25	744,770
	Quarry stone	57,730 tons	8.00	461,840
	Riprap	93,260 tons	9.00	839,340
	Timber spur dikes	1,315 LF	70.00	92,050
	Subtotal			2,300,000
	Contingencies 25%			575,000
	Subtotal			2,875,000
30	Engineering and design 8%			230,000
	Subtotal			3,105,000
31	Supervision & admin. 10%			311,000
	Total cost--deferred construction			$3,416,000

TABLE 14
JETTIES FOR BAPTISTE COLLETTE BAYOU
ESTIMATE OF ANNUAL CHARGES
(July 1974 Price Levels)

Item	Federal
Summary of project costs	
Jetty first cost	$4,752,000
Annual Economic costs	
Interest (3 1/4%)	$ 154,400
Amortization (50 yrs)	39,100
Maintenance jetties	180,000*
Total annual charges	$ 373,500

* Based on Southwest Pass jetty maintenance costs over the past 8 years.

TABLE 15
JETTIES FOR GRAND-TIGER PASSES
ESTIMATE OF ANNUAL CHARGES
(July 1974 Price Levels)

Item	Federal
Summary of project costs	
Jetty first cost	$3,416,000
Annual economic costs	
Interest (3 1/4%)	$ 111,000
Amortization (50 yrs)	28,100
Maintenance	
Jetties	120,000*
Total annual charges	$ 259,100

*Based on Southwest Pass jetty maintenance costs over the past 8 years.

67. Conclusions. Based on the foregoing evaluation, it is concluded that jetties are not presently justified. Experience with maintenance dredging will be the only way to show justification for jetties and future justification appears doubtful. Therefore, the cost of jetties has been excluded from the benefits analysis.

BENEFITS ANALYSIS

68. General. An analysis of the project benefits was made in the preauthorization stage. The results of that analysis are presented in House Document No. 361, "Mississippi River Outlets, Vicinity of Venice, Louisiana." The rationale for the preauthorization analysis was reviewed and considered valid with two exceptions. First, all benefits had to be updated due to inflation. Secondly, area redevelopment benefits which were omitted from the original analysis were included in this study.

69. Category of benefits. Benefits for the project accrue from five sources: (1) offshore oilfield operations, (2) menhaden fishing operations, (3) shrimping operations (4) Coast Guard operations, and (5) area redevelopment. Each category of benefits is discussed in following subparagraphs:

a. Oilfield operations. The proposed channels would provide benefits to the petroleum industry by savings in the cost of transportation of materials for platform construction, drilling materials, and materials for specialized oil well services.

(1) Platform construction. Savings to this end of the petroleum industry would occur thru the savings in travel time to platform construction crews between the base of operation at Venice and the platform site. These 25-man crews are paid $9.50 per hour (an increase of $3.50 over the figure used in the project document) for travel time and are rotated at 5-day intervals or about 3 times during the construction of a platform. Average annual benefits to Baptiste Collette Bayou have increased from $35,000 to $55,400 and from $5,200 to $8,300 to Grand-Tiger Passes. These increases resulted from an increase in wage rates.

(2) Transportation of drilling materials. Although the number of wells drilled per year and tons of drilling material remain the same, the operating cost of the vessel used in the transporting of these materials has increased from $28 per hour to $37 per hour. Average annual benefits to Baptiste Collette Bayou have increased from $352,800 to $470,400 and to Grand and Tiger Passes from $65,000 to $86,300.

(3) Specialized oil well services. The services of well specialty companies are required before, during and after drilling operations. The company technicians are paid travel time between the offshore areas and the base of operations. Benefits accruing to the project from savings in travel time now amount to $315,800 for Baptiste Collette Bayou and $58,200 for Grand-Tiger Passes. These changes in benefits from $184,000 and $33,800 as shown in the project document, result from increases in the size of electrical logging crews (2 to 3) and casing crews (4 to 6) as well as wage rates.

b. Menhaden fishing. The Menhaden fishing fleet currently operating in the areas around the mouth of the Mississippi River consists of 14 vessels based at Empire, Louisiana, 18 vessels based at Dulac-Morgan City, Louisiana, and 16 vessels from the Moss Point-Pascagoula area of Mississippi. In the project document, this fleet consisted of 19, 23, and 19 vessels from each respective area. During the fishing season each vessel will make about 122 trips from its home port to the Gulf of Mexico coastal waters. By way of the proposed channels these vessels would save about 3 hours for each trip on which they now go around the mouth of the Mississippi River. Operating costs for Menhaden fishing vessels have increased from $40 per hour to $55 per hour. Therefore, annual benefits to the project have increased from $390,000 to $414,600. Since both of the channels under consideration are necessary to secure any reduction in travel distance and time, the benefits are considered to 50 percent, or $207,300 for each of the channels.

c. Shrimping operations. During 1971 about 113,000 tons (net) of shrimp were landed at ports in the Gulf Coast states. About 40 percent of this total was for the Louisiana Coastal and Mississippi

River Delta area. The operating costs of the shrimping vessels benefited by the proposed projects average about $15 per hour (an increase of $4 per hour). Average annual benefits accrued through reduction in travel distance and time increased from $416,400 to $605,600. These benefits depend on both channels under consideration being in place and therefore are considered to accrue equally to each channel.

d. Coast Guard operations. The United States Coast Guard has two vessels permanently based at Venice for logistics support of a buoy at the entrance to the Mississippi River-Gulf Outlet navigation channel and for search, rescue and law enforcement. The Coast Guard estimates that 25 round trips per year would be made through Baptiste Collette and Grand-Tiger Passes for search and rescue missions. Total annual savings are estimated to be $17,000 to Baptiste Collette Bayou and $8,000 to Grand-Tiger Passes. This $25,000 total is an increase of $5,000 from the project document.

e. Area redevelopment.

(1) The project is located in Plaquemines Parish and is within reasonable commuting distance to Jefferson, Orleans, and St. Bernard Parishes. Orleans Parish is the only parish qualified by the economic Development Administration for full financial assistance under the Public Works and Economic Development Act of 1965. A decline in per capita employment was the basis for qualification. Jefferson and St. Bernard are qualified for grants under the same act. The following table summarizes pertinent information concerning area redevelopment in the four affected parishes.

Parish	Date Qualification	Qualified under Title	Criterion under Title IV
Jefferson	Apr 72	1	-
Orleans	Jan 73	IV	(7)*
Plaquemines	-	-	-
St. Bernard	Jul 72	I	-

*(7) Decline in per capita employment

(2) A portion of the underemployed labor potential in the area can reasonably be expected to be employed on project construction. It is estimated that labor expenditures will represent about 40% of construction costs, and that 55% of these funds will be expended upon otherwise underemployed labor. When amortized at an interest rate of 3 1/4% for 50 years the annual area redevelopment benefits attributable to construction expenditures on Baptiste Collette Bayou are $21,500 (2,405,100 x .40 x .55 x .04073). Similar benefits for Grand-Tiger Passes amount to $20,500 (2,289,200 x .40 x .55 x .04073).

(3) Area redevelopment benefits also will accrue from project operation and maintenance (O&M). These benefits were computed as shown below.

(a) Baptiste Collette Bayou. Approximately 40% of O&M expenditures will accrue to labor; about 50% will be expended on otherwise underemployed labor resources. It is anticipated that the underemployed labor resources will diminish on a straight-line basis to zero in 20 years. An annual benefit of $39,800 will result when the figure is amortized for 50 years at an interest rate of 3 1/4%. (581,280 x .40 x .50 ÷ 20 x 168.02012 x .04073).

(b) Grand-Tiger Passes. In this segment of the project about 40% of O&M expenditures will accrue to labor. Based on computations described above, average annual benefits amount to $21,100 ($274,500 x .45 x .50 ÷ 20 x 168.02012 x .04073).

(4) Summing average annual benefits attributable to construction labor expenditure and annual benefits accruing to O&M labor expenditure, total annual area redevelopment benefits are given below:

AREA REDEVELOPMENT BENEFITS

Construction Proposal	On construction expenditure	On O&M Expenditure	Total
Baptiste Collette Bayou	$21,500	$39,800	$61,300
Grand-Tiger Passes	20,500	21,100	41,600
Total	$42,000	$60,900	$102,900

70. Average annual benefits. The average annual benefits that would accrue to the project are presented below:

AVERAGE ANNUAL BENEFITS

Source	Baptiste Collette Bayou (East Channel)	Grand-Tiger Passes (West Channel)	Total
Offshore oilfield operations	$ 841,600	$152,700	$ 994,300
Menhaden fishing operations	207,300[1]	207,300[1]	414,600
Shrimping operations	283,900[1]	283,900[1]	567,800
Coast Guard operations	17,000	8,000	25,000
Subtotal	$1,349,800	$651,900	$2,001,700
Area redevelopment:			
Construction	$ 21,500	$ 20,500	$ 42,000
O&M	39,800	21,100	60,900
Subtotal	61,300	41,600	$ 102,900
TOTAL	$1,411,100	$693,500	$2,104,600

[1]50 percent of total benefits assigned to each channel.

71. Baptiste Collette Bayou average annual charges. The total estimated average annual charges for constructing the project are $698,400, of which $545,400 are Federal costs and $153,000 are non-Federal costs. Details of the annual charges are shown in table 16.

TABLE 16
BAPTISTE COLLETTE BAYOU
ESTIMATE OF ANNUAL CHARGES
(July 1974 Price Levels)

Item	Federal	Non-Federal	Total
Summary of project costs			
Channel construction and aids to navigation	$1,282,000	-	$1,282,000
Lands, damages, relocations	-	$ 620,000	620,000
Spoil dikes	-	780,000	780,000
First cost	$1,282,000	$1,400,000	$2,682,000
Annual economic costs			
Interest (3 1/4%)	$ 41,700	$ 45,500	$ 87,200
Amortization (50 yrs)	10,600	11,500	22,100
Maintenance			
Dredging (Corps of Engrs)	485,300	-	485,300
Aids to navigation (USCG)	7,800	-	7,800
Spoil dikes	-	96,000	96,000
Total annual economic costs	$ 545,400	$ 153,000	$ 698,400

72. Grand-Tiger Passes average annual charges. The total estimated average annual charges for construction of the project are $405,400, of which $341,400 are Federal costs and $64,000 are non-Federal costs. Details of the annual charges are shown in table 17.

TABLE 17
GRAND-TIGER PASSES
ESTIMATE OF ANNUAL CHARGES

(July 1974 Price Levels)

Item	Federal	Non-Federal	Total
Summary of project costs			
Channel construction and aids to navigation	$1,926,000	-	$1,926,000
Lands, damages, relocations	-	$ 972,000	972,000
Spoil dikes	-	108,000	108,000
First cost	$1,926,000	$1,080,000	$3,006,000
Annual economic cost			
Interest (3 1/4%)	$ 62,600	$ 35,100	$ 97,700
Amortization	15,800	8,900	24,700
Maintenance			
Dredging (Corps of Engr)	254,500	-	254,500
Aids to navigation (USCG)	8,500	-	8,500
Spoil dikes	-	20,000	20,000
Total annual economic costs	$ 341,400	$ 64,000	$ 405,400

73. Economic justification. The benefit-cost ratios for the authorized and considered alinements are shown in table 18.

TABLE 18

MISSISSIPPI RIVER OUTLETS, VICINITY OF VENICE, LOUISIANA
Benefit-Cost ratios for authorized and considered alinements

	EAST CHANNELS			WEST CHANNELS		
	Baptiste Collette Bayou (Auth)	Alt No 1 Grand Bay	Alt No 2 Kimbel Pass	Grand-Tiger Passes (Auth.)	Alt No 3 Red Pass	Alt No 4 Grand Pass
First costs	$2,682,000	$10,588,000	$2,997,000	$3,006,000	$3,947,000	$3,853,000
Average annual charges	698,400	689,100	725,900	405,400	470,900	455,100
Average annual benefits	1,411,100	1,255,500	1,414,700	693,500	702,600	535,700
Benefit/cost ratio	2.0	1.8	1.9	1.7	1.5	1.18

RECOMMENDATION

74. Recommendation. In response to Public Law 90-483, 90th Congress, 2d Session, approved 13 August 1968, and in general agreement with the recommendation contained in House Document No. 361, 90th Congress, 2d Session, the District Engineer recommends that a project, Mississippi River Outlets, Vicinity of Venice, Louisiana, be constructed to provide for enlargement of the existing channels of Baptiste Collette Bayou and Grand-Tiger Passes to -14 feet by 150 feet wide with offshore entrance channels that are -16 feet by 250 feet wide (jetties to the 6-foot depth contour are recommended, if and when dredging experience shows that construction of jetties would reduce the cost of annual maintenance dredging by an amount that is greater than the annual cost of the jetties) at a Federal cost of $3,230,400 and an average annual cost of $889,200 for maintenance, subject to the conditions that prior to initiation of construction local interests shall provide assurances satisfactory to the Secretary of the Army that they will:

a. Provide without cost to the United States all lands, easements, and rights-of-way required for construction and subsequent maintenance of the project and for aids to navigation upon the request of the Chief of Engineers, including suitable areas determined by the Chief of Engineers to be required in the general public interest for initial and subsequent disposal of dredged material, and also necessary retaining dikes, bulkheads and embankment therefor or the costs of such retaining works.

b. Accomplish without cost to the United States such alterations as required in pipelines, cables and other improvements, as well as their maintenance.

c. Hold and save the United States free from damages due to the construction and maintenance of the project, including but not limited to erosion beyond the rights-of-way furnished, and damages to oyster beds and other fisheries.

CORPS OF ENGINEERS

U.S. ARMY

LAKE PONTCHARTRAIN

LAKE BORGNE

CHANDELEUR SOUND

CHANDELEUR ISLANDS

BRETON SOUND

BARATARIA BAY

GULF OF MEXICO

INNER HARBOR NAVIGATION CANAL

NEW ORLEANS

GULF INTRACOASTAL WATERWAY 12'X150'

Harvey Lock

Algiers Lock

Belle Chase – Scarsdale Ferry

LAKE SALVADOR

GULF INTRACOASTAL WATERWAY EXISTING 12'x125' AUTHORIZED 16'x150'

BARATARIA BAY WATERWAY 12'X125'

BAYOU LAFOURCHE 6'X60' 9'X100' 12'X125'

Grand Isle

Jetties

FT. DE LA BOULAYE

MISSISSIPPI RIVER

Phoenix

Point-A-La-Hache Ferry

Bohemia

City Price

Bohemia Wildlife Mgm't. Area

Port Sulphur

Richardson and Bass Ferry

40'X1000'

Empire Lock

Gatrica Lock

Buras

WATERWAY FROM EMPIRE TO THE GULF 9'X80'

FT. JACKSON

Venice

FT. ST. PHILIP

GRAND BAY

BAPTISTE COLLETTE BAYOU

MISSISSIPPI RIVER-GULF OUTLET (36'X500')

Jetties

IMPROVEMENTS AUTHORIZED

KIMBAL PASS

MAIN PASS

DELTA NATIONAL WILDLIFE REFUGE

PASS A LOUTRE

PASS A LOUTRE FISH & WILDLIFE PRESERVE

RED PASS

TIGER PASS

Head of Passes

SOUTH PASS

GRAND PASS

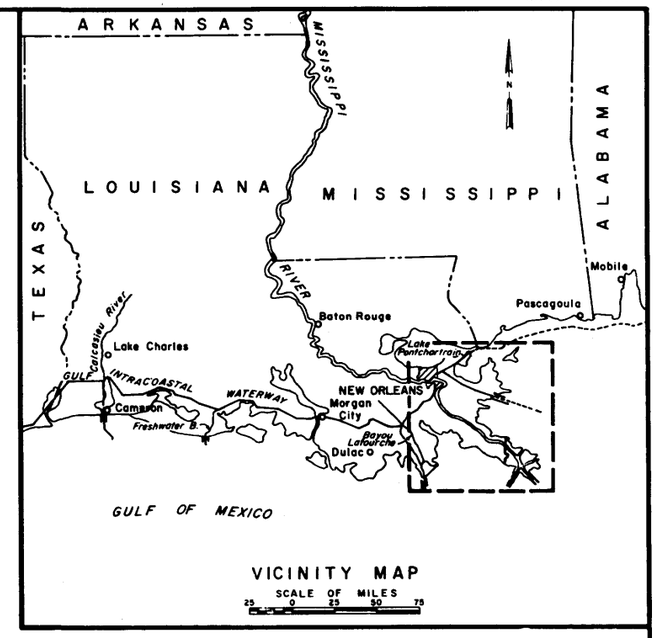
SOUTHWEST PASS 40'X600'

SOUTH PASS 30'X400'

CONSIDERED ALTERNATIVE ALINEMENTS

CONSIDERED ALTERNATIVE ALINEMENTS

SCALE OF MILES 5 0 5 10



VICINITY MAP

SCALE OF MILES 25 0 25 50 75

LEGEND

Corps of Engineers Lock

State owned Lock

EXISTING PROJECTS

[1] MISSISSIPPI RIVER, BATON ROUGE TO THE GULF OF MEXICO, LA.

[2] MISSISSIPPI RIVER & TRIBUTARIES

[3] NEW ORLEANS TO VENICE, LA. HURRICANE PROTECTION

–10 MILES ABOVE OR BELOW HEAD OF PASSES.

MISSISSIPPI RIVER OUTLETS

VICINITY OF VENICE, LA.

GENERAL DESIGN MEMORANDUM

GENERAL MAP

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

OCTOBER 1974 FILE NO. H-2-26789

PLATE I

LAKE MAUREPAS

LAKE PONTCHARTRAIN

NEW ORLEANS

LAKE BORGNE

MISSISSIPPI SOUND

MISSISSIPPI RIVER – GULF OUTLET

MISSISSIPPI RIVER

CHANDELEUR SOUND AREA

CHANDELEUR ISLANDS

CHANDELEUR AREA

CHANDELEUR AREA EAST ADDITION

Jetties

BRETON SOUND AREA

MAIN PASS AREA

MAIN PASS AREA EAST ADDITION

MAIN PASS AREA SOUTH ADDITION

Baptiste Collette Bayou

Venice

Tiger Pass

Grand Pass

WEST DELTA AREA

Southwest Pass

South Pass

Jetties

Jetties

SOUTH PASS AREA EAST ADDITION

SOUTH PASS AREA

SOUTH TIMBALIER AREA

GRAND ISLE AREA

WEST DELTA AREA SOUTH ADDITION

SOUTH PASS AREA SOUTH ADDITION

MEXICO

OF

GULF

N

SCALE IN MILES

5 0 5 10 15

MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.

GENERAL DESIGN MEMORANDUM

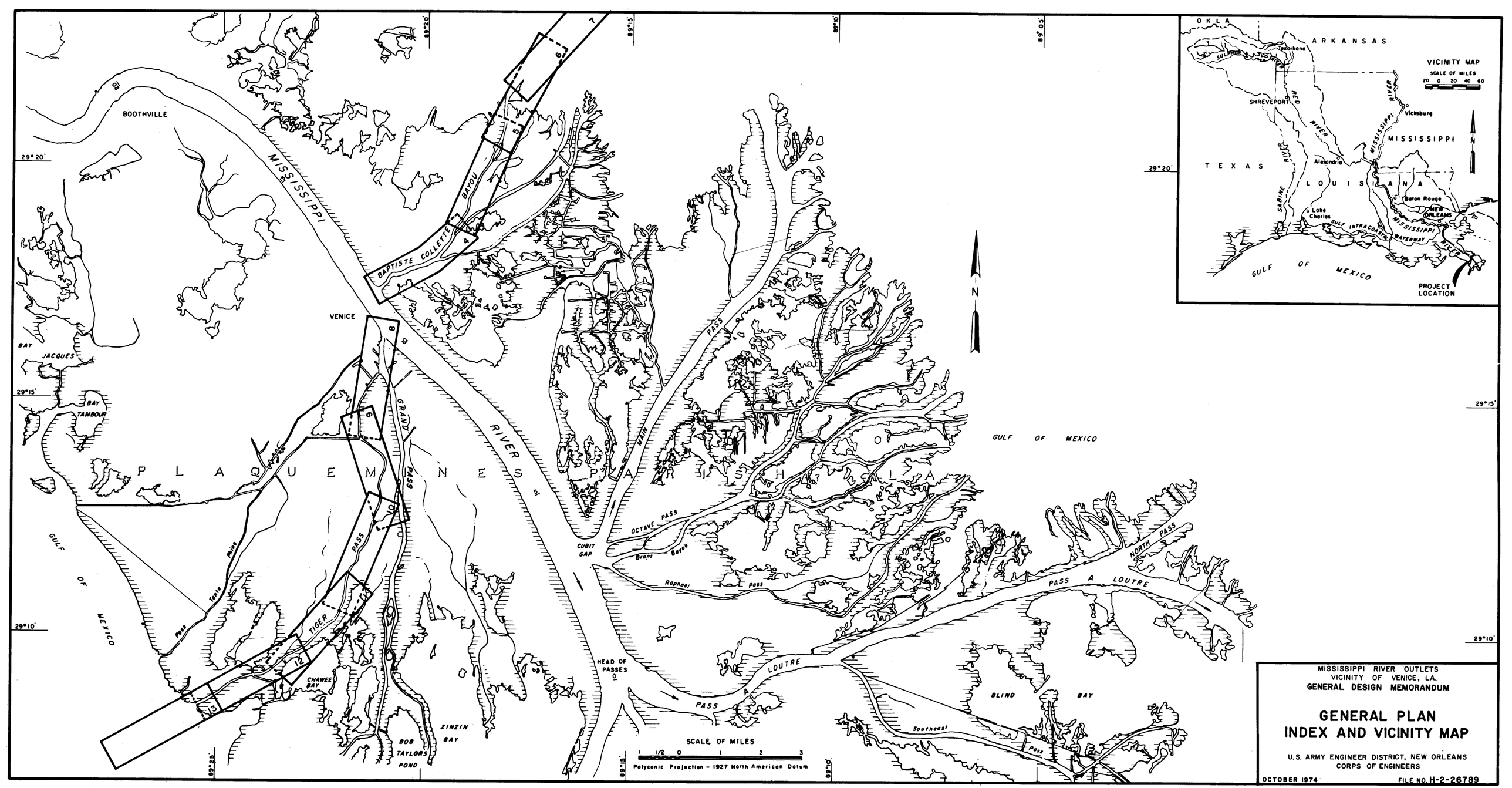
OFFSHORE LEASE AREAS

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

OCTOBER 1974

FILE NO. H-2-24264

PLATE 2



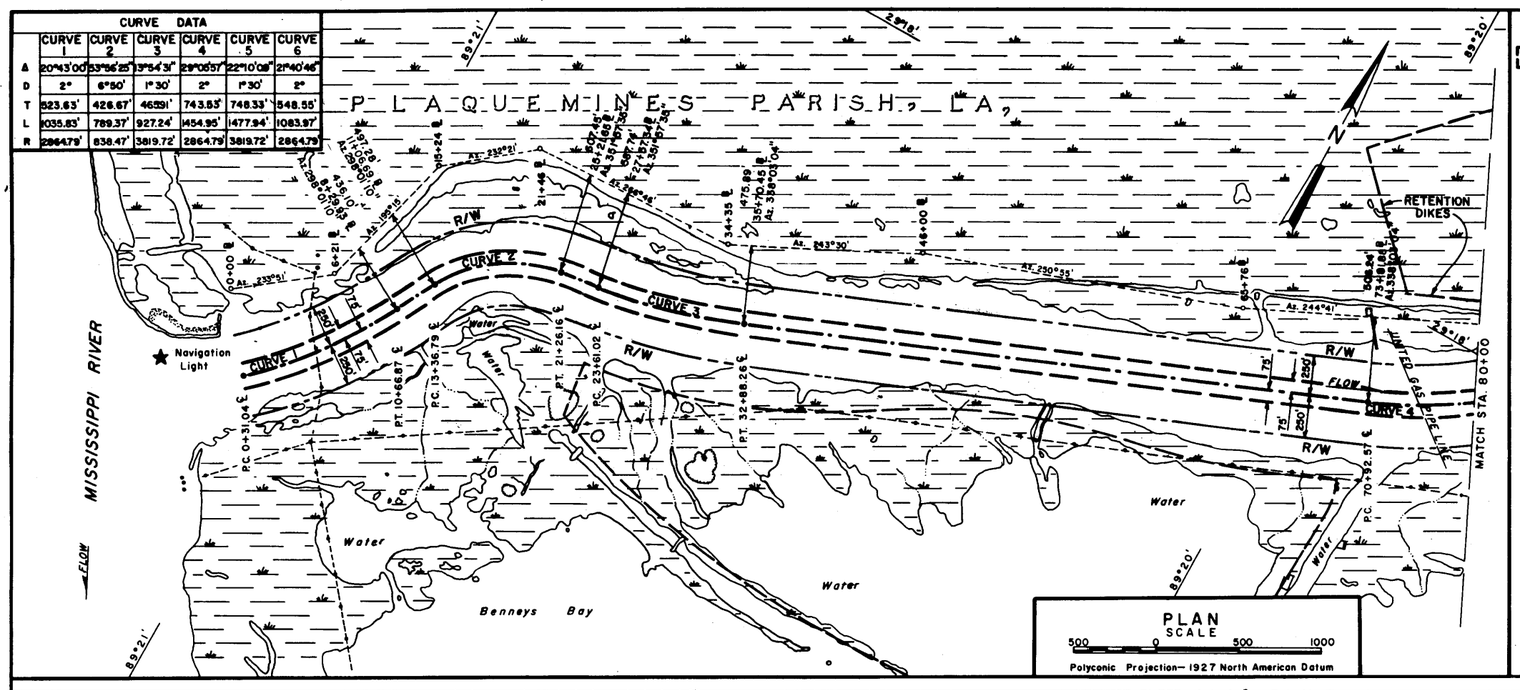
MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

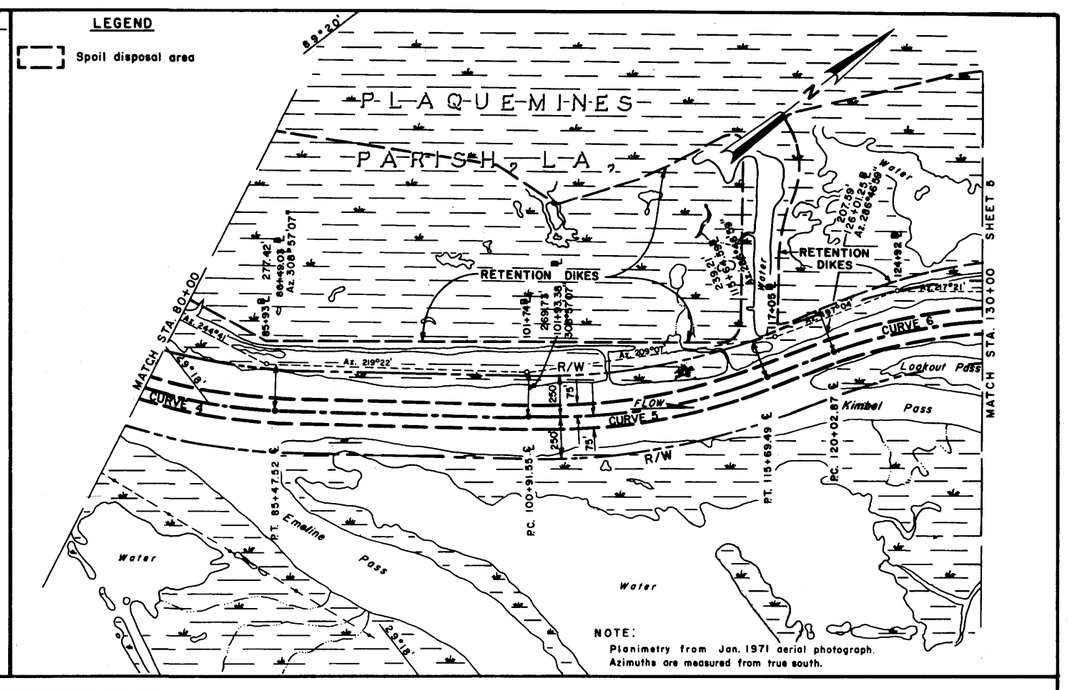
GENERAL PLAN
INDEX AND VICINITY MAP

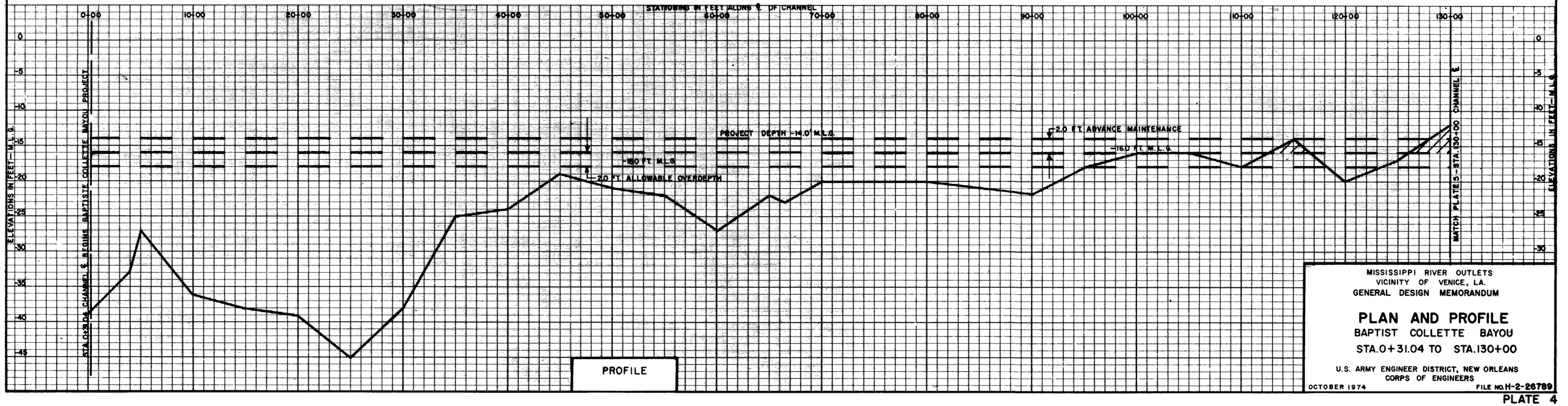
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

OCTOBER 1974 FILE NO. H-2-26789

PLATE 3







MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

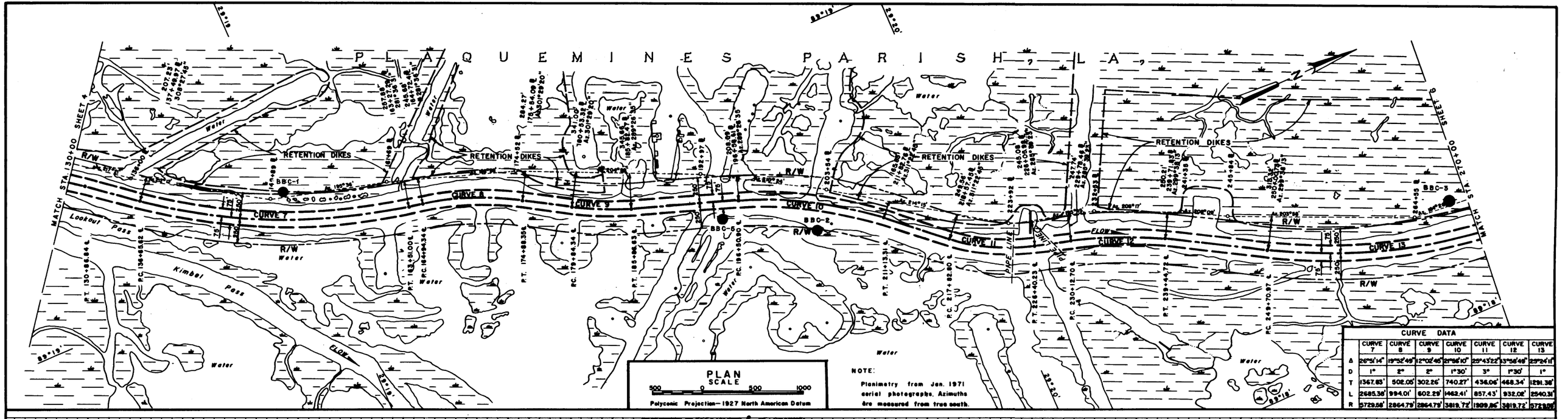
PLAN AND PROFILE
BAPTIST COLLETTE BAYOU
STA. 0+31.04 TO STA. 130+00

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

OCTOBER 1974

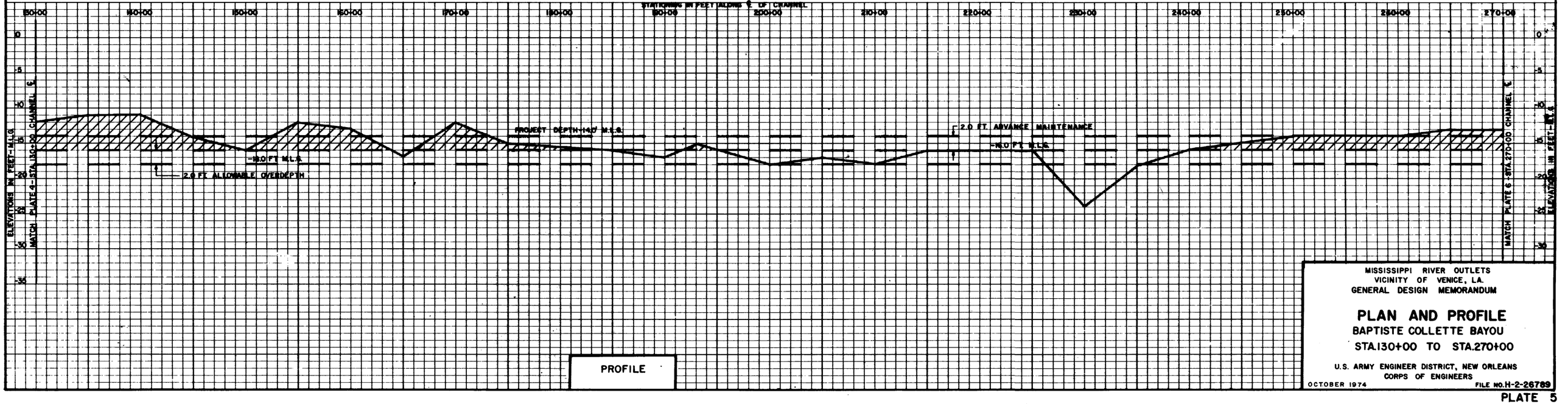
FILE NO. H-2-26789

PLATE 4



CURVE DATA

	CURVE 7	CURVE 8	CURVE 9	CURVE 10	CURVE 11	CURVE 12	CURVE 13
Δ	26°51'14"	19°52'48"	12°02'45"	21°56'10"	25°43'22"	33°56'48"	23°24'11"
D	1°	2°	2°	1°30'	3°	1°30'	1°
T	1367.85'	502.05'	302.26'	740.27'	436.06'	468.34'	1291.38'
L	2685.36'	994.01'	602.29'	1462.41'	857.43'	932.02'	2540.31'
R	5729.58'	2864.79'	2864.79'	3819.72'	1909.86'	3819.72'	5729.58'



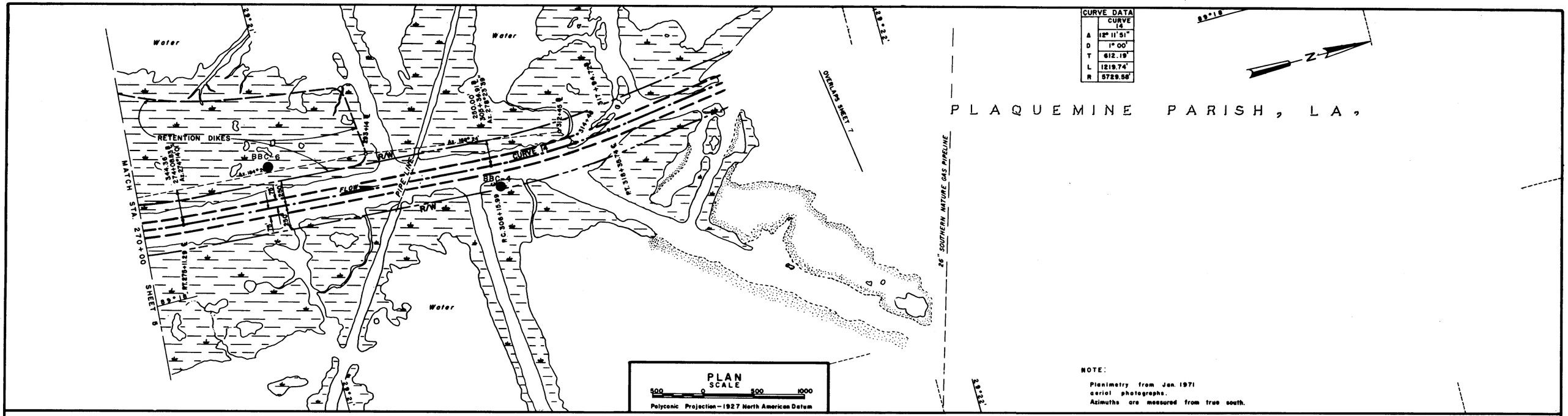
MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

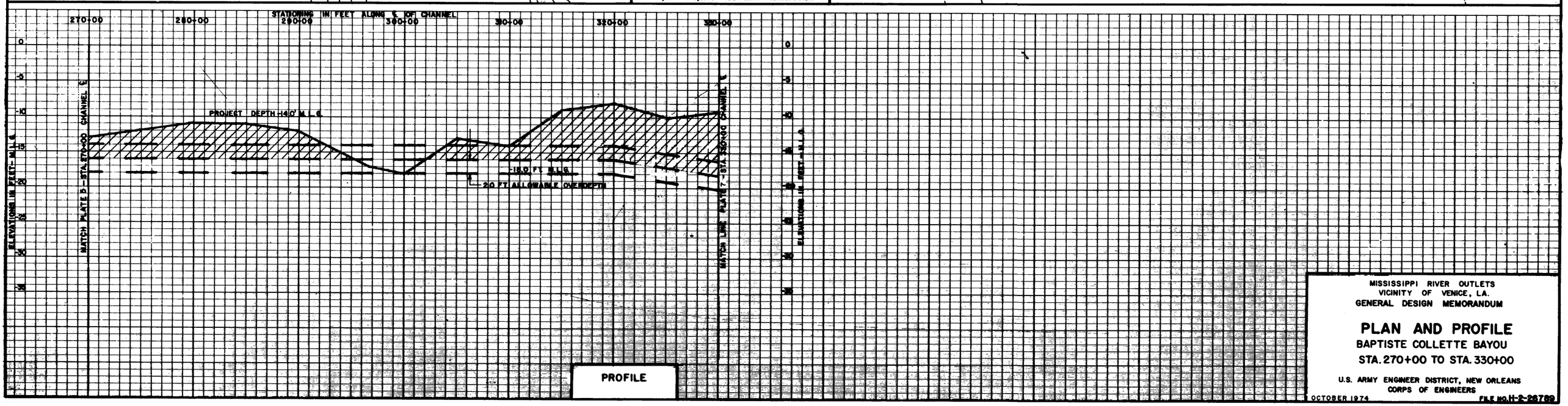
PLAN AND PROFILE
BAPTISTE COLLETTE BAYOU
STA.130+00 TO STA.270+00

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

OCTOBER 1974 FILE NO.H-2-26789

PLATE 5





MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

PLAN AND PROFILE

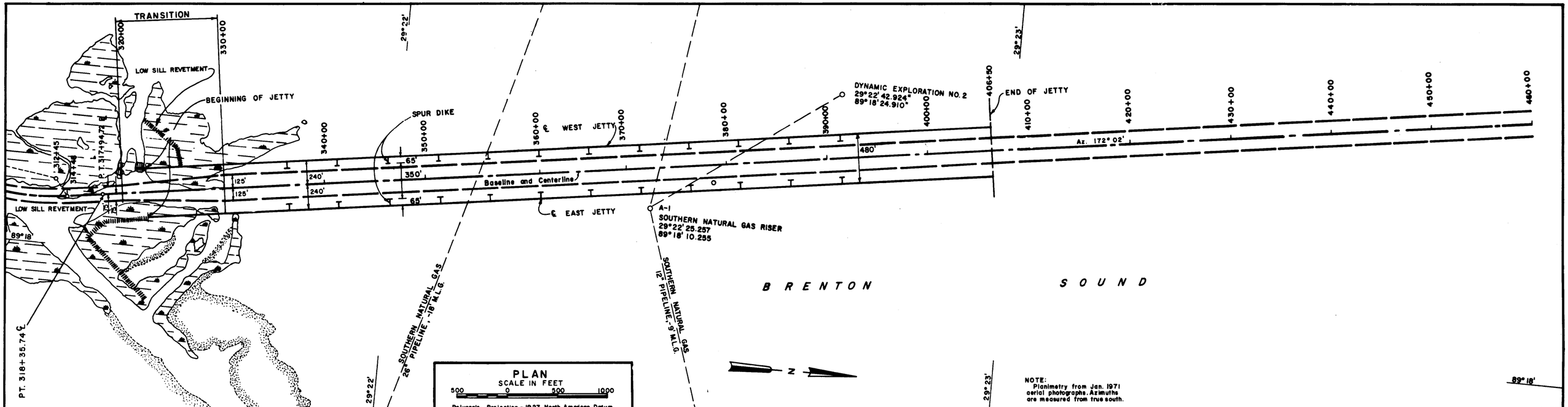
BAPTISTE COLLETTE BAYOU
STA. 270+00 TO STA. 330+00

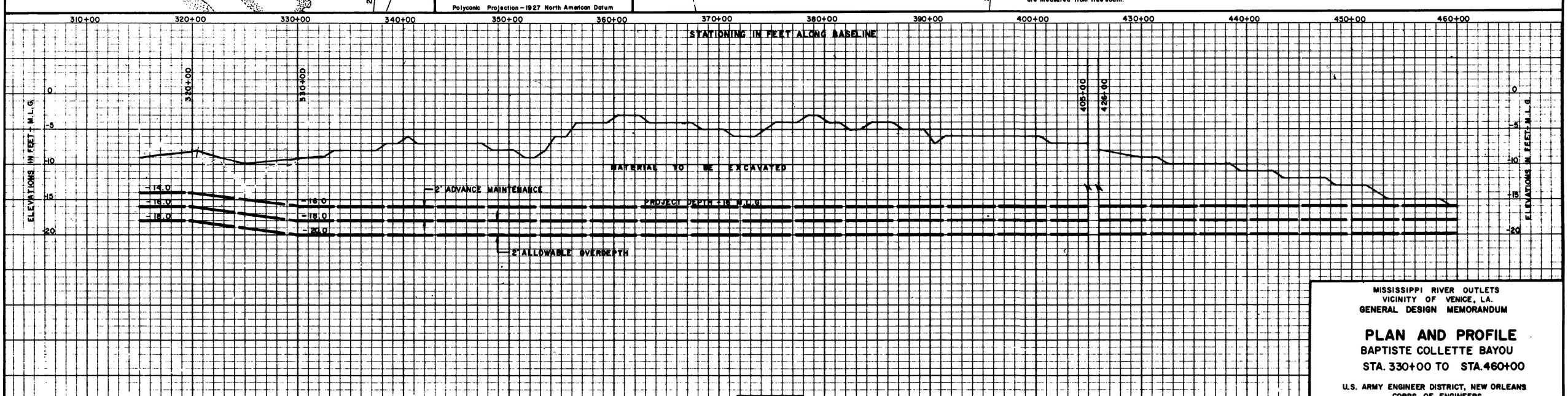
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

OCTOBER 1974

FILE No. H-2-26789

PLATE 6





MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

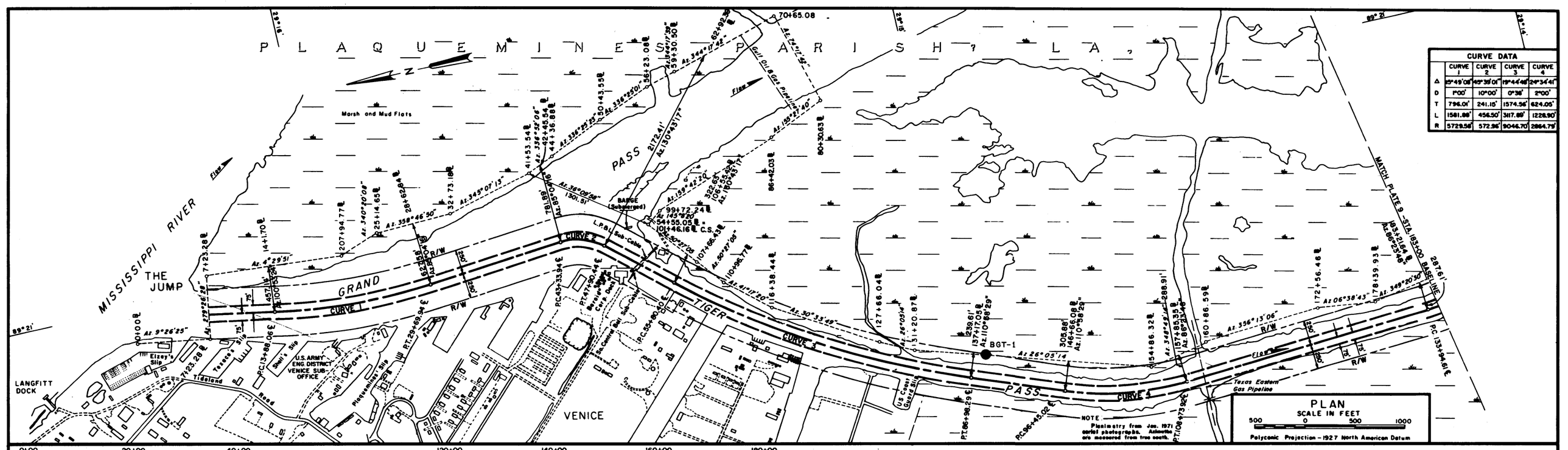
PLAN AND PROFILE

BAPTISTE COLLETTE BAYOU
STA. 330+00 TO STA. 460+00

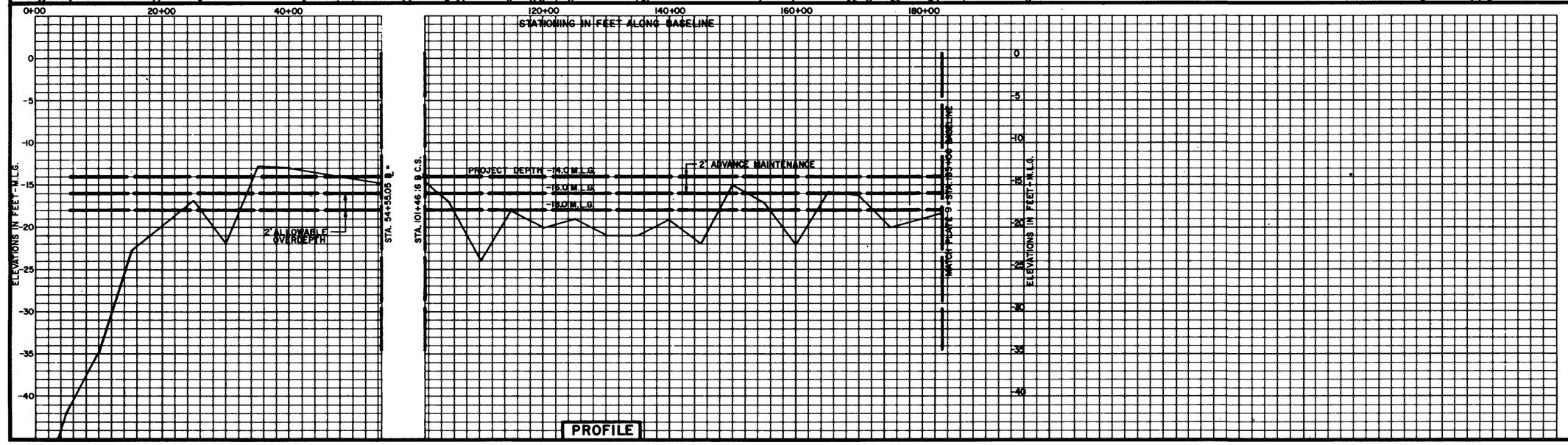
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

OCTOBER 1974 . FILE NO. H-2-26789

PLATE 7



CURVE DATA	CURVE 1	CURVE 2	CURVE 3	CURVE 4
Δ	85°49'08"	45°39'01"	19°44'46"	24°34'41"
D	1°00'	10°00'	0°38'	2°00'
T	796.01'	241.15'	1574.56'	624.05'
L	1581.88'	456.50'	3117.89'	1228.90'
R	5729.58'	572.96'	9046.70'	2864.79'



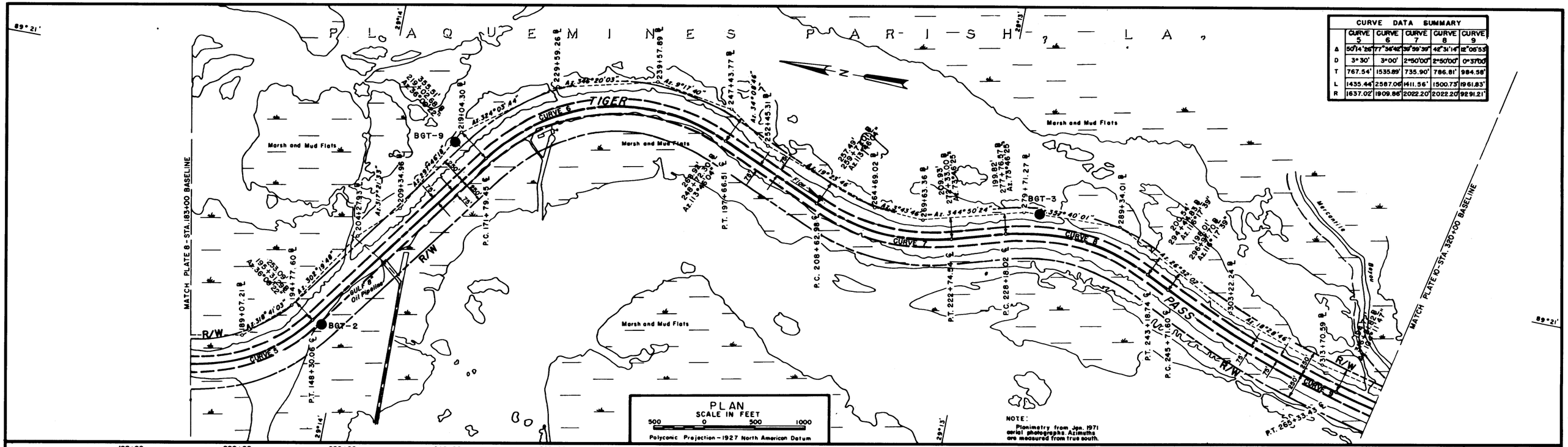
MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

PLAN AND PROFILE
GRAND-TIGER PASSES
STA. 7+23.28 TO STA 183+00

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

OCTOBER 1974 FILE NO. H-2-26789

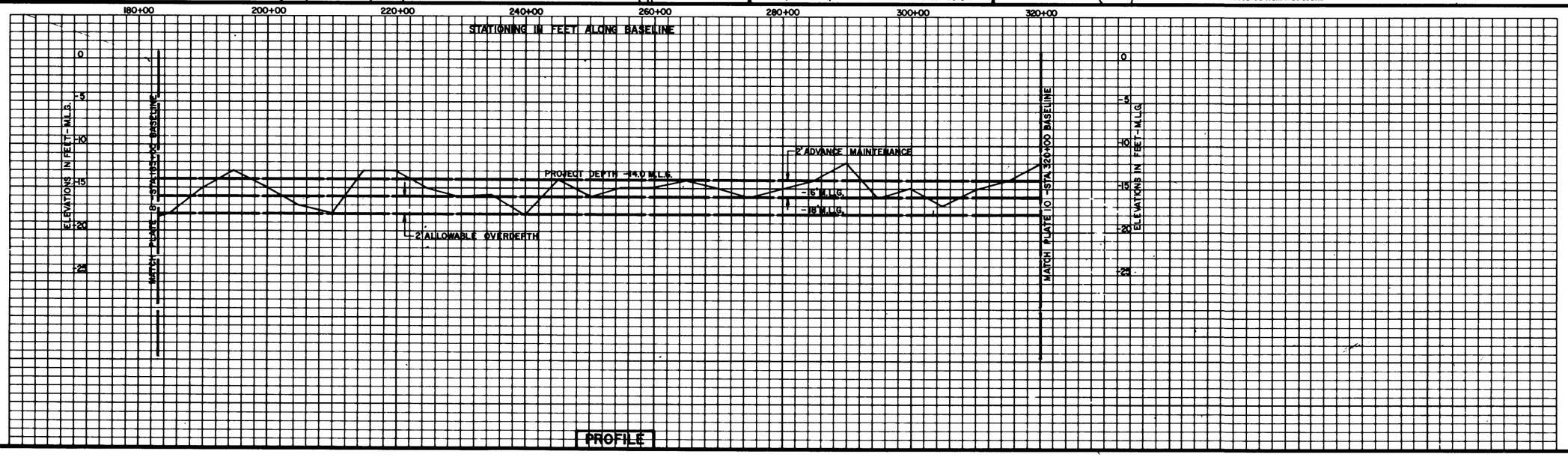
PLATE 8



CURVE DATA SUMMARY					
	CURVE 5	CURVE 6	CURVE 7	CURVE 8	CURVE 9
Δ	50°14'26"	77°36'42"	39°39'39"	46°31'14"	12°06'53"
D	3°30'	3°00'	2°50'00"	2°50'00"	0°37'00"
T	767.54'	1535.89'	735.90'	786.81'	984.58'
L	1435.44'	2587.06'	1411.56'	1500.73'	1961.83'
R	1637.02'	1909.86'	2022.20'	2022.20'	9291.21'

PLAN
SCALE IN FEET
500 0 500 1000
Polyconic Projection – 1927 North American Datum

NOTE:
Planimetry from Jan. 1971 aerial photographs. Azimuths are measured from true south.



MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

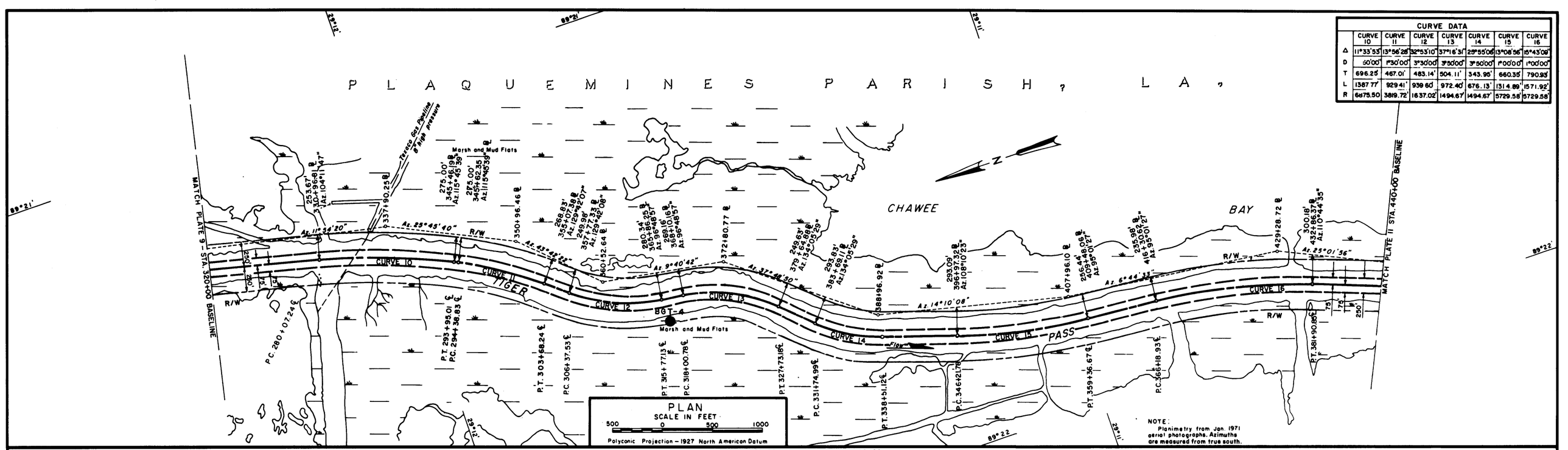
PLAN AND PROFILE
GRAND-TIGER PASSES
STA. 183+00 TO STA. 320+00

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

OCTOBER 1974

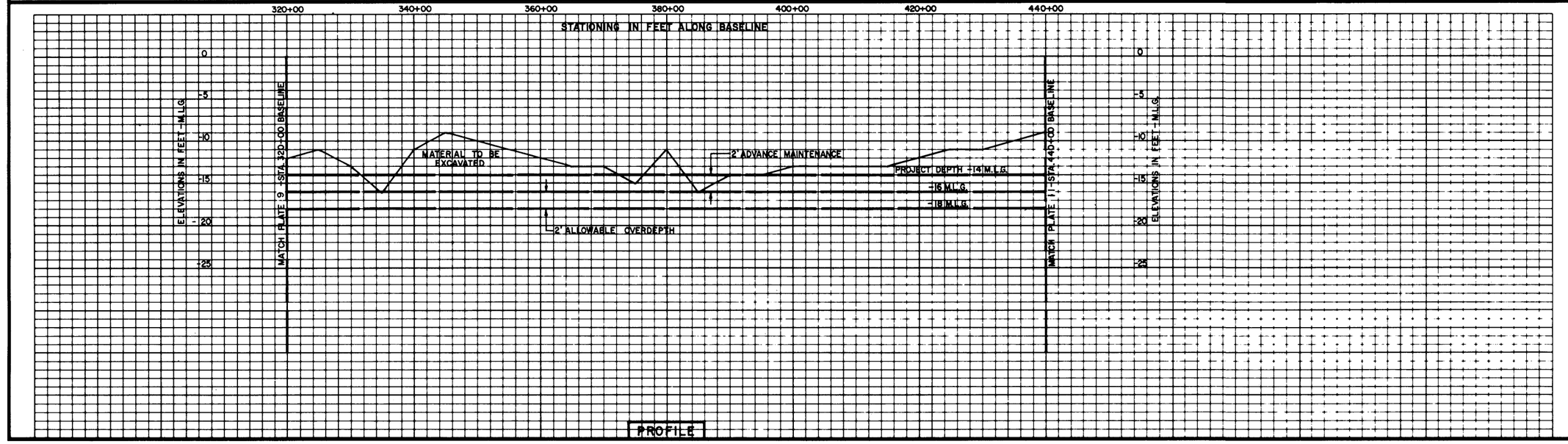
FILE NO. H-2-26789

PLATE 9



CURVE DATA

	CURVE 10	CURVE 11	CURVE 12	CURVE 13	CURVE 14	CURVE 15	CURVE 16
Δ	11°33'53"	13°56'28"	32°53'10"	37°16'31"	29°55'06"	13°08'56"	15°43'09"
D	50'00"	1°30'00"	3°30'00"	3°50'00"	3°50'00"	1°00'00"	1°00'00"
T	696.25'	467.01'	483.14'	504.11'	343.95'	660.35'	790.93'
L	1387.77'	929.41'	939.60'	972.40'	676.13'	1314.89'	1571.92'
R	6875.50'	3819.72'	1637.02'	1494.67'	1494.67'	5729.58'	5729.58'



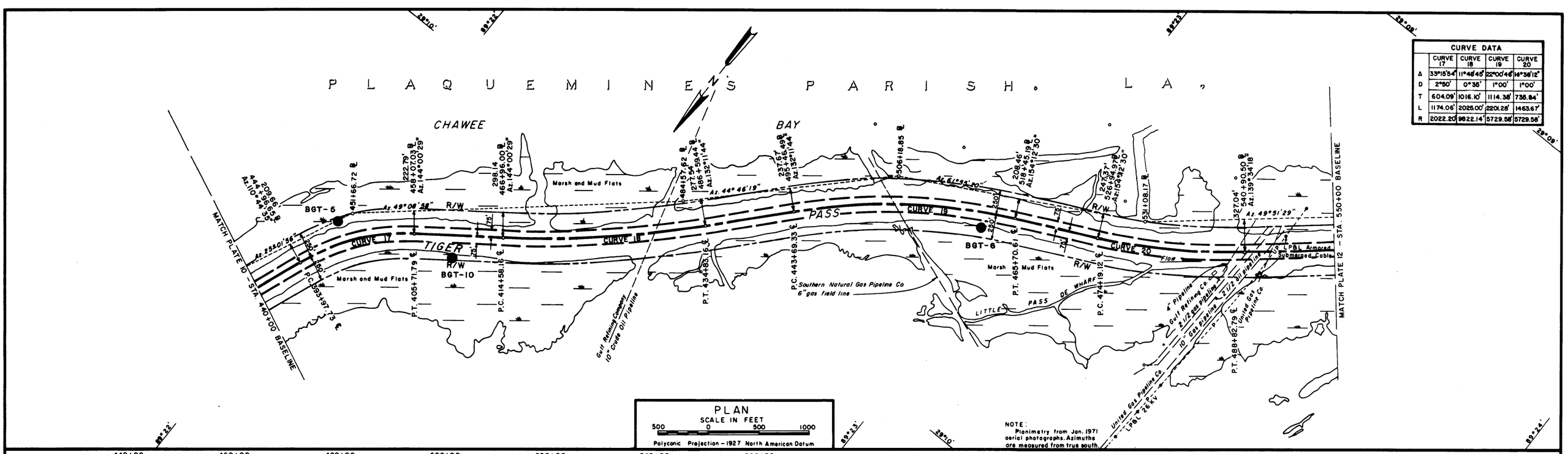
MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

PLAN AND PROFILE
GRAND-TIGER PASSES
STA. 320+00 TO STA. 440+00

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

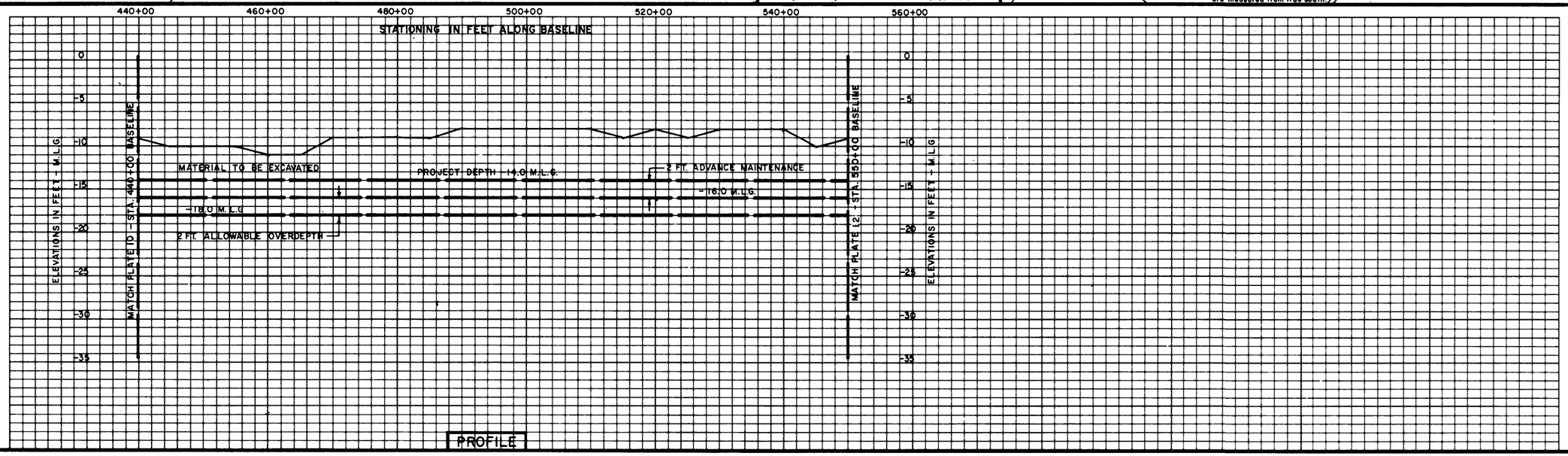
OCTOBER 1974 FILE NO. H-2-26789

PLATE 10



PLAN
SCALE IN FEET
500 0 500 1000
Polyconic Projection – 1927 North American Datum

CURVE DATA	CURVE 17	CURVE 18	CURVE 19	CURVE 20
Δ	33°15'54"	11°48'45"	22°00'46"	14°38'12"
D	2°50'	0°35'	1°00'	1°00'
T	604.09'	1016.10'	1114.38'	736.84'
L	1174.06'	2026.00'	2201.28'	1463.67'
R	2022.20'	9822.14'	5729.58'	5729.58'



PROFILE

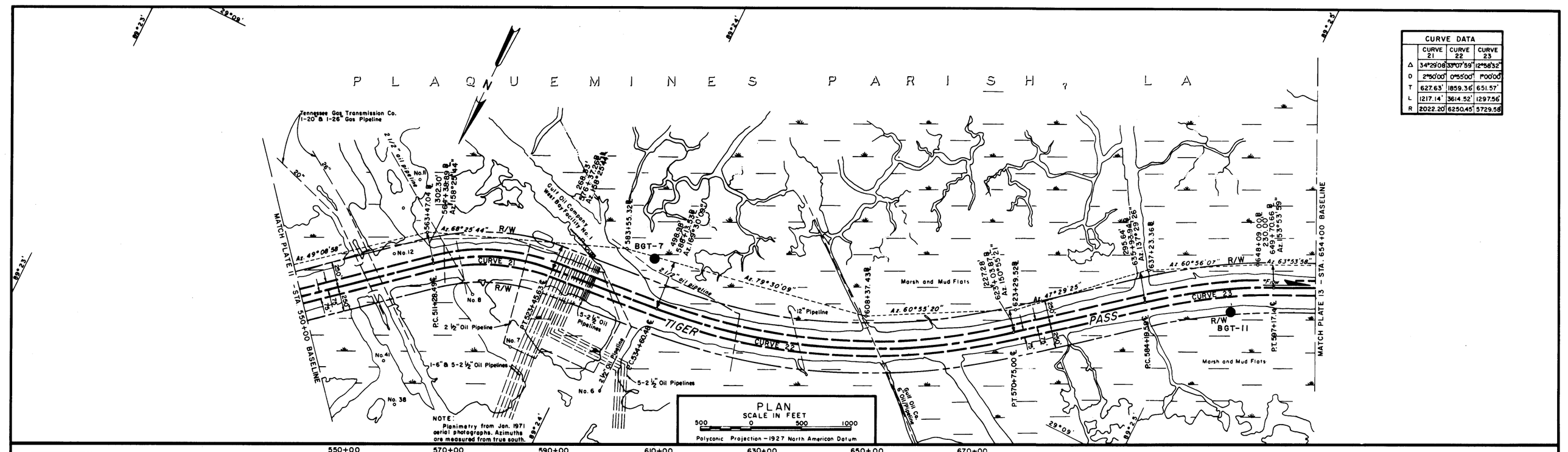
MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA
GENERAL DESIGN MEMORANDUM

PLAN AND PROFILE
GRAND-TIGER PASSES
STA. 440+00 TO STA. 550+00

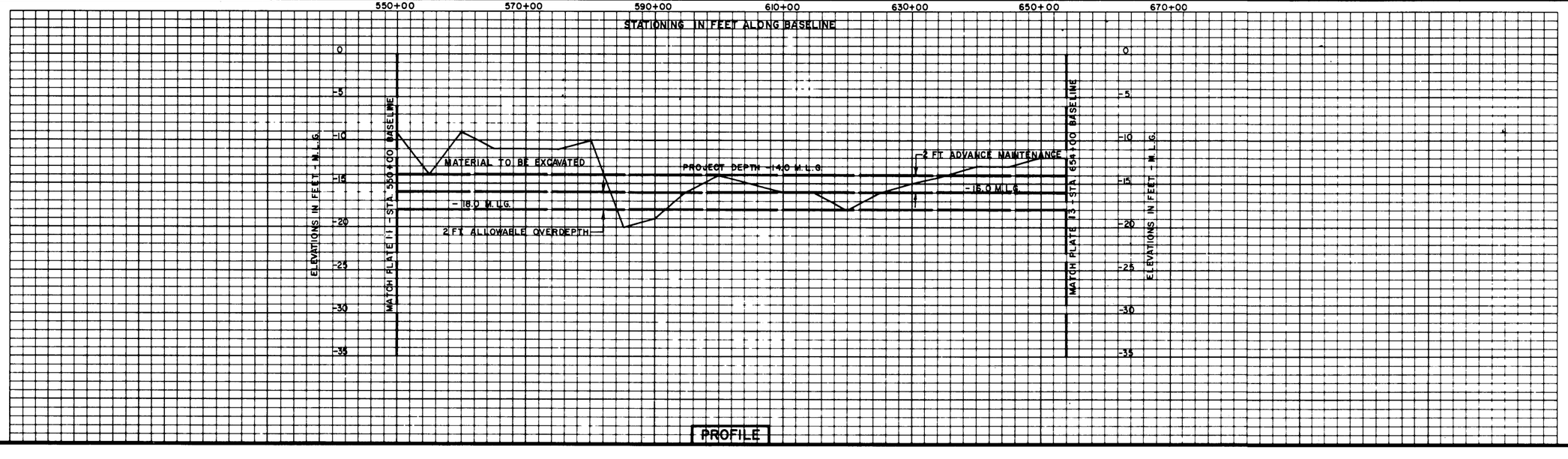
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

OCTOBER 1974 FILE NO. H-2-26789

PLATE 11



CURVE DATA			
	CURVE 21	CURVE 22	CURVE 23
Δ	34°29'08"	33°07'59"	12°58'32"
D	2°50'00"	0°55'00"	1°00'00"
T	627.63'	1859.36'	651.57'
L	1217.14'	3614.52'	1297.56'
R	2022.20'	6250.45'	5729.58'



MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

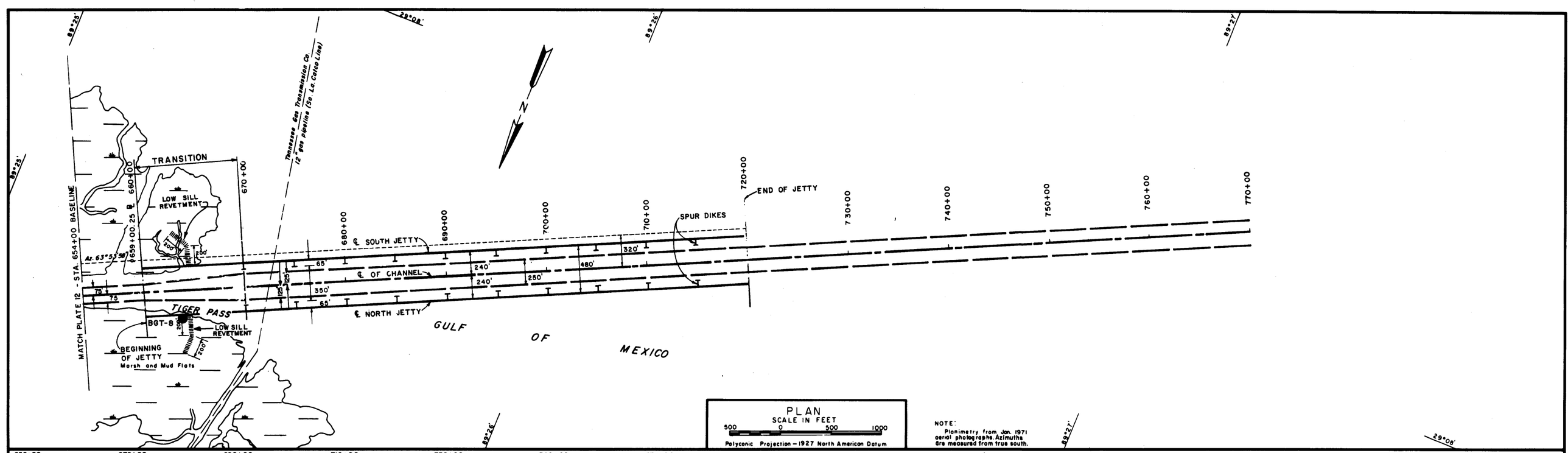
PLAN AND PROFILE
GRAND-TIGER PASSES
STA. 550+00 TO STA. 654+00

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

OCTOBER 1974

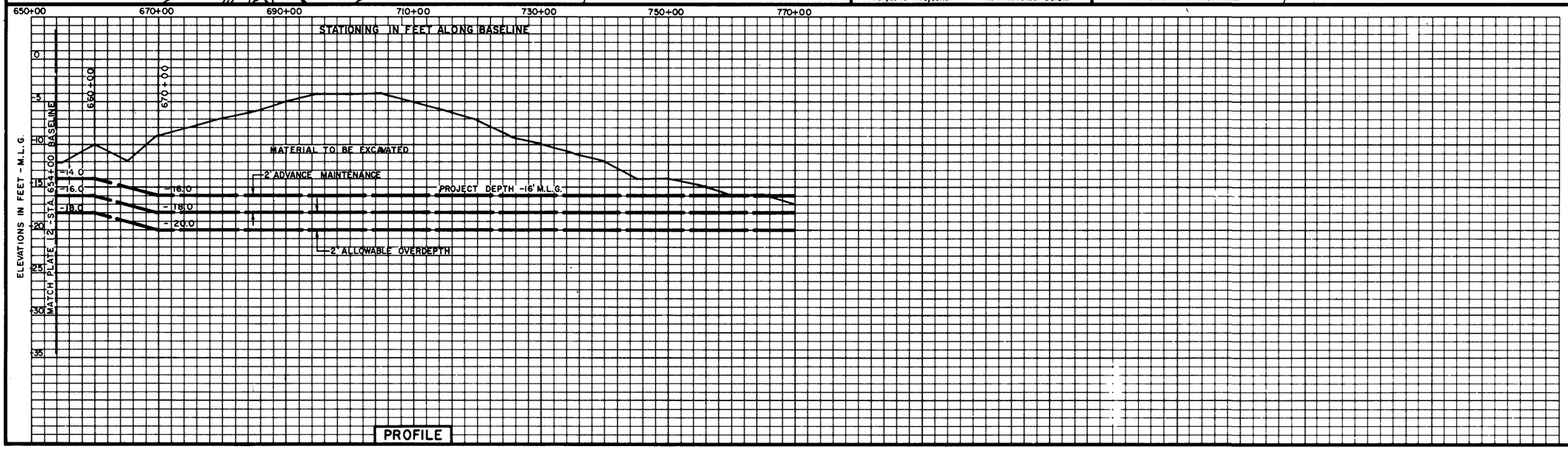
FILE NO. H-2-26789

PLATE 12



PLAN
SCALE IN FEET
500 0 500 1000
Polyconic Projection – 1927 North American Datum

NOTE:
Planimetry from Jan. 1971 aerial photographs. Azimuths are measured from true south.



PROFILE

MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

PLAN AND PROFILE
GRAND-TIGER PASSES
STA. 654+00 TO STA. 770+00

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

OCTOBER 1974

FILE NO. H-2-26789

PLATE 13

NOTE: Limit maximum disposal elev. to 2.5' m.s.l.

LEGEND

Disposal Area

Retaining Dike

SCALE

500 0 500 1000 FT

Uncontrolled mosaic prepared from aerial photos flown 26 January 1971

MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

DISPOSAL AREAS

BAPTISTE COLLETTE BAYOU

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

OCTOBER 1974

FILE NO. H-2-26789

PLATE 14

NOTE: Limit maximum disposal elev. to 2.5' m.s.l.

LEGEND

Disposal Area

Retaining Dike

SCALE

500 0 500 1000 FT.

Uncontrolled mosaic prepared from aerial photos flown 26 January 1971.

MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

DISPOSAL AREAS

BAPTISTE COLLETTE BAYOU

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

OCTOBER 1974

FILE NO. H-2-26789

PLATE 15

NOTE: Limit maximum disposal elev. to 2.5' m.s.l.

LEGEND

Disposal Area

Retaining Dike

SCALE 500 0 500 1000 FT.

Uncontrolled mosaic prepared from aerial photos flown 26 January 1971.

MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

DISPOSAL AREAS

BAPTISTE COLLETTE BAYOU

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

OCTOBER 1974 FILE NO. H-2-26789

PLATE 16

NOTE: Limit maximum disposal elev. to 2.5' m.s.l.

LEGEND

Disposal Area

Retaining Dike

SCALE

500 0 500 1000 FT.

Uncontrolled mosaic prepared from aerial photos flown 26 January 1971.

MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

DISPOSAL AREAS

GRAND-TIGER PASSES

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

OCTOBER 1974

FILE NO. H-2-26789

PLATE 17

NOTE: Limit maximum disposal elev. to 2.5' m.s.l.

MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

DISPOSAL AREAS

GRAND-TIGER PASSES

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

OCTOBER 1974

FILE NO. H-2-26789

PLATE 18

NOTE: Limit maximum disposal elev. to 2.5' m.s.l.

LEGEND

Disposal Area

Retaining Dike

SCALE

500 0 500 1000 FT

Uncontrolled mosaic prepared from aerial photos flown 26 January 1971

MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

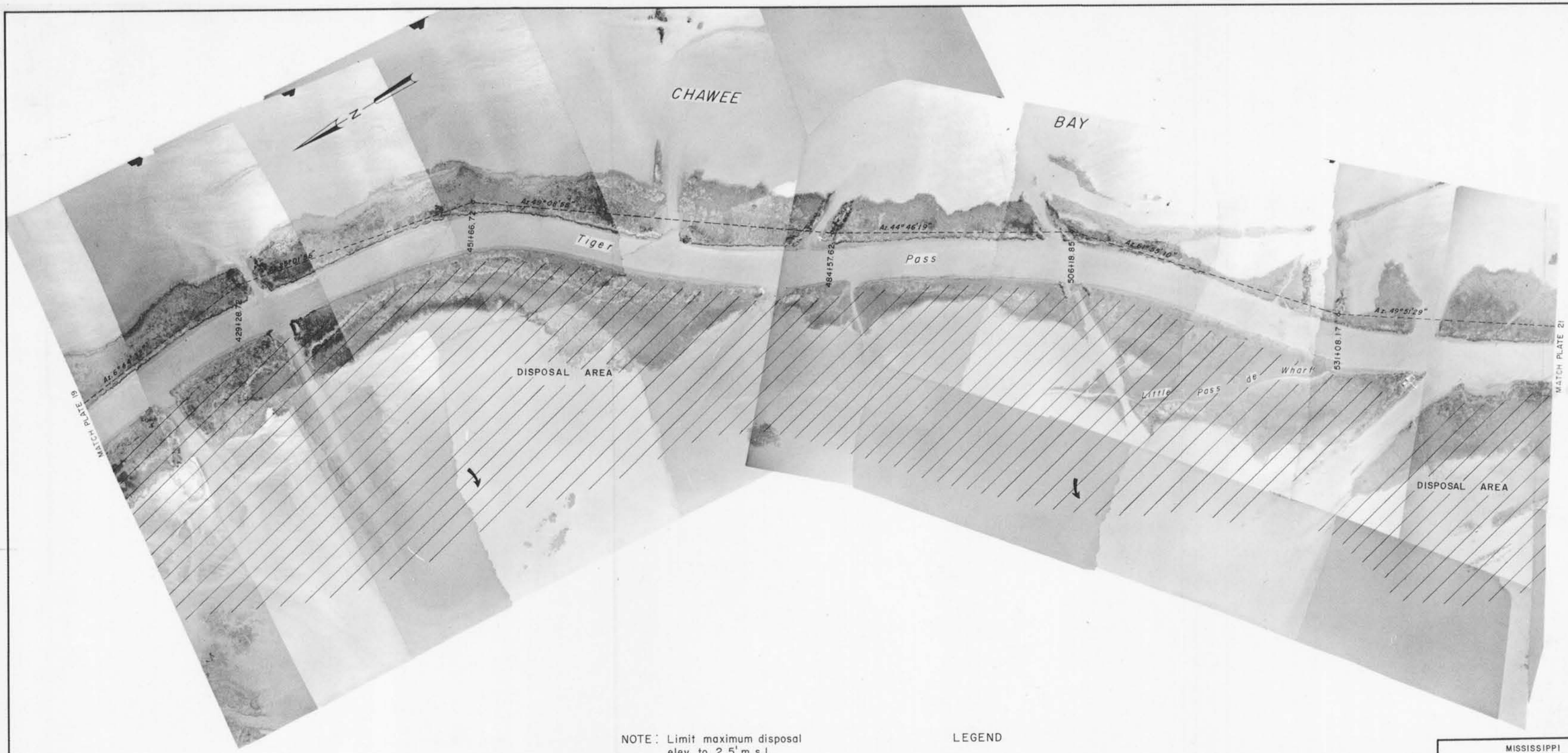
DISPOSAL AREAS

GRAND-TIGER PASSES

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

OCTOBER 1974

FILE NO. H-2-26789



NOTE: Limit maximum disposal elev. to 2.5' m.s.l.

LEGEND

Disposal Area

Retaining Dike

SCALE

500 0 500 1000 FT.

Uncontrolled mosaic prepared from aerial photos flown 26 January 1971

MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

DISPOSAL AREAS

GRAND-TIGER PASSES

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

OCTOBER 1974

FILE NO. H-2-26789

PLATE 20

NOTE: Limit maximum disposal elev. to 2.5' m.s.l.

LEGEND

Disposal Area

Retaining Dike

SCALE 500 0 500 1000 FT

Uncontrolled mosaic prepared from aerial photos flown 26 January 1971

MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

DISPOSAL AREAS

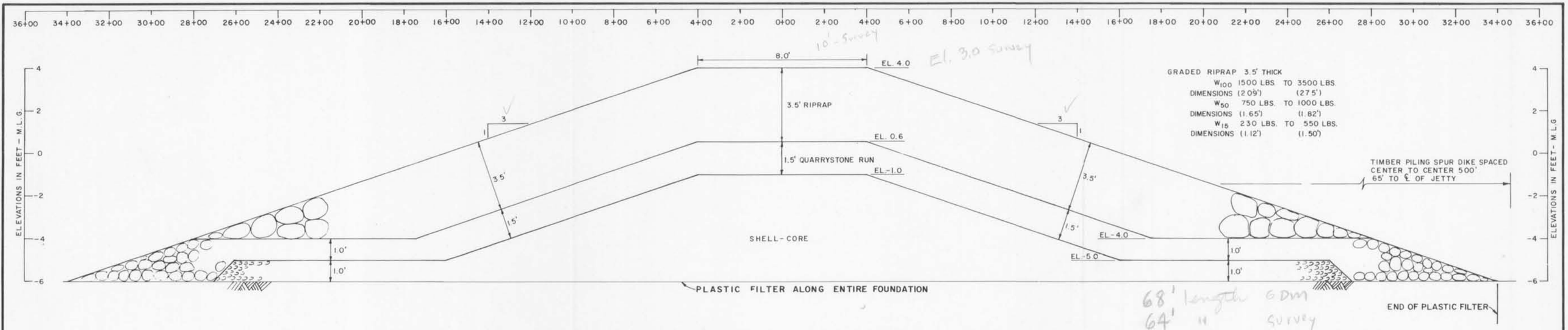
GRAND-TIGER PASSES

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

OCTOBER 1974

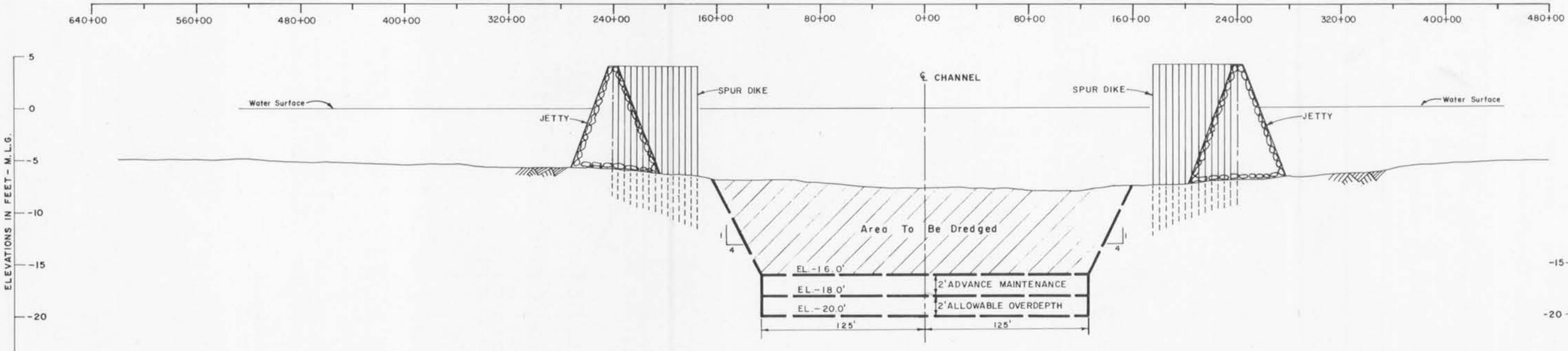
FILE NO. H-2-26789

PLATE 21



GRADED RIPRAP DESIGN SECTION
(FOR CUT IN OPEN WATER)

SCALE: AS SHOWN



TYPICAL SECTION
(FOR CUT IN OPEN WATER)

SCALE: AS SHOWN

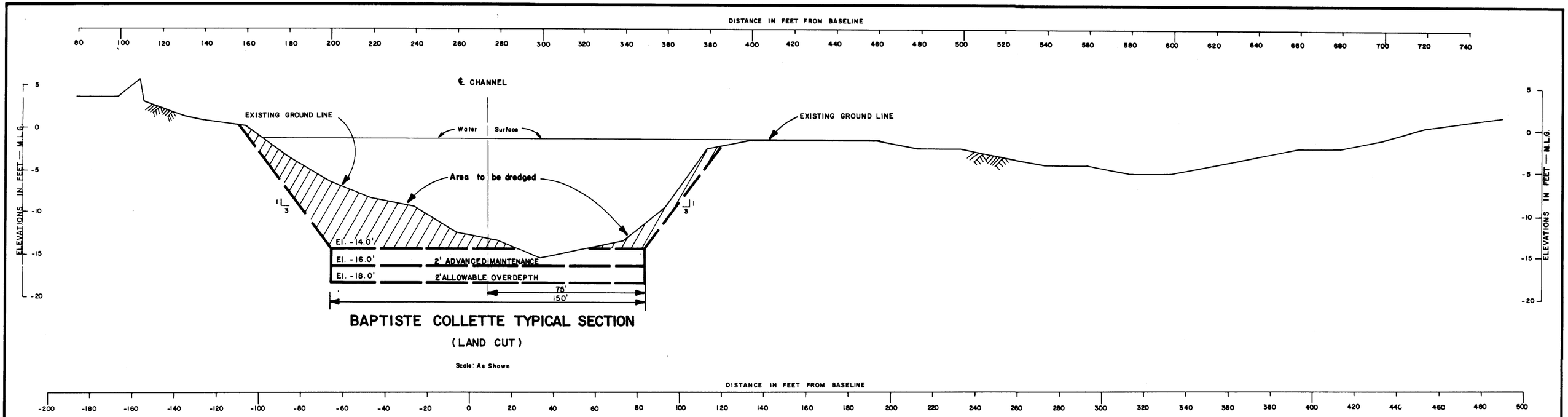
MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

TYPICAL JETTY CHANNEL SECTIONS
BAPTISTE COLLETTE BAYOU
AND GRAND-TIGER PASSES

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

OCTOBER 1974 FILE NO. H-2-26789

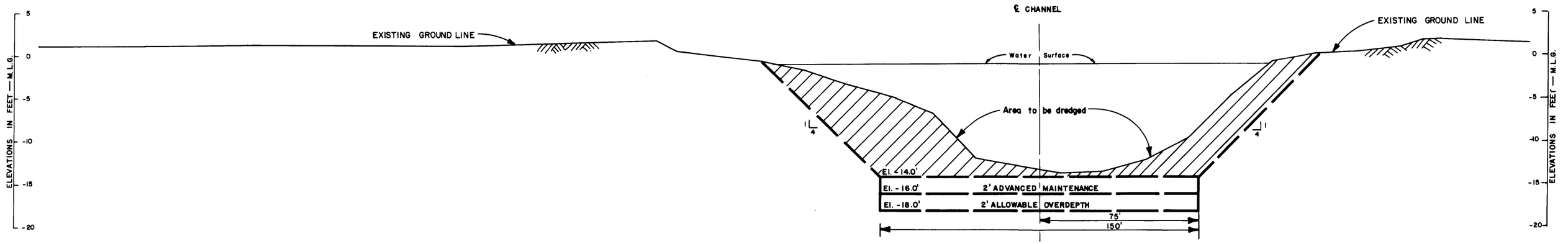
PLATE 22



BAPTISTE COLLETTE TYPICAL SECTION

(LAND CUT)

Scale: As Shown



GRAND TIGER PASS TYPICAL SECTION

(LAND CUT)

Scale: As Shown

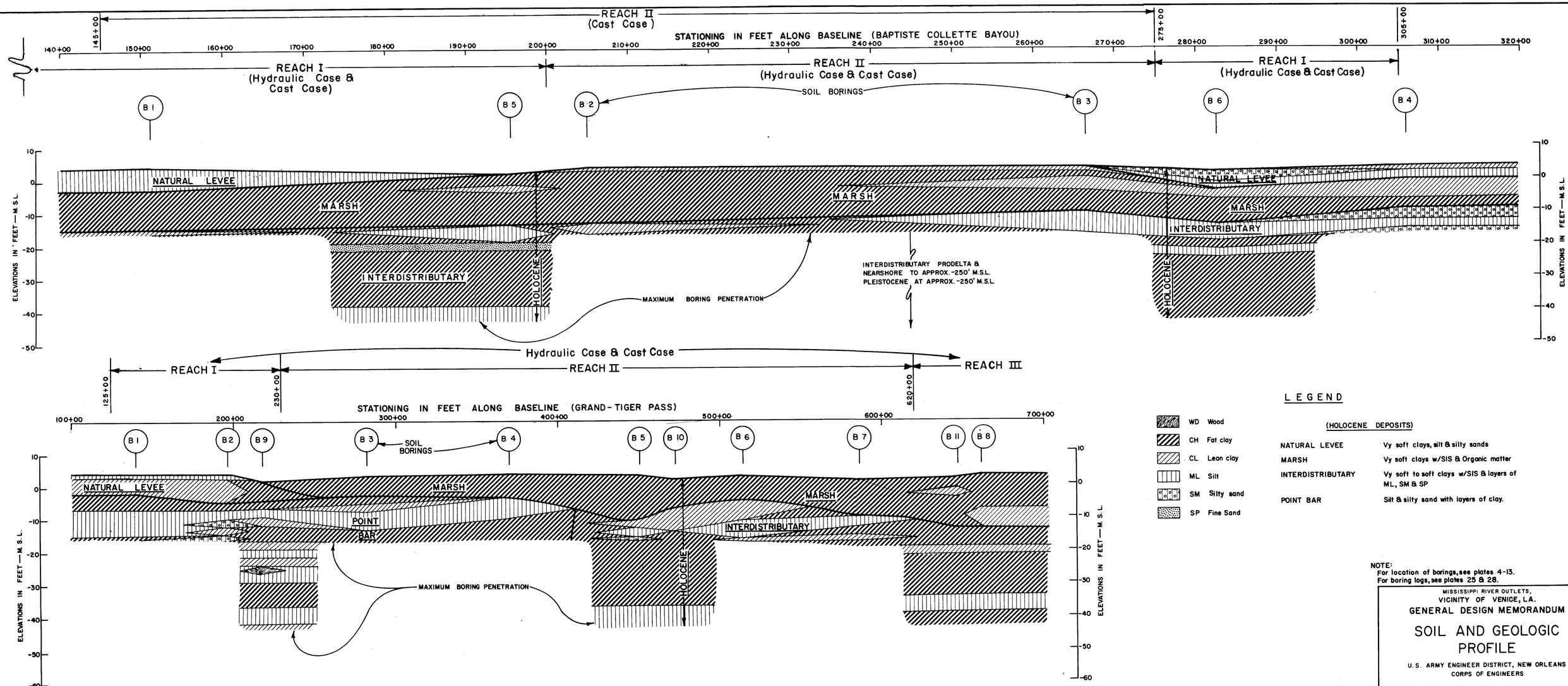
MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

TYPICAL CHANNEL SECTIONS BAPTISTE COLLETTE BAYOU AND GRAND-TIGER PASSES

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

OCTOBER 1974 FILE NO. H-2-26789

PLATE 23



NOTE:
For location of borings, see plates 4-13.
For boring logs, see plates 25 & 28.

MISSISSIPPI RIVER OUTLETS,
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

SOIL AND GEOLOGIC PROFILE

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

OCTOBER 1974 FILE NO. H-2-26789

PLATE 24

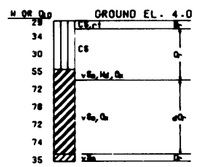
BBC-1

STA 151+24

40 FT LT OF B/L

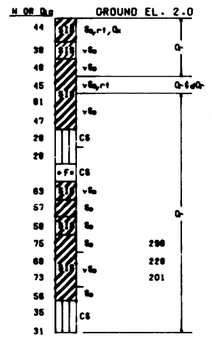
27 MAY 71

WATER TABLE AT 2.0



BBC-5

STA 196+80,
500 FT. RT. OF B/L
3 DEC 71



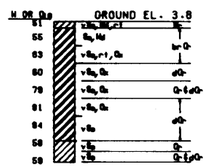
BBC-2

STA 205+07

400 FT RT OF B/L

WATER TABLE AT 3.0

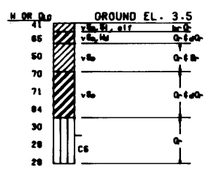
27 MAY 71



BBC-3

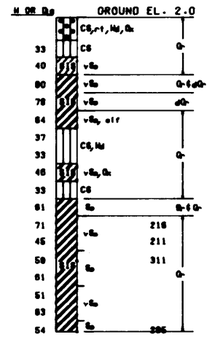
STA 268+20,
40 FT. LT. OF B/L

26 MAY 71



BBC-6

STA 282+50
50 FT. LF OF B/L
3 DEC. 71

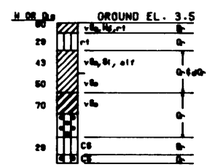


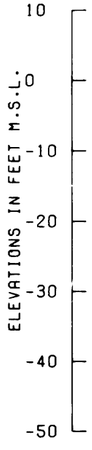
BBC-4

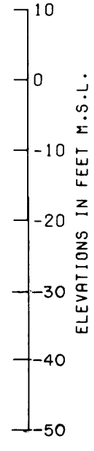
STA 306+00

480 FT RT OF B/L

26 MAY 71





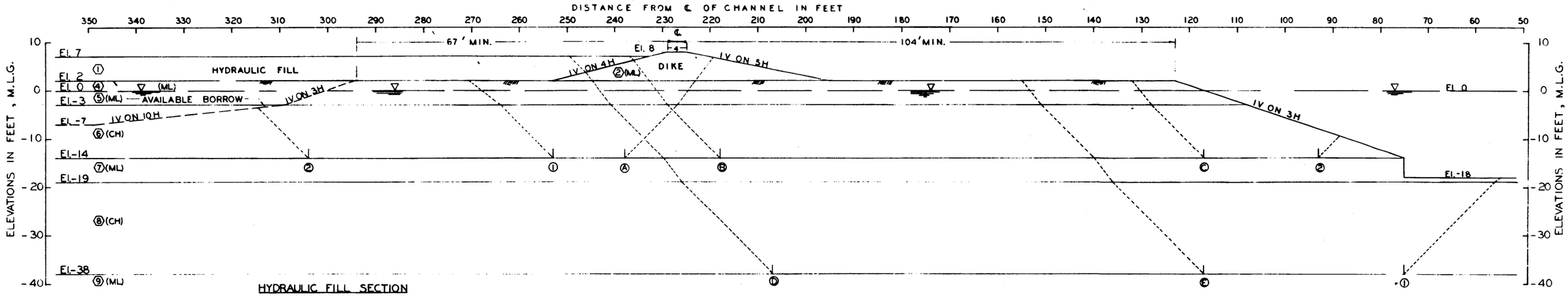


NOTE:
For legend see plate 24.

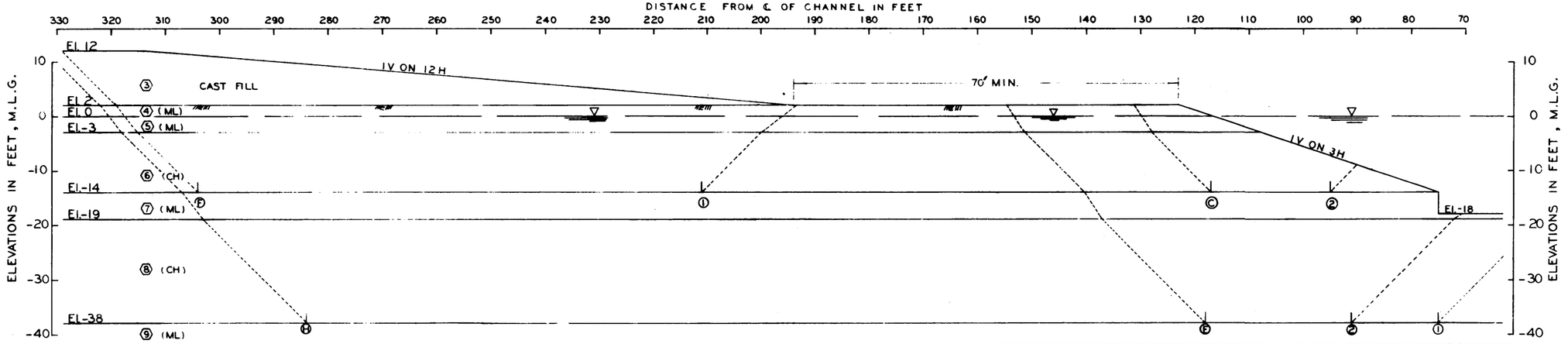
MISSISSIPPI RIVER OUTLETS,
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

BAPTISTE COLLETTE BAYOU SOIL BORINGS

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS
OCTOBER 1974 FILE NO. H-2-26789



HYDRAULIC FILL SECTION
REACH I STA. 00+00 TO STA. 200+00
STA. 275+00 TO STA. 305+00



CAST FILL SECTION
REACH I STA. 00+00 TO STA. 200+00
STA. 275+00 TO STA. 305+00

GENERAL NOTES

CLASSIFICATION, STRATIFICATION, SHEAR STRENGTHS, AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF THE GENERAL TYPE BORINGS, SEE BORING DATA PLATES.

STRATUM NO.	SOIL TYPE	EFFECTIVE UNIT WEIGHT P.S.F.	C - UNIT COHESION P.S.F. CENTER OF STRATUM	C - UNIT COHESION P.S.F. BOTTOM OF STRATUM	FRICTION ANGLE DEGREES
①	CL	90	0	0	0
②	ML	117	200	200	15
③	CL	100	75	75	0
④	ML	117	200	200	15
⑤	ML	55	200	200	15
⑥	CH	38	125	150	0
⑦	ML	55	200	200	15
⑧	CH	43	250	300	0
⑨	ML	55	200	200	15

ASSUMED FAILURE SURFACE NO.	ELEV.	RESISTING FORCES R_A	R_B	R_P	DRIVING FORCES D_A	D_P	SUMMATION OF FORCES RESISTING	DRIVING	FACTOR OF SAFETY
Ⓐ ①	-14	8 225	2 250	6 183	19 539	7 886	16 658	11 653	1.43
Ⓐ ②	-14	8 225	9 900	2613	19 539	2465	20 738	17074	1.21
Ⓑ ②	-14	8 329	18 750	1 213	19 658	511	28 292	19 147	1.48
Ⓒ ②	-14	4 990	3 600	1 213	7 379	511	9 803	6 868	1.43
Ⓓ ①	-38	21 282	39 600	10 040	63 285	8834	71522	54 442	1.31
Ⓔ ①	-38	17 987	12600	10 040	39 751	8834	40627	30917	1.31
Ⓕ ①	-14	8 327	13950	6 263	28452	9040	28540	19412	1.47
Ⓕ ②	-14	8 327	31 350	1 211	28452	510	40 888	27942	1.46
Ⓗ ①	-38	23 310	62700	10 041	83504	8 834	97 051	74 670	1.30
Ⓗ ②	-38	23 310	57900	10 041	83 504	13962	91 251	69 542	1.31

NOTES:
- ϕ — ANGLE OF INTERNAL FRICTION, DEGREES.
- C — UNIT COHESION, P.S.F.
- ▽ — STATIC WATER SURFACE.
- D — HORIZONTAL DRIVING FORCE IN POUNDS.
- R — HORIZONTAL RESISTING FORCE IN POUNDS.
- A — AS A SUBSCRIPT, REFERS TO ACTIVE WEDGE.
- B — AS A SUBSCRIPT, REFERS TO CENTRAL BLOCK.
- P — AS A SUBSCRIPT, REFERS TO PASSIVE WEDGE.

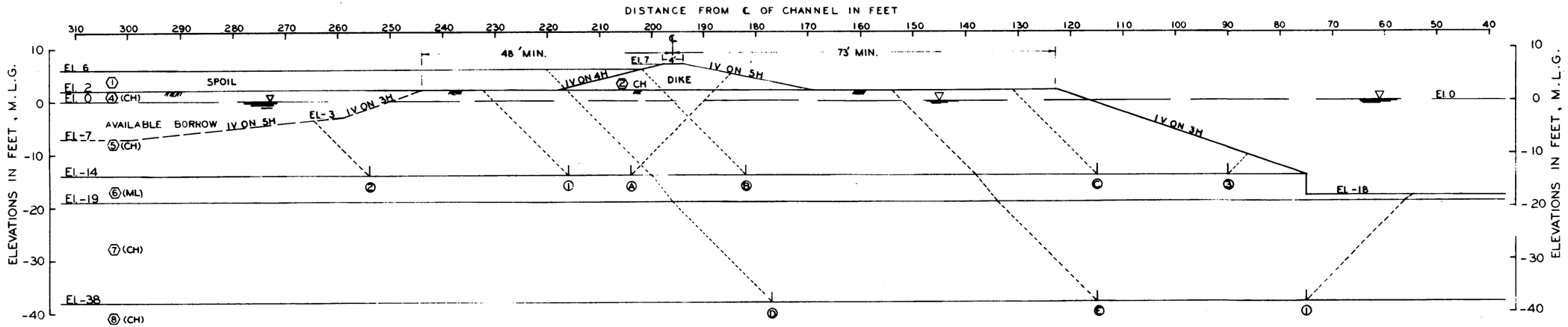
$$*F.S. = \frac{R_A + R_B + R_P}{D_A - D_P}$$

MISSISSIPPI RIVER OUTLETS,
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

BAPTISTE COLLETTE BAYOU STABILITY ANALYSIS

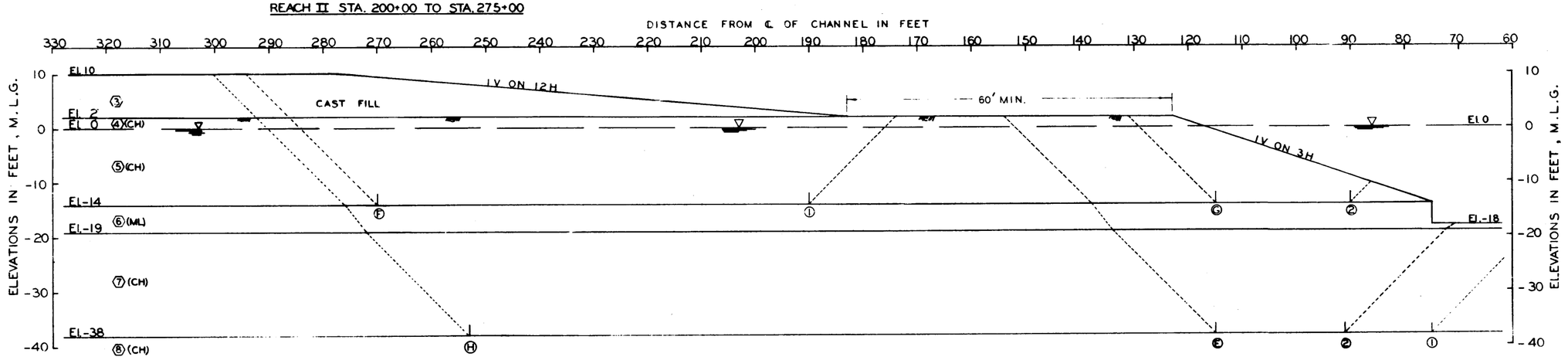
~~STA. 0+00 TO STA. 200+00~~
STA. 275+00 TO STA. 305+00
REACH I

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS
OCTOBER 1974 FILE NO. H-2-26789



HYDRAULIC FILL SECTION

REACH II STA. 200+00 TO STA. 275+00



CAST FILL SECTION

REACH II STA. 200+00 TO STA. 275+00

STRATUM NO.	SOIL TYPE	EFFECTIVE UNIT WEIGHT P.C.F.	C-UNIT COHESION P.S.F. CENTER OF STRATUM	C-UNIT COHESION P.S.F. BOTTOM OF STRATUM	FRICTION ANGLE DEGREES
①	CH	90	0	0	0
②	CH	100	75	75	0
③	CH	100	75	75	0
④	CH	100	150	150	0
⑤	CH	38	125	150	0
⑥	ML	55	200	200	15
⑦	CH	43	250	300	0
⑧	CH	55	200	200	15

GENERAL NOTES

CLASSIFICATION, STRATIFICATION, SHEAR STRENGTHS, AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF THE GENERAL TYPE BORINGS, SEE BORING DATA PLATES.

ASSUMED FAILURE SURFACE NO.	ASSUMED FAILURE SURFACE ELEV.	RESISTING FORCES R_A	R_B	R_P	DRIVING FORCES D_A	D_P	SUMMATION OF FORCES RESISTING	DRIVING	FACTOR OF SAFETY
Ⓐ ①	-14	4625	1800	4100	14497	6774	10525	7723	1.36
Ⓐ ②	-14	4625	7500	2613	14497	2395	14738	12102	1.22
Ⓑ ③	-14	4700	13800	1061	14242	380	19561	13862	1.41
Ⓒ ③	-14	4099	3750	1061	6653	380	8910	6273	1.42
Ⓓ ①	-38	17982	30600	10041	53724	8873	58622	44851	1.31
Ⓔ ①	-38	16911	12000	10041	36697	8873	38952	27824	1.40
Ⓕ ①	-14	5300	12000	4100	22949	6969	21400	15980	1.34
Ⓕ ②	-14	5360	27000	1061	22949	380	33361	22569	1.48
Ⓒ ②	-14	4099	3750	1061	6653	380	8910	6273	1.42
Ⓑ ①	-38	19881	53400	10041	72770	8873	83322	63617	1.30
Ⓑ ②	-38	19881	48600	10041	72770	13962	78522	58808	1.34

NOTES:

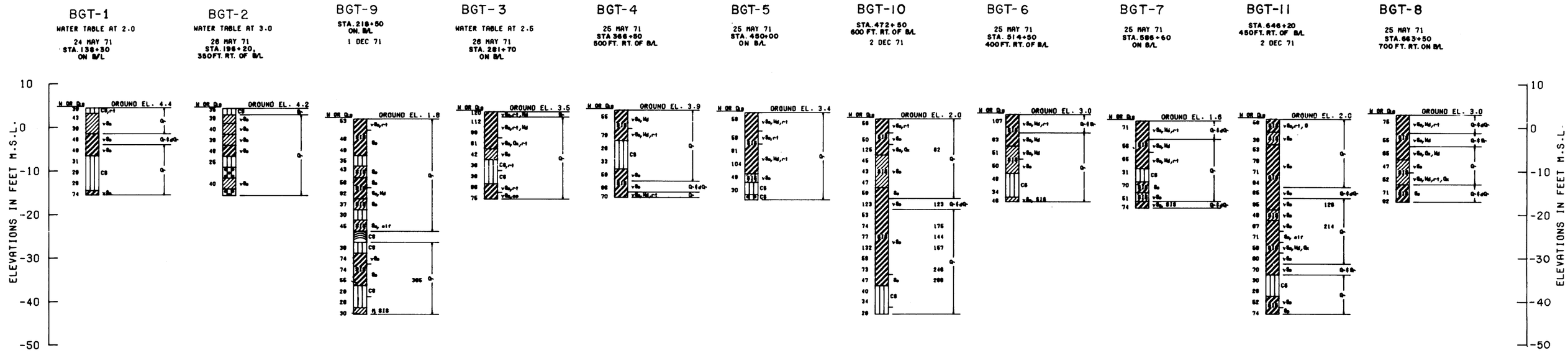
Φ—ANGLE OF INTERNAL FRICTION, DEGREES.
C—UNIT COHESION, P.S.F.
▽—STATIC WATER SURFACE.
D—HORIZONTAL DRIVING FORCE IN POUNDS.
R—HORIZONTAL RESISTING FORCE IN POUNDS.
A—AS A SUBSCRIPT, REFERS TO ACTIVE WEDGE.
B—AS A SUBSCRIPT, REFERS TO CENTRAL BLOCK.
P—AS A SUBSCRIPT, REFERS TO PASSIVE WEDGE.

$$F.S. = \frac{R_A + R_B + R_P}{D_A - D_P}$$

MISSISSIPPI RIVER OUTLETS,
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

BAPTISTE COLLETTE BAYOU STABILITY ANALYSIS

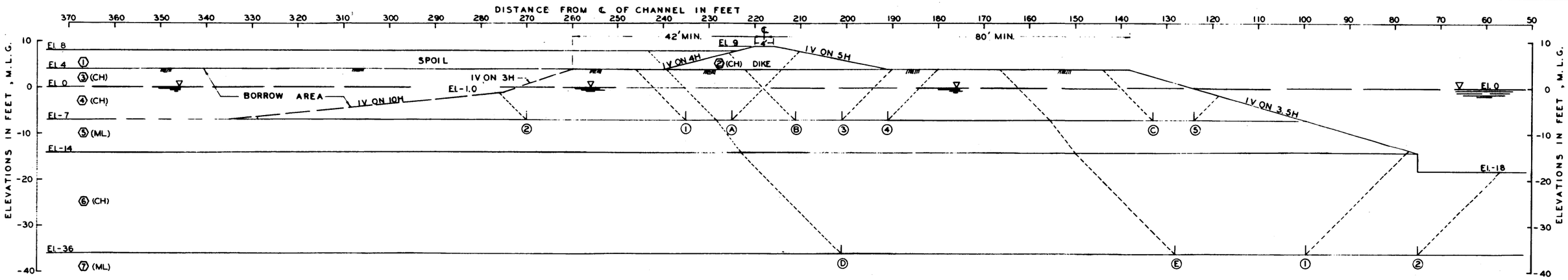
STA. 200+00 TO STA. 275+00
REACH II
U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS
OCTOBER 1974 FILE NO. H-2-26789



NOTE:
For legend see plate 24.

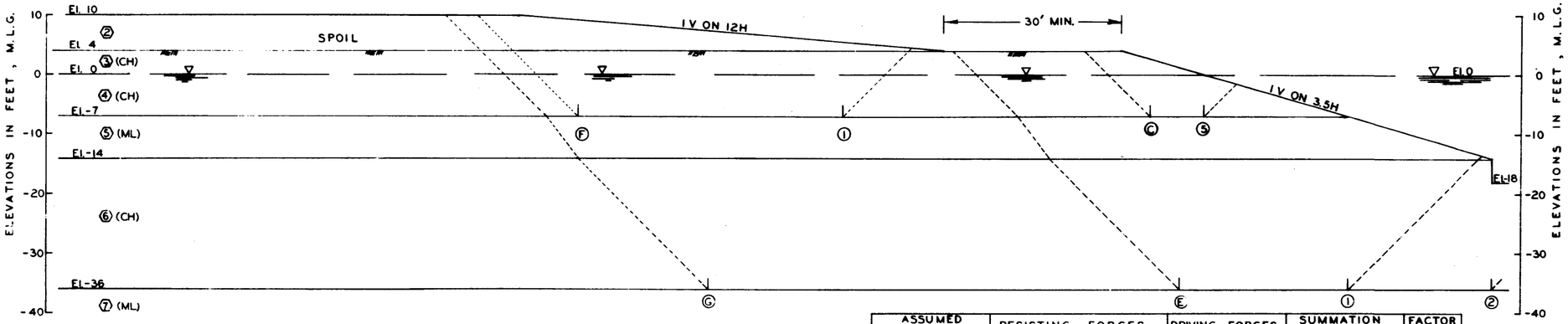
MISSISSIPPI RIVER OUTLETS,
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM
GRAND-TIGER PASSES
SOIL BORINGS

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS
OCTOBER 1974 FILE NO. H-2-26789



HYDRAULIC FILL CASE

REACH I STA.125+00 TO STA.230+00



CAST FILL CASE

REACH I STA.125+00 TO STA.230+00

STRATUM NO.	SOIL TYPE	EFFECTIVE UNIT WEIGHT P.C.F.	C-UNIT COHESION P.S.F. CENTER OF STRATUM	C-UNIT COHESION P.S.F. BOTTOM OF STRATUM	FRICTION ANGLE DEGREES
①	CH	90	0	0	0
②	CH	100	75	75	0
③	CH	100	104.5	118.2	0
④	CH	38	134.1	150	0
⑤	ML	55	200	200	15
⑥	CH	43	260	320	0
⑦	ML	55	200	200	15

GENERAL NOTES

CLASSIFICATION, STRATIFICATION, SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF THE GENERAL TYPE BORINGS, SEE BORING DATA PLATES.

ASSUMED FAILURE SURFACE NO.	ELEV.	RESISTING FORCES R_A	R_B	R_P	DRIVING FORCES D_A	D_P	SUMMATION OF FORCES RESISTING	DRIVING	FACTOR OF SAFETY
Ⓐ ①	-7	3305	1500	2713	10 5 9	4844	7518	5755	1.30
Ⓐ ②	-7	3305	6750	1585	10559	881	11640	9678	1.20
Ⓑ ③	-7	3254	1500	2713	10576	5531	7467	5045	1.48
Ⓑ ④	-7	3254	3000	2713	10576	4531	8967	6045	1.48
Ⓒ ⑤	-7	2713	1350	1460	4171	724	5523	3447	1.60
Ⓓ ①	-36	19938	32480	11714	60339	15076	64132	45263	1.42
Ⓓ ②	-36	19938	40320	9753	60339	6966	70011	53373	1.31
Ⓔ ①	-36	18773	9120	11714	42630	15076	39607	27754	1.42
Ⓔ ②	-36	18773	16960	9753	42630	6966	45486	35664	1.28
Ⓕ ①	-7	3400	6750	2750	12531	5102	12900	9131	1.41
Ⓒ ①	-36	21224	34720	11714	65498	15076	67658	50422	1.34
Ⓒ ②	-36	21224	45440	9753	65498	6966	76417	58532	1.31

NOTES

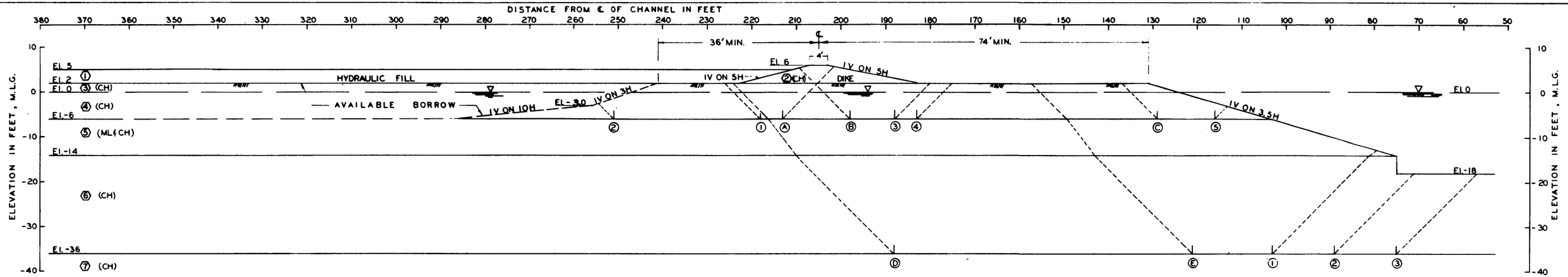
Ø - ANGLE OF INTERNAL FRICTION, DEGREES.
C - UNIT COHESION, P.S.F.
⧖ STATIC WATER SURFACE.
D - HORIZONTAL DRIVING FORCE IN POUNDS.
R - HORIZONTAL RESISTING FORCE IN POUNDS.
A - AS A SUBSCRIPT, REFERS TO ACTIVE WEDGE.
B - AS A SUBSCRIPT, REFERS TO CENTRAL BLOCK.
P - AS A SUBSCRIPT, REFERS TO PASSIVE WEDGE.

$$F.S. = \frac{R_A + R_B + R_P}{D_A - D_P}$$

MISSISSIPPI RIVER OUTLETS,
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM

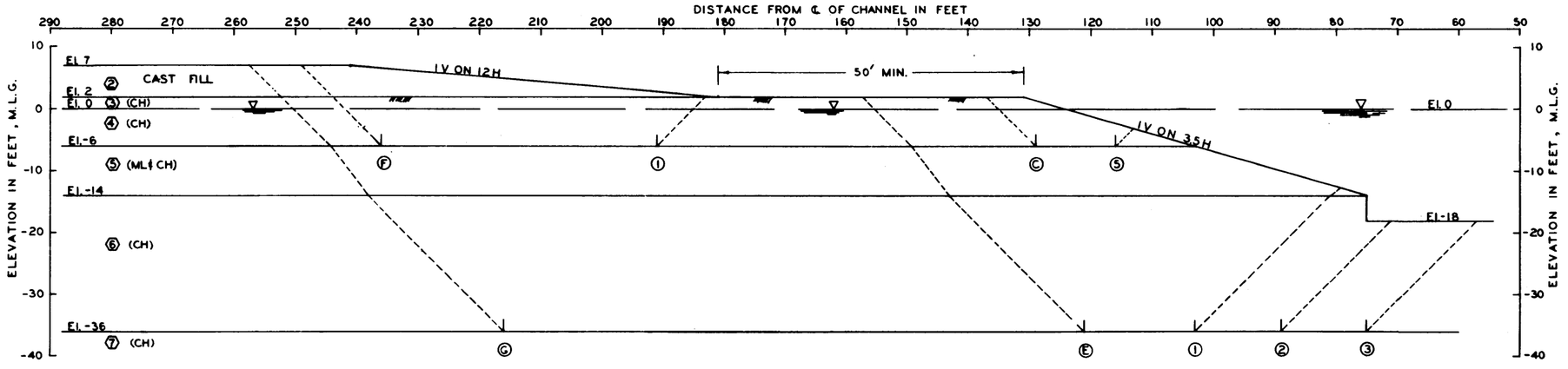
GRAND-TIGER PASSES STABILITY ANALYSIS

STA. 125+00 TO STA. 230+00
REACH I
U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS
OCTOBER 1974 FILE NO. H-2-26789



HYDRAULIC FILL CASE

REACH II STA. 230+00 TO STA. 620+00



CAST FILL CASE

REACH II STA. 230+00 TO STA. 620+00

GENERAL NOTES

CLASSIFICATION, STRATIFICATION, SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF THE GENERAL TYPE BORINGS. SEE BORING DATA PLATES.

STRATUM NO.	SOIL TYPE	EFFECTIVE UNIT WEIGHT P.C.F.	C-UNIT COHESION P.S.F. CENTER OF STRATUM	C-UNIT COHESION P.S.F. BOTTOM OF STRATUM	FRICTION ANGLE DEGREES
①	CH	90	0	0	0
②	CH	100	75	75	0
③	CH	100	100	100	0
④	CH	38	100	100	0
⑤	ML&CL	53	350	350	0
⑥	CH	43	185	270	0
⑦	CH	55	200	200	15

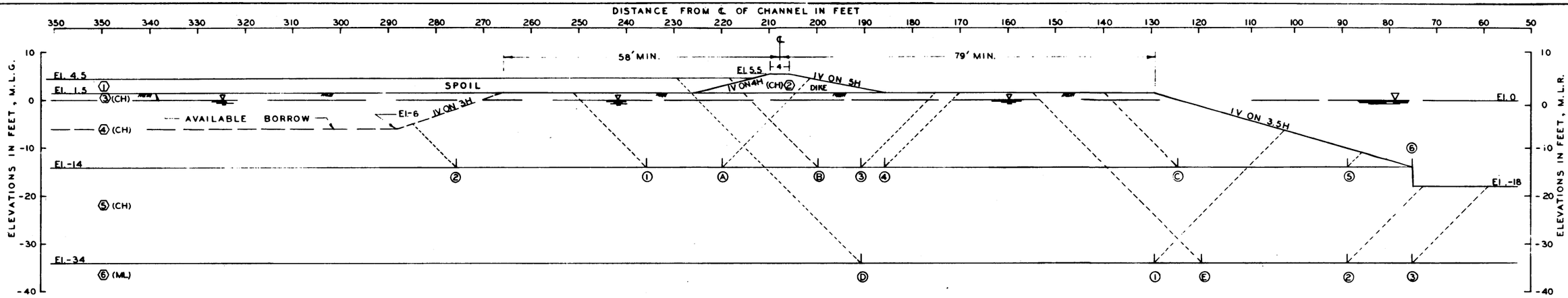
ASSUMED FAILURE SURFACE NO.	ELEV.	RESISTING FORCES R_A	R_B	R_P	DRIVING FORCES D_A	D_P	SUMMATION OF FORCES RESISTING	DRIVING	FACTOR OF SAFETY
Ⓐ ①	-6	2170	500	1600	5794	2334	4270	3460	1.23
Ⓐ ②	-6	2170	3800	700	5794	310	6670	5484	1.22
Ⓑ ③	-6	2110	1000	1600	5743	2334	4710	3409	1.38
Ⓑ ④	-6	2110	1500	1600	5743	2084	5210	3659	1.42
Ⓒ ⑤	-6	1600	1300	600	2027	196	3500	1831	1.91
Ⓓ ①	-36	15340	22950	9070	47738	16120	47360	31618	1.50
Ⓓ ②	-36	15340	26730	7214	47738	11021	49284	36717	1.34
Ⓓ ③	-36	15340	30510	7214	47738	6966	53064	40772	1.30
Ⓔ ①	-36	15340	4860	9070	34997	16120	29270	18877	1.55
Ⓔ ②	-36	15340	8640	7214	34997	11021	31194	23976	1.30
Ⓔ ③	-36	15340	12420	7214	34997	6966	34974	28031	1.25
Ⓕ ①	-6	2250	4500	1623	7229	2485	8373	4744	1.76
Ⓖ ①	-36	15990	30510	9070	53996	16120	55570	37876	1.47
Ⓖ ②	-36	15990	35370	7214	53996	11021	58574	42975	1.36
Ⓖ ③	-36	15990	39150	7214	53996	6966	62354	47030	1.32

NOTES

Ø - ANGLE OF INTERNAL FRICTION, DEGREES.
C - UNIT COHESION, P.S.F.
⊻ - STATIC WATER SURFACE.
D - HORIZONTAL DRIVING FORCE IN POUNDS.
R - HORIZONTAL RESISTING FORCE IN POUNDS.
A - AS A SUBSCRIPT, REFERS TO ACTIVE WEDGE.
B - AS A SUBSCRIPT, REFERS TO CENTRAL BLOCK.
P - AS A SUBSCRIPT, REFERS TO PASSIVE WEDGE.

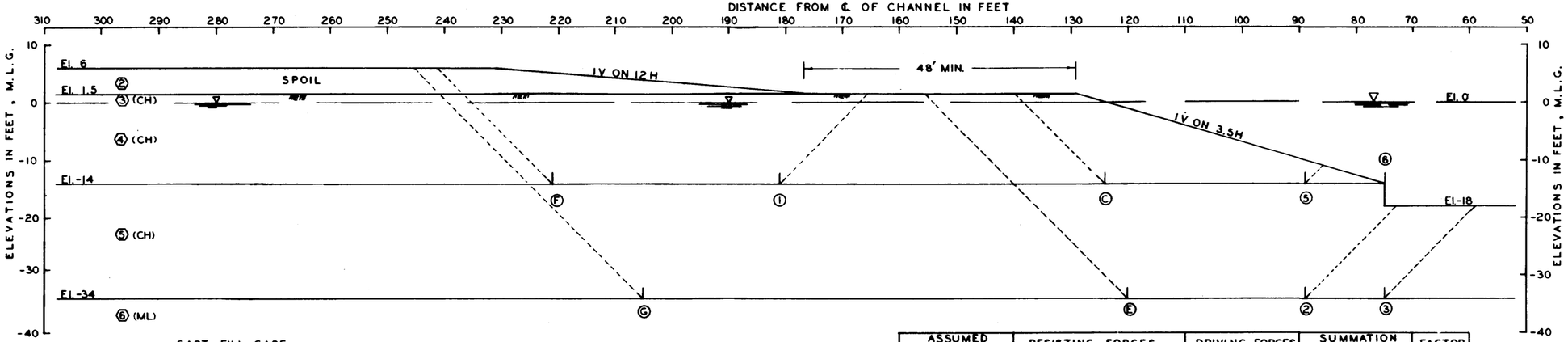
$$F.S. = \frac{R_A + R_B + R_P}{D_A - D_P}$$

MISSISSIPPI RIVER OUTLETS,
VICINITY OF VENICE, LA.
GENERAL DESIGN MEMORANDUM
GRAND-TIGER PASSES STABILITY ANALYSIS
STA. 230+00 TO STA. 620+00
REACH II
U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS
OCTOBER 1974 FILE NO. H-2-26789



HYDRAULIC FILL CASE

REACH III STA. 620+00 TO STA. 665+00



CAST FILL CASE

REACH III STA. 620+00 TO STA. 665+00

GENERAL NOTES

CLASSIFICATION, STRATIFICATION, SHEAR STRENGTHS AND UNIT WEIGHTS OF THE SOIL WERE BASED ON THE RESULTS OF THE GENERAL BORINGS. SEE BORING DATA PLATES.

STRATUM NO.	SOIL TYPE	EFFECTIVE UNIT WEIGHT P.C.F.	C-UNIT COHESION P.S.F. CENTER OF STRATUM	C-UNIT COHESION P.S.F. BOTTOM OF STRATUM	FRICTION ANGLE DEGREES
①	CH	90	0	0	0
②	CH	100	75	75	0
③	CH	100	100	100	0
④	CH	38	100	100	0
⑤	CH	43	177	254.5	0
⑥	ML	55	200	200	15

ASSUMED FAILURE SURFACE NO.	ASSUMED FAILURE SURFACE ELEV.	RESISTING FORCES R_A	R_B	R_P	DRIVING FORCES D_A	D_P	SUMMATION OF FORCES RESISTING	DRIVING	FACTOR OF SAFETY
Ⓐ ①	-14	3563	1600	3100	11432	5937	8263	5495	1.50
Ⓐ ②	-14	3563	5600	2100	11432	2253	11263	9179	1.23
Ⓑ ③	-14	3415	900	3100	11856	6138	7415	5718	1.30
Ⓑ ④	-14	3415	1400	3100	11856	5937	7915	5919	1.34
Ⓑ ⑤	-14	3415	11100	633	11856	245	15148	11611	1.30
Ⓑ ⑥	-14	3415	12475	—	11856	—	15890	11856	1.34
Ⓒ ⑤	-14	3100	3550	633	5933	245	7283	5688	1.28
Ⓒ ⑥	-14	3100	4925	—	5933	—	8025	5933	1.35
Ⓓ ①	-34	10190	15652	8754	38888	20398	34596	18490	1.87
Ⓓ ②	-34	10190	25959	6166	38888	9208	42315	29680	1.42
Ⓓ ③	-34	10190	29522	6166	38888	5504	45878	33384	1.37
Ⓔ ②	-34	10190	7762	6166	26947	9208	24118	17739	1.36
Ⓔ ③	-34	10190	11198	6166	26947	5504	27554	21443	1.28
Ⓕ ①	-14	3775	4000	3100	13571	5937	10874	7634	1.42
Ⓕ ⑤	-14	3775	13200	633	13571	245	17608	13326	1.32
Ⓖ ②	-36	10865	29522	6166	42963	9208	46553	33755	1.38
Ⓖ ③	-36	10865	33085	6166	42963	5504	50116	37459	1.34

NOTES

Ø - ANGLE OF INTERNAL FRICTION, DEGREES.
C - UNIT COHESION, P.S.F.
▽ - STATIC WATER SURFACE.
D - HORIZONTAL DRIVING FORCE IN POUNDS.
R - HORIZONTAL RESISTING FORCE IN POUNDS.
A - AS A SUBSCRIPT, REFERS TO ACTIVE WEDGE.
B - AS A SUBSCRIPT, REFERS TO CENTRAL BLOCK.
P - AS A SUBSCRIPT, REFERS TO PASSIVE WEDGE.

$$F.S.=\frac{R_A+R_B+R_P}{D_A-D_P}$$

MISSISSIPPI RIVER OUTLETS,
VENICE, LOUISIANA
GENERAL DESIGN MEMORANDUM

GRAND-TIGER PASSES STABILITY ANALYSIS

STA. 620+00 TO STA. 655+00
REACH III
U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS
OCTOBER 1974 FILE NO. H-2-26789

UNIFIED SOIL CLASSIFICATION

MAJOR DIVISION		TYPE	LETTER SYMBOL	SYMBOL	TYPICAL NAMES
COARSE – GRAINED SOILS More than half of material is larger than No. 200 sieve size.	GRAVELS More than half of coarse fraction is larger than No. 4 sieve size.	CLEAN GRAVEL (Little or No Fines)	GW		GRAVEL, Well Graded, gravel-sand mixtures, little or no fines
			GP		GRAVEL, Poorly Graded, gravel-sand mixtures, little or no fines
		GRAVEL WITH FINES (Appreciable Amount of Fines)	GM		SILTY GRAVEL, gravel-sand-silt mixtures
			GC		CLAYEY GRAVEL, gravel-sand-clay mixtures
	SANDS More than half of coarse fraction is smaller than No. 4 sieve size.	CLEAN SAND (Little or No Fines)	SW		SAND, Well-Graded, gravelly sands
			SP		SAND, Poorly-Graded, gravelly sands
		SANDS WITH FINES (Appreciable Amount of Fines	SM		SILTY SAND, sand-silt mixtures
			SC		CLAYEY SAND, sand-clay mixtures
FINE – GRAINED SOILS More than half the material is smaller than No. 200 sieve size.		SILTS AND CLAYS (Liquid Limit <50)	ML		SILT & very fine sand, silty or clayey fine sand or clayey silt with slight plasticity
			CL		LEAN CLAY; Sandy Clay; Silty Clay; of low to medium plasticity
			OL		ORGANIC SILTS and organic silty clays of low plasticity
		SILTS AND CLAYS (Liquid Limit >50)	MH		SILT, fine sandy or silty soil with high plasticity
			CH		FAT CLAY, inorganic clay of high plasticity
			OH		ORGANIC CLAYS of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			Pt		PEAT, and other highly organic soil
WOOD			Wd		WOOD
SHELLS			Sl		SHELLS
NO SAMPLE					

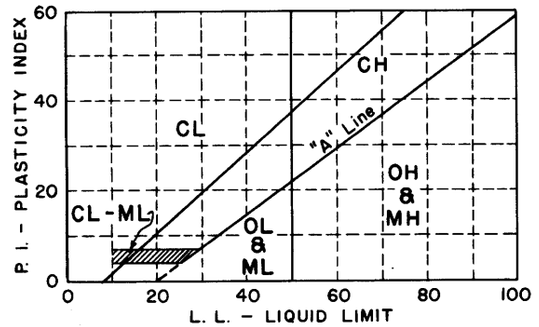
NOTE: Soils possessing characteristics of two groups are designated by combinations of group symbols

DESCRIPTIVE SYMBOLS

COLOR	
COLOR	SYMBOL
TAN	T
YELLOW	Y
RED	R
BLACK	BK
GRAY	Gr
LIGHT GRAY	lGr
DARK GRAY	dGr
BROWN	Br
LIGHT BROWN	lBr
DARK BROWN	dBr
BROWNISH-GRAY	br Gr
GRAYISH-BROWN	gy Br
GREENISH-GRAY	gn Gr
GRAYISH-GREEN	gy Gn
GREEN	Gn
BLUE	Bl
BLUE-GREEN	Bl Gn
WHITE	Wh
MOTTLED	Mot

CONSISTENCY FOR COHESIVE SOILS		
CONSISTENCY	COHESION IN LBS./SQ.FT. FROM UNCONFINED COMPRESSION TEST	SYMBOL
VERY SOFT	< 250	vSo
SOFT	250 - 500	So
MEDIUM	500 - 1000	M
STIFF	1000 - 2000	St
VERY STIFF	2000 - 4000	vSt
HARD	> 4000	H

MODIFICATIONS	
MODIFICATION	SYMBOL
Traces	Tr-
Fine	F
Medium	M
Coarse	C
Concretions	cc
Rootlets	rt
Lignite fragments	lg
Shale fragments	sh
Sandstone fragments	sds
Shell fragments	slf
Organic matter	O
Clay strata or lenses	CS
Silt strata or lenses	SIS
Sand strata or lenses	SS
Sandy	S
Gravelly	G
Boulders	B
Slickensides	SL
Wood	Wd
Oxidized	Ox



PLASTICITY CHART

For classification of fine - grained soils

NOTES:

FIGURES TO LEFT OF BORING UNDER COLUMN "W OR D_{10}"

- Are natural water contents in percent dry weight
- When underlined denotes D_{10} size in mm *

FIGURES TO LEFT OF BORING UNDER COLUMNS "LL" AND "PL"

- Are liquid and plastic limits, respectively

SYMBOLS TO LEFT OF BORING

- ▽ Ground-water surface and date observed
- (C) Denotes location of consolidation test **
- (S) Denotes location of consolidated-drained direct shear test **
- (R) Denotes location of consolidated-undrained triaxial compression test **
- (Q) Denotes location of unconsolidated-undrained triaxial compression test **
- (T) Denotes location of sample subjected to consolidation test and each of the above three types of shear tests **
- FW Denotes free water encountered in boring or sample

FIGURES TO RIGHT OF BORING

- Are values of cohesion in lbs./sq. ft. from unconfined compression tests
- In parenthesis are driving resistances in blows per foot determined with a standard split spoon sampler (1 3/8" I.D., 2" O.D.) and a 140 lb. driving hammer with a 30" drop
- Where underlined with a solid line denotes laboratory permeability in centimeters per second of undisturbed sample
- Where underlined with a dashed line denotes laboratory permeability in centimeters per second of sample remoulded to the estimated natural void ratio

* The D_{10} size of a soil is the grain diameter in millimeters of which 10% of the soil is finer, and 90% coarser than size D_{10}.

**Results of these tests are available for inspection in the U.S. Army Engineer District Office, if these symbols appear beside the boring logs on the drawings.

GENERAL NOTES:

While the borings are representative of subsurface conditions at their respective locations and for their respective vertical reaches, local variations characteristic of the subsurface materials of the region are anticipated and, if encountered, such variations will not be considered as differing materially within the purview of clause 4 of the contract.

Ground-water elevations shown on the boring logs represent ground-water surfaces encountered on the dates shown. Absence of water surface data on certain borings implies that no ground-water data is available, but does not necessarily mean that ground water will not be encountered at the locations or within the vertical reaches of these borings.

Consistency of cohesive soils shown on the boring logs is based on driller's log and visual examination and is approximate, except within those vertical reaches of the borings where shear strengths from unconfined compression tests are shown.

REVISION	DATE	DESCRIPTION	BY
3	5-3-71	ADDED UPPER LIMIT LINE (P.I.=0.9 (LL-8)) ON PLASTICITY CHART	LMVED-G LETTER D'T'D 29 APRIL 1971
2	6-8-64	SYMBOL FW, NOTE REVISED	ORAL FROM L.M.V.G.G. 5 JUNE 1964
1	9-17-63	IST. PAR. OF GENERAL NOTES REVISED	L. M. V. D. MULTIPLE LETTER, DATED 5 SEPT., 1963

SOIL BORING LEGEND

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
FILE NO. H-2-21800

PLATE A

MISSISSIPPI RIVER OUTLETS

VICINITY OF VENICE, LOUISIANA

GENERAL DESIGN MEMORANDUM

APPENDIX A
HYDROLOGY

MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LOUISIANA
GENERAL DESIGN MEMORANDUM

APPENDIX A
HYDROLOGY

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TABLES

PLATES

GLOSSARY

BAR
: An offshore ridge or mound of sand, gravel, or other unconsolidated material submerged, at least at high tide; especially at the mouth of a river or estuary, or lying a short distance from and usually parallel to, the beach.

CONTROLLING DEPTH
: The least depth of water in navigable parts of a waterway, which limits the allowable draft of vessels.

CURRENT
: A flow of water.

DIURNAL
: Having a period or cycle of approximately one tidal day.

DIURNAL TIDE
: A tide with one high water and one low water in a tidal day.

JETTY
: On open seacoasts, a structure extending into a body of water, and designed to prevent shoaling of a channel by littoral materials, and to direct and confine the stream or tidal flow. Jetties are built at the mouth of a river or tidal inlet to help deepen and stabilize a channel.

LITTORAL
: Of or pertaining to a shore, expecially of the sea.

LITTORAL DEPOSITS
: Deposits of littoral drift.

LITTORAL DRIFT
: The material moved in the littoral zone under the influence of waves and currents.

REVETMENT
: A facing of stone, concrete, etc., built to protect a scarp, embankment, or shore structure against erosion by wave action or currents.

SEDIMENT
: The matter that settles to the bottom of a liquid.

SEDIMENTATION

The movement in any direction of solid particles through a fluid as a result of gravitational or other force. The action or process of depositing sediment.

SHOAL (noun)

A detatched elevation of the sea bottom comprised of any material except rock, or coral, and which may endanger surface navigation.

MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LOUISIANA
GENERAL DESIGN MEMORANDUM

Appendix A

HYDROLOGY

1. Climatology.

a. Climate. The climate of the study area is influenced by its subtropical latitude and proximity to the Gulf of Mexico, giving characteristics of a marine climate, especially in summer when southerly winds prevail. The southerly winds produce a condition favorable for afternoon summer thundershowers. In the colder seasons the area is subjected to frontal movements which produce squalls and sudden temperature drops. As the water temperature of the Mississippi River is somewhat colder than the air temperature in winter and spring, river fogs are prevalent. Normally, the flood season of the river occurs from December to early June, and the hurricane season from June to October. Climatological data for this area are contained in monthly and annual publications by the US Department of Commerce, National Weather Service, titled "Climatological Data for Louisiana." Station locations are shown on plate A-1.

b. Temperature. Temperature data for the area are available for stations at Burrwood and Boothville, La., with a period of record of 57 years for Burrwood and 7 years for Boothville. The normal annual temperature is 70.5°F with monthly normals ranging from 57.5°F in January to 82.8°F in August. Normal temperatures for each month are given in table A-1. Extreme recorded temperatures range from 99° at Burrwood on 3 August 1961 to 19° at Boothville on 30 January 1966. Maximum and minimum temperatures for both stations are shown in table A-2.

TABLE A-1

PRECIPITATION AND TEMPERATURE NORMALS
(Based on Burrwood, La.)

Precipitation

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
4.08	4.31	4.22	4.01	4.08	4.25	6.69	7.52	7.67	3.40	4.15	3.97	58.35

Temperature

57.5	58.2	61.5	67.9	75.1	81.1	82.7	82.8	80.5	74.3	65.1	59.7	70.5

TABLE A-2
MAXIMUM AND MINIMUM TEMPERATURE DATA

Station	Period of Record	Maximum	Date	Minimum	Date
Burrwood	1907-65	99	3 Aug 61	21	11 Jan 62
Boothville	1965-72	96	6 Aug 72	19	30 Jan 66

c. Rainfall. Precipitation for this area is usually heaviest during the months of July, August, and September when numerous thunderstorms occur; rainfall during the remaining months is generally uniform. Precipitation records are available for 57 years at Burrwood and 7 years at Boothville. The normal annual rainfall is 58.4 inches, with monthly normals ranging from 3.4 inches in October to 7.7 inches in September. Monthly normals are shown in table A-1. The maximum monthly rainfall was 21.06 inches, recorded at Burrwood in September 1957; the minimum occurred at the same station in October 1952 when no rainfall was recorded. The greatest annual rainfall, 86.01 inches, occurred at Burrwood in 1912; the least, 33.4, occurred in 1917 at Burrwood. Maximum and minimum precipitation amounts are shown in table A-3.

TABLE A-3
MAXIMUM AND MINIMUM PRECIPITATION DATA

Station	Period of Record	Maximum			Minimum		
		Monthly	Date	Annual	Monthly	Date	Annual
Burrwood	1907-65	21.06	Sep 57	86.01 1912	0.0	Oct 52	33.34 1917
Boothville	1965-72	12.08	Aug 66	82.60 1966	0.09	Nov 67	39.80 1968

d. Wind. Based on wind data from Grand Isle, La., which is approximately 35 miles west of the project area, the prevailing wind direction is from the southeast with an average velocity of 9.5 miles per hour. A wind rose diagram is shown on plate A-2.

2. Hydrology and hydraulics.

a. Hydrologic features of the distributaries. The Mississippi River entrance to the eastern distributary system, Baptiste Collette Bayou, has a cross section of approximately 8,500 ft^2; the entrance of the western distributary system, Grand-Tiger Passes, has a cross section of approximately 37,000 ft^2. Concurrent discharge measurements taken within 1 mile below the head of each of these distributary channels for below bankfull flows (5 feet m.s.l.) reported nearly equal volumes of discharge are diverted gulfward by each distributary. At

flows above bankfull stage, Grand-Tiger Passes discharges about 30 percent more than Baptiste Collette Bayou. Distribution of flow measurements taken in 1966 within the channels of the project area, for Mississippi River discharges of 429,000 cubic feet per second (ft^3/s) and 1,019,000 ft^3/s, revealed that, of the Mississippi River flow diverted into Grand-Tiger Passes, about 25 percent was routed into Tiger Pass down to the latitude of mile 2.7, and 13 percent remained in the channel at mile 5.5. The 12 percent loss of flow below mile 2.7 in Tiger Pass is attributed to flow diverted into a canal system which forms a junction with Red Pass and Pass Tante Phine to carry this water gulfward. Of the flow diverted into Baptiste Collette Bayou, about 50 percent is routed into Emeline Pass and the remainder equally distributed between Main and Kimbel Passes.

b. Tides. The tide along the coast is diurnal and has a mean range of approximately 1 foot under normal conditions. Records shown an average tidal range of 1.3 feet in the Mississippi River at Venice.

c. Stages. Average stages for the Baptiste Collette Bayou channel and the Grand-Tiger Passes channel will range from 2.4 feet m.s.l. at the junction with the Mississippi River at Venice to 1.5 feet m.s.l. at the gulfshore. The inland channel length is approximately 6 miles in Baptiste Collette Bayou and 12 miles in Grand-Tiger Passes. In a normal year, stages on the river end of the channels will range from 5.2 feet m.s.l. during highwater season to 0.20 foot m.s.l. in the low-flow period. Extreme annual stages on the gulf end of the channels range from 2.1 feet m.s.l. to 0.6 foot m.s.l. Extreme stages, the Mississippi River Commission's approved low flow line, and the Mississippi River and Tributaries project flow line for stations in the vicinity of the project are shown in table A-4. Station locations are shown on plate A-1.

d. Currents. Currents in the inland portions of the channels are controlled by a combination of tide, wind, and Mississippi River flows. During high-water periods on the river, with a normal stage in the gulf, current velocities are expected to be about 3.5 ft/s in Baptiste Collette Bayou and 2.5 ft/s in Grand-Tiger Passes channels. During low-flow periods, velocities in the channels are expected to decrease to approximately 1.8 ft/s in Baptiste Collette Bayou and 1.6 ft/s in Grand-Tiger Passes channels. However, these current velocities can vary considerably due to wind and tide conditions.

e. Salinity. Measurements taken in Grand Pass at Venice show chloride concentrations as high as 7,500 parts per million (p/m) during low-flow periods on the river. The deepening of the channels in Baptiste Collette Bayou and Tiger Pass is expected not to significantly increase salinity in or below the project area. The results of an investigation of the possibility of salinity intrusion into the Mississippi River, caused by deepening of Baptiste Collette Bayou and Grand-Tiger

TABLE A-4

TIDE GAGING STATIONS

Zero, m.s.l.

Station	Period of Record	High	Year	Low	Year	Average Annual HIgh	Average Annual Low	MRC Approved Low	MR&T Project Flow LIne
Breton Sound at Gardner Island	1957-71	5.74	1960	-2.82	1965	3.9	-1.3	-	-
Bayou Yscloskey at Shell Beach	1957-71	11.06	1969	-2.70	1965	4.1	-1.1	-	-
Mississippi River (SW Pass) at East Jetty	1953-71	5.02	1969	-1.60	1940	3.6	-0.1	-0.78	4.0
Mississippi River at Head of Passes	1944-71	12.03	1969	-0.85	1940	4.8	0.2	-0.36	6.8
Mississippi River at Venice	1953-71	9.11	1969	-0.64	1956	5.2	0.2	-0.36	8.5

Passes, indicate that a freshwater discharge with velocities of 1.0 ft/s or greater would limit saltwater intrusion to 4 miles in either channel. This intrusion would be in the form of a saltwater prism, sloping from approximately 10 feet below the surface at the mouth of the channels to 18 feet below the surface 4 miles upstream.

3. Sedimentation, littoral drift and associated problems.

a. Suspended sediment.

(1) Interpolations. Observations in Southwest Pass indicate a suspended sediment concentration of 317 p/m within a zone from the surface to a depth of 20 feet, for stages of 2 feet m.s.l., or above and 50 p/m for stages below 2 feet m.s.l. at Venice, La. Average discharges at the headwaters of each project distributary were interpolated from stage-discharge curves and were 19,000 ft^3/s for Baptiste Collette Bayou and 23,000 ft^3/s for Grand-Tiger Passes.

(2) Total annual volume. Using the above data, computation of total sediment loads diverted by each pass were based on the flow duration relations for the Mississippi River at Red River Landing. These flow duration relations indicate that a flow corresponding to a stage of 2.0 feet m.s.l. or above at Venice, La., occurs 146 days per year. This flow carries a total suspended load of 1,757,000 yd^3 into Baptiste Collette Bayou and 2,127,000 yd^3 into Grand-Tiger Passes annually. Flows corresponding to a Venice stage lower than 2.0 feet m.s.l., which will occur the remainder of the year, carry 416,000 yd^3 and 503,000 yd^3 into Baptiste Collette Bayou and Grand-Tiger Passes, respectively. The high and low discharge sediment loads were combined to determine the total annual volume of suspended sediments in each system. The bed load contribution is estimated to be 10 percent of the suspended load. The total sediment transport diverted into the distributaries is 2,173,000 + 217,000 = 2,390,000 yd^3/yr into Baptiste Collette Bayou and 2,630,000 + 263,000 = 2,893,000 yd^3/yr into Grand-Tiger Passes.

b. Sedimentation and littoral drift into the Baptiste Collette Bayou navigation channel.

(1) Inland reach. Of the 2,390,000 yd^3/yr of sediment diverted into Baptiste Collette Bayou, 33.5 percent or 800,000 yd^3/yr will reach Main Pass due to the increased conveyance for the proposed channel. In the pass from mile 1.6 to mile 6.0 estimated deposits are 112,000 yd^3/yr for the proposed channel. This gives a rate of deposition of 0.6 ft/yr.

(2) Offshore reach. In the offshore reach, from mile 6.0 to mile 8.0, the estimated channel deposits are 688,000 yd^3/yr for the proposed channel. This gives a shoaling rate of 4.3 ft/yr. In addition to the suspended channel sediments in the offshore reach,

littoral drift contributes an estimated 548,000 yd^3/yr with a shoaling rate of 3.4 ft/yr. If jetties are not built at Baptiste Collette Bayou, the annual dredging requirements will be 1,348,000 yd^3 with most of the sediment, 1,236,000 yd^3/yr, depositing in the offshore reach. The combined shoaling rate for suspended sediments, bed load, and littoral drift in the offshore reach will average 7.7 ft/yr. To keep the channel open at navigation depths, dredging would be required at least twice every year.

(3) Considered jetty reach. A jetty built at the mouth of the proposed channel would in effect carry suspended channel sediments out into deeper water and prevent littoral drift from being deposited in the jetty reach (approximately mile 6.0 to mile 7.5). The channel sediment within the jetty is estimated to be 80,000 yd^3/yr. This gives a rate of shoaling of 0.7 ft/yr. In the offshore reach beyond the jetty, channel sediments would be 304,000 yd^3/yr and the littoral drift would be 274,000 yd^3/yr; this gives shoaling rates of 0.8 and 0.7 ft/yr, respectively. The combined shoaling rate is 1.5 ft/yr and would require maintenance dredging at an interval of 2 years.

(4) Summary. The construction of the jetties would reduce the total quantities of annual deposits to be dredged from 1,348,000 yd^3/yr to 770,000 yd^3/yr and would cause 578,000 yd^3/yr to be carried out into deep water.

c. Sedimentation and littoral drift in Grand-Tiger Passes navigation channel.

(1) Inland reach. Of the 2,893,000 yd^3/yr of sediment diverted into Grand-Tiger Passes, 25 percent or 723,000 yd^3/yr goes into Tiger Pass. Seventeen percent of this sediment load, or 492,000 yd^3/yr reaches the lower reaches of Tiger Pass due to increased conveyance of the proposed channel. The sediment deposition from mile 0.0 to mile 1.0 will be 15,000 yd^3/yr, and the associated shoaling rate is 0.3 ft/yr. In the inland reach from mile 1.0 to mile 5.5, deposits will be 84,000 yd^3/yr for the proposed channel with a shoaling rate of 0.4 ft/yr. In the remaining inland reach from mile 5.5 to mile 12.2, deposits will be 123,000 yd^3/yr for the proposed channel with a shoaling rate of 0.4 ft/yr.

(2) Offshore reach. In the offshore reach from mile 12.2 to mile 14.2, estimated channel deposits for the proposed channel will be 270,000 yd^3/yr. This gives a shoaling rate of 1.7 ft/yr. Littoral drift in the same offshore reach will contribute 215,000 yd^3/yr which will give a shoaling rate of 1.3 ft/yr. The predominant direction of littoral drift is towards the north. If jetties are not built at Tiger Pass, the annual dredging requirement will be 707,000 yd^3, with most of the sediment, 485,000 yd^3/yr, depositing in the

offshore reach. The combined shoaling rate for suspended sediments, bed load, and littoral drift will average 3.0 ft/yr. In order to keep the channel open at navigation depths, dredging will be required on an annual basis.

(3) Considered jetty reach. A jetty built from mile 12.2 to mile 13.3 would carry most of the channel sediments offshore of the jetty. The littoral drift would be trapped by the jetty and prevented from being deposited in the jetty reach. The channel sediment deposited within the jetty is estimated to be 49,000 yd^3/yr with a shoaling rate of 0.4 ft/yr. In the offshore reach beyond the jetty, channel sediments would be 55,000 yd /yr with littoral drift contributing an additional 54,000 yd^3/yr. Respective shoaling rates are 0.2 and 0.2 ft/yr. The combined shoaling rate for suspended sediments and littoral drift offshore of the jetties would be 0.4 ft/yr and would require maintenance dredging at intervals of 8 years.

(4) Summary. The construction of the jetties would reduce the total quantities of annual deposits to be dredged from 707,000 yd^3/yr to 380,000 yd^3/yr and would cause 327,000 yd^3/yr to be carried out into deep water.

d. Previous emergency maintenance dredging. In April 1972 and April 1973, due to emergency operations on the Inner Harbor Navigation Canal, it became necessary to dredge an alternate navigation channel of dimensions 9 feet by 125 feet through the offshore reach of Baptiste Collette Bayou. The alinement followed a northerly direction through North Pass to avoid existing pipelines. The total dredging required in 1972 was 265,520 yd^3, and in 1973 was 395,916 yd^3 for an average of 330,718 yd^3. After 1 week had elapsed, the channel was no longer at project depth and consequently navigation was very limited. During the 1973 emergency dredging, strong winds of approximately 40-45 mi/h were experienced from the north, northeast, and ssoutheast. These winds are attributed with being the primary cause for the rapid shoals which occurred.

e. Navigation problems. The inland reaches of both Baptiste Collette Bayou and Tiger Pass are generally navigable to depths of at least 10 feet below mean low gulf (m.l.g.), and some reaches exceed the project depths. However, there are some isolated reaches, such as in the vicinity of Mercantile Bayou on Tiger Pass, which have a controlling depth of only 6 feet m.l.g. The major sedimentation and navigation problems are in the offshore reaches. The velocities within the land cut are generally sufficient to keep most of the sediment load suspended. As the flow enters the Gulf of Mexico the velocities approach zero and the sediments will fall out and combine with the littoral drift moving alongshore to cause restrictive navigational depths. Immediatley offshore of both Baptiste Collette Bayou and Tiger Pass, scour holes form relatively deep navigation depths. This condition is caused by the momentum of the

flow as it enters the Gulf of Mexico and Breton Sound. Jetties would trap littoral drift which would otherwise move into the channel and would channel the flow and suspended sediments into deeper water.

f. Bank erosion and revetments. In order to prevent flanking, the jetty would be extended landward as shown on plates 7 and 13. A low profile revetment (-2.0 feet to +2.5 feet m.l.g.) will be built perpendicular to the jetty intersection with the shoreline. This revetment will be instrumental in preventing scour and erosion which could allow flows to flank the jetty and cause sedimentation problems and reduce the effectiveness of the jetty. In the inland reaches some minor bank erosion occurs in the existing channel, and with the increased cross-sectional area of the proposed channel, this erosion may increase. This is not considered to be a major problem at present, but there may be some isolated reaches where special treatment may be warranted in the future. There are several areas in the lower reaches of both passes where sediment is diverted away from the existing main channels. Some of the gaps actually divert some of the sediment during high flows that would otherwise deposit in the channel or in reaches offshore of the jetties. When the project is built, some of these gaps near the shoreline may enlarge and significantly reduce the flow actually going through the jetties. If this situation arises, it may be necessary to incorporate low sill structures or closure dams in the project to prevent diversion of the flows necessary to maintain channel depths.

4. Design criteria for considered jetties.

a. General. In preceding paragraphs, the need for jetty construction was discussed. Efforts to dredge Baptiste Collette Bayou have shown that the offshore reaches will shoal a combination of littoral drift and sediment deposits. See plates 7 and 13 for location of considered jetties.

b. Design wave criteria. The design wave height H_s is 4.5 feet, and the associated wave period is 5.0 seconds. This wave criteria is based on a storm surge elevation of 4.0 feet m.l.g. Higher storm surges would tend to ride over the structure and would be less critical to the jetty.

c. Height, alinement, and length.

(1) Height. In the interest of navigation, the crown of the jetties would be at elevation 4.0 feet m.l.g. This elevation would expose the jetties for most storm conditions. Navigation would be improbable for severe storm conditions.

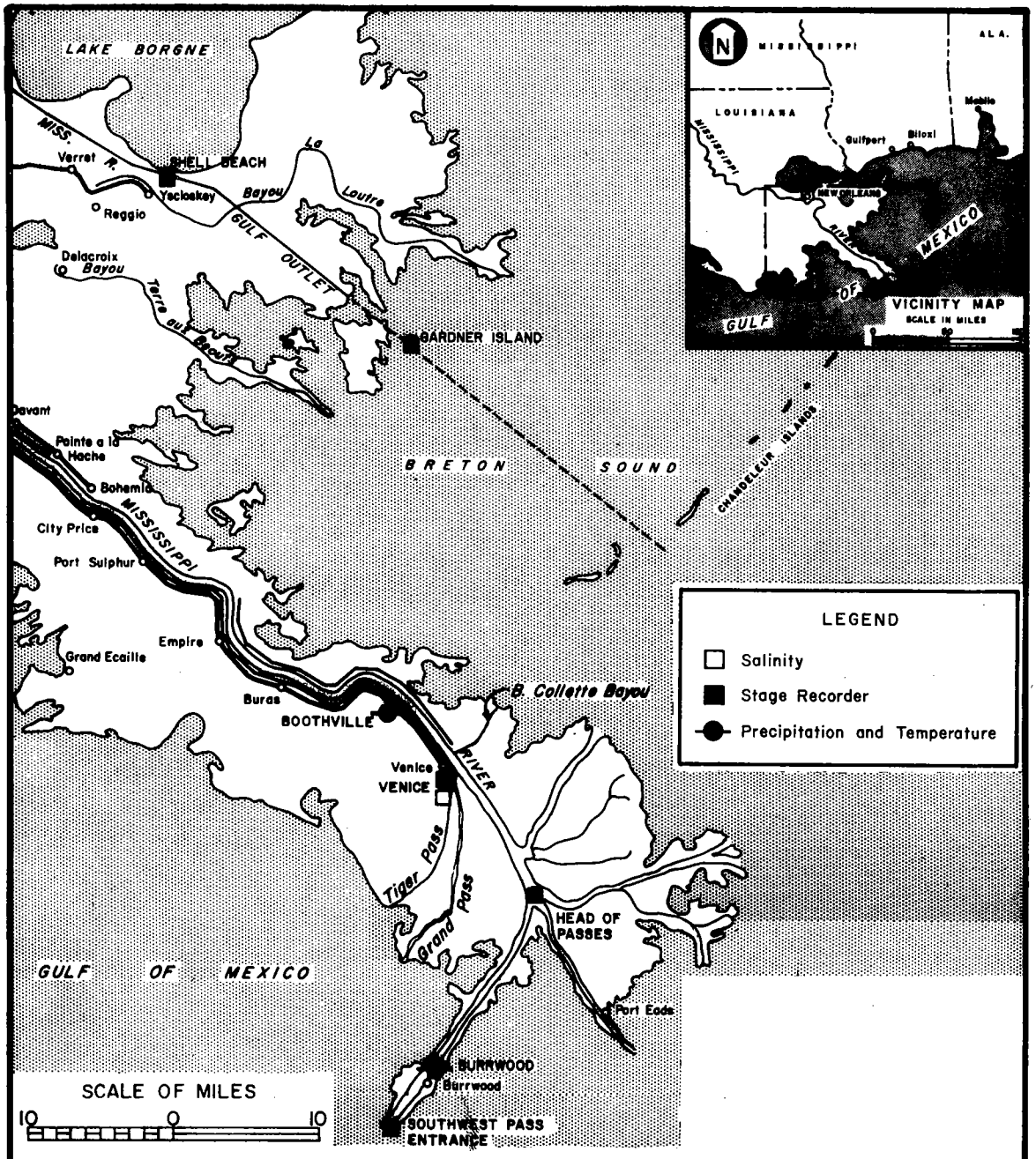
(2) Alinement. Construction of the jetties at Baptiste Collette Bayou would begin onshore and follow a northerly alinement. Construction of the jetties at Tiger Pass would begin onshore and follow a west-southwest alinement into deeper water.

(3) Length. In order for the Baptiste Collette Bayou jetty to be effective, it would be necessary to extend it for a reach of 1.5 miles through the variable shoal areas that exist offshore. In order to get through an offshore bar area, it would be necessary to extend the jetties for a distance of 1.1 miles from the shoreline. The jetty at Tiger Pass would extend to the -6.0-foot m.l.g. contour.

d. Permeability and proximity to the channel. The jetties should be relatively impermeable to insure confinement of the discharge and to maintain sufficient velocities to carry the suspended sediment into deeper water. A design incorporating rock, shell, and plastic filter cloth would make the jetty relatively impermeable. The shell core of the jetty should extend upward to -1 foot m.l.g. A plastic filter cloth incorporated in the design would prevent undercutting of the foundation of the jetty. In order to achieve a further confinement of flow, the jetties would be built as close to the channel as practicable. The toe of the jetty would be built approximately 50 feet from the top of the channel and 80 feet from the bottom of the channel.

e. Spur dikes. The distance between centerlines of jetties would be 480 feet. This distance is necessary to accommodate a 16-by 250-foot navigational channel in the offshore reaches of Baptiste Collette Bayou and Tiger Pass, and to prevent erosion and undercutting of the toe of the jetties. The cross-sectional area as proposed gives velocities of flow in the order of 0.7 foot per second. In order to make the jetties more efficient and give velocities of at least 1 foot per second, further constriction of the jetties would be needed. Perpendicular spur dikes built at 500-foot intervals would assist in maintaining desired velocities in the jettied channels. These spur dikes would allow for a safe navigation width of 250 feet for ease of navigation in the jetty reaches.

f. Tie in to spoil retention dikes. To prevent flanking of the inland reaches of the jetties, retention dikes should be tied in to the revetment and jetties. Planting of proper vegetation on the spoil banks would reduce the erosion in the vicinity of the jetties.



MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LOUISIANA

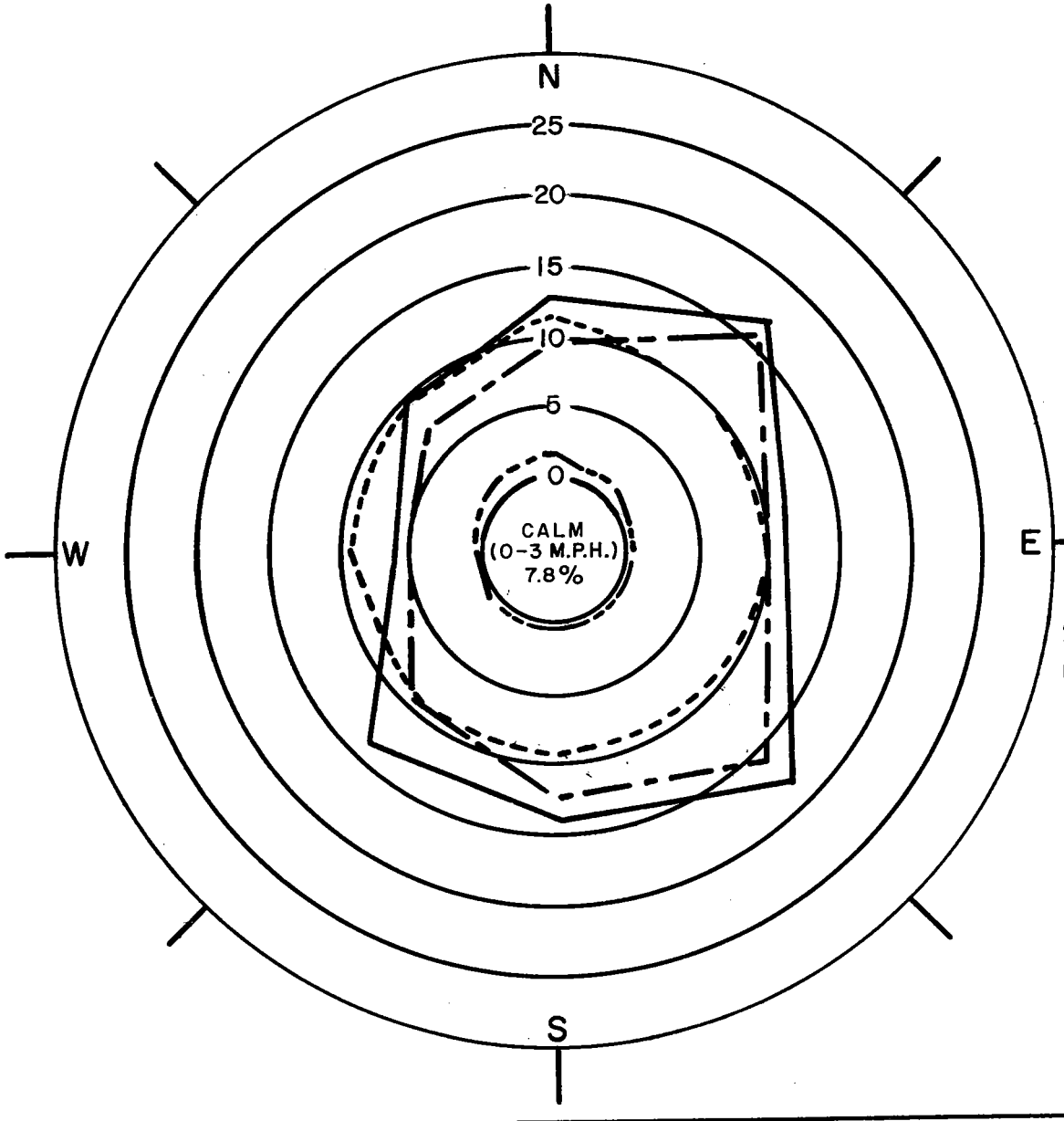
LOCATION OF HYDROLOGIC STATIONS

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

OCTOBER 1974

FILE NO. H-2-26694

PLATE A-1



AVERAGE SPEED IN M.P.H.
WIND DURATION IN PERCENT
PERCENT OF TIME
WIND BLEW 4-15 M.P.H.
PERCENT OF TIME
WIND BLEW 16-31 M.P.H.

MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LOUISIANA

WIND ROSE
FOR
GRAND ISLE AND VICINITY

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
OCTOBER 1974 FILE NO. H-2-26694

PLATE A-2

MISSISSIPPI RIVER OUTLETS

VICINITY OF VENICE, LOUISIANA

GENERAL DESIGN MEMORANDUM

APPENDIX B
VIEWS OF OTHER AGENCIES

MISSISSIPPI RIVER OUTLETS,
VICINITY OF VENICE, LOUISIANA
GENERAL DESIGN MEMORANDUM

APPENDIX B
VIEWS OF OTHER AGENCIES

TABLE OF CONTENTS

ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1600 PATTERSON, SUITE 1100
DALLAS, TEXAS 75201

April 29, 1974

OFFICE OF THE
REGIONAL ADMINISTRATOR

Colonel Richard L. Hunt
District Engineer
U.S. Army Corps of Engineers
P.O. Box 60267
New Orleans, Louisiana 70160

Re: LMNED-MP

Dear Colonel Hunt:

We are writing in response to your recent letter requesting our comments concerning a proposed project to construct additional navigation outlets from the Mississippi River in the vicinity of Venice, Louisiana. Please accept our apology for the lateness of this reply. We have the following comments for your consideration in developing the project plan, and in the preparation of an Environmental Impact Statement for the project.

1. Spoil disposal plans for this project should be developed in consonance with the guidelines presently being developed by EPA under Section 404(b) of P.L. 92-500.

2. Your letter states that some of the dredged material will be used to build new shoreline. The Louisiana Wildlife and Fisheries Commission has indicated that there are important oyster producing bottoms adjacent to Tiger Pass and Bayou Baptiste Collette. We believe that the disposal of spoil in these areas could have adverse effects on this important resource.

3. Studies should be made to determine whether any changes in water circulation, salinity, and sedimentation will be caused by the project.

We appreciate the opportunity to provide our comments on this project during the early stages of project development, and we look forward to reviewing the Draft Environmental Impact Statement for the project. We would be happy to meet with you to discuss environmental issues relating to this project, if you feel it would be beneficial.

Sincerely yours,

for Arthur W. Busch
Regional Administrator

United States Department of the Interior
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
17 EXECUTIVE PARK DRIVE, N. E.
ATLANTA, GEORGIA 30329

September 20, 1974

District Engineer
U.S. Army Corps of Engineers
P.O. Box 60267
New Orleans, Louisiana 70160

Dear Sir:

Subject: Project Providing for Additional Navigation Outlets from the Mississippi River in the Vicinity of Venice, La. (report dated 9/13/74)

Enclosed are five copies of our report on the subject project.

Sincerely yours,

John D. Green

John D. Green
Regional Supervisor
Division of River Basin Studies

Enclosures

United States Department of the Interior
FISH AND WILDLIFE SERVICE
17 EXECUTIVE PARK DRIVE, N. E.
ATLANTA, GEORGIA 30329

SEP 13 1974

District Engineer
U.S. Army Corps of Engineers
New Orleans, Louisiana

Dear Sir:

Reference is made to your letter dated January 30, 1974, LMNED-MP, regarding the authorized project to provide additional navigation outlets from the Mississippi River in the vicinity of Venice, Louisiana. You requested our comments on this project by February 25, 1974. We regret that the magnitude of this project and prior commitment on other projects prevented a more timely response. Our comments are submitted in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

PROJECT DESCRIPTION

Present plans call for enlargement and maintenance of Baptiste Collette Bayou between the Mississippi River and Breton Sound, and Grand/Tiger Passes between the Mississippi River and the Gulf of Mexico, to a depth of 14 feet below mean low gulf (m.l.g.) over a bottom width of 150 feet, with entrance channels in open water 16 feet deep over a bottom width of 250 feet, and jetties to the 6-foot contour, if and when justified, to reduce cost of maintenance dredging.

Dredging will be confined within the existing channels of Baptiste Collette Bayou and Grand/Tiger Passes. Three kinds of spoil areas, shown on enclosures 2 and 3 of your January 30, 1974, letter, will be utilized for disposal of construction and annual maintenance spoil. Many of these spoil areas will be enclosed with retention dikes, and maximum spoil elevation within these sites will be 3 feet m.l.g. It was also noted in your letter that shallow water areas along Tiger Pass are suitable for allowing spoil to spread out and build marshland (elevation 2-3 feet m.l.g.). Such areas would contain dikes along the channel to prevent return of dredged material into the channel. Spoil resulting from dredging in Breton Sound and gulf waters will be pumped to the shoreline areas and will build the existing shoreline outward at an elevation of approximately 2 feet m.l.g. You estimated that about 1,800 acres of land will be created by spoil disposal in shallow water off Baptiste Collette Bayou over the life of the project, and that 560 acres will be similarly formed near the mouth of Tiger Pass. According to your letter, locations

of spoil disposal areas are approximate and can be altered as field conditions permit. Possible uses were listed as wildlife or bird refuges.

DISCUSSION

The various spoil sites (plates 1 and 2) are discussed below under appropriate headings.

I. Grand/Tiger Pass Spoil Sites

A. Spoil Area A. Utilization of the spoil area along Tiger Pass will not result in significant damages to fish and wildlife resources. A major portion of the area has been cleared and utilized to obtain fill for a levee construction project. In addition, a marina will be constructed by the Plaquemines Parish Commission Council in this area.

B. Spoil Area B. The practice of creating marshland with spoil is still in the experimental stage, but represents a possible alternative to conversion of valuable wetlands to upland habitat through the use of diked spoil disposal areas. A major consideration in such a program is the final elevation of the deposited material. Minor differences in subtrate elevation will have profound effects on the type of vegetation inhabiting these sites. Undesirable growth of shrubby terrestrial plants such as marsh elder (Iva frutescens) and eastern baccharis (Baccharis halimifolia) are encouraged by excessive spoil elevations. The timing and location of maintenance spoiling are also important. Annual deposition of spoil on newly established marsh plant communities will offset any gains achieved through initial plant succession. We have correlated vegetation observed in the proposed unconfined spoil areas labeled "B" with elevation of these obtained from members of your staff. It is our opinion that an approximate elevation of 2.5 feet m.l.g. should be the maximum allowed in these areas after initial settling has occurred. We also believe that construction of the pass bank retaining dikes is unnecessary, since the elevation of these banks is sufficient to prevent return flows of dredged spoil. Construction of these dikes will also destroy a major portion of the existing narrow band of marsh and woody vegetation. Such dikes will also prevent sediment-laden overbank flows from nourishing the adjacent marshes. If such dikes are built, they should be constructed beyond the zone of vegetation and should have frequent openings to allow overbank flows to reach adjacent marshes. Openings presently exist along the proposed spoil area B, and any dikes constructed should have openings immediately adjacent to these.

C. Spoil Area C. Spoiling within the two diked disposal sites labeled "C" will cause severe degradation of the fish and wildlife value of these sites. These sites contain marshland vegetated primarily with saltmarsh cordgrass (Spartina alterniflora) and delta duckpotato (Sagittaria platyphylla), with interspersed tidal ponds and creeks. Construction of dikes around these sites and placing of spoil to an elevation of 3 feet m.l.g. will eliminate their value as waterfowl and wading bird feeding and resting areas, as producers of tide-transported plant detritus, and as nursery areas for marine and estuarine fishes and crustaceans. A less damaging alternative to the severe degradation of these 373 acres of valuable wetlands would be to utilize spoil area D located in shallow gulf waters adjacent to Tiger Pass.

D. Spoil Area D. Spoiling in shallow gulf waters will eliminate an estimated 560 acres of this habitat over the 50-year project life. However, the creation of this low elevation land (2.0 feet m.l.g.) offers a possible opportunity to create marshland from spoil deposits. This task will be a complex one, requiring close coordination between our agencies. If successful, however, techniques developed could be employed on other maintenance spoil areas in coastal Louisiana. Critical factors are elevation and stability of the soil, timing and location of maintenance spoil deposition, and mode and rate of plant succession. The predicted 2.0 feet m.l.g. elevation will probably favor saltmarsh cordgrass and possibly delta threesquare (Scirpus sp.). Artificial seeding or transplanting of these species may be necessary to initiate and/or accelerate their establishment.

II. Baptiste Collette Bayou Spoil Sites

A. Completely diked spoil sites.

This category contains two general ecological subdivisions. These are: (a) shallow open water and associated mudflats (areas A and F), and (b) vegetated marsh with associated open water (Areas B, C, D, E, G, H, I, and J).

1. Deposition of spoil on sites A and F may result in the establishment of vegetated marshland. However, care must be taken to prevent spoil from reaching an elevation sufficient to cause invasion by undesirable shrubs and other woody plant species. The maximum allowable spoil elevation in these sites, following initial settling, should be 2.5 feet m.l.g. In order to encourage maximum

spreading of the dredged effluent and subsequent minimum spoil elevation, dikes should not be constructed along the rear perimeters of these areas.

2. Spoil disposal on vegetated marshland located within sites in this category will cause succession to shrubby vegetation of reduced value to wetland wildlife species. An environmentally acceptable alternative to this practice is to deposit spoil only in unvegetated open water within these sites, or in alternate sites located across Baptiste Collette Bayou or in Breton Sound. Rear containment dikes would be eliminated to allow for greater distribution of the dredged effluent. This alternative may also result in the creation of new, vegetated marshland.

B. Partially diked spoil areas.

Areas K and L are in this category. The previous discussion of spoil area D for Tiger Pass is considered sufficient for this category. Caution should be taken, however, not to damage the small areas of vegetated marsh located in the apices of these V-shaped sites. This vegetation is composed chiefly of saltmarsh cordgrass and delta threesquare and will serve as a source of parent stock needed to vegetate the new land to be formed by open-water spoiling in these two sites.

RECOMMENDATIONS

In order to derive maximum fish and wetland wildlife use from the spoil disposal sites, the Fish and Wildlife Service recommends that the spoil disposal plan be modified as follows:

I. Grand/Tiger Pass Sites

A. Limit maximum spoil elevation in site B to 2.5 m.l.g. and eliminate retaining dikes. If retaining dikes are constructed, construction should be beyond the zone of vegetation without alteration of existing pass bank openings.

B. Eliminate spoil area C from further consideration and utilize shallow gulf waters to deposit spoil originally designated for site C.

C. As new land is built within spoil site D, inspections of these sites by Fish and Wildlife Service personnel will be conducted to evaluate rates and nature of plant establishment. Recommenda-

tions designed to establish, perpetuate, and improve this vegetation will be made, and these should be incorporated into the spoil disposal plan.

II. Baptiste Collette Bayou Sites

A. Spoil areas A and F. Limit elevation to 2.5 ft. m.l.g. Eliminate retaining dikes along rear perimeters of these areas.

B. Spoil areas B, C, D, E, G, H, I and J. Confine spoil disposal and retaining dikes to open water within these sites or to open water sites located across Baptiste Collette Bayou or in Breton Sound; limit maximum elevation of spoil to 2.5 ft. m.l.g. Eliminate rear containment dikes.

C. Spoil areas K and L. Recommendations same as "C" for Tiger Pass; spoil and dikes should be excluded from vegetated marsh within these sites.

Spoil disposal in marsh and inland open water areas should be accomplished to the maximum extent possible during periods of high river discharge. This will encourage maximum dispersal of the dredged effluent throughout the lower elevations.

Since creation of marshland with dredged spoil is still in the experimental stage, numerous modifications in the spoil plan will probably be periodically necessary to achieve the desired effects. These modifications must be based on adequate field review and on close coordination between our two agencies, completed sufficiently in advance of annual maintenance operations to be meaningful. We, therefore, request that the Fish and Wildlife Service, National Marine Fisheries Service, and the Louisiana Wild Life and Fisheries Commission be advised of annual maintenance schedules at an early date so that such field review and coordination can be accomplished and recommendations made in the interest of preservation and enhancement of fish and wildlife resources in the project area.

This report has been reviewed and concurred in by the National Marine Fisheries Service and the Louisiana Wild Life and Fisheries Commission. Copies of Regional Director Stevenson's and Director Angelle's letters of concurrence and comments are attached.

Please advise us of any changes in project plans.

Sincerely yours,

Gary L. Vaughn

ACTING Regional Director

Attachments

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Duval Building
9450 Gandy Boulevard
St. Petersburg, Florida 33702

August 23, 1974

Mr. Kenneth E. Black
Regional Director
Fish and Wildlife Service
17 Executive Park Drive, N.E.
Atlanta, Georgia 30329

Dear Mr. Black:

This is in reply to Mr. John D. Green's letter of July 8, 1974, requesting our review of your proposed report on the Corps of Engineers' authorized project to provide additional navigation outlets from the Mississippi River in the vicinity of Venice, Louisiana.

We have reviewed your proposed report and concur in your findings and recommendations. However, the following suggestions are offered for inclusion in your final report: We, along with the Louisiana Wild Life and Fisheries Commission, should also be advised of the annual maintenance schedule at an early date. Also, as suggested by the Louisiana Wild Life and Fisheries Commission in a letter to the Corps on February 12, 1974, an evaluation of marshland building operations should be included in the project. In addition, the oyster leases mentioned by the Louisiana Wild Life and Fisheries Commission should be avoided for spoil disposal as much as possible if they are good producing leases at the time of each dredging.

Thank you for the opportunity to review this proposed report.

Sincerely,

for William H. Stevenson
Regional Director

State of Louisiana

WILD LIFE AND FISHERIES COMMISSION
400 ROYAL STREET
NEW ORLEANS 70130

J. BURTON ANGELLE
DIRECTOR

EDWIN EDWARDS
GOVERNOR

August 12, 1974

Mr. John D. Green, Regional Supervisor
Division of River Basin Studies
United States Fish and Wildlife Service
17 Executive Park Drive, N. E.
Atlanta, Georgia 30329

Dear Mr. Green:

These comments are in regard to the United States Department of the Interior, Fish and Wildlife Service's report on the construction of the two navigation channels at Baptiste Collette and Tiger Pass.

Both of these navigation channels will provide additional freshwater to the marshes, bays and sounds in the vicinity, and the additional freshwater should benefit fisheries. The Baptiste Collette enlargement will certainly aid some in controlling salinity intrusion in the sound, and we are extremely interested in the results of the marsh-building activities. There are no oyster leases in the immediate area of spoil deposition, but in both cases, the added pollution load from the Mississippi River might cause additional oyster growing areas to be closed. However, the spoil obtained from the Tiger Pass channel will possibly affect one lease and cover at least one lease at this channel's junction with the Gulf of Mexico. These leases should be contacted, and the oysters possibly moved to other bedding grounds.

Creating marshland from spoil deposition is fine, but the elevation of this spoil is critical. If too high, then we will probably get the same effect as has occurred to the west of the M. R. G. O. (to much fill resulting in lost estuarine acreage). We are in concurrance with the United States Fish and Wildlife Service's

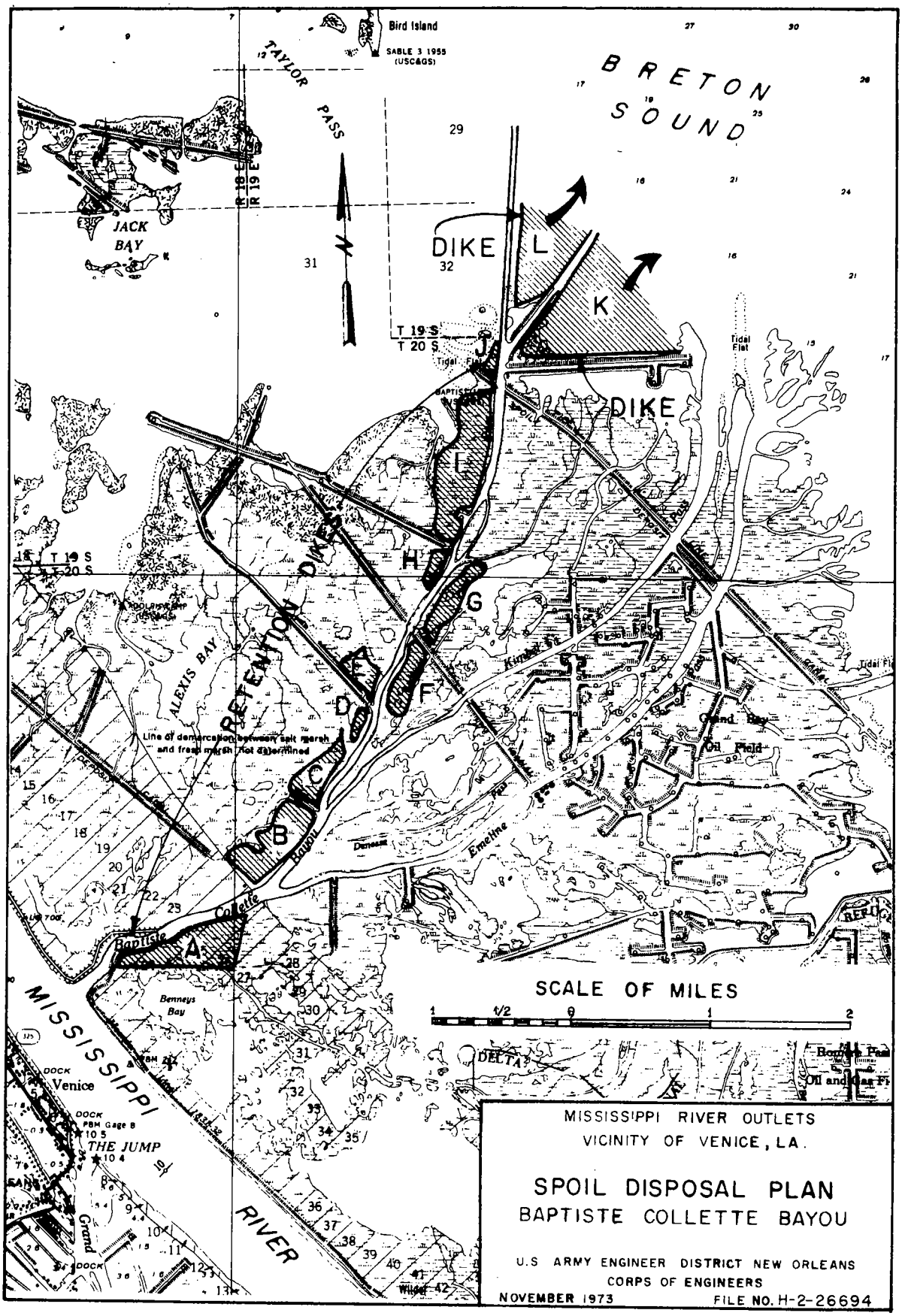
recommendations concerning the proposed marsh building efforts by the Corps of Engineers and stress the need for flexibility in plans to allow whatever changes are necessary to establish productive marshlands.

Thank you for the opportunity to comment on this report.

Sincerely yours,

J. Burton Angelle
Director

JBA:MW/ibm

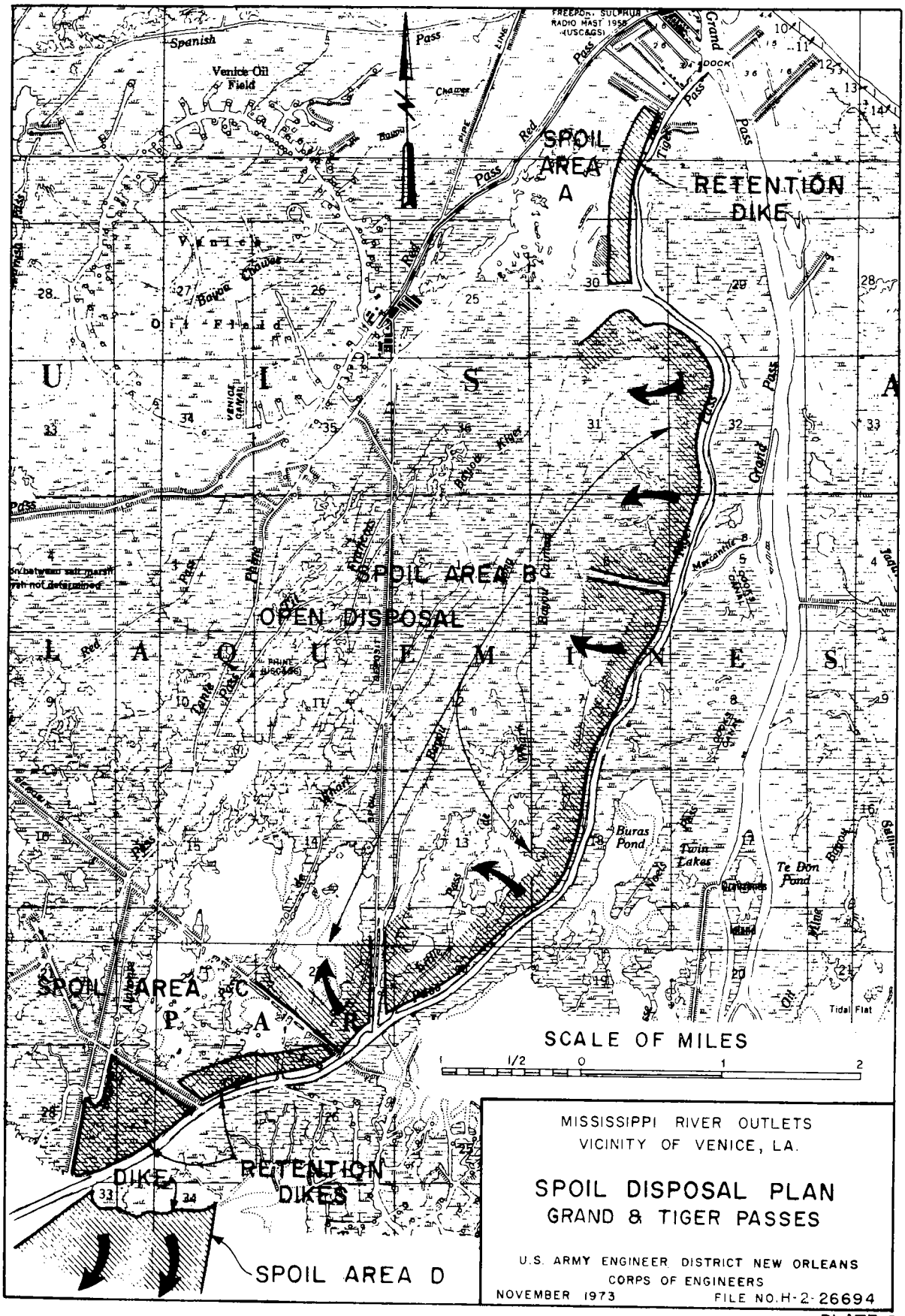


MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.

SPOIL DISPOSAL PLAN
BAPTISTE COLLETTE BAYOU

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS
NOVEMBER 1973 FILE NO. H-2-26694

PLATE I



MISSISSIPPI RIVER OUTLETS
VICINITY OF VENICE, LA.

SPOIL DISPOSAL PLAN
GRAND & TIGER PASSES

U.S. ARMY ENGINEER DISTRICT NEW ORLEANS
CORPS OF ENGINEERS
NOVEMBER 1973 FILE NO. H-2-26694

PLATE 2

ROY AGUILLARD
DIRECTOR

State of Louisiana

DEPARTMENT OF PUBLIC WORKS
P. O. BOX 44155, CAPITOL STATION
BATON ROUGE, LOUISIANA 70804

March 15, 1974

Col. Richard L. Hunt
District Engineer
Department of the Army
New Orleans District
Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Col. Hunt:

Reference is made to your letter of January 30, 1974, in which you have requested comments from the Louisiana Department of Public Works concerning the plan of improvement to provide additional navigation outlets from the Mississippi River in the vicinity of Venice, Louisiana, by the enlargement and maintenance of Baptiste Collette Bayou between the Mississippi River and Breton Sound, and Grand/Tiger Passes between the Mississippi River and the Gulf of Mexico, Plaquemines Parish, Louisiana.

We have reviewed the proposed plan submitted and concur with this plan and with the plan for disposal of the spoil as a result of the dredging. It is recommended that in the actual dredging operations that the spoil not be allowed to enter any natural water courses in the area. Also, retention dikes should be used where necessary to prevent damage to the oyster producing areas in this vicinity.

We have been advised that the mouth of Baptiste Colette Bayou has become silted and non-navigable for most vessels using this navigation channel. It is therefore suggested that due consideration be given for early construction of jetties at the mouth of this Bayou to maintain its depth after enlargement.

I appreciate the opportunity to review and comment on your plans for this project.

Yours very truly,

Roy Aguillard

ROY AGUILLARD
Director

DVC/cjh

LOUISIANA WILD LIFE AND FISHERIES COMMISSION

WILD LIFE AND FISHERIES BUILDING
400 ROYAL STREET
NEW ORLEANS, LOUISIANA 70130

February 12, 1974

Colonel Richard L. Hunt, CE
District Engineer, New Orleans District
U. S. Army Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Col. Hunt:

This is in reply to your letter of January 24, 1974, coded LMNED-MP, regarding additional navigation outlets from the Mississippi River through Baptiste Collette and Grand/Tiger Pass.

We would like to point out the oyster leases in the area as noted on the enclosed maps. Compensation to the lessees for any damage that might occur should be part of the project.

We have no objection to these navigational projects which should introduce fresh water into the oyster growing areas.

The new marshland building will be interesting to watch and we would recommend that money for the evaluation of this marshland building be included in the project cost for a three year study.

Thank you for affording us the opportunity to comment on this project.

Sincerely yours,

J. Burton Angelle

J. Burton Angelle
Director

JBA:HES/lm

cc: Dr. Lyle S. St. Amant
cc: Mr. Robert E. Murry
cc: Mr. Harry E. Schafer

Enclosures (2)

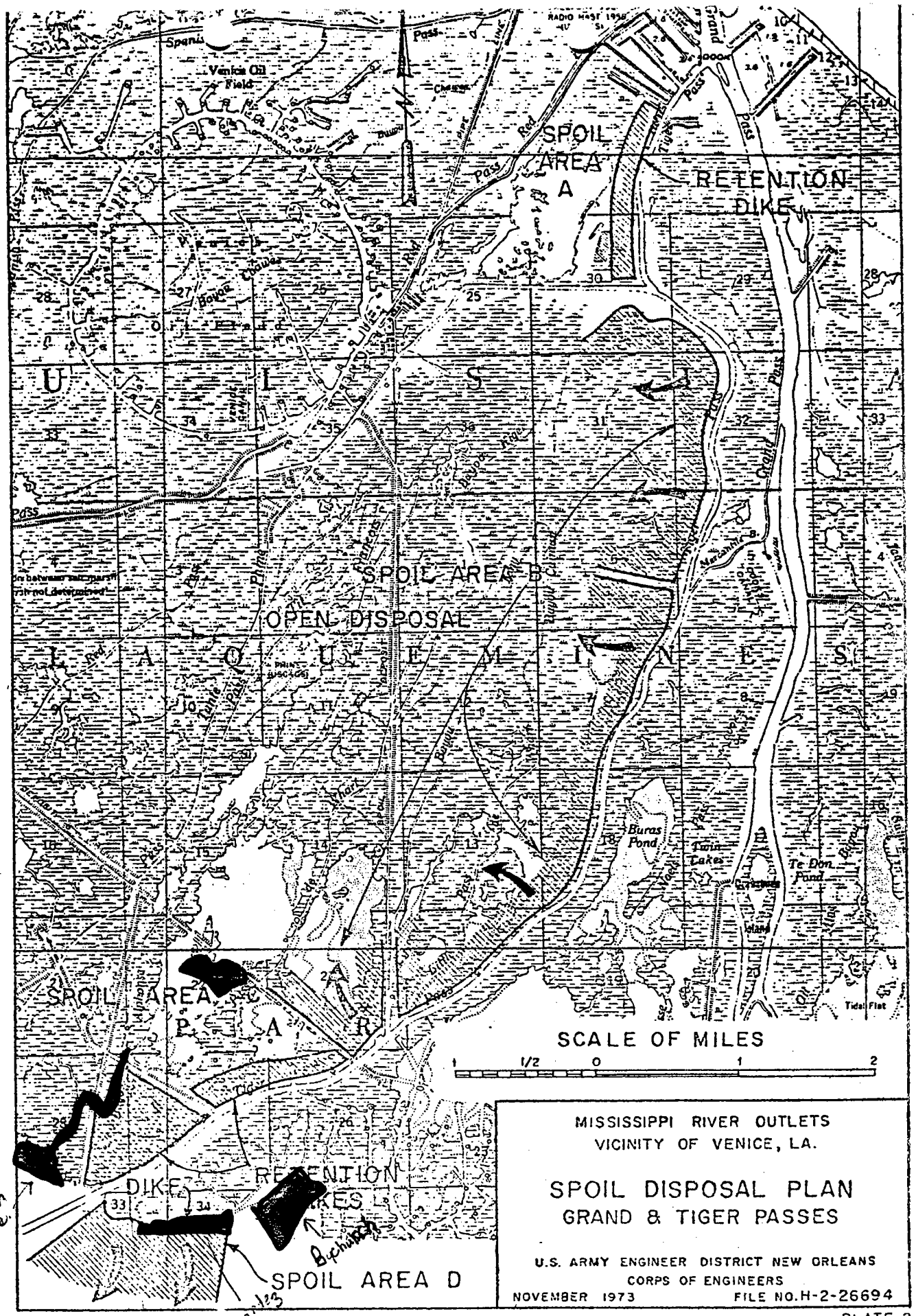


PLATE 2

Incl 3

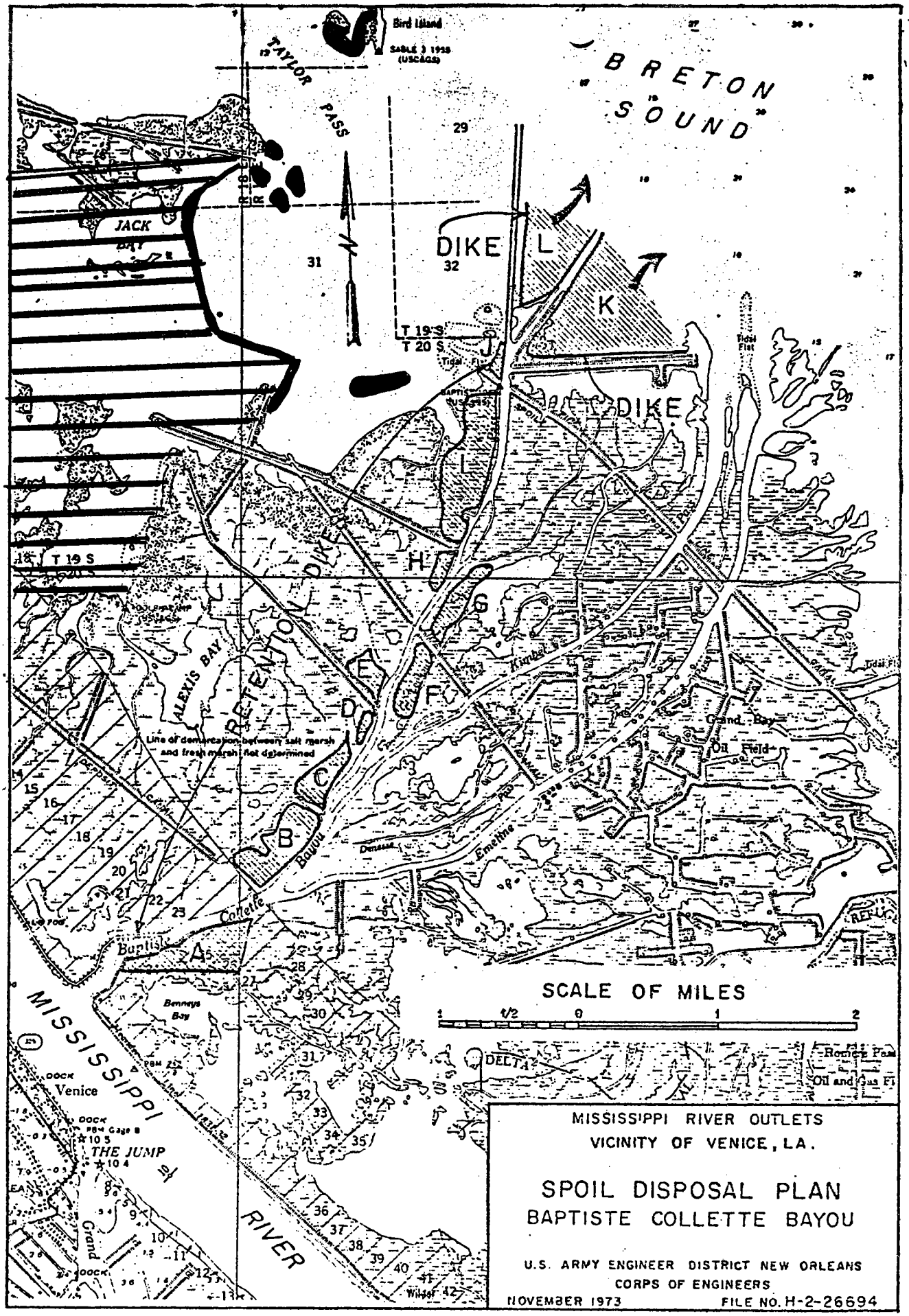


PLATE 1

Incl 2

Plaquemines Parish Commission Council

POINTE-A-LA-HACHE, LA. 70082

February 13, 1974

Re: LMNED-MP

Hon. Richard L. Hunt
Colonel, CE
District Engineer
Department of the Army
New Orleans District
Corps of Engineers
P. O. Box 60267
New Orleans, La. 70160

Dear Colonel Hunt:

This is in response to your letter dated 30 January 1974, concerning the navigation outlets from the Mississippi River in the vicinity of Venice, Louisiana. We would like, at the outset, to impress upon you the extreme urgency of proceeding with the construction of this project, particularly the improvement of Baptiste Collette channel by the construction of rock jetties at the mouth of the channel and thereafter the dredging of Baptiste Collette channel.

The Venice area serves approximately 40% of all offshore mineral operations in Louisiana. In addition, we have recently been advised by representatives of the mineral industry that they intend to operate a large part of the offshore mineral drilling activities off the coasts of Mississippi and Alabama from Venice. Baptiste Collette channel is presently navigable and would be used by many vessels if the mouth of the channel were properly maintained. Most vessels are now required to navigate through South or Southwest Pass of the Mississippi River in order to gain access to the offshore mineral operations to the East of the River. For most vessels this would require 30 additional miles in each direction to the many existing inshore and offshore producing areas, and with the beginning of additional drilling operations under recently granted leases off the coasts of Mississippi and Alabama, many more vessels will be required to travel this additional 30 miles in each direction to and from the location of the drilling sites. The opening of Baptiste Collette Bayou would result in the saving of thousands of gallons of fuel daily for the vessels used in the mineral industry.

The area between Venice and Pilottown is probably the most congested area along the entire Mississippi River because all ships and most of the support vessels for the offshore mineral industry must navigate through this stretch of the River.

We urge that you reconsider your plan for the construction of the Venice channels project so that you might use the first monies available for the construction of rock jetties and the dredging of the mouth of Baptiste Collette so that this channel might be utilized at the earliest possible time.

We call your attention to the fact that last year when the Industrial Canal Locks were closed at New Orleans, the Corps of Engineers, as an emergency measure, dredged the mouth of Baptiste Collette. The mineral industry used this channel extensively until recently when the mouth of the channel became silted and non-navigable for most vessels.

The Plaquemines Parish Commission Council is in general agreement with the construction of the navigation channels and with respect to the proposed method of spoil disposal including the disposal of some of the material by allowing it to spread out in order to build new marshland. The deterioration of the marshes in the lower reaches of the Mississippi River, particularly in the Venice area, has been caused primarily because of the subsidence of the marsh areas and the limited quantity of silt during high river stages to maintain the elevation of land so that it will support marsh growth. If, in certain areas, the material is allowed to flow free, it will increase the elevation of the shallow pond or bay areas and thus encouraging the growth of vegetation so vital to the support of wildlife. In certain areas, retention dikes will be needed in order to prevent damage to oyster producing areas. However, these should be limited in number. We therefore agree that the areas indicated for spoil disposal should be considered as approximate and should be altered as conditions dictate.

Very truly yours,

CHALIN O. PEREZ, President
PLAQUEMINES PARISH COMMISSION COUNCIL

COP/jg