A0007953

Seabrook Lock
"Protective Breakwater"

LMNED-PP Seabrook Complex

Ch, Basin Plng. Br. Ch, Plng. & Rpts. Br. 16 Sept 71
Lt. Richter/kn/430

1. A meeting was held last month regarding the proposed protective breakwater for the subject complex. The purpose of the meeting was to clarify requests for information pertinent to the usage of the Seabrook Lock by local industries, though the representatives of the industries directed much discussion towards criticism of the lock and the necessity therefor.

2. One suggestion arising from the meeting was that the lock ought be relocated to the general vicinity of the junction of the IHNC and MRGO. We feel that this suggestion warrants general review and feel that this new location may be worthy of more detailed investigation in the future.

3. Inclosed herewith is a mosaic with an overlay which roughly illustrates a possible alignment. This alignment has not been coordinated as yet with any other offices, but we feel that it might reasonably approximate proper positioning.

4. We feel that inherent benefits may be realized from this location; namely, up to 5' lower flood stages from the MRGO to Seabrook Bridge, elimination of the protective breakwater, construction in the dry, reduction in the size of the control structure, and better mooring facilities on both sides of the lock. Certain additional costs necessitated by this relocation might be due to a necessity for lowering the sill depth, cutting approach channels, and relocating the American Marine Company. These are by no means the full extent of the benefits and costs for such a revision.

5. In view of the foregoing it is requested that you review the proposal and furnish this branch your comments as to the ~~efficiency~~ feasibility of implementing the same.

6. Your comments should include a brief discussion of the effect on ~~shipbuilding~~ shipping & ship repairing activities from the MRGO to Seabrook and a recommendation, if possible, of a sill depth required to sustain these activities if impaired. You should also indicate its effect on the utilization of the GIWW waterway system, and in general terms advise on the merit of investigating this proposal to a fuller extent.

7. You should provide the requested information to this office by COB 30 Sept 71 and costs for your work should be charged to account 05 2272 030 121 600 080. Kindly return the inclosed mosaic with your reply.

1 Incl
Mosaic map & overlay

MASK

WATER RESOURCES CONGRESS

Uniting
WATER RESOURCES ASSOCIATED / NATIONAL RIVERS and HARBORS CONGRESS
(Formerly Mississippi Valley Association)

International Trade Mart Tower
New Orleans, Louisiana 70130
(504) 525-3402

August 17, 1971

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

Dear Colonel Hunt:

Under date of July 12, 1971, a letter from your office concerning the Seabrook Complex requested information that would assist you in your planning determinations.

The information requested is being assembled and coordinated, but it is anticipated that approximately two more weeks will be required before the information can be submitted to you.

Following submission of the information and after your office has had time to study it, it is suggested that a conference be held between your planning people and the operators through the Seabrook Complex.

Sincerely yours,

Robert L. Shortle
Senior Vice-President

RLS/mrr

LMNED-PP 12 July 1971

Mr. Robert L. Shortle, Senior Vice President
Water Resources Congress
International Trade Mart
New Orleans, Louisiana 70130

Dear Mr. Shortle:

Reference is made to the Seabrook Complex feature of the Lake Pontchartrain hurricane protection project and more specifically to the proposed protective breakwater located just north of the lock site.

We recently initiated a study to determine the need of constructing the proposed breakwater on the premise that it would (1) reduce the costs of constructing the Seabrook Complex, (2) reduce navigation delays that would occur during certain periods while the lock is under construction, and (3) eliminate navigation delays due solely to the configuration of the lock. The breakwater would additionally assure greater safety to marine plant using the lock and also the integrity of the lock structure by reducing the possibility of vessel impact.

The study is, of course, a complex analysis which requires detailed input, and, accordingly, as the coordinating agent for concerned private interests, we would appreciate it if you would furnish us the following information:

a. At the meeting held in my office on 2 April 1971 relative to the proposed breakwater, several private parties alluded to wind data obtained from Nash Roberts which described roughly the days per year during which winds were prevalent from the northwest quadrant, periodically developing rough sea conditions in the lake. In this regard we need the wind velocity, direction, and daily distribution over a 1-year period of those winds which would affect tow transit (1) to the extent that the marine plant could not traverse the lake, and (2) to the extent that the marine plant could cross the lake but could not safely enter the lock from the lake.

Lt.Richter/kn/430

LMNED-PP
Mr. Robert L. Shortle

12 July 1971

b. What is the distribution and estimated number of days per year, if any, that marine plant could not maneuver and enter the Inner Harbor Navigation Canal (IHNC) through the navigation bypass provided during construction of the lock, in addition to those lost days as described in a(1) above?

c. What is the estimated number of hours of delay per day per vessel, if any, that would be experienced by tows entering the IHNC through the navigation bypass during calm sea conditions?

d. What is the average barge size used by shell producers and what is the average tow configuration?

We are cognizant of the fact that the information requested is complex in nature and may require extensive compilation of data, but it is critically requisite to proper evaluation of the breakwater proposal. Upon completion of our study, we will apprise you of our findings and afford you further discussion of the same.

Your early consideration of this matter would be greatly appreciated. If you have any questions, do not hesitate to call.

Sincerely yours,

SEALE

MASK

HERBERT R. HAAR, JR.
Colonel, CE
District Engineer

CHATRY

BARHR

EXEC OFC

DISPOSITION FORM

WSM 6/29/71 Mr Seale

For use of this form, see AR 340-15; the proponent agency is The Adjutant General's Office.

REFERENCE OR OFFICE SYMBOL	SUBJECT
LMNED-B	Seabrook Lock - Protective Breakwater Study

TO Ch, Plng & Repts Br FROM Ch, Basin Plng Br DATE 29 June 1971 CMT 1

Mr. Constan/cc/373

1. Reference is made to LMNED-PP DF dated 23 June 1971, subject supra.

2. The following information shall be required in order to initiate the study:

a. Distribution of the duration of lost-days, i.e. how many 1-day periods, 2-day periods, etc.

b. A detailed description of the character and magnitude of delays occasioned by construction.

c. The year in which construction will begin.

CHATRY

LMNED-PP Seabrook Lock - Protective Breakwater Study

Chief, Basin Planning Br Chief, Planning & Reports Br 23 June 1971
Lt. Richter/jlf/430

1. Reference is made to LMNED-BE DF dated 21 June 1971, subject as above.

2. In accordance with your request in the referenced DF, the following information is submitted for your use:

a. Assume that approximately 30 days lost due to navigation difficulties would be incurred during the winter months.

b. Assume that an additional 10 days would be lost during squalls which obtain intermittently throughout the summer.

c. You should allow special consideration to navigational delays which would occur during the construction of the lock over a period of about 2 1/2 years. Because of cofferdam requirements, ingress and egress to the IWNC will be restricted to a construction bypass on the west side of the lock centerline, between the cofferdam and the Seabrook Bridge fenders.

3. By copy of this DF, you are requested to proceed with your analysis as soon as possible. Funds in the amount of $2,500 are available for your work. Costs incurred by your office should be charged to account number 05 2272 030 121 600 080. It is requested that you furnish results of your analysis to this Branch by 30 July 1971.

MASK

DISPOSITION FORM

W87m 6/21/71

For use of this form, see AR 340-15; the proponent agency is The Adjutant General's Office.

REFERENCE OR OFFICE SYMBOL	SUBJECT
LMNED-BE	Seabrook Lock-Protective Breakwater Study

TO Chief, Plng & Repts. Br. FROM Chief, Basin Plng. Br. DATE 21 Jun 71 CMT 1

Mr. Constan/cc/387

1. Reference is made to your DF LMNED-PP dated 16 June 71, subject supra.

2. Approximately $2000 will be required to analyze the navigation losses incident to the estimated 80-90 days lost due to navigation difficulties which would be encountered without a protective breakwater. It is estimated that 4 weeks would be needed to complete the study.

3. Your instructions to proceed should be accompanied by an estimated annual chronological distribution of the lost days.

CHATRY

LMNED-PP Seabrook Lock - Protective Breakwater Study

Chief, Basin Planning Branch Chief, Planning & Reports Br 15 Jun 71
Lt.Richter/jlf/420

1. We have recently received inquiries from prospective users of Seabrook Lock concerning possible navigation difficulties which might arise in aligning tows entering the lock from the lake. Said difficulties would arise during periods when wind-driven high waves approach the shore essentially from the north and west quadrants. It has also been claimed that during periods of locking operations, the lakeward end of the lock could become congested by smaller craft awaiting lockage and tows attempting to gain alignment. It has been stated that multiple-barge tows have limited control during rough sea conditions and may represent a safety hazard to both life and marine plant in such a congested area. Local concerns have therefore suggested that we construct a protective breakwater in the lake to provide a safe harbor forebay. Included herewith as inclosure 1 are copies of correspondence which document the problem and recommend a protective barrier system in the lake.

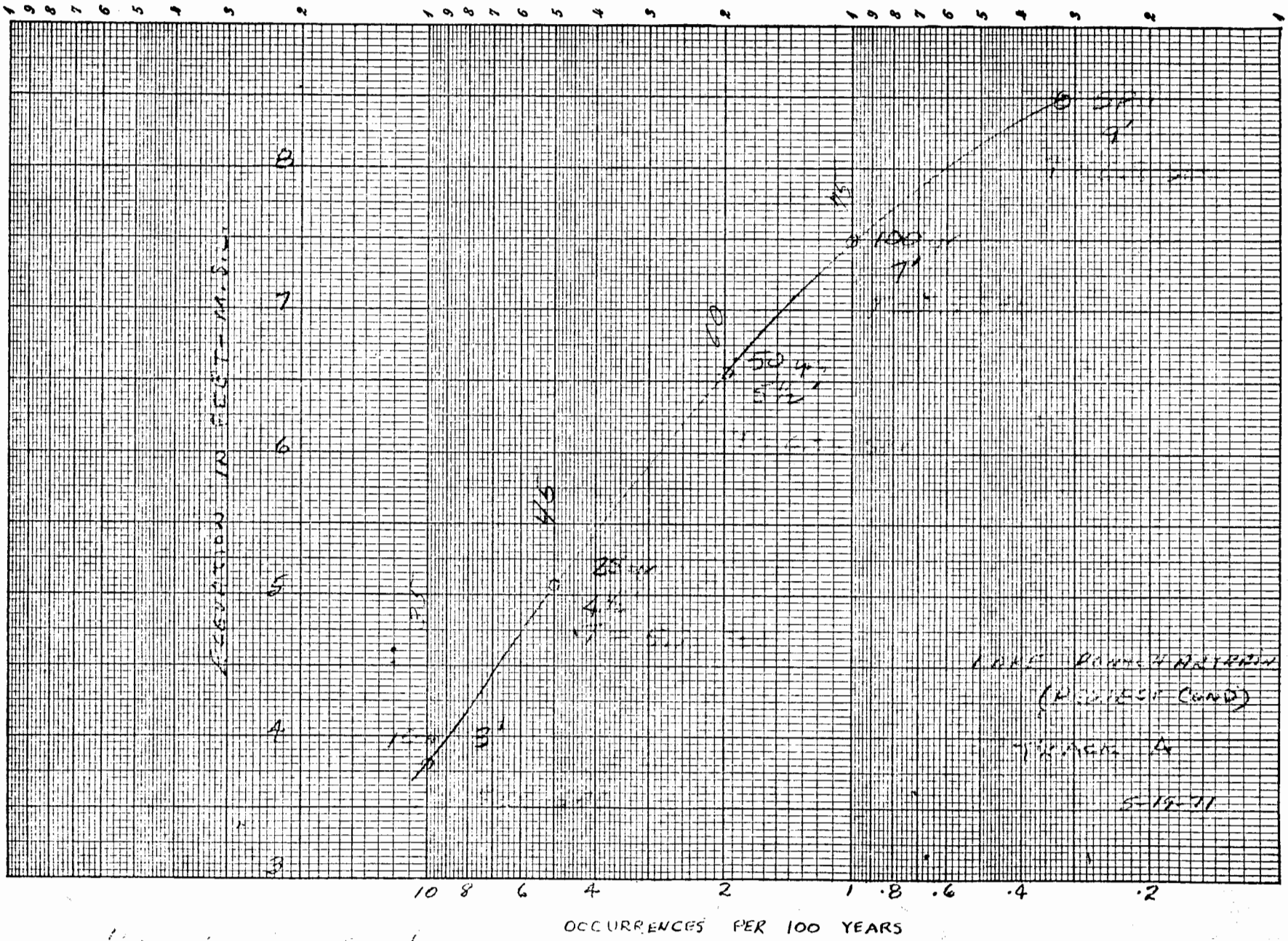
2. On 2 April 1971, a meeting was held in Colonel Haar's office concerning the need for a protective breakwater. The minutes of the meeting and list of attendants ~~is~~ are inclosed as inclosure 2.

3. Before a rational decision can be made as to whether or not a protective system is warranted, it is necessary to determine economic benefits for such construction. We feel that some benefit is assured by a reduction in the cost of construction of the lock since the lock could be constructed in essentially safe harbor assuming a barrier was erected prior to initiation of lock construction. However, we are expressely concerned with benefits which would accrue by increasing lock user days, i.e., by not loosing the estimated 80-90 days of tow operations (estimated by representatives of the shell industries) due to navigation difficulties in using the lock.

4. It is requested that you provide this Branch an estimate of the annual benefits (or damages prevented) which would accrue if such a breakwater were constructed prior to construction of the lock, assuming that whatever type of barrier system was installed, that days lost in tow operations would be recovered.

5. You are further requested to furnish this Branch an estimate of the time required for you to complete the required analysis and also furnish the estimated cost of the same by COB 23 Jun 71. After we have received this information, we will furnish you a cost account number for charges.

2 Incl MASK
1. Correspondence
2. Minutes of meeting and list


10 8 6 4 2 1 .8 .6 .4 .2
OCCURRENCES PER 100 YEARS
8
7
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5
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3

#1

Rock Jetty

SEABROOK LOCK - PROPOSED BREAKWATER (1000 Ft in length)

Item	Estimated Quantity	Unit	Unit cost	Amount
Excavation	30,250	CY	1.35	40,840.00
Shell Fill	43,830	CY	3.80	166,560.00
Riprap (Type C)	13,900	Tons	11.55	160,550.00
Riprap (Type B)	13,500	Tons	11.55	155,930.00
Cover Stone (Type A)	38,960	Tons	11.55	450,000.00
Sub total				973,900.00
Contingencies (20%)				194,780.00
Total Estimated Contractors Earning plus Contingencies				1,167,700.00
Engineering & Design (8% ±)				93,150.00
Supervision & Adm. (8% ±)				93,150.00
Total Estimated First Cost				# 1,354,000.00

#2

Double Sheet Pile Wall

SEABROOK LOCK – PROPOSED BREAKWATER
(1000 ft in length)

Item	Estimated Quantity	Unit	Unit Cost	Amount
Sheet Piling (Z-27)	100,000	S.F.	5.90	590,000 00
Shell Fill	19,500	CY	4.30	83,900 00
Rock	11,400	TON	11.50	131,100 00
Concrete Cap	370	CY	75.00	27,800 00
Paint (1/2 of S.P.)	40,000	S.F.	1.00	40,000 00
Cathodic Protection	L.S.		L.S.	35,000 00
Metal Work	150,000	LB.	.40	60,000 00

Sub Total	967,800. 00
Contingencies (20%)	193,600 00
Total Estimated Contractors Earnings plus Contingencies	1,161,400 00
Engineering & Design Cost (8 2±)	92,800 00
Supervision & Adm. (8 2±)	92,800 00
* Total estimated First Cost	1,347,000 00

* The yearly maintains would be much higher and repairs more extensive than Estimate #1 "Rock Jetty"

COMPUTATION SHEET

#3

CELLULAR SHEET PILE COFFER DAM
SEABROOK LOCK - PROPOSED BREAKWATER
(1000 Ft in length)

Item	Estimated Quantity	Unit	Unit cost	AMOUNT
Sheet Pile (SA-23)	173,900	S.F.	6.05	1,052,100 00
Shell Fill	18,800	CY	4.30	80,800 00
Conc. Cap	410	CY	75.00	30,800 00
Paint	64,800	S.F.	1.00	64,800 00
Cathodic Protection	L.S.		L.S.	50,000 00
Sub Total				1,278,500 00
Contingencies (20%)				255,700 00
Total Estimated Contractor's Earnings Plus Contingencies				1,534,200 00
Engineering Cost (8% ±)				122,900 00
Supervision & Adm. (8% ±)				122,900 00
Total Estimated First Cost				$ 1,780,000 00

#4

SEABROOK LOCK - PROPOSED BREAKWATER

Prestressed CONC. Piles 54" Dia.
(1000 ft. in length)

Item	Estimated Quantity	unit	unit cost	Amount
54" Prestressed Conc. Piles	11,000	L.F.	40.00	440,000 00
Sand Fill (Conc. Piles)	1000	CY	4.00	4,000 00
Precast Conc. Cap.	6000	SF	3.00	18,000 00

Sub Total	462,000 00
Contingencies (20%)	92,400 00
Total Estimated Contractors Earnings Plus Contingencies	554,400 00
Engineering Cost (8%±)	44,300 00
Supervision & Adm. (8%±)	44,300 00
Total Estimated First Cost	642,000 00

~~Bill~~ WBS
Rick
Karen (file)

Lt.Richter/k jlf/430

LMN

21 May 1971

Mr. John C. Fraser, President
Crescent City Boat Owners Association
P. O. Box 4146
New Orleans, Louisiana 70118

Dear Mr. Fraser:

This is to acknowledge receipt of your letter dated 14 May 1971 concerning our Seabrook Lock project, and more specifically, concerning the possibility of providing a protective breakwater lakeward of the lock.

We are currently studying the operational procedure of the lock with the view in mind of optimizing its navigable utility. In conjunction with our studies, we are considering the feasibility of constructing a protective breakwater lakeward of the lock, and are now evaluating several designs for such a breakwater. Be assured that we will consider every means of effecting optimum lock usage, and that we will advise you of any future meetings regarding this matter.

Thank you for expressing your views and allowing us early consideration of this matter.

Sincerely yours,

HERBERT R. HAAR, JR.
Colonel, CE
District Engineer

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EXEC OF
#1599

Box 4146 • New Orleans, Louisiana 70118

May 14, 1971

Colonel Herbert R. Haar, Jr.
Department of the Army
New Orleans District, Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Haar:

The Crescent City Boat Owners Association represents a substantial number of boat owners in the New Orleans area, and we have recently been appraised of the plans for the Seabrook Lock as proposed by the Corps of Engineers.

We would like to go on record as strongly urging the Corps to give every consideration towards a protective breakwater to allow for the safe passage of both private and commercial vessels using this proposed facility. More specifically, we are in general agreement with the outline suggested by Mr. E. Gerard Rees' letter to you of April 19, 1971.

It would be very much appreciated if you would be kind enough to keep this Association appraised of any future meetings concerning this proposed lock and facility.

Thanking you very much for your consideration, I remain

Sincerely,
Crescent City Boat Owners Association

John C. Fraser
President

JCF/fk
cc: E. Gerard Rees

Dr. Haar

x 4146 • New Orleans, Louisiana 70118

May 14, 1971

Colonel Herbert R. Haar, Jr.
Department of the Army
New Orleans District, Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Haar:

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We would like to go on record as strongly urging the Corps to give every consideration towards a protective breakwater to allow for the safe passage of both private and commercial vessels using this proposed facility. More specifically, we are in general agreement with the outline suggested by Mr. E. Gerard Rees' letter to you of April 19, 1971.

It would be very much appreciated if you would be kind enough to keep this Association appraised of any future meetings concerning this proposed lock and facility.

Thanking you very much for your consideration, I remain

Sincerely,
Crescent City Boat Owners Association

John C. Fraser
President

JCF/fk
cc: E. Gerard Rees

Lt.Richter/jlf/430

LMNED-PP

10 May 1971

Mr. Robert L. Shortle
Senior Vice-President
Water Resources Congress
International Trade Mart Tower
New Orleans, Louisiana 70130

Dear Mr. Shortle:

This is to acknowledge receipt of your letter dated 27 April 1971 concerning our Seabrook Lock project and, more specifically, to the possibility of including a protective breakwater in Lake Pontchartrain to provide a stillwater harbor on the lakeside of the lock.

We are very appreciative of your sketch depicting such a breakwater and also for your role as a coordinating agent for local interests mutually concerned with the project.

We are presently reexamining the entire project with the overview of determining the economic feasibility of a protective breakwater. Due to the complexity of foundation conditions in the project area, a detailed analysis must be undertaken and may require some time to complete. Be assured, however, that the matter will be given expeditious consideration until resolved.

It has always been our intent that navigational access during construction be available from the westerly side of the lock as you have annotated on your sketch.

Again, allow me to express my sincere appreciation for your assistance in this regard. Be assured that you will be notified as soon as we have completed our studies.

Sincerely yours,

HERBERT R. HAAR, JR.
Colonel, CE
District Engineer

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Ops Div
EXEC OF

WATER RESOURCES CONGRESS

Featuring
WATER RESOURCES ASSOCIATED / NATIONAL RIVERS and HARBORS CONGRESS
(formerly Mississippi Valley Association)

International Trade Mart Tower
New Orleans, Louisiana 701 3(
(504) 525-340?

April 27, 1971

Colonel Herbert R. Haar
District Engineer
New Orleans District
Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Haar:

This letter is in addition to my letter to you of March 25, 1971 and the informal meeting held in your office on April 2, 1971, both concerned with the proposed SEABROOK Lock features of the Lake Pontchartrain Hurricane Protection Project. Be assured of our appreciation for the opportunity to meet with you and members of your staff on April 2.

You will recall that you asked Mr. McVey Ward and the writer to serve as coordinators of the several interests who attended the meeting and you requested that the comments of the several interests be submitted to you at the earliest possible date. Mr. Ward and I have met on this matter and he is in agreement with the content of this letter.

Although we have not received comments from all of those who attended the meeting, we have received some, and these in concert with the comments offered at the meeting leads us to believe that we are submitting a concensus opinion with this letter.

It was fairly well agreed at the meeting that some sort of breakwater arrangement would be required to dissipate the heavy seas that can be generated in the area of the proposed lock during winter northers as well as summer squalls.

District Engineer
New Orleans

The enclosed print shows a suggested system of curved broken breakwaters (blue) and a system of straight broken breakwaters (red) that would, it is believed, provide the necessary stilling action should either be constructed. Hydraulic study or investigation may indicate that other alignments with shorter lengths may prove equally as effective in reducing the seas. It is felt that either of the systems would provide maximum protection from winter storms out of the north, and the northwest and the west. Additionally, seas from storms out of the northeast would be dissipated by the New Orleans Lakefront Airport. It is our further opinion that any breakwater arrangement should be constructed at the earliest possible date to provide maximum protection and reduce costly weather delays during the construction of the lock and additionally provide for maximum navigation safety during the construction period.

It was noted during the meeting that members of your staff indicated the navigation channel entering the Inner-Harbor Navigation Canal during construction of the proposed lock would be on the eastern side of the lock. It appears that such a navigation opening would be hazardous to navigation particularly in bad weather or when the tide is running. The proposed narrow navigation opening on the eastern side of the lock would in fact, be a flume that would tend to create currents so swift as to render navigation extremely hazardous. Accordingly, we suggest a wider navigation opening be provided on the westerly side of the lock in order to reduce current velocity while the lock is under construction. Additionally, this wider opening would allow tows to properly align themselves for transiting the Seabrook Bridge from either direction.

Thanking you for the opportunity of expressing the views of the several interests, I am,

Sincerely yours,

Robert L. Shortle
Senior Vice-President

RLS/mtr

Lt. Richter/kn/430

LMNED-PP

26 April 1971

Mr. E. Gerard Rees
Top Hamper, Inc.
7590 Lakeshore Drive
New Orleans, Louisiana 70124

Dear Mr. Rees:

This is to acknowledge receipt of your letter dated 19 April 1971 concerning our Seabrook Lock project, and more specifically concerning the possibility of providing a protective breakwater lakeward of the lock.

We are currently reassessing the operational procedure for the lock complex with the view in mind of optimizing marine plant transit through the lock. In review of this procedure, a protective breakwater will be considered as a possible solution to insure effective lock usage.

Thank you for expressing your views and allowing us early consideration of this matter.

Sincerely yours,

HERBERT R. HAAR, JR.
Colonel, CE
District Engineer

SEALE

MASK

MARTIN

BAEHR

EXEC OFC

#1252

MKX Lt.Ribbeck/kn/
430

LMNED-PP 22 April 1971

Mr. Robert L. Shortle, Vice-President
Water Resources Associated
1147 International Trade Mart Building
New Orleans, Louisiana 70130

Dear Mr. Shortle:

This is to acknowledge receipt of your letter dated 25 March 1971 concerning the Seabrook Lock feature of the Lake Pontchartrain hurricane protection project.

In your letter you express concern that considerable difficulty might arise to marine plant attempting to traverse the lock.

We are presently reexamining the entire Seabrook complex with the view in mind of optimizing its navigable utility.

Sincerely yours,

SEALE

MASK

BAEHR

EXEC OFC

WILLIAM E. LEE, JR.
Lieutenant Colonel, CE
Acting District Engineer

Same letter sent to:
Sidney Torres, Chalmette, La.
La. Materials, Co., Inc.
American Waterways Operators, Inc.
New Orleans Sportsmen's League
La. WL&F Comm.
Ayers Materials Co., Inc.

Lt.Richter/jlf/430

LMNED-PP

19 April 1971

Mr. D. W. Milhan
Prestressed Concrete Products Co., Inc.
P. O. Drawer 1
Mandeville, Louisiana 70448

Dear Mr. Milham:

This is in response to your letter dated 9 April 1971 concerning our proposed Seabrook Lock.

The lock structure will be located at the lakeward terminus of the Inner Harbor Navigation Canal (IHNC). Inclosed is a plan map which depicts the lock in relation to adjacent areas. Authorized dimensions of the lock are as follows: usable chamber length of 800 feet; width of 84 feet; and depth over the sill of -15.0 feet referred to mean low gulf datum. The time required for lockage is dependent on many variables, and consequently, the time required for locking is not constant in all cases. We do, however, anticipate that a normal lockage will require a total time of approximately 20 minutes.

Also noteworthy is that the lock will only be operated when the current velocity through the lock chamber exceeds 3 feet per second. We estimate that this condition will occur for approximately 7 hours of each day.

We hope the above information will suffice your needs.

Sincerely yours,

SEALE
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MARTIN
BAEHR
EXEC OFC
#1164

1 Incl
Map

HERBERT R. HAAR, JR.
Colonel, CE
District Engineer

Mead
~~Franklin~~
~~Trask~~ WSM
~~Beale~~
Copy to Mr. Decker

TOP HAMPER INC

"THE SPARS AND RIGGING ABOVE THE DECKS"

7590 LAKESHORE DRIVE NEW ORLEANS LA. 70124
AC. 504 282-3021

April 19, 1971

Col. Herbert [illegible]. Haar, Jr.
District Engineer
U.S. Corps of Engineers
Foot of Prytania St.
New Orleans, La.

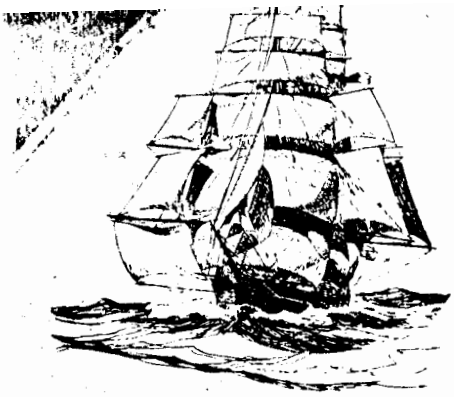
Dear Col. Haar:

[illegible]. [illegible] Alphonso and myself, representing the membership of the New Orleans Yacht Club, at the recent meeting held in your offices wish to take this opportunity to thank you for allowing us to express our views on the proposed industrial canal locks.

After jointly meeting to discuss the proposal we are in agreement with the general feelings of the group in attendance, that a break water would be mandatory to the safe operation of the proposed locks. Indeed we feel that as proposed the lock would not be operable under certain weather conditions. As we understand the problem, there is no other suitable location available.

We therefore urge you to consider adding a break water to the present Seabrook lock proposal and I have taken the liberty of including a rough sketch.

Also shown is a set of dolphins or a finger pier that vessels could lay alongside while waiting to transit. This would then in effect create a safe temporary harbor and mooring facility and secondarily a storm shelter if the locks were closed for flood control reasons.



TOP HAMPER INC.

"THE SPARS AND RIGGING ABOVE THE DECKS"

7590 LAKESHORE DRIVE NEW ORLEANS LA. 70124

AC. 504 282-3021

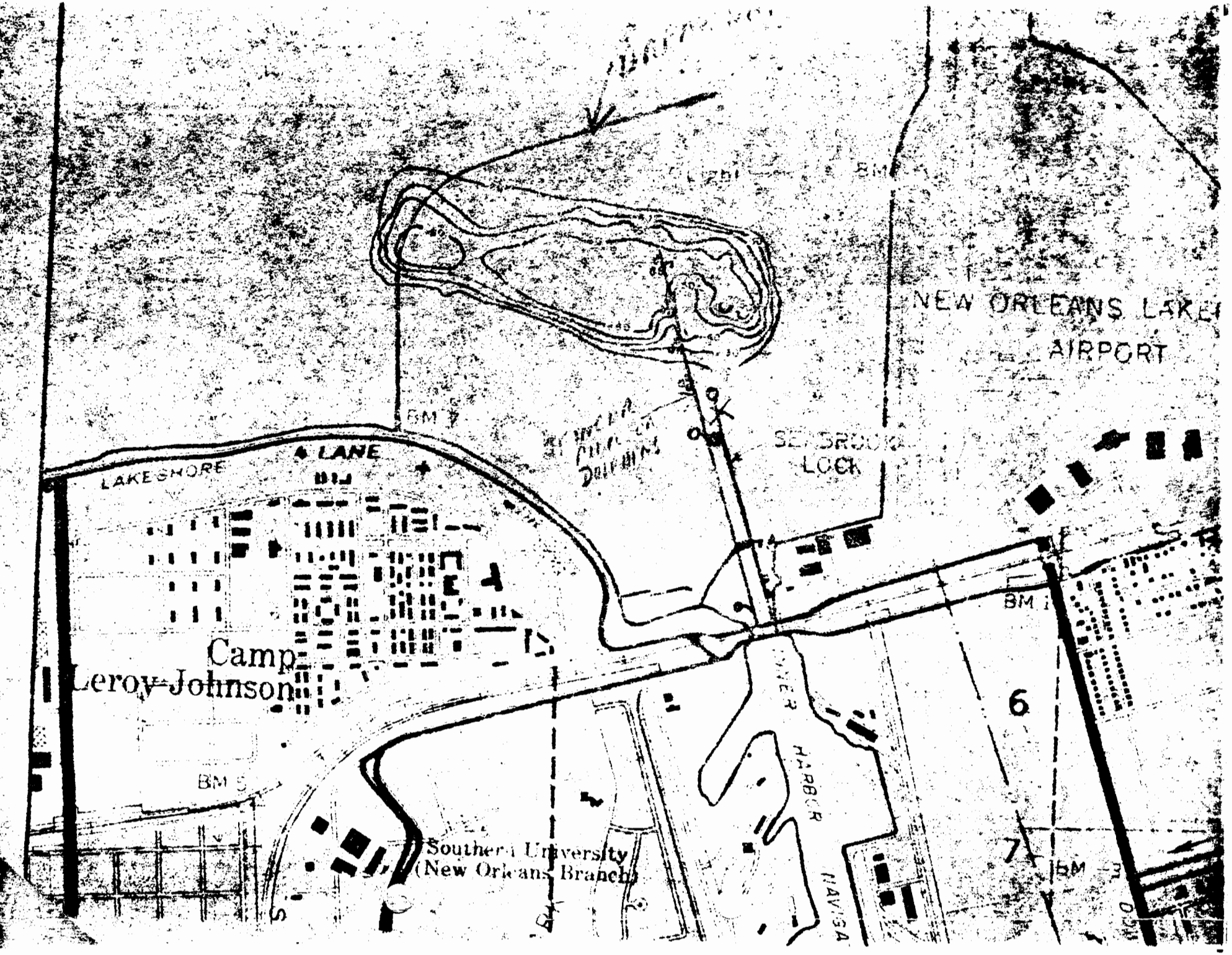
We feel that such a break water would serve both private and commercial interests equally well, allow the locks to be operated under all but the severest weather conditions, and provide shelter during those times when the locks must be closed or are not operating due to mechanical difficulty.

Very truly yours,

E. Gerard Rees

EGR/lh
Encl.

cc: Mr. Robert L. Shottle
cc: Mr. Rofie L. Alphonso (2)


NEW ORLEANS LAKE
AIRPORT
LAKESHORE
LANE
SEABROOK
LOCK
Camp
Leroy Johnson
Southern University
(New Orleans Branch)
HARBOR
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7
BM

Lt.Richter/jlf/
430

LMNED-PP

19 April 1971

Mr. Harvey H. Loumiet, Jr., President
Louisiana Shell Producers Association
P. O. Box 568
Harvey, Louisiana 70058

Dear Mr. Loumiet:

This is to acknowledge receipt of your letter dated 18 March 1971 concerning the Seabrook Lock feature of the Lake Pontchartrain Hurricane Protection project.

In your letter, you express concern that considerable difficulty might arise to marine plant attempting to traverse the lock.

We are presently reexamining the entire Seabrook complex with the view in mind of optimizing its navigable utility.

Sincerely yours,

HERBERT R. HAAR, JR.
Colonel, CE
District Engineer

SEALE

MASK

BAEHR

BROWNLE
Ops Div

EXEC OF

#901

Chgr. Div.
For reply.

WEH

LOUISIANA SHELL
PRODUCERS
ASSOCIATION

Post Office Box 568 Harvey, Louisiana 70058

March 18, 1971.

Department of Army
New Orleans District, Corps of Engineers
Post Office Box 60267
New Orleans, Louisiana 70160

Attention: Colonel Herbert Haar

Gentlemen:

We have been informed that the Corps is contemplating the construction of a lock, measuring 84 x 800 feet, in the area of Seabrook, where the Industrial Canal enters Lake Pontchartrain.

This Association is made up of firms that produce shell in Lake Pontchartrain and probably use the Seabrook Channel more than any other single industry. After looking over the plans, we have come to the conclusion that this lock, as planned, will create an extreme hardship on our industry.

The industry feels that the size of the lock chamber is satisfactory, however, it is very much concerned and alarmed over the fact that the forebay, in Lake Pontchartrain, affords no protection from the severe weather and sea conditions that can develop in the Lake, on very short notice, particularly during the winter months. During these periods of severe weather, it would be impossible for a towing vessel with several barges in tow to either enter the chamber or round up and hold up unless some means is provided to knock down the sea.

We are also concerned as to what method will be used in the Industrial Canal for the mooring of tows while waiting for the locks. Most of the area along the banks of the Industrial Canal is leased to private industry who, we feel, will not allow any tows to indiscriminately tie up at their docks.

We would appreciate your giving these problems your immediate attention as they could affect the future economic welfare of an entire industry.

As usual, we stand ready to assist in any way you feel advisable.

Very truly yours,

LOUISIANA SHELL PRODUCERS ASSOCIATION

H. H. Loumiet

Harvey H. Loumiet, Jr.
President

HHLjr:mll

Lt.Richter/kn/430

LMNED-PP

9 April 1971

Mr. John B. Giddens, Jr., Chief Engineer
Board of Commissioners of the
Port of New Orleans
P. O. Box 60046
New Orleans, Louisiana 70160

Dear Mr. Giddens:

We have received your letter dated 18 March 1971 concerning the operating procedure for the Seabrook Lock complex.

Your items for consideration are noted and, accordingly, the operating plan for the complex is being reexamined by our engineers. Be assured that any procedural modifications deemed necessary by our review will be incorporated into the operation manual for the complex.

Thank you for affording us an early review of your ideas relating to our project. We welcome any future views you might offer in this regard.

Sincerely yours,

SEALE

MASK

JEROME C. BAEHR
Chief, Engineering Division

BAEHR

#898

March 18, 1971

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

Attention: Mr. Jerome C. Baehr
Chief, Engineering Division

Subject: Seabrook Lock

Gentlemen:

Reference is made to the conference on March 3, 1971, between your Mr. Jerome C. Baehr and our Messrs. P. C. Reeh and C. A. Peyronnin, relative to the Seabrook Lock. Based upon that conference, we have two items for your consideration in the preparation of an Operational Manual for the Lock.

The first concerns the criteria for beginning locking operations at a prescribed velocity in the lock chamber. We believe that this velocity criterion should be investigated with respect to other velocities that may be occurring in the canal during wind driven tidal changes so as to be certain that the criterion is set not only for adverse lock velocities, but also for adverse canal or bridge velocities. Since this may require some hydraulic investigation on your part, we are mentioning it at this early date before construction begins.

The second consideration is that of allowing flow through the gates and lock during peak flood flows. We realize that this was a compromise condition, but due to the long period between conception and final operation, it may be well to reconsider this procedure in the light of changing canal users and improvements east of the canal on other property once the lock has been built. Accordingly, we would appreciate it if you would reexamine this planned procedure when the lock is in operation.

Very truly yours,

J. B. Giddens

John B. Giddens, Jr.
Chief Engineer

JBG/CAP:lm

DISPOSITION FORM

For use of this form, see AR 340-15; the proponent agency is The Adjutant General's Office. WSM 4/8/71 NWB Seale

REFERENCE OR OFFICE SYMBOL	SUBJECT
LMNED-PP	Seabrook Lock--Plan of Operation

TO	FROM	DATE	CMT 1
Ch, Hydraulics Br.	Ch, Plng. & Rpts. Br.	24 Mar 71 Lt. Richter/kn/430	

1. Inclosed herewith is a letter from the Board of Commissioners of the Port of New Orleans dated 18 Mar 71 concerning the operational procedure for the Seabrook Lock and control structure.

2. It is requested that you review the inclosed letter and furnish this Branch your comments thereon by COB 7 Apr 71.

NWB

WSM

1 Incl
as

MASK

LMNED-HP

TO: Ch, Plng. & Rpts. Br. FROM: Ch, Hydraulics Br. DATE 5 Apr 71 CMT 2
Mr. Cook/esk/354

The following comments are furnished by the Hydraulics Branch on the letter of 18 Mar 71 from the Board of Commissioners of the Port of New Orleans:

a. Second paragraph. During periods of these wind driven tides, velocities in the open lock chamber would be greater than those at the ~~canal~~ bridges, since the cross sectional area of the lock is smaller. Accordingly, operation of the lock in accordance with velocities in the chamber of 3 to 6 ft. per second would automatically produce velocities at the bridge sections which should not be critical. However, it should be noted that the planned operational procedure may be modified once the lock complex is completed and the necessity and desirability of modification is indicated.

b. Third paragraph. Hurricane discharges in the Inner Harbor Navigation Canal will not appreciably affect the corresponding water surface elevations in Lake Pontchartrain or at the junction of the Mississippi River-Gulf Outlet and the canal. Accordingly, flows in the canal can be compared with discharges through orifices of variable sizes operating under a constant head. Namely, the flow becomes larger as the size of the outlet increases. Therefore, the increase in outlet capacity produced by operation of the lock and outlet structure to convey hurricane flows would generate discharges and velocities higher than those occasioned by operation of the outlet structure alone. For any future changes in

operating procedures, the possible adverse effects of these higher velocities on the lock and outlet structure and on the channel of the canal will have to be considered. These adverse effects will have to be weighed against changes in canal use and improvements east of the canal or other property which will have taken place after the lock complex has been completed.

FOR

FOR
BECNEL

1 Incl
w/d

MINUTES OF MEETING
2 April 1971

SUBJECT: Seabrook Lock - Plan of Operation

A meeting was held this date in Colonel Haar's office to discuss the above subject matter. A list of those attending the meeting is attached. Mr. R. L. Shortel served to head the meeting and H. H. Loumiet acted as representative to all IHNC users and presented the grievances of the same. The consensus of the users was that the Seabrook Lock by virtue of its location (protruding lakeward of Seabrook bridge) would serve to the detriment rather than benefit of those traversing the lock.

The problems most apparent were concerned with tows approaching the lock from the lake. Problems were alleged to obtain both during and after construction. A brief listing of the more salient points presented follows:

1. Because of prevalent winds from the northwest quadrant, it was estimated that approximately 80-90 days of tow operations would be lost upon completion of the lock due to the inability of tows to traverse the lock during adverse conditions. The tows can presently pass through the bridges because of the natural cove formed by the airport and the western shoreline of the Lake Vista area.

2. No provision has been incorporated into the project to provide a lay area in the lake or the IHNC.

3. No analysis has been performed of current conditions at the Seabrook site during construction. Said conditions could prove to be adverse.

4. No operational consideration has been given to multiple tows (four or five) approaching the lock from the lake at the same time.

5. The navigation bypass during construction appears to be inhibitive during adverse conditions.

6. Consideration should be given to a reduction in construction costs for a protected area condition, i.e., if a breakwater were implemented prior to construction of this lock.

7. An evaluation of usage ought to be presented showing the influence of pleasure craft.

8. Would the project as planned ~~increase~~ incur losses to the shell industry? (approximately $35,000,000 gross sales per annum).

The overall view of the IHNC users was that a breakwater westward of the lock location should be erected to provide a protected area lakeward of the lock.

Colonel Haar acknowledged the views presented and requested that a coordinated proposal be forwarded NOD from the canal users listing specific problems and presenting recommendations. Participants agreed that they would comply.

Meeting was adjourned.

RLR

RICHARD P. RICHTER
LT, CE

Meeting with Water Resources Congress and
American Waterways Operators re Seabrook
Lock
2 April 1971

NAME	ORGANIZATION
COL H. R. Haar, Jr.	DE, NOD, CE
George Douglass, Jr.	Ayers Materials Co.
McVey Ward	AWO, INC.
Robert L. Shortle 525-3402	Water Resources Congress
Dudley Andry ITM Bldg.	Metro New Orleans Safety Council
LT Richard Richter Suite 1147	NOD
P. H. Owens	Ayers Materials Co., Inc.
Henry Schorr	NOD
John Carrington, Jr.	Radcliff Materials, Inc.
John A. Green	Jahncke Service, Inc.
R. F. Spangenberg	N. O. Sportsmen's League
Richard B. Koen	La. Materials Co., Inc.
Nofie D. Alfonso, Sr.	New Orleans Yacht Club
Hugh L. Brownlee	NOD
Richard R. Murphy	Louisiana Materials Co., Inc.
H. H. Loumiet	Louisiana Sheel Prod. Assn.
	Ayers Materials Co., Inc.
Clint Bridgerman	N. O. Sportsmen's League
Harry Schafer	La. Wildlife & Fisheries Comm.
E. J. Bagnell	N. O. Safety Council
E. Gerard Rees	Top Hamper, Inc.
H. B. Crozier	Oprns. Div., NOD
J. C. Baehr	Engr. Div., NOD

EXECUTIVE OFFICES

1250 CONNECTICUT AVENUE • SUITE 502 • WASHINGTON, D. C. 20036

BRAXTON B. CARR, President

Telephone: 296-0320

ADDRESS REPLY TO:

McVEY F. WARD, Southern Regional Representative
WHITNEY BUILDING, SUITE 1020, NEW ORLEANS, LA. 70130
Telephone 524-3366

March 29, 1971

Colonel Herbert R. Haar, Jr., District Engineer
New Orleans District, Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Haar:

We are advised that your office is in the process of designing a new lock to be constructed in the vicinity of the Seabrook connection of the Inner Harbor Navigation Canal and Lake Pontchartrain. This is one of the structures to be built in connection with the Lake Pontchartrain and vicinity hurricane protection plan.

Current considerations for the lock, we understand, do not include the construction of a forebay or sheltered area to the north, or Lake Pontchartrain entrance of the lock.

Lake Pontchartrain is widely known as a treacherous body of water. The shallow depth of the Lake is exposed to the full force of the fronts, or northers during the winter and to squalls and thunderstorms which develop rather suddenly and violently during the warmer months. This characteristic of the Lake is compounded along the shoreline indentation in the vicinity of Seabrook where the wave action is additionally subject to the backlash from the seawall protecting the western shore of the New Orleans Airport.

Without the construction of an adequate forebay, or some type of barrier construction to reduce the sea conditions in the Seabrook indentation of the lakeshore, vessels will be unable safely to enter the new Seabrook Lock from the Lake under the frequently adverse weather conditions. Vessels and tows departing the lock northbound could also experience difficulty.

Therefore, we feel the design of this lock should include the construction of an adequate forebay or other type of protection system for the north approach to the lock.

We will appreciate your consideration of this matter and will gladly furnish any additional information we might have available,

March 29, 1971

Colonel Herbert R. Haar, Jr., District Engineer
New Orleans District, Corps of Engineers

or can obtain from our members operating on Lake Pontchartrain.

Sincerely,

McVey E. Ward

McVFW:rb

cc: Mr. Braxton B. Carr, AWO President
Mr. John M. Donnelly, Region 3 Vice President
Mr. Harry J. Collins, Chairman, Chairman, Region 3 Bridges, Locks and Waterways Committee

WATER RESOURCES ASSOCIATED

Since 1919
America's Voice
in
Water Resources

formerly **MISSISSIPPI VALLEY ASSOCIATION** 1130 SEVENTEENTH ST., N.W. WASHINGTON, D.C. 2003
1147 International Trade Mart Building
New Orleans, Louisiana 70130
202/223-065

March 25, 1971

Colonel Herbert R. Haar
District Engineer
Department of the Army
New Orleans District, Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Herb:

Member firms of Water Resources Congress, our new name, have been in discussion with me concerning a proposed Seabrook lock that will connect the Industrial Canal and Lake Pontchartrain and advised me that the proposed dimensions of the lock of 800-feet X 84-feet are adequate for the type of equipment estimated to utilize the lock for the foreseeable future.

They express understandable concern, however, about the entrance conditions to the lock from either end, but particularly from the North or Lake end. I know I need not tell you how quickly Lake Pontchartrain can develop sea conditions of major proportions with little or no advance notice. The shallow nature of the Lake causes these adverse conditions but the pocket or bay-like condition that exists in the location of the proposed lock magnifies many times the adverse sea conditions that frequently arise.

It is my understanding that guide walls into the Lake from the North end of the proposed lock will offer little if any protection to the vessels and personnel transiting the lock in foul weather or trying to hold off from entering the lock at such time. It is my further understanding that because of privately owned land along the shores of the Industrial Canal, South of the lock, no mooring space is available there.

District Engineer

Because of the many serious problems that seem to attach themselves to the proposed lock I would suggest that you call a meeting of all interests concerned with the lock so that their views might be heard and that necessary and desirable features can be designed into the lock to make it as accident-free as possible. I am certain that all interests would welcome the opportunity to meet with you and hopefully at a very early date.

With sincere thanks for your consideration of this request and looking forward to an early meeting with you, I am,

Cordially yours,

Robert L. Shortle
Vice-President

RLS/mtr

LNED-PP

Seabrook Lock Complex
Approach Barrier

Ch, Operations Division Ch, Engineering Division

25 Mar 71
Lt.Richter/jlf/430

1. Inclosed herewith is a topographic map which depicts the Seabrook Complex and the adjacent borrow pit directly northward of the lock.

2. As you know, we have recently received inquiries from prospective users of the lock concerning possible navigational difficulties in aligning tows entering the lock from the lake. Said difficulties would arise during periods when high waves approach the shore essentially from the north or west. We are, therefore, considering a plan which would assure a safe approach to the lock during adverse conditions. One such plan would be a breakwater (barrier) located lakeward of the locksite. A navigation gap would be provided in the breakwater.

3. Several criteria would appear to govern the location and feasibility of such a system:

a. The barrier should be located northward of the existing borrow pit to assure an economical means of construction with respect to depth and foundation conditions.

b. The barrier should lie within the lines of fetch which would allow high winds to develop an adverse sea condition. Note that the two fetch lines shown on the inclosed map depict the outer limits of an envelope of possible fetch lines as well as the fetch length which they avail:

c. The barrier should be located in a manner which would assure acceptable sea conditions within angular limits of vessel approach.

d. The barrier should be located far enough northward of the lock to allow a 1,200-foot long tow to maneuver and align after passing the barrier.

e. The area protected by the barrier should be of sufficient size to safely permit two-way traffic.

4. It is felt at this time that if a barrier were justifiable, a model study would be necessary to determine proper positioning and sizing of the barrier with respect to acceptable wave reductions.

5. In light of the foregoing, it is requested that you furnish this office comments on the suitability of such a barrier and any justification therefor. We would also appreciate any suggestions you may proffer concerning a reasonable alternative to

the barrier scheme described above or any additional criteria which may support or reject such a system.

6. It is further requested that your comments be furnished this office by COB 9 Apr 71.

1 Incl
Map (Spanish Port quad)

BAEHR

LMNED-PP Seabrook Lock--Plan of Operation

Ch, Operations Div. Ch, Engineering Div. 24 Mar 71
Lt. Richter/km/430

1. Inclosed herewith is a letter from the Board of Commissioners of the Port of New Orleans dated 18 Mar 71 concerning the operational procedure for the Seabrook Lock and control structure.

2. It is requested that you review the inclosed letter and furnish this Division your comments thereon by COB 7 Apr 71.

1 Incl
as

BAEHR

BOARD OF COMMISSIONERS OF THE PORT OF NEW ORLEANS POST OFFICE BOX 60046 • NEW ORLEANS, LOUISIANA 7
Tel: 504-522-2551
An Agency of the City of New Orleans
Cable: CENTRAL

PORT OF NEW ORLEANS
CENTROPORT
U.S.A.

March 18, 1971

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

Attention: Mr. Jerome C. Baehr
Chief, Engineering Division

Subject: Seabrook Lock

Gentlemen:

Reference is made to the conference on March 3, 1971, between your Mr. Jerome C. Baehr and our Messrs. P. C. Koch and C. A. Peyronnin, relative to the Seabrook Lock. Based upon that conference, we have two items for your consideration in the preparation of an Operational Manual for the Lock.

The first concerns the criteria for beginning locking operations at a prescribed velocity in the lock chamber. We believe that this velocity criterion should be investigated with respect to other velocities that may be occurring in the canal during wind driven tidal changes so as to be certain that the criterion is set not only for adverse lock velocities, but also for adverse canal or bridge velocities. Since this may require some hydraulic investigation on your part, we are mentioning it at this early date before construction begins.

The second consideration is that of allowing flow through the gates and lock during peak flood flows. We realize that this was a compromise condition, but due to the long period between conception and final operation, it may be well to reconsider this procedure in the light of changing canal users and improvements constructed on other property once the lock has been built. Accordingly, we would appreciate it if you would reexamine this planned procedure when the lock is in operation.

Very truly yours,

John D. Giddens, Jr.
Chief Engineer

PCR/CAP:lm

Ayers Materials Co., Inc.

For information & reply WEB

Mr. Seale

Mr. Masters WBM

P.O. Box 568 - Peters Road - Harvey, La. 7005

Phone: 366-539

Ho Brownlee is in the Sch He has contact pilot riding for Tuesday to evaluate problem JWS

March 17, 1971

Department of the Army
New Orleans District, Corps of Engineers
Post Office Box 60267
New Orleans, Louisiana 70160

Attention: Colonel Herbert Haar

Gentlemen:

It is our understanding that the U. S. Army Corps of Engineers has, in the planning stages, a new shallow draft barge lock in the vicinity of the Industrial Canal and Lake Pontchartrain. This passage from the Mississippi River into Lake Pontchartrain is of vital concern to Ayers Materials Co., Inc., a producer of shells in Lake Pontchartrain. This canal offers the only economic access from Lake Pontchartrain and thus any restrictions in this canal are of prime concern to Ayers Materials Co., Inc. and the entire shell industry.

The preliminary drawings of the lock show it to have a chamber of some 800 feet in length by 84 feet in width. This length and width, in conjunction with the fact that the lock would only be in operation when the current in the canal exceeded a certain speed (approximately 7-9 hours a day), appear to offer no problem; however, it was noticed there appears to be no protective fore bay on the north or Lake Pontchartrain end of the lock.

Lake Pontchartrain, being a shallow body of water of great size, can develop a sizeable sea condition in a matter of minutes. The particular area where the lock enters the Lake is especially hazardous at these times with the backlash of the sea from the eastern barrier formed by the New Orleans Airport extending into the Lake. It is our feeling that some protection is necessary for vessels or tow approaching the lock from the north, both

A SUBSIDIARY OF

during a waiting period for the lock to clear, and also to aid in aligning the tow for entrance to the lock chamber.

These conditions exist mainly during the winter months when prevailing winds from the north or northwest are predominant; however, squalls and thunderstorms in the summer can and do offer the same conditions though for shorter periods of time.

It is our request that the U. S. Army Engineers study the problem, so that proper steps can be taken to offer a safe approach to these proposed locks. It is our feeling that a protective jetty of some type would offer a possible solution.

We would be more than happy to offer any assistance you may deem necessary.

Yours truly,

AYERS MATERIALS CO., INC.

By George Douglass Jr.
George Douglass, Jr.
Executive Vice President

GDjr:sam

Seabrook Lock

comparison estimates to Lock 84ft wide & elevation = 13.0 ft. m.s.l.

for drawing see interim survey report

SLABS - ADDITIONAL DEPTS

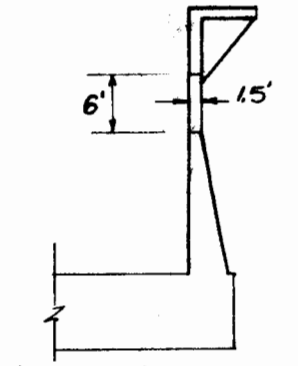
From [redacted] to 100' ADD .5'
" 84' to 110' " 1.0'
" 56' to 100' " 2.0'
" 56' to 110' " 2.5'

SHEET PILING

Z-32 18' DEEP
Z 38 50' DEEP

SEABROOK LOCK
WIDTH 84'; WALL EL. 13.0'
20 SEPT 67 TFP

⑥ Gate Bay Walls ADD 6'



APPROACH CHANNEL WALL

$A = 6 \times 1.5 = \frac{9}{27} = 0.333\ FT^3/FT$

$V = 85 \times 4 \times .333 = \underline{114\ YDS^3}$ APPROACH CHANNEL

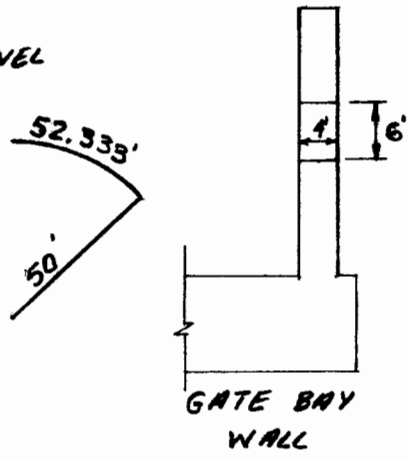
$A = 6 \times 4 = \frac{24}{27} = 0.888\ FT^3/FT$

$S = r\theta \qquad \theta = \frac{60\pi}{180} = \frac{\pi}{3}$

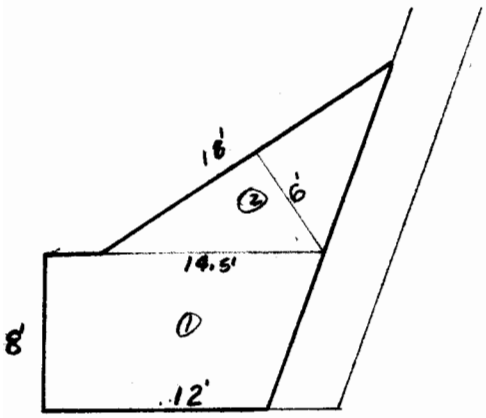
$= 50 \times \frac{3.14}{3} = 52.333$

$V = 52.333 \times 0.888 \times 2 = \underline{93}\ YDS^3$

$V = 50 \times 0.888 \times 2 = \underline{89}\ YDS^3$



GATE BAY WALL



CONCRETE IN PINTLE

$A_1 = \frac{8}{2}(14.5+12) = 106$

$A_2 = \frac{1}{2} \times 18 \times 6 = 54$

$\frac{160}{27} = 5.925\ YDS^3/FT$

$V = 5.925 \times 28 \times 2 = \underline{332}\ YDS^3$

D. M. VOLUME $= \underline{4,150}\ YDS^3$

$\Sigma = \underline{4778}\ YDS^3$

⑧ Cement

Increase in volume = 628 YDS^3
Cement = $628 \times 1.375 = 864$ bbls
D.M. = 31,300
32,164

Cement = 32,164 bbls

⑨ Reinforcing Steel

Steel = $628\ YDS^3 \times 150\ \#/YD = 94,200\ \#$
D.M. = 2,205,000
2,299,200

TFP

SEABROOK LOCK
WIDTH 84'; WALL EL. 10
20 SEPT 67 TFP

⑮ Concrete Cylinder Piles 54"

610' Chamber ÷ 5.5' spaces = 111 Piles x 2 = 222

ADDITIONAL LENGTH = 222 x 6 = 1332 L.F.

D.M. = 12,320

13,652 L.F.

⑰ Timber Wales

Length of chamber wall = 610 x 2 = 1220 ft.

1220' x 12 x 2 = 29,280 30 MFBM

ASSUME VERTICAL TIMBERS PLACED 5' O.C.

N = 610 ÷ 5 = 122 x 2 = 244

6' x 244 x 12 = 17,568 18 MFBM

D.M. = 45

93 MFBM

TFP

Gate Bay Walls & Approach Walls

Section Type A-A
Wall area - gate bay

$4 \times \pi \times 53.5 \times \frac{1}{3} = 224.1$
$2.0 \times 4.0 = 8$
$2.0 \times 12.0 = 24$
$2.0 \times 8.0 = 16$
$2.0 \times 13.6 = 27.2$
$57.8 \times 4.0 = 231.2$
$10.2 \times 2.0 = 20.4$
$16.0 \times 2.0 = 32$

$582.9 \times 28 = 16{,}318$ c.f.
slab 200 c.f.
16538 c.f. $\times 4 = 66152$ c.f.

Section type B-B

area = $7(1) + 27(2\frac{1}{2}) + 15(2\frac{1}{2})(\frac{1}{2}) = 66.25$ ft^2

length for $\frac{1}{2}$ of 1 gate = 190 ft.

$190(66.25) = 11{,}260\ (4) = 45{,}040$

Total concrete = $\frac{(48{,}495 + 66{,}152)}{27} \doteq 4110$ cu. yds.

Gate Bay Slabs - remain same as previous estimate

Concrete = 10,500 cu. yds.
tremie slabs = 7,400 cu. yds.

Cement

x = 1.41 bbls cement / cu. yd. concrete

$1.41(10{,}500 + 7400 + 4250) = 31\,230$ bbls.
1.375 22,810 4110 30,264

Reinforcing steel

$x = 150$ lbs steel / 1 cu. yd. concrete

$(14750 \text{ (14,610)} \text{ cu. yds})(150) = 2,212,500 \text{ (2,191,500)}$ lbs. steel

Riprap

$2[(100)(124)(2)] + [(610)(84)(2)] =$

$49600 \text{ (2755)} + 102,480 \text{ (5,700)} = 152,100 \text{ ft}^3 = 5633$ cu. yds

$x = 1.5$ tons riprap / 1 cu. yd

$1.5(5633) = 8,500$ tons

Shell

$2[(100)(124)(1)] + [(610)(84)(1)] =$

$24800 + 51,240 = 76,040 = 2815$ cu yds

Sheet Pile Bumper

assume approximate job cost = $22,000/each

Steel sheet Pile (MZ-32)

$[(85+72)2+84]27 + [2)(72)(60)]$

$10750 + 8640 = 19,390 \text{ ft}^2$

- Rock Dam 84 ft. wide gate bay el=13.0'

Length = 580 lin. ft.

riprap $\frac{112(1\frac{1}{2})(580)(1.5)}{27} = 5415$ tons

shell $2(225)(\frac{1}{2})(56\frac{1}{4}) + 18(56\frac{1}{4}) + 3+12 = 2292\ ft^2$

$\frac{580(2292)}{27} = 49,235$ cu. yds.

derrick stone

$\frac{244(580)}{27} = 5240$ cu. yds.

$1.62(5240) = 8,490$ tons

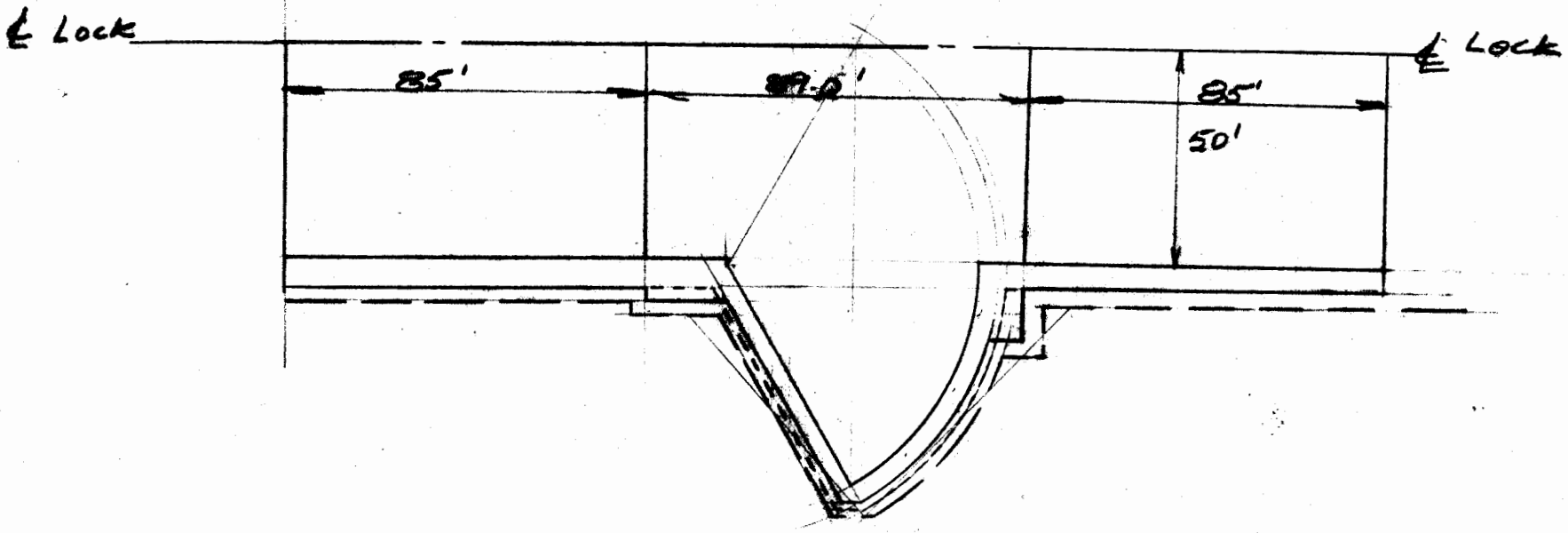
steel sheet pile MA-22

$580 - (72+72) = 436'$

$(436')(54') = 23545\ ft^2$

Seabrook Lock

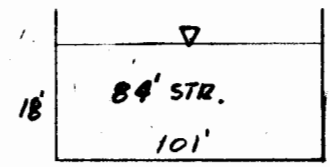
Width = 100 feet
Max elev. = 150 ft.



scale: 1" = 40'

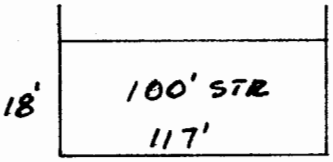
SEABROOK LOCK
WIDTH 100'; WALL EL. 13.0
20 SEPT 67 TFP

① DEWATERING



% OF INCREASE

$\text{Cost} = \frac{117}{101} \times 345 = 399.5$

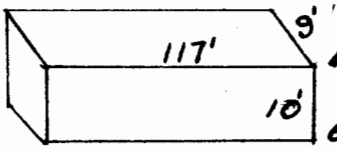


② PERMANENT RELIEF WELLS

Cost = 1.158 x 89 = 103.1

③ EXCAVATION (Under Water)

Gate Bay



INCREASE

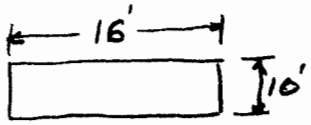
$V = \frac{117 \times 9 \times 10}{27}$

$= 390 \times 2 = 780$ YDS³

$V = 16 \times 10 = \frac{160}{27} = 5.925$ YDS³/FT

$= 5.925 \times 2 \times 80 = 948$ YDS³

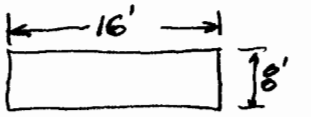
} GATE BAY



GATE BAY

$V = 16 \times 8 = \frac{128}{27} = 4.740$

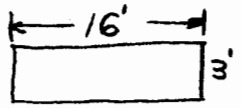
$= 4.74 \times 85 \times 4 = 1612$ YDS³



APPROACH CHANNEL

3340 YDS³
1084
4424
23,000
27,424

D.M. =



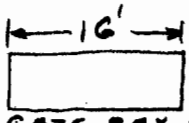
$16 \times 3 = \frac{48}{27} = 1.777$

$V = 1.777 \times 610$

$= 1084$ YDS³

CHAMBER

④ TREMIE PLACED SLAB



GATE BAY & APPROACH CHANNEL

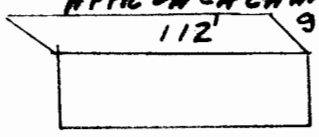
$16 \times 4 = \frac{64}{27} = 2.370$ YDS³/FT

$V = 2.370 \times 500 = 1185$ YDS³

LENGTH = 2 x 80 = 160 GATE BAYS

4 x 85 = 340' APP. CH.

500



GATE BAY

$112 \times 4 = \frac{448}{27} = 16.592$

$V = 16.592 \times 9 \times 2 = 299$ YDS³

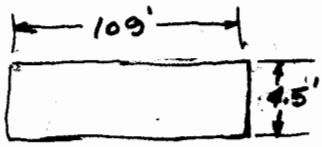
D.M. 7400

8884 YDS³

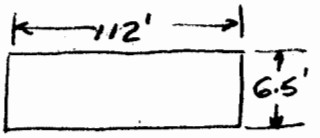
TFP

SEABROOK LOCK
WIDTH 100'; WALL El. 13.0
20 SEPT 67 TFP

⑤ GATE BAY SLAB



APPROACH CHANNEL



GATE BAY

$V = \frac{109 \times 4.5}{27} = 18.166$ YDS³/FT

$V = 18.166 \times 85 \times 4 = 6177$ YDS³

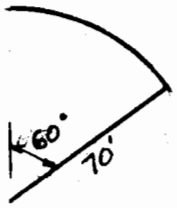
$V = \frac{112 \times 6.5}{27} = 26.962$

$V = 26.962 \times 2 \times 89 = 4800$

$A = \frac{\pi d^2}{4} = \frac{3.14}{4}(140)^2 = 15,386 \times \frac{240^\circ}{360^\circ} = \frac{10,247'}{27} = 380$ YDS³/FT

$V = 380 \times 6.5 = 2470$

$\Sigma = 13,447$ YDS³



⑥ GATE BAY WALLS

SEE SKETCHES, SEABROOK LOCK, WIDTH 84', WALLS El. 13.0 m.s.l.

VOL APP CHANNEL WALLS

114 YDS³

GATE BAY

$V = 0.888 \times 64.852 \times 2$

$= 116$ YDS³

$V = 60 \times .888 \times 2 = 107$

VOL IN PINTLES = 332

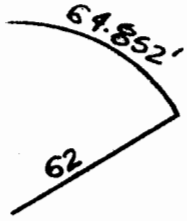
D.M. = 4150

$\Sigma = 4819$ YDS³

$s = r\theta \quad \theta = \frac{60\pi}{180} = \frac{\pi}{3} = 1.046$

$= 62 \times 1.046$

$= 64.852$



⑧ CEMENT

TREMIE PLACED SLAB	= 8884
GATE BAY SLAB	= 12510
GATE BAY WALLS	= 4819
APPROACH BRIDGES	= 60
	26,273

Cement = 26,273 YDS³ × 1.375 bbls/YD³

= 36,126 bbls

TFP

115.4% in.

SEABROOK LOCK
WIDTH 100' ; WALL El. 13.0
20 SEPT 67 TFP

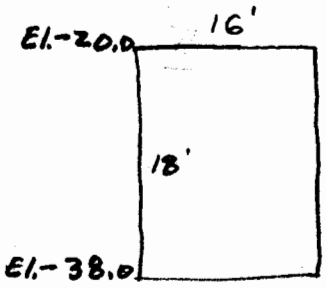
⑨ REINFORCING STEEL

GATE BAY SLAB	12,510
GATE BAY WALLS	4819
APPROACH BRIDGE	60
	17,389

RE STEEL = 17,389 YDS^3 X 150 # steel/yd^3

= 2,608,350 # 1.82 % in.

⑩ STEEL SHEET PILING (Z-32)

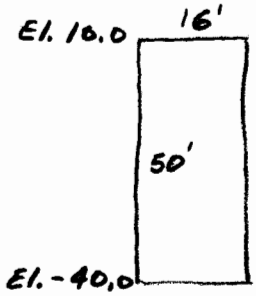


A = 16 X 18 = 288 X 2 = 576 ft^2

D.M. 17,100

17,676 ft^2

⑪ STEEL SHEET PILING (Z-38)



A = 16 X 50 = 800 X 4 = 3200

D.M. = 41,500

44,700 ft^2

⑫ STRUCTURAL STEEL

PROPORTION $\frac{117}{101}$ X 380 = 440,000 #

⑬ PIPE HANDRAIL

COMPUTE INCREASE IN LENGTHS — COMPARE WITH 84' LOCK

SECTOR GATES	65-53 = 12' X 4 =	48'
RADIUS	60-50 = 10' X 4 =	40'
GATE BAY	9 X 4 =	36'
	124 X 2 =	248 L.F.

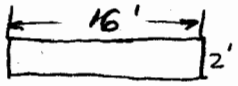
D.M. 5100 L.F.

5348 L.F.

TFP

SEABROOK LOCK
WIDTH 100'; WALL EL. 13.0
21 SEPT 67 TFP

(18) RIPRAP



CHAMBER & APPROACH

$16 \times 2 = \frac{32}{27} = 1.185$ YDS³/FT

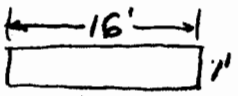
$L = 610 + 2 \times 100 = 810'$

$V = 810 \times 1.185 = 960$ YDS³ $\times$ 1.5 TON/YD³ = 1440 Tons

D.M. = 10,400

11,840

(19) SHELL



$V = \frac{100 \times 2 \times 9}{27} = 66.6 \times 2 = 134$ YDS³

$16 \times 1 = \frac{16}{27} = 0.592$ YDS³/FT

$V = 810 \times 0.592 = 480$ YDS³

D.M. = 1000

1480

D.M. = 10,400

12,041 Tons

TFP

Gate Bay Walls

1. Section type A-A

area of gate bay wall – 13 feet high

$28' \times 4' = 112\ ft^2$

length for $\frac{1}{2}$ of 1 gate (2 gates) = 134 feet

$134' \times 2 \times 2 = 540\ ft.$

$112\ ft^2 \ (540\ ft) = 60,480\ ft^3$

2. Section type B-B

area of gate bay wall – 13 ft. high

$7(1) + 27(2\frac{1}{2}) + 15(2\frac{1}{2})(\frac{1}{2}) = 66.25\ ft^2$

length for $\frac{1}{2}$ of 1 gate (2 gates) = 195 ft.

$195\ ft \times 2 \times 2 = 780\ ft.$

$(780\ ft)(66.25\ ft^2) = 51,625\ ft^3$

3 Cantilevered walkways at corners of gate bay

depth = $2\frac{1}{2}$ feet

$(48ft + 40\ ft)(2\frac{1}{2}) = 220\ ft^3\ (4)$

4. Total volume concrete gate bay walls =

$60,480 + 51,625 + 880 = 112,985\ ft^3$

$112,985\ ft^3 \times \frac{1}{27}\ \frac{cu\ yds}{ft^3} = 4185\ cu\ yds$

Gate Bay Slabs

$$\Big[100(85)(6\tfrac{1}{2}) + (4.5)(85)(2)(6\tfrac{1}{2})\Big]4 + \Big[(89)(8\tfrac{1}{2})(112) + (3.14)(59)^2\left(\tfrac{2}{3}\right)(8\tfrac{1}{2})\Big]2 =$$

$55{,}250 \quad 4973 \quad 240{,}890 \quad 84{,}730 \quad 30970 \quad 231{,}400$

total volume = ~~464,380~~ 472,290 ft^3

$$\frac{472{,}290\ ft^3}{} \times \frac{1\ cu.yd}{27\ ft^3} = 17{,}490\ cu\ yds.\ concrete$$

~~464,380~~

Tremie placed slab

$$\Big[100(85)(4) + (4.5)(85)(4)\Big]4 + \Big[(89)(4)(112) + 3.14(59)^2\left(\tfrac{1}{3}\right)(4)\Big]2 = 256{,}980\ ft^3$$

$$256{,}980\ ft^3 \times \frac{1\ cu.yd}{27\ ft^3} = 9{,}517\ cu\ yd.\ tremie\ concrete$$

Cement

total concrete = 60 + 4185 + ~~16,830~~ 17490 + 9300 = ~~30,375~~ 31035 cu yds.

assume X = 1.41* where X (amount of concrete in cu.yds) = (amount of cement in bbls)

* X was proportioned from previous estimate

~~30,395~~ 31,035 (1.41) = ~~42,830~~ 43,760 bbls. cement

Reinforcing steel

total concrete (excluding tremie) =

60 + 4185 + ~~11,830~~ 17,490 = ~~21,075~~ 21735 cu yds.

assume X = 150 lbs./cu yd.*

where X (amount of concrete in cu yds) = (amount of reinforcing steel in lbs.)

~~21,075~~ 21735 (150) = ~~3,161,250~~ 3,260,250 lbs. of reinforcing steel

Riprap 2 feet thick

$$(610\ ft.)(100\ ft.)(2\ ft.) + [(100\ ft.)(100\ ft.)(2\ ft.)]2 =$$
$$122{,}000\ ft^3 + 40{,}000\ ft^3 = 162{,}000\ cu\ ft.$$

use conversion factor of 1.5 tons of riprap/cu. yd. riprap

$$\frac{162{,}000}{27}(1.5) = 9{,}000\ tons$$

Shell (filter) 1 foot thick

$$(610\ ft.)(100\ ft.)(1\ ft.) + [(100\ ft.)(100\ ft.)(1\ ft.)]2 =$$

$$\frac{81{,}000}{27} = 3{,}000\ cu\ yds.$$

54" ϕ Concrete Cylinder Piles

from estimate for elevation = 18.0, 12320 lin. ft. of pile required @ 56'/pile.

$\therefore \frac{12320}{56} = 220$ piles

increase length to 61 ft/pile (change from el. = 8.0 to el. = 130)

(220 piles)(61 ft/pile) = 13420 linear feet

same length of lock chamber walls

12" x 12" Greenheart Timber Wales

length of chamber wall = 610' x 2 = 1220 ft.

add two extra lengths of timber wales (Greenheart) to existing three wales to compensate for extra height.

1220 ft. x 12" x 5 = 73,200 BFM

74 MBFM @

check figures costs

* Timber Guide Walls (elevation = 13.0 ft.)

850 ft.

Sheet Pile Bumper

cost for el. = 8.0' throughout - $18,000/each

cost for el. = 14.0' & el. = 8.0' = $20,000/each

assume approximate cost for el. = 13.0 feet throughout = $22,000/each

Sheet Pile Dolphin (34" ϕ)

$C = \pi d = 3.1417(34") = 106.82$ in.

5 foot increase from elevation of 8.0' to 13.0'

height x circum. = surface area

surface area = ~~60~~ 5 ft x 106.82 in = 6410 ~~in²~~ = ~~44.5 ft²~~ 534 ft²

@ 3.00/ft² 1600

necessary increase in fill =

$\pi r^2(h) = 3.1417(17")^2(\cancel{60"}\ 5') = \cancel{81,480\ in^3}$

$\cancel{1,168}$ 4540 ft³ = 170 cu. yd @ $1.50 = $255

cu yds. fill @ $1.00/cu yd

use $3000 increase = $3,000

Steel Sheet Piling (MZ-32)

$[(69+90)2+100]27 + [2(72)(60)] =$

$11290 + 8640 = 19930\ ft^2$

Excavation

$122(259) + 2\left[\frac{1}{2}(90)(55)\right] = 36550\ ft^2$

depth of excavation = 10'

$\frac{36550 \times 10}{27} = 13550 \times 2 = 27{,}100$ cu. yds.

Rock Dam 100 ft. wide gate bay el.=13.0'

length = 565 linear ft.

Riprap $112\left(1\frac{1}{2}\right)\frac{(565)}{27}(1.5) = 5270$ tons

shell $2\left(22.5\right)\left(\frac{1}{2}\right)\left(56\frac{1}{4}\right) + 18\left(56\frac{1}{4}\right) + 3 + 12 = 2292$ ft²

$\frac{565 \times 2292}{27} = 47{,}960$ cu. yds.

derrick stone

$45(4) + 12(4) + \frac{1}{2}(4)(8) = 244$ ft²

$\frac{565(244)}{27} = 5105$ cu. yds.

$x = 1.62$ tons stone / cu. yd.

$5105 \times 1.62 = 8270$ tons

steel sheet pile MP-22

$565 - (72+72) = 421$

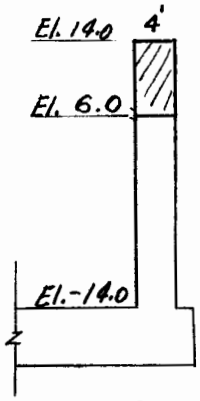
$(421')(54') = 22{,}735$ ft²

	C.P.	Elec. Work
Seabrook - 100'	$132,000	$248,000.00
110'	144,000	$261,000.00
Rigolets - 100'	Same as Seabrook	
110'		
Chef - 100'	$27,000	$126,000
110'	$29,400	133,000

Based on $15,000

RIGOLETS LOCK
WIDTH = 84'; ELEV = 14.0
22 SEPT 1967 T.F.P.
CONCRETE SHEET PILE CHAMBER

④ Concrete, Gate Bay Walls



GATE BAY WALL

$A = \frac{8 \times 4}{27} = 1.185$ YDS³/FT

$V = 2 \times 54 \times 1.185 = 128$ YDS³ ARC

$A = \frac{8}{2}(14.5 + 12) = 106$ ft²

$A = \frac{1}{2} \times 18 \times 6 = 54$

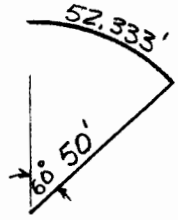
$\frac{160}{27} = 5.925$ YDS³/FT

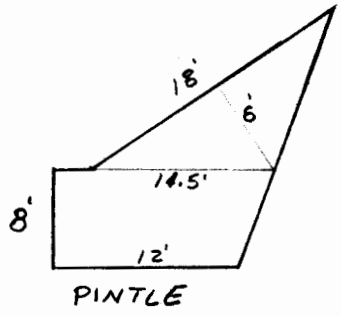
$V = 2 \times 8 \times 5.925 = 95$ YDS³ PINTLE

$V = 2 \times 50 \times 1.185 = 119$ YDS³ RADIUS

D.M. = 3180

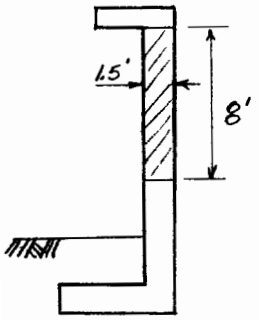
Σ = 3522 YDS³





PINTLE

⑥ Concrete, Chamber Walls



$A = \frac{1.5 \times 8}{27} = 0.444$ YDS³/FT

$V = 2 \times 690 \times 0.444 = 613$ YDS³

D.M. = 1200 YDS³

1813 YDS³

⑦ Cement

Concrete	
Gate Bay Walls	3522
Gate Bay Slab	8350
Chamber Walls	1813
	13,685 YDS³

Cement = 13,685 YDS³ × 1.375 bbls/YD³ = 18,817 bbls

⑧ Reinforcing Steel

Wt = 13,685 YDS³ × 150 #/YD³ = 2,052,750 lbs

TFP

RIGOLETS LOCK
WIDTH = 84'; El. = 14.0
22 Sept 67 TFP

⑫ Concrete Sheet Pile

No. = $\frac{690 \times 2}{2}$ = 690 ea.

L.F. = 698 x 8 = 5584

D.M. = 35,000
40,584 l.f.

⑮ Steel sheet Pile Bumper (quadrant) Low

Lump sum $30,000 same as High Bumper

⑯ Timber Guide Walls

Assume 4 Rows of 12x12 Timbers
Added = 500 x 12 x 4 x 2 = 48 MFBM
Vertical piling 5' o.c. = 100 ea.
100 x 12 = 1.2 MFBM

49.2 x 600 = $29,520
D.M. = 135,000
164,520

L.F. = $\frac{164,520}{900'}$ = 183'

⑰ Bulkheads, Low Gates

Lump Sum $32,000 Same as High Bulkhead

⑱ Sector Gates

Lump Sum $346,500

TFP

Rigolets 84' wide el=14'

Excavation = 75,700 cy.

Backfill = 21,000 cy.

Concrete Gate Bay Walls

1. A-A. $38(4) = 112\,ft^2$

length for $\frac{1}{2}$ of 1 gate = 122 ft.

$122(2)(2) = 488$ ft.

$112(488) = 54{,}660\,ft^3$

2. B-B.

area = $62.0\,ft^2$

length for 1 gate = 190 ft.

$2(190)(62) = 23{,}560\,ft^3$

3. walkways = $880\,ft^3$

4. total concrete = $79100\,ft^3$

$\frac{79{,}100}{27} = 2930$ cu.yds.

Gate Bay Slabs = 8350 cu.yd

Stabilizing Slab = -500 cu.yd

Cement

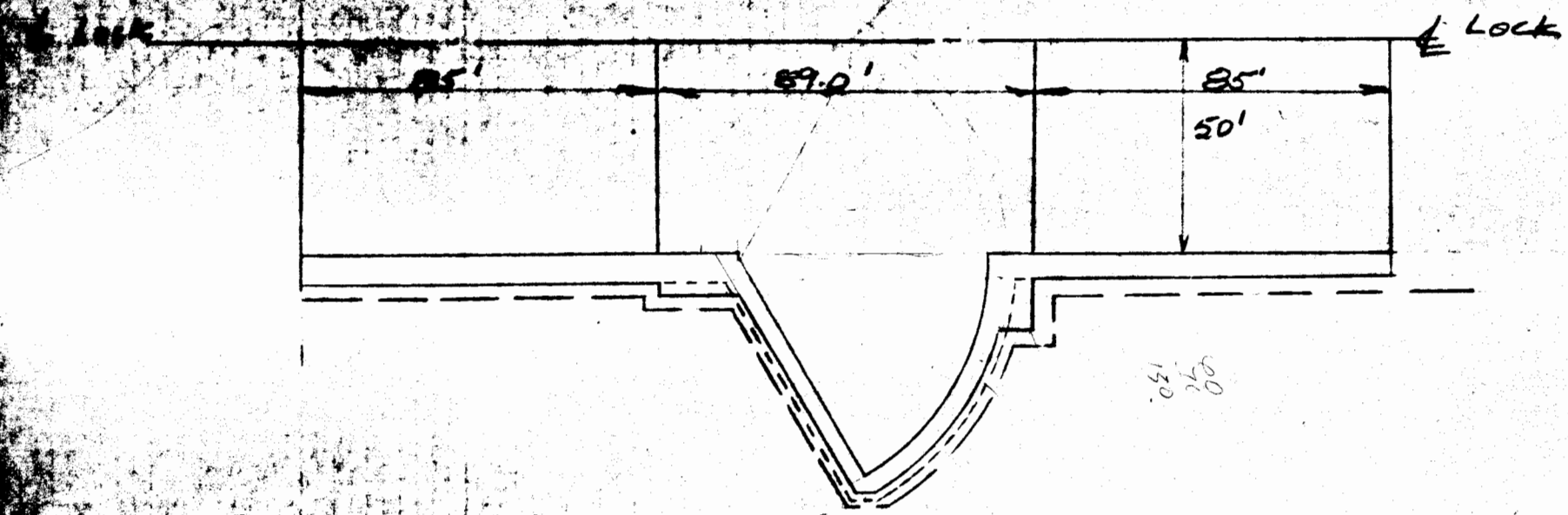
$12480(1.4) = 17{,}470$ bbls.

Reinforcing Steel =

$11980(150) = 1{,}797{,}000$ lbs steel

Rigolets Lock

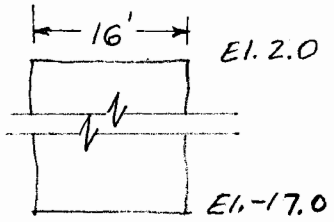
Width = 100 feet
Max elev. = 14.0 ft.



scale: 1" = 40'

RIGOLETS LOCK
WIDTH = 100'; El. 14.0
22 SEPT 67 TFP

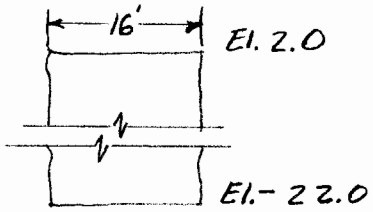
① EXCAVATION



CHAMBER

$V = \frac{16 \times 21}{27} = 12.444$ yds³/Ft.

$V = 690 \times 12.444 = \underline{8587}$ YDS³



GATE BAY

APPROACH BAY

$V = \frac{16 \times 22}{27} = 13.037$

$V = 2 \times 85 \times 13.037 = \underline{2217}$ YDS³

GATE BAY

$V = \frac{16 \times 24}{27} = 14.222$

$V = 2 \times 80 \times 14.222 = \underline{2276}$ YDS³

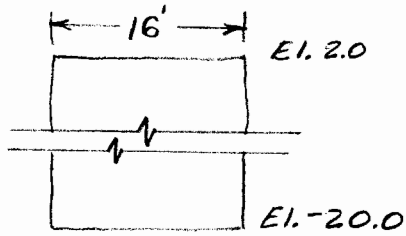
Approach Channel

$V = \frac{16 \times 19}{27} = 11.259$

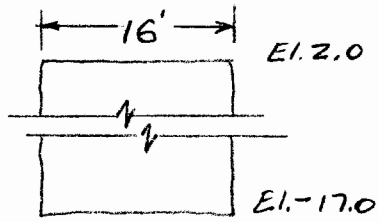
$V = 11.259 \times 2 \times 100 = \underline{2252}$ YDS³

D.M. = 76,000

Σ = 91,332 YDS³

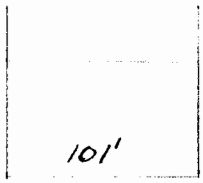


Approach BAY

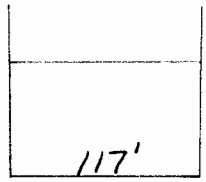


Approach Channel

③ DEWATERING



COST = $\frac{117}{101} \times \$200 = \$231{,}600$



④ GATE BAY WALLS

See sketch of 84' Lock (Rigolets)

V = 1.185 YDS³/FT

V = 2 × 65 × 1.185 = 155 YDS³ ARC

V = 2 × 62 × 1.185 = 147 YDS³ RADIUS

V = 95 YDS³ PINTLE

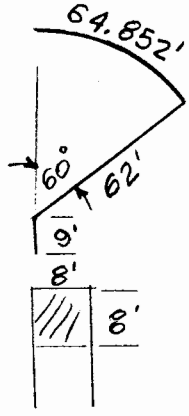
$V = \frac{8 \times 8}{27} = 2.370$ INCREASE GATE BAY LENGTH

V = 2.37 × 9 × 4 = 86 YDS³

V = 417 YDS³ INCREASE PRESENT WALLS

D.M. = 3180 YDS³

Σ = 4080

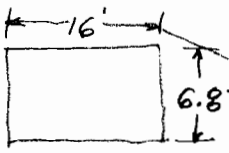


TFP

RIGOLETS LOCK
WIDTH = 100'; El. 14.0
22 SEPT. 67 TFP

⑤ GATE BAY SLAB

INCREASE VOL OF PRESENT SLAB 8350 x 1.083 = 9043



GATE BAY

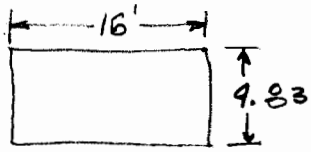
$V = \frac{16 \times 6.83}{27} = 4.047$

$V = 4.047 \times 80 \times 2 = 648$

$V = \frac{16 \times 4.83}{27} = 2.862$

$V = 2.862 \times 2 \times 85 = 487$

$\Sigma = 10,178$ YDS³



APPROACH BAY

⑥ CHAMBER WALLS

$V = 1813$ YDS³

⑦ CEMENT

GATE BAY WALLS	4080
GATE BAY SLAB	10,178
CHAMBER WALLS	1813
	16,071 YDS³

CEMENT = 16,071 x 1.375 = 22,098 bbls

⑧ REINFORCING STEEL

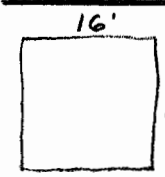
Wt = 16,071 x 150 = 2,410,650 lbs.

⑨ PIPE HANDRAIL

COMPUTE INCREASE IN LENGTHS COMPARE WITH 84' LOCK

SECTOR GATES	65-53 = 12 x 4 =	48
RADIUS	60-50 = 10 x 4 =	40
GATE BAY	9 x 4 =	36
	124 x 2 =	248
		2400
		2648 L.F.

⑩ SHEET PILING MA 22



BULKHEAD
LAKE BORGNE
END

$A = 16 \times 10 = 160\ \square' \times 2 = 320\ \square'$

DM = 5200

5,520

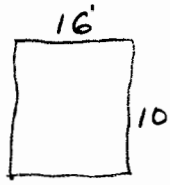
⑪ SHEET PILING ≠ 32

$A = 16 \times 10 = 160\ \square'$

$A_T = 160 \times 2 = 320$

D.M. = 4650

4,970 □'



TFP

RIGOLETS LOCK
WIDTH = 100'; El. 14.0
22 SEPT 67 TFP

⑫ CONCRETE SHEET PILES

40,584 l.f. — 84' LOCK RIGOLETS FOR COMPUTATION

⑭ STEEL SHEET PILE BUMPER

@ 30,000 EA. — BOTH ARE NOW AT SAME El.

⑮ TIMBER GUIDE WALLS

@ 183 FT — 84' LOCK RIGOLESE FOR COMPUTATION

⑯ FLOODWALLS

16' INCREASE IN LOCK WIDTH

170' FLOODWALL IN D.M.

170 - 16 = 154' FLOODWALL REMAINING

⑰ BULKHEADS

@ 32,000 EA. — BOTH ARE NOW AT SAME ELEVATION

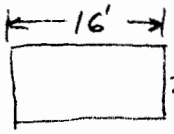
⑱ SECTOR GATES

@ 414,000

⑲ MISC. STRUCTURAL STEEL

$\frac{117}{101} \times 17{,}000^{\#} = 19{,}700^{\#}$

⑳ RIPRAP



$V = \frac{16 \times 2}{27} = 1.185$

L = 690' + 2 x 100
= 890'

V = 890 x 1.185 = 1055

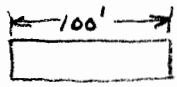
Wt = 1055 x 1.5 = 1583 Tons

D.M. = 12,380 / 13,963 Tons

㉑ FILTER GRAVEL

V = 1.185 ÷ 2 = .593

V = (85 + 80) 0.593 = 98 YDS³



GATE BAY
LAKE PONT.
END

$V = \frac{100 \times 1}{27} = 3.703$

V = 3.703 x 9 = 34 YDS³

D.M. = 840 YDS³

Σ = 972 YDS³

㉒ FILTER (SHELL)

V = 1.185 ÷ 2 = .593

L = 2 x 100 + 690
= 890

V = 890 x 0.593 = 528 YDS³

D.M. = 3500 / 4028 YDS³

TFP

Gate Bay Walls

1 Section type A-A

area of gate bay wall - 14' elev.

28' x 4' = 112 ft²

length for $\frac{1}{2}$ of 1 gate = 134 ft.

134 x 2 x 2 = 540 ft.

112 (540) = 60,480 ft³

2. Section of Gate Bay Walls - 14 ft elev.

Section type B-B

area =

$4(1) + 1.5(27) + 2\frac{1}{2}(14)\left(\frac{1}{2}\right) =$

$4 + 46.5 + 17.5 = 62.0 \text{ ft}^2$

length for $\frac{1}{2}$ of 1 gate (1 gate) = 195 ft.

$2(195')(62.0'^2) = 24,180 \text{ ft}^3$

3 Cantilevered walkways at corners of gate bay

depth = 2½ ft.

$(48+40)(2\frac{1}{2}) = 220 \text{ ft}^3$

4. Total volume concrete gate bay walls =

60,480 + 24,180 + 880 = 85,540

$\frac{85,540}{27} = 3170$ cu. yds.

Gate Bay Slabs

$[100(25)(6.5) + 4.5(85)(6.5)(2)]2 + [89(8.5)(112) + 3.14(6)^2\left(\frac{3}{63}\right)\left(\frac{1}{3}\right)]2 =$

$(55,250 + 4970)2 + (84785 + 33105)2 = 356,220 \text{ ft}^3$

$120,440 + 235,780$

$356,220 \div 27 = 13,200$ cu. yds.

4" Stabilizing Slab

$[100(85)(\frac{1}{3}) + 4.5(85)(\frac{1}{3})(2)]2 + [89(\frac{1}{3})(112) - 3.14(6)^2\left(\frac{3}{63}\right)\left(\frac{1}{3}\right)]2$

$(2833 + 255)2 + (3322 + 1298)2 = 15416 \text{ ft}^3$

$\frac{15416}{27} = 570$ cu. yds.

Concrete Chamber Walls

same length therefore = 1200 cu. yds.

Cement

concrete = $570 + 13200 + 1200 + 3170 = 18140$ cu yds.

$18140(1.4) = 25,400$ bbls of cement

Reinforcing steel

$13200 + 1200 + 3170 = 17,570$ cu yds

$17570(150) = 2,635,500$ lbs of steel

Pipe handrail 2450 lin. ft.

Excavation

$16(17)(695) + 16(170)(21) + 16(178)(23) + 9(65)(2)(23)$

$159{,}460 + 57{,}120 + 65500 + 26910$

$= 338570 \text{ ft}^3 = \frac{338570}{27} = 12{,}540 \text{ cu. yds.}$

76,000 cu. yds. + 12,540 cu yds = 88,540 cu yds.

Backfill

$\frac{920}{840}(21000) = 23{,}000$ cu. yds.

Steel Sheet Pile Bumper

2 (high el. = 14.0') job = $30,000 / each

Shell

$(5)(2)(\frac{1}{2})(10) + 2[100(16)(1)] + 16[(695)(1)] = \frac{14370}{27} = 532$ cu. yds

3500 + 532 = 4030 cu. yds

Gravel

$250(108)(1.0) \div 27 = 1000$ cu. yds

Floodwalls – remain same

Concrete Sheet Piles (2 ft wide)

$\left(\frac{675+675}{2}\right) = 675 \times 6'$ (increase) $= 4050$ lin ft.

$4050 + 37{,}000 = 41{,}050$ lin. ft.

Concrete Batter Piles (12" x 12")

$\left(\frac{675+675}{10}\right) = 135 \times 6 \times \frac{1.116}{2{,}232} = 904$ ft. (increase)

$9000 + 900 = 9900$ lin. ft.

Timber Guide Wall 900 lin. ft. - new cast

Riprap

$(100)(2)(695) = 139{,}000$
$+ (20)(820)(1)(2) = 32{,}800$
$+ (2)(35)(1.5)(100) = 10500$
$+ 2(100)(2)(100) = 40{,}000$
$+ 2(45)(100)\left(\frac{1}{2}\right)(2) = 9000$
$+ (2)(45)(110)(1.5) = 14850$
246150 ft^3

$\frac{246150}{27} = 9120$

$9120 \times 1.5 = 13{,}680$ tons

Steel Sheet Piling

MZ -32

$$\underset{1800}{90(10)(2)} + \underset{1300}{5(2)(130)} + \underset{+\ 2400}{40(30)(2)} = 5{,}500\ ft^2$$

MA-22

$$\underset{2160}{(108+108)(10)} + \underset{1000}{10(100)} + \underset{2520}{30(42)(2)} = 5700\ ft^2$$

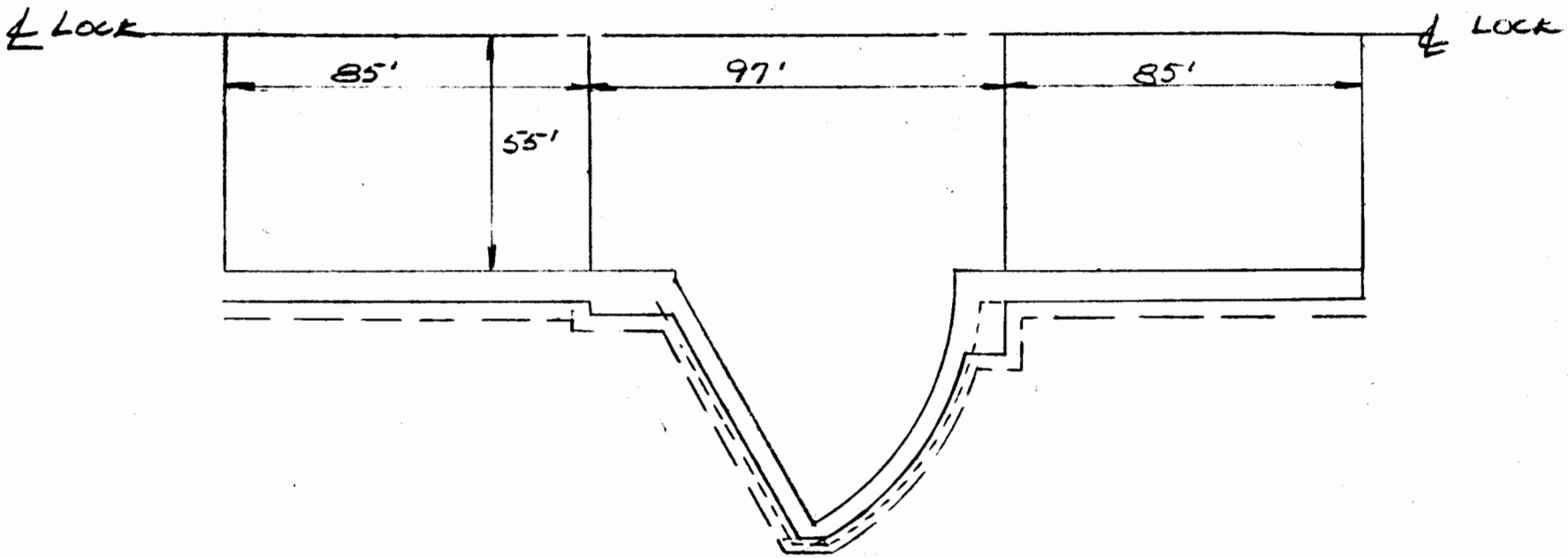
Bulkheads

2 @ job = $32,000 / each

Rigolets Lock

Width = 110 feet

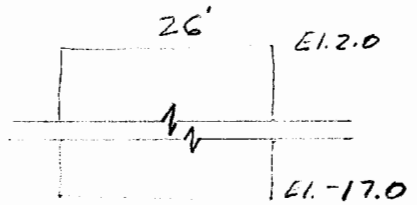
Max elev. = 14.0 feet



scale. 1" = 40'

RIGOLETS LOCK
WIDTH = 110'; El. 14.0'
25 SEPT 67 TFP

① EXCAVATION



CHAMBER

CHAMBER

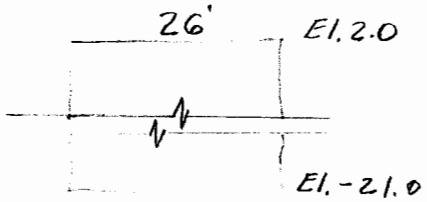
$V = \frac{26 \times 19}{27} = 18.296$

$V = 690 \times 18.296 = 12,625$

APPROACH BAY

$V = \frac{26 \times 22}{27} = 21.185$

$V = 2 \times 85 \times 21.185 = 3602$



GATE BAY

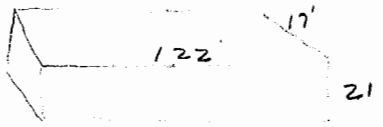
GATE BAY

$V = \frac{26 \times 23}{27} = 22.148$

$V = 2 \times 80 \times 22.148 = 3544$

APPROACH CHANNEL

$V = 2 \times 100 \times 18.296 = 3660$



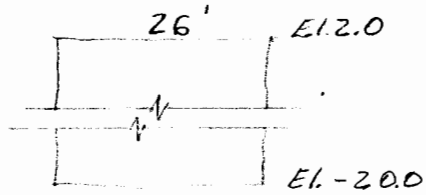
GATE BAY

GATE BAY

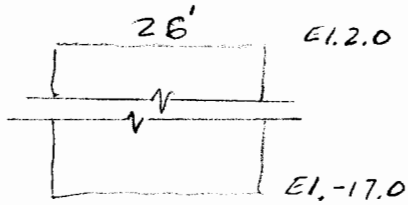
$V = \frac{122 \times 21 \times 2 \times 17}{27} = 3227$

D.M. = 76,000

Σ = 102,700



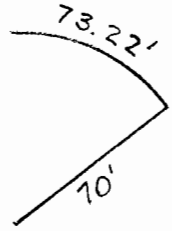
APPROACH BAY



APPROACH CHANNEL

③ DEWATERING

$COST = \frac{127}{101} \times \$200,000 = \$251,400$

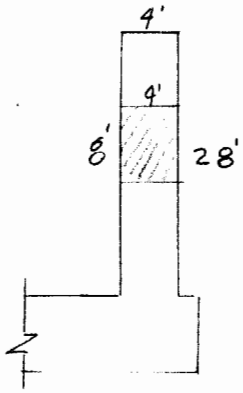


L = 74 - 53 = 21

L = 70 - 50 = 20

42 X 4 = 168

④ GATE BAY WALLS



$V = \frac{4 \times 28}{27} = 4.148$

$V = 168 \times 4.148 = 697$

TO RAISE LAKE BORGNE END OF GATE BAY WALL

$V = \frac{4 \times 8}{27} = 1.185$

$V = 84 \times 1.185 = 100$

PINTLE

$V = 16 \times 5.925 = 95 \text{ YDS}^3$

INCREASE PRESENT WALLS

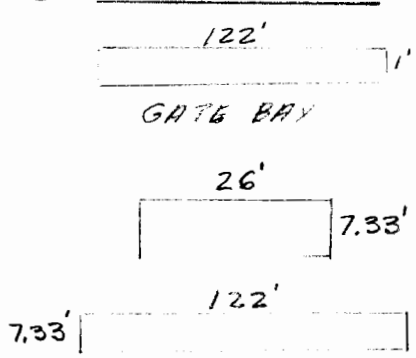
$V = \frac{97}{80} \times 3180 = 3856$

Σ = 4748

TFP

RIGOLETS LOCK
WIDTH 110'; El. 19.0
25 SEPT 67 TFP

⑤ GATE BAY SLAB



GATE BAY

$V = \frac{122 \times 1}{27} = 4.158$

$V = 2 \times 97 \times 4.158 = 807$

$V = \frac{26 \times 7.33}{27} = 7.051$

$V = 2 \times 97 \times 7.051 = 1368$

$V = \frac{122 \times 7.33}{27} = 33.111$

$V = 2 \times 17 \times 33.111 = 1126$

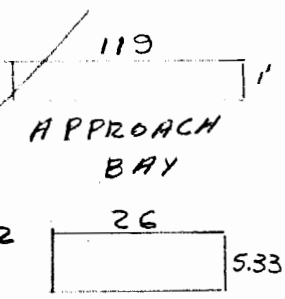
APPROACH BAY

$V = \frac{119 \times 1}{27} = 4.407$

$V = 2 \times 85 \times 4.407 = 750$

$V = \frac{26 \times 5.33}{27} = 5.132$

$V = 2 \times 85 \times 5.132 = 874$



D.M. = 8360

Σ = 13,275

⑥ CONCRETE CHAMBER WALLS

$V = 1813$ YDS³

⑦ CEMENT

GATE BAY WALLS	4748
GATE BAY SLAB	13275
CONCRETE CHAMBER WALLS	1813
Σ =	19,836

CEMENT = 19,836 × 1.375 = 27,275

⑧ REINFORCING STEEL

$W_t = 19,836 \times 150 = 2,975,400$ lbs

⑨ PIPE HANDRAIL

COMPUTE INCREASE IN LENGTHS

SECTOR GATES	74 - 53 = 21 × 4 =	84
RADIUS	70 - 50 = 20 × 4 =	80
GATE BAY 17 × 4	=	68
		232 × 2 = 464
D.M.		2400
		2864

TFP

RIGOLETS LOCK
WIDTH 110'; El. 14.0
25 SEPT 67 TFP

(10) MA 22 SHEET PILING

26 X 10 X 2 = 520 □'

D.M. = 5200

5720 □'

(11) Z-32 SHEET PILING

26 X 10 X 2 = 520 □'

D.M. = 4650

5170 □'

(12) CONCRETE SHEET PILES

40,584 l.f.

(14) STEEL SHEET PILE BUMPER

@ 30.00 Ea.

(15) TIMBER GUIDE WALL

@ 183 FT.

(16) FLOODWALLS

26' INCREASE IN WIDTH
170' FLOODWALL IN D.M.
170 - 26 = 144 FT.

(17) BULK HEADS

@ 32,000 EA.

(18) SECTOR GATES

@ 468,000

(19) MISC. STRUCTURAL STEEL

$\frac{127}{101} \times 17{,}000 \text{ lbs} = 21{,}400$

(20) RIPRAP

26' × 2' CHAMBER & APPROACH CHANNELS

V = $\frac{26 \times 2}{27}$ = 1.925

V = 890 X 1.925

= 1714 YDS³

T = 1714 X 1.5 = 2571

D.M. = 12,380

14,951

(22) FILTER (SHELL)

26' × 1'

V = 0.963

V = 890 X 0.963

= 858 YDS³

Wt = 858 X 1.5 = 1287

D.M. = 3500

4787

(21) FILTER (GRAVEL)

V = 1.925 ÷ 2 = 0.963

V = (85 + 80) 0.963 = 159 YDS³

122 × 1'

V = $\frac{122 \times 1 \times 2 \times 17}{27}$ = 154

D.M. = 840

Σ = 1153 YDS³

TFP

Gate Bay Walls el = 14'

1. A-A. $28 \times 4 = 112\ ft^2$

   length for $\frac{1}{2}$ of 1 gate = 143 ft.

   $4(143) = 572$

   $112(572) = 64{,}065\ ft^3$

2. B-B area = 62.0 ft^2

   length for $\frac{1}{2}$ of 1 gate (1 gate) = 202 ft.

   $2(202)(62) = 25{,}050\ ft^3$

3. Cantilevered walkways at corner of gate bay

   $220(4) = 880\ ft^3$

4. Total volume = 90,000

   $\frac{90{,}000}{27} = 3{,}335$ Cu. yds.

Gate Bay Slabs

$[110(85)(7) + 4.5(85)(7)(2)]2 + [(97)(9)(124) + 3.14(68)^2(\frac{2}{6})(\frac{3}{9})]2$

$(65450 + 5355)2 + (108,250 + 43558)2 =$

$\frac{445225}{27}$ ft^3 = 16,490 cu. yds.

4" Stabilizing Slab

$[110(85)(\frac{1}{3}) + 4.5(85)(\frac{1}{3})(2)]2 + [(97)(\frac{1}{3})(112) + 3.14(68)^2(\frac{2}{6})(\frac{1}{3})]2$

$(3116 + 255)2 + (3620 + 1610)2 = 17,200$

$\frac{17,200}{27}$ ft^3 = 640 cu. yds.

Concrete Chamber Walls

same length ∴ = 1200 cu. yds.

Cement

concrete = 3340 + 16490 + 640 + 1200 = 21,670 cu. yds.

21670(1.4) = 30,340 bbls cement

Reinforcing Steel

3340 + 16490 + 1200 = 21030 cu. yds.

150(21030) = 3,154,500 lbs. steel

Pipe handrail = 2500 lin. ft.

Excavation

$26(17)(695) + 26(170)(21) + 16(23)(188) + 14(65)(2)(23)$

$307190 + 92820 + 69185 + 41860 =$

$\frac{571060}{27}$ ft³ = 18,900 cu. yds.

76,000 + 18900 = 94,900 cu. yds.

Backfill

$\frac{980}{840}(21{,}000) = 24{,}350$ cu. yds.

Steel Sheet Pile Bumper

2(high el − 14.0) job = # 30,000 / each

Shell

$2[(100)(26)(1)] + 26[(695)(1)] + 2(\frac{1}{2})(10)(5) =$

$5{,}200 + 18{,}070 + 50 = \frac{23320}{27}$ ft³ = 865 cu. yds.

3500 + 865 = 4365 cu. yds.

Gravel

$(250)(118)(1.0) \div 27 = 1090$ cu. yds.

Floodwalls – remain same

Concrete Sheet Piles (2 ft. wide)

$(\frac{675+675}{2}) = 675 \times 6'$ (increase) = 4050 lin ft.

4050 + 37,000 = 41,050 lin. ft.

Concrete Batter Piles (12" x 12")

$\left(\frac{675+675}{10}\right) = 135 \times 6 \times \frac{1.116}{2} = 904$ ft (increase)

7000 + 900 = 7900 lin. ft.

Timber Guide Wall 900 lin. ft. - new cost

Riprap

$(110)(2)(695) = 152900$
$+ 20(840)(1)(2) = 33{,}600$
$+ 2(100)(2)(100) = 40{,}000$
$+ 2(35)(1.5)(100) = 10500$
$+ 2(45)(100)(\frac{1}{2})(2) = 9000$
$+ 2(45)(110)(1.5) = 14850$
260850

$\frac{260850}{27} = 9660$

$9660(1.5) = 14{,}490$ tons.

Steel Sheet Piling

MZ-32

$90(10)(2) + 5(2)(140) + 40(30)(2)$
$1800 + 1400 + 2400$
$= 5600$ ft^2

MA-22

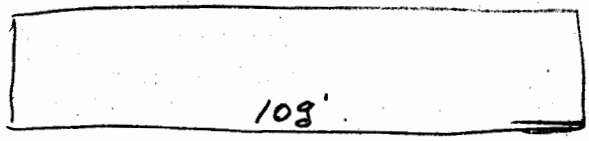
$(118+118)(10) + 10(110) + 30(42)(\frac{1}{2})$
$2360 + 1100 + 2520$
$= 5980$ ft^2

Bulkheads

2 @ job = $32,000/each

RIGOLETTO 100

TFP
20CT 67
-14
-18
-4.33
-.50
4.83

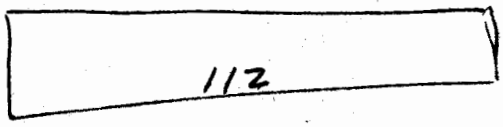


APPROACH BAY

$V = \frac{109 \times 4.83}{27} = 19.498$

$V = 19.498 \times 170 = 3315$

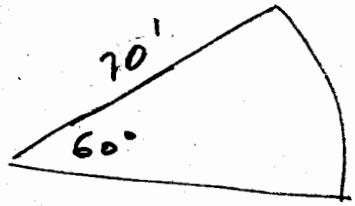
-19.0
-20.0
6.00
.33
.50
6.83



GATE BAY

$V = \frac{112 \times 6.83}{27} = 28.331$

$V = 28.331 \times 178 = 5042$



$A = \frac{\pi}{4} d^2 = \frac{3.14}{4} \times (140)^2 = 15,386$

$A = \frac{240}{360} \times 15,386 = 10,262$

$\frac{4}{6} = \frac{2}{3}$

$V = \frac{10,262 \times 6.83}{27} = 2596$

$\Sigma = 10,953$

RIGOLETS 100'

⑦ CEMENT

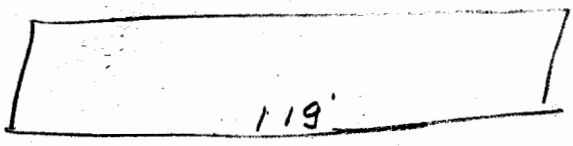
4080
10953
1813
16,846

16,846 X 1.375 = 23,164

⑧ RE STEEL

16,846 X 150 = 2,526,900

RIGOLETS 110



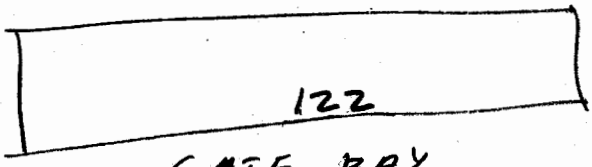
APPROACH BAY

$V = \frac{119 \times 5.33}{27} = 23.491$

$V = 23.491 \times 170 = 3994$

4.33
1.0
5.33

6.33
1.
7.33



GATE BAY

$V = \frac{122 \times 7.33}{27} = 33.120$

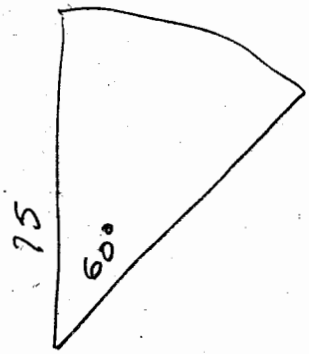
$V = 33.12 \times 194 = 6425$

18,170
16,071

$A = \frac{\pi}{4} d^2 = \frac{3.14}{4} (150)^2 = 17,663$

$A = \frac{2}{3} \times 17,663 = 11,781$

$V = \frac{11,781 \times 7.33}{27} = 3198$



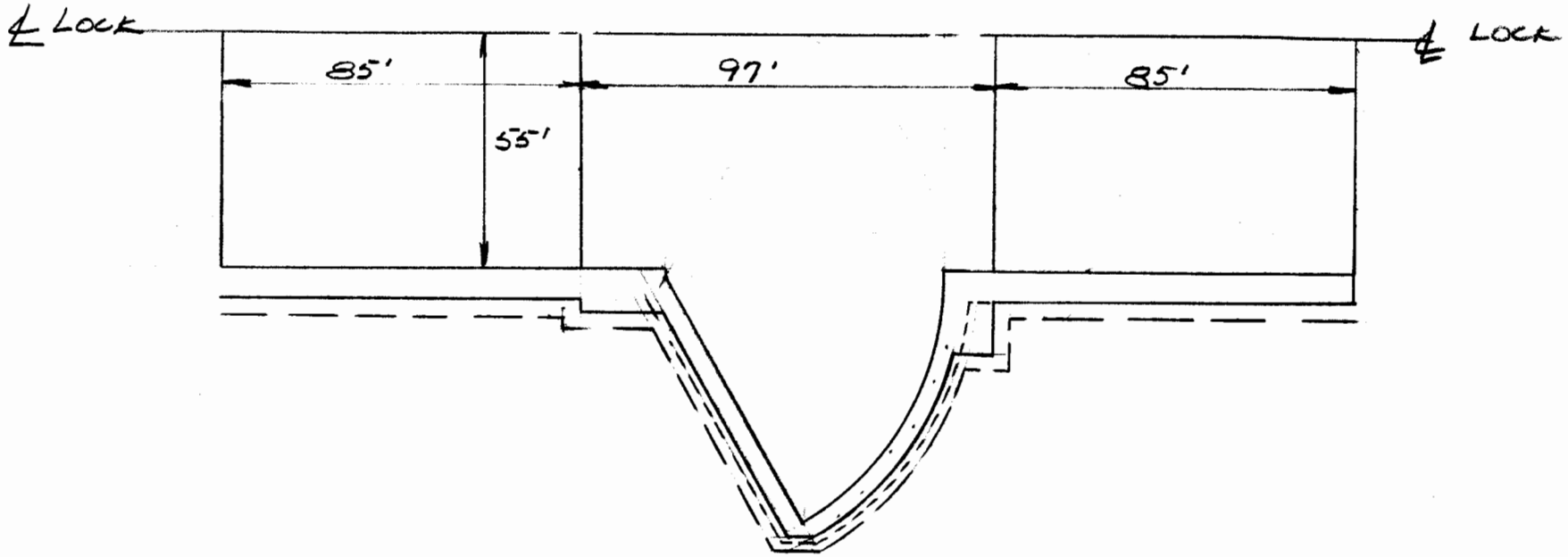
18,023

$\Sigma = 13,617$

Seabrook Lock

Width = 110 feet

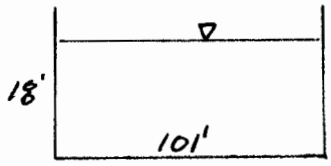
Max elev. = 13.0 feet



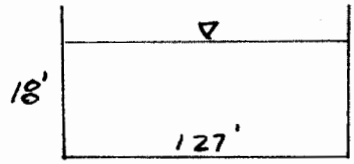
scale. 1" = 40'

SEABROOK LOCK
WIDTH 110'; WALL EL. 13.0
21 SEPT 67 TFP

① DEWATERING



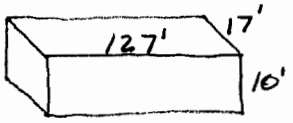
$$\text{Cost} = \frac{127}{101} \times \$345. = \$433.7$$



② PERMANENT RELIEF WELLS

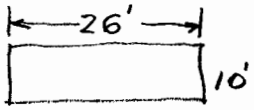
$$\text{Cost} = 1.257 \times 89.0 = \$111.9$$

③ EXCAVATION (under water)



$$V = \frac{127 \times 10 \times 17}{27}$$

$$= 800 \times 2 = \underline{1600}\ \text{YDS}^3$$

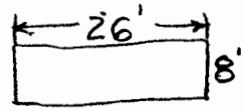


GATE BAY

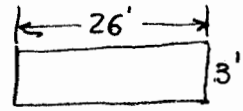
$$V = \frac{26 \times 10}{27} = 9.629\ \text{YDS}^3/\text{FT}$$

$$V = 9.629 \times 2 \times 80 = \underline{1541}\ \text{YDS}^3$$

} GATE BAY



APPROACH CHANNEL

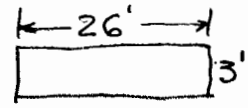


CHAMBER

$$V = \frac{26 \times 8}{27} = 7.703\ \text{YDS}^3/\text{FT}$$

$$V = 7.703 \times 85 \times 4 = \underline{2619}\ \text{YDS}^3$$

} APPROACH CHANNEL



APPROACH CHANNEL

$$V = \frac{26 \times 3}{27} = 2.888$$

$$V = 2.888 \times 610 = \underline{1762}\ \text{YDS}^3$$

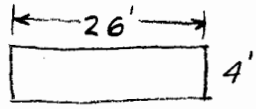
} CHAMBER

$$V = 2.888 \times 2 \times 100 = \underline{558}\ \text{YDS}^3$$

D.M. = 23,000

$\Sigma = \underline{31,080}$

④ TREMIE PLACED SLAB

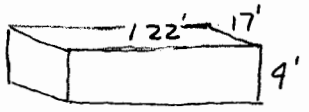


GATE BAY & APPROACH CHANNEL

$$V = \frac{26 \times 4}{27} = 3.851\ \text{YDS}^3/\text{FT}$$

LENGTH = 2 × 80 = 160
4 × 85 = 340
500

$$V = 3.851 \times 500 = \underline{1926}\ \text{YDS}^3$$



GATE BAY

$$V = \frac{122 \times 17 \times 4}{27} = 308$$

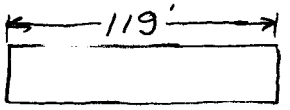
$$V = 308 \times 2 = \underline{616}$$

D.M. = 7,400

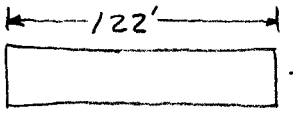
$\Sigma = \underline{9942}\ \text{YDS}^3$ TFP

SEABROOK LOCK
WIDTH 110'; WALL El. 13.0
21 SEPT 67 TFP

⑤ GATE BAY SLAB



APPROACH CHANNEL 85x40= 340ft



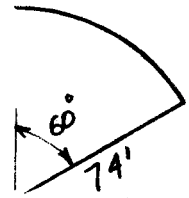
GATE BAY

$V = \frac{119 \times 5}{27} = 22.037 \text{ YDS}^3/\text{FT}$

$V = 22.037 \times 340 = \underline{7493} \text{ YDS}^3$

$V = \frac{122 \times 7}{27} = 31.629 \text{ YDS}^3/\text{FT}$

$V = 31.629 \times 2 \times 97 = \underline{6136} \text{ YDS}^3$



$A = \frac{\pi d^2}{4} = \frac{3.14}{4} (148)^2 = \frac{17195}{6 \times 27} = 106.141 \text{ YDS}^3/\text{FT}$

$V = 106.141 \times 7 \times 4 = \underline{2972} \text{ YDS}^3$

$\Sigma = \underline{16,601} \text{ YDS}^3$

⑥ GATE BAY WALLS

VOLUME APPROACH CHANNEL WALLS = 114 YDS³

GATE BAY

$V = 0.888 \times 73.22' \times 2 = \underline{130} \text{ YDS}^3$

$V = 0.888 \times 70 \times 2 = \underline{125} \text{ YDS}^3$

VOL IN PINTLES = 332 YDS³

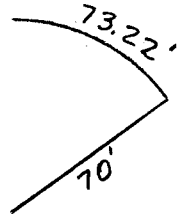
D.M. = 4150 YDS³

$\Sigma = \underline{4851} \text{ YDS}^3$

$S = r\theta \quad \theta = \frac{60\pi}{180} = 1.046$

$= 70 \times 1.046$

$= 73.22'$



⑧ CEMENT

TREMIE PLACED SLAB	=	9942
GATE BAY SLAB	=	16,601
GATE BAY WALLS	=	4851
APPROACH BRIDGES	=	60
		31,454

CEMENT = 31,454 YDS³ x 1.375 bbls/YD³

= 43,250 bbls

TFP

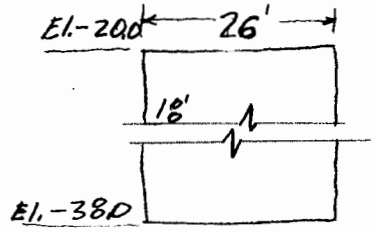
SEABROOK LOCK
WIDTH 110'; WALL EL. 13.0
21 SEPT 67 TFP

⑨ REINFORCING STEEL

GATE BAY SLAB	16,601
GATE BAY WALLS	4851
APPROACH BRIDGE	60
	21,512

RE STEEL = 21,512 YDS^3 X 150 LB STEEL/YD^3 = 3,226,800

⑩ STEEL SHEET PILING Z-32

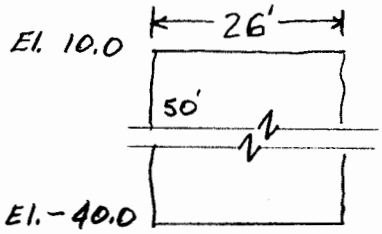


A = 26X18 = 468X2 = 936 □'

D.M. = 17,100

18,036 ft^2

⑪ STEEL SHEET PILING Z-38



A = 26X 50 = 1300 X 4 = 5200

D.M. = 41,500

46,700

⑫ STRUCTURAL STEEL

PROPORTION $\frac{127}{101}$ X 380 = 477,660 #

⑬ PIPE HANDRAIL

SECTOR GATES	74-53 = 21'X4 = 84'	COMPARED WITH 84' LOCK
RADIUS GATES	70-50 = 20X4 = 80	
GATE BAY	97-80 = 17X4 = 68	
	232 X2 464	

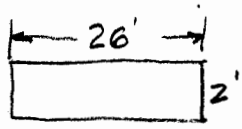
D.M. = 5100

5,564 L.F.

TFP

SEABROOK LOCK
WIDTH 110'; WALL EL. 13.0
21 SEPT 67 TFP

(18) RIPRAP



CHAMBER & APPROACH 810'

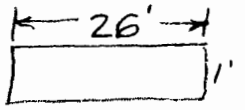
$V = \frac{26 \times 2}{27} = 1.925$ YDS³/FT

$V = 1.925 \times 810 = 1560$

$W = 1560$ YDS³ $\times$ 1.5 T/YD³ $= 2340$ T

D.M. = 10400 / 12,740 Tons

(19) SHELL



$V = \frac{26 \times 1}{27} = 0.962$ YDS³/FT

$V = 0.962 \times 810 = 780$ YDS³

D.M. = 1000 / 1780 YDS³

TFP

Gate Bay Walls

1. Sect A-A

   28 x 4 = 112 ft²

   length for 1/2 of 1 gate = 143.2 ft. (2 gates)

   143.2 (2)(2) = 572.8 ft.

   112 (572.8 ft) = 64,150 ft³

2. Sect. B-B

   area = 7'(1) + 27(2 1/2) + 15(2 1/2)(1/2) = 66.25 ft²

   length of 1/2 of 1 gate (2 gates) = 195 ft.

   195 (2)(2) = 780 ft.

   780 (66.25) = 51,625 ft³

3. Cantilevered walkways at corners of gate bay

   depth = 2 1/2 ft.

   (48 + 40)(2 1/2) = 220 ft³ (4) = 880

4 Total volume concrete gate bay walls =

   64,150 + 51,625 + 220 = 116,660 ft³

   115,995 ~~ft³~~ $\left(\frac{1 \text{ cu yds}}{27 \text{ ~~ft³~~}}\right)$ = 4320 cu. yds.

Gate Bay Slabs

$[110(85)(7) + (4.5)(85)(7)(2)]4 +$

$[(97)(9)(124) + (3.14)(68)^2(\frac{2}{3})(9)]2 =$

586,844 cu ft

$\frac{586,844 \text{ cu ft.}}{27} = 21,735$ cu yds. concrete

Tremie Placed Slabs

$[110(85)(4) + 4.5(85)(4)(2)]4 +$

$[(97)(4)(124) + 3.14(68)^2(\frac{2}{3})(4)]2$

$= 296,780 \text{ ft}^3$

$\frac{296,780 \text{ ft}^3}{27 \frac{\text{ft}^3}{\text{cu. yd.}}} = 10,990$ cu yds. tremie concrete

Cement

total concrete = 4320 + 21,735 + 10,990 + 60 = 37,100 cu yds.

assume x = 1.41 where x (concrete) = (cement)

1.41(37,100) = 52,310 bbls. cement

Reinforcing Steel

total concrete (excluding tremie) = 60 + 21,735 + 4320 = 26,115 cu yds

assume K = 150 lbs steel / cu. yd.

150(26,115) = 3,917,250 lbs. of reinforcing steel

Riprap (2 feet thick)

$(610\,ft)(110\,ft)(2\,ft.) + \left[(100\,ft.)(110\,ft.)(2\,ft.)\right]2 =$

$134{,}200\,ft^3 + 44{,}000 = 178{,}200$ cu.ft.

use conversion factor of 1.5 tons riprap/cu. yd. riprap

$\frac{178{,}200}{27}(1.5) = 9{,}900$ tons

Shell (filter. – 1 foot thick)

$(610)(110)(1\,ft.) + \left[100\,(110)(1)\right]2 =$

$67{,}100\,ft^3 + 22{,}000 = 89{,}100\,ft^3$

$\frac{89{,}100}{27} = 3{,}300$ cu. yds.

54" ϕ Concrete Cylinder Piles

from estimate for elevation -18.0, 12320 lin. ft. of pile required @ 56'/pile.

$\therefore \frac{12320}{56} = 220$ piles

increase length to 61 ft/pile. (change from el. -8.0 to el. -130)

(220 piles)(61 ft/pile) = 13420 linear feet

same length of lock chamber walls

12" x 12" Greenheart Timber Wales

length of chamber wall = 610' x 2 = 1220 ft.

add two extra lengths of timber wales (greenheart) to existing three wales to compensate for extra height.

1220 ft. x 12" x 5 = 73,200 BFM

74 MBFM @

check cost

* Timber Guide Walls (elevation = 13.0 ft.)

850 ft.

Sheet Pile Bumper

cost for el. = 8.0' throughout - $18,000/each

cost for el. = 14.0' & el = 8.0' = $20,000/each

assume approximate cost for el. = 13.0 feet throughout = $22,000/each

Sheet Pile Dolphin (34" ϕ)

$C = \pi d = 3.1417(34^{in}) = 106.82\ in.$ $= 106.82\ ft$

5 foot increase from elevation of 8.0' to 13.0'

height x circum. = surface area

surface area = $60^{in} = 5ft \times 106.82\ ft = 6410\ in^2$ ~~$= 44.5\ ft^2$~~ $534\ ft^2$

necessary increase in fill =

$\pi r^2(h) = 3.1417(17^{in})^2(60^{in}) = 54{,}450\ in^3$ ~~$= 1.68\ cu.\ yds.\ fill$~~

$= 45\ 40\ ft^3$

$= 170\ cu.\ yd \times \$1.50 = \$255$

$534 \times \$3.00 = 1600$

~~$\$1855$~~ to $\$2000$

Steel Sheet Piling (MZ-32)

$[(72+91)2+110]27+[2(72)(60)]$

$11770 + 8640 = 20{,}410\ ft^2$

Excavation

$[(132)(267)] + 2[(\frac{1}{2})(107)(52)] = 40820\ ft^2$

depth of excavation = 10'

$\frac{40820 \times 10}{27} = 15120$ cu. yds. $\times 2 = 30250$ cu. yds.

Rock Dam 110 ft wide gate bay el. = 13.0'

length = 550 lin ft

riprap $\frac{112(1\frac{1}{2})(550)(1.5)}{27} = 5130$ tons

shell $\frac{550(2292)}{27} = 46{,}690$ cu yds.

derrick stone

$\frac{550(244)}{27}(1.62) = 8050$ tons

steel sheet pile MA-22

$550-(72+72) = 406$

$406' (54') = 21{,}925\ ft^2$

OVERWIDTH CONNECTION TO LAKE PONTCHARTRAIN UNDER "LAKE PONTCHARTRAIN, LA. AND VICINITY" PROJECT

NAME OF PROJECT	LOCK WITH CONCRETE SHEET PILING WALL	LOCK WITH EARTH CHAMBER.	DIFFERENCE IN COST
RIGOLETS LOCK (WALLS & GATES EL. 14.0 FT. M.S.L.)			
WIDTH 84'	4,750,000	4,703,000	47,000
WIDTH 100'	5,378,000	5,333,000	45,000
WIDTH 110'	5,903,000	5,871,000	32,000

THE CHART ABOVE SHOWS COMPARISON COSTS AND DIFFERENCE IN COSTS TO CONSTRUCT RIGOLETS LOCK WITH CONCRETE SHEET PILING WALLS AND CONSTRUCTING THE SAME LOCK WITH ~~riprapped~~ earth chamber including two timber guide walls in chamber. Levees to El. 6.0 around chamber.

20 OCT 67

GOVERNMENT | SHEET | OF

PROJECT: RIGOLETS LOCK, ELEV. 14.0; WIDTH 110' TFP | INVITATION NO.: EARTH CHAMBER

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	NAVIGATION LOCK				
1	EXCAVATION	155013	cy	1.50	232,520
2	BACKFILL	69,442	cy	1.00	69,450
3	DEWATERING		job		251,400
	CONCRETE				
4	GATE BAY WALLS	4748	cy	40.00	189,920
5	GATE BAY SLABS	13,617	cy	20.00	272,340
7	CEMENT	25,252	bbl	5.00	126,260
8	REINFORCING STEEL	2,754,750	lb	0.15	413,220
9	PIPE HANDRAIL	2,528	lf	7.50	18,960
	STEEL SHEET PILING				
10	MA 22	5720	sf	3.50	20,020
11	Z 32	5170	sf	5.25	27,140
14	STEEL SHEET PILE BUMPER	2	ea.	30,000	60,000
15	TIMBER GUIDE WALL	2280	lf	183.00	417,240
16	FLOODWALLS	340	lf	150.00	51,000
17	BULKHEADS	2	ea	32,000	64,000
18	SECTOR GATES				468,000
19	MISC. STRUCTURAL STEEL	21,400	lb	0.30	6,420
20	RIPRAP	22,998	ton	8.00	183,990
21	FILTER (Gravel)	1153	cy	8.00	9,230
22	FILTER (Shell)	6358	cy	3.50	22,260
23	CONTROL HOUSE	4	ea	8000	32,000
	Subtotal				2,935,370
	Price Level Increase				754,390
	Subtotal				3,689,760
	Cathodic Protection				144,000*
	Electrical System				261,000*
	Sector Gate Machinery				170,000*
	Subtotal				4,264,760
	Contingencies 20%				852,960
	Subtotal				5,117,720
	Engineering & Design 7.9%				404,300
	Supervision & Admin 6.8%				348,000
	Subtotal				5,870,020
	* 1967 Price Level (1 July)				

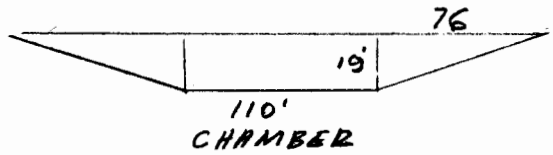
ENG FORM 1738 1 APR 51 SUPERSEDES ENG FORM 1738, 1 JAN 49, WHICH IS OBSOLETE. (TRANSLUCENT)

GPO : 1963 OF—694-802

(EM 1110-2-1302)

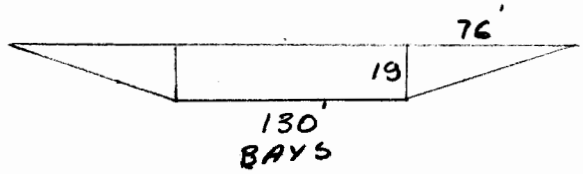
RIGOLETS LOCK
WIDTH 110; El. 14.0
2 OCT 67 TFP
EARTH CHAMBER

① EXCAVATION



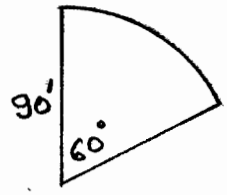
$A = 110 \times 19 = 2090$
$A = 76 \times 19 = \underline{1444}$
3534

$V = \frac{3534 \times 690}{27} = \underline{90,314}$



$A = 130 \times 19 = 2470$
$A = 76 \times 19 = \underline{1444}$
3914

$V = \frac{3914 \times 364}{27} = \underline{52,767}$



$A = \frac{\pi}{4} d^2 = \frac{3.14}{4}(180)^2 = 25,434$

$A = 240/360 \times 25,434 = 16,956$

$V = \frac{16,956 \times 19}{27} = \underline{11,932}$

$\Sigma = \underline{155,013}$

② BACKFILL

$V = 67.555 \times 364 = 24,590$
$\underline{44,852}$
$69,442$

⑦ CEMENT

GATE BAY WALLS	4748
GATE BAY SLABS	13,617
	18,365

$CEMENT = 18,365 \times 1.375 = \underline{25,252}$

⑧ REINFORCING STEEL

$W_T = 18,365 \times 150 = \underline{2,754,750}$

⑨ PIPE HANDRAIL

2200 FROM 84' LOCK
70 - 50 = 20
74 - 53 = 21
41
x4
164 x 2 = 328
2200
2528

RIGOLETS LOCK
WIDTH 110'; EL. 14.0
3 OCT 67 TFP
EARTH CHAMBER

(26) RIPRAP

$V = \frac{110 \times 2}{27} = 8.148$

$V = 690 \times 8.148 = 5809$ CHAMBER

$V = \frac{158 \times 1.5}{27} = 8.777$

$V = 690 \times 8.777 = 6056$ CHAMBER

$V = \frac{150 \times 2}{27} = 11.111$

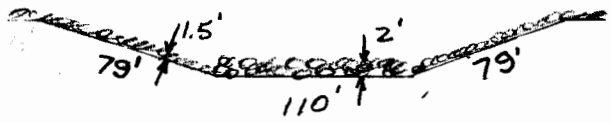
$V = 200 \times 11.111 = 2222$ CHANNEL

$V = \frac{112 \times 1.5}{27} = 6.222$

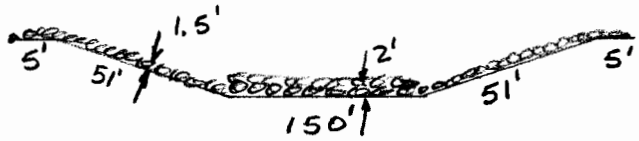
$V = 200 \times 6.222 = 1245$

$\Sigma = 15,332$

$T = 15,332 \times 1.5 = 22,998$



CHAMBER



CHANNEL

(22) FILTER SHELL

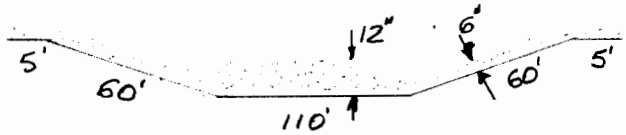
$V = \frac{110 \times 1 \times 690}{27} = 2812$ CHAMBER

$V = \frac{158 \times .5 \times 690}{27} = 2019$

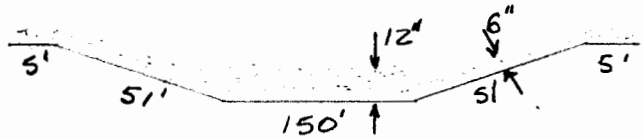
$V = \frac{150 \times 1 \times 200}{27} = 1112$

$V = \frac{112 \times .5 \times 200}{27} = 415$

6358



CHAMBER



CHANNEL

2 OCT 67

GOVERNMENT | SHEET OF

PROJECT: RIGOLETS Lock ELEV. 14.0; WIDTH 100' TFP | INVITATION NO.: EARTH CHAMBER

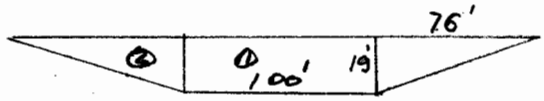
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	NAVIGATION LOCK				
1	EXCAVATION	140,400		1.50	210,600
2	BACKFILL	68,362	cy	1.00	68,370
3	DEWATERING		job		231,600
	CONCRETE				
4	GATE BAY WALLS	4080	cy	40.00	163,200
5	GATE BAY SLABS	10,953	cy	20.00	219,060
7	CEMENT	20,670	bbl	5.00	103,350
8	REINFORCING STEEL	2,254,950	lb	0.15	338,250
9	PIPE HANDRAIL	2,400	lf	7.50	18,000
	STEEL SHEET PILING				
10	MA 22	5,520	sf	3.50	19,320
11	Z 32	4970	sf	5.25	26,100
14	STEEL SHEET PILE BUMPER	2	ea	30,000	60,000
15	TIMBER GUIDE WALL	2280	lf	183.00	417,240
16	FLOODWALLS	340	lf	150.00	51,000
17	BULKHEADS	2	ea	32,000	64,000
18	SECTOR GATES				414,000
19	MISC. STRUCTURAL STEEL	19,700	lb	0.30	5,910
20	RIPRAP	21,729	Ton	8.00	173,840
21	FILTER (Gravel)	972	cy	8.00	7,800
22	FILTER (Shell)	6,027	cy	3.50	21,100
23	CONTROL HOUSES	4	ea	8,000	32,000
	Subtotal				2,644,740
	Price Level Increase				679,700
	Subtotal				3,324,440
	Cathodic Protection				132,000 *
	Electrical System				248,000 *
	Sector Gate Machinery				170,000 *
	Subtotal				3,874,440
	Contingencies 20%				774,990
	Subtotal				4,649,430
	Engineering & Design 7.9%				367,310
	Supervision & Admin 6.8%				316,160
	Total				5,332,900
	* 1967 Price Level (1 July)				

ENG FORM 1738 1 APR 51 SUPERSEDES ENG FORM 1738, 1 JAN 49, WHICH IS OBSOLETE. (TRANSLUCENT)

GPO : 1963 OF—684-802 (EM 1110-2-1302)

RIGOLETS LOCK
WIDTH 100'; El. 14.0
29 SEPT 67 TFP
EARTH CHAMBER

① EXCAVATION



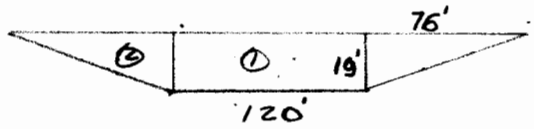
LOCK CHAMBER

$A_1 = 100 \times 19 = 1900$

$A_2 = 19 \times 76 = 1444$

3344

$V = \frac{3344}{27} = 123.851$



$V = 690 \times 123.851 = \underline{85,457}$

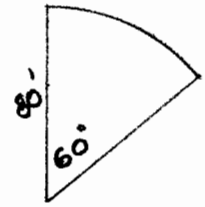
$A_1 = 120 \times 19 = 2280$

$A_2 = 1444$

3724

$V = \frac{3724}{27} = 137.925$ ✓

$V = 330 \times 137.925 = \underline{45,515}$



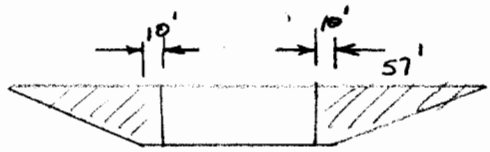
$A = \frac{\pi}{4} d^2 = \frac{3.14}{4} (160)^2 = 20,096$

$A = \frac{240}{360} \times 20,096 = 13,397$

$V = \frac{13,397 \times 19}{27} = \underline{9428}$

$\Sigma = \underline{140,400}$

② BACKFILL



$V = 67.555 \times 348 = 23,510$

44,852

68,362

③ CEMENT

GATE BAY WALLS	4080
GATE BAY SLABS	10,953
	15,033

$CEMENT = 15,033 \times 1.375 = \underline{20,670}$

④ REINFORCING STEEL

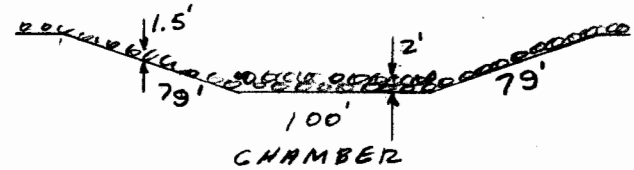
$W_T = 15,033 \times 150 = \underline{2,254,950}$

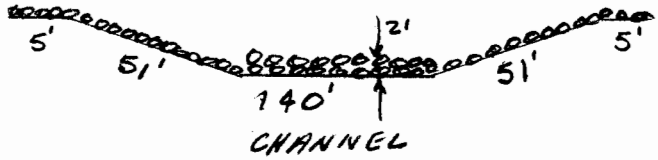
⑤ PIPE HANDRAIL

62 − 50 = 12
65 − 53 = 12
24
× 4
96 × 2 = 200

2200 FROM 84' LOCK
200
2400

RIGOLETS LOCK
WIDTH 100'; EL. 14.0
2 OCT. 67 TFP
EARTH CHAMBER





(20) RIPRAP

$V = \frac{100 \times 2}{27} = 7.407$

$V = 690 \times 7.407 = 5111$

$V = \frac{158 \times 1.5}{27} = 8.777$

$V = 690 \times 8.777 = 6056$

$V = \frac{140 \times 2}{27} = 10.370$

$V = 200 \times 10.37 = 2074$

$V = \frac{112 \times 1.5}{27} = 6.222$

$V = 200 \times 6.222 = 1245$

$\Sigma = 14,486$

$T = 14,486 \times 1.5 = 21,729$

(21) FILTER SHELL

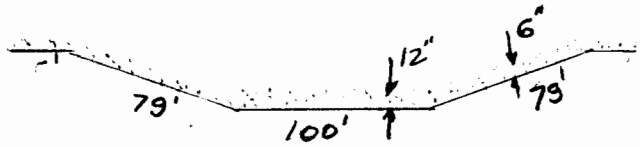
$V = \frac{108 \times 1 \times 690}{27} = 2556$

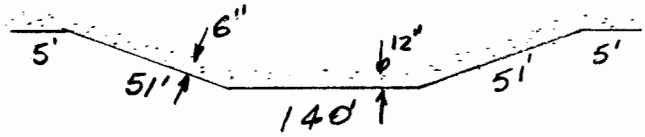
$V = \frac{158 \times .5 \times 690}{27} = 2019$

$V = \frac{140 \times 1 \times 200}{27} = 1037$

$V = \frac{112 \times .5 \times 200}{27} = 415$

6027





29 SEPT 67

GOVERNMENT | SHEET OF

PROJECT: RIGOLETS LOCK ELEV. 14.0 WIDTH = 84.0 TFP | INVITATION NO.: EARTH CHAMBER

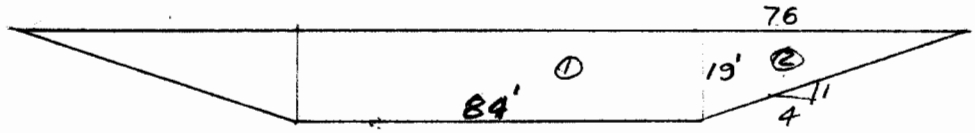
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	NAVIGATION LOCK				
1	EXCAVATION	126,708	cy	1.50	190,100
2	BACKFILL	67,148	cy	1.00	67,200
3	DEWATERING		Job		200,000
	CONCRETE				
4	GATE BAY WALLS	3522	cy	40.00	140,880
5	GATE BAY SLABS	8350	cy	20.00	167,000
7	CEMENT	16,324	bbl	5.00	81,620
8	REINFORCING STEEL	1,780,800	lb	0.15	267,120
9	PIPE HANDRAIL	2,200	lf	7.50	16,500
	STEEL SHEET PILING				
10	MA 22	5,200	sf	3.50	18,200
11	Z 32	4,650	sf	5.25	24,420
14	STEEL SHEET PILE BUMPER	2	ea	30,000	60,000
15	TIMBER GUIDE WALL	2280	lf	183.00	417,240
16	FLOODWALLS	340	lf	150.00	51,000
17	BULKHEADS	2	ea	32,000	64,000
18	SECTOR GATES				346,500
19	MISC. STRUCTURAL STEEL	17,000	lb	0.30	5,100
20	RIPRAP	20,146	Ton	8.00	161,170
21	FILTER (Gravel)	840	cy	8.00	6,720
22	FILTER (shell)	5,498	cy	3.50	19,250
23	CONTROL HOUSES	4	ea	8,000	32,000
	Subtotal				2,336,020
	Price Level Increase				600,360
	Subtotal				2,936,380
	Cathodic Protection				110,000 *
	Electrical System				200,000 *
	Sector Gate Machinery				170,000 *
	Subtotal				3,416,380
	Contingencies 20%				683,280
	Subtotal				4,099,660
	Engineering & Design 7.9%				323,880
	Supervision & Admin 6.8%				278,780
	Total				4,702,320
	* 1967 Price Level (1 July)				

ENG FORM 1738 1 APR 51 SUPERSEDES ENG FORM 1738, 1 JAN 49, WHICH IS OBSOLETE. (TRANSLUCENT)

GPO : 1963 OF—694-802 (EM 1110-2-1302)

RIGOLETS LOCK
WIDTH 84'; EL. 14.0
29 SEPT 67 TFP

① EXCAVATION



LOCK CHAMBER

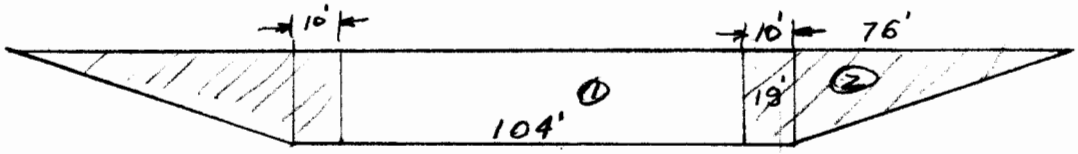
$A_1 = 84 \times 19 = 1596$

$A_2 = 19 \times 76 = 1444$

3040

$V = \frac{3040}{27} = 112.592$

$V = 690 \times 112.592 = 77,689$



APPROACH BAYS & GATE BAYS

$A_1 = 104 \times 19 = 1976$

$A_2 = 19 \times 76 = 1444$

3420

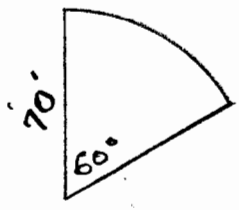
$V = \frac{3420}{27} = 126.666$

$V = 330 \times 126.666 = 41,800$

$A = \frac{\pi}{4} d^2 = \frac{3.14}{4}(140)^2 = 15,386$

$A = \frac{240}{360} \times 15,386 = 10,258$

$V = \frac{10,258 \times 19}{27} = 7219$



EXCAVATION, ≤ = 126,708

RIGOLETS LOCK
WIDTH 84'; EL. 14.0
29 SEPT 67 TFP
EARTH CHAMBER

② BACKFILL REFER TO PRECEDING PAGE

A = 19 X 20 = 380 V = 1824/27 = 67.555

A = 76 X 19 = 1444

1824 V = 67.555 X 330 = 22,293

③ DEWATERING

$ 200,000 SAME AS PREVIOUS ESTIMATE

④ CONCRETE, GATE BAY WALLS

3522 YDS³ SAME AS PREVIOUS ESTIMATE

⑤ CONCRETE, GATE BAY SLABS

8350 YDS³ SAME AS D.M. ESTIMATE

⑦ CEMENT

GATE BAY WALLS 3522 YDS³
GATE BAY SLABS 8350
11,872 YDS

CEMENT = 11,872 X 1.375 = 16,324

⑧ REINFORCING STEEL

W_T = 11,872 X 150 = 1,780,800 lbs

⑨ PIPE HANDRAIL

4 X 85 = 340'
4 X 50 = 200'
4 X 54 = 216'
4 X 85 = 340
1096 X 2 = 2200

⑩ RIPRAP

L = 690'

V = 84 X 2/27 = 6.222

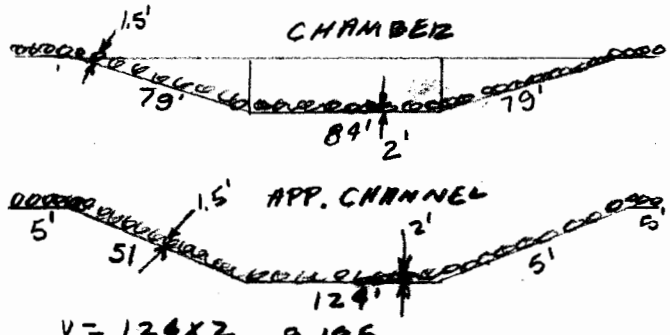
V = 690 X 6.222 = 4293

V = 158 X 1.5/27 = 8.777

V = 690 X 8.777 = 6056

Σ = 10,349

T = 15,524



V = 124 X 2/27 = 9.185

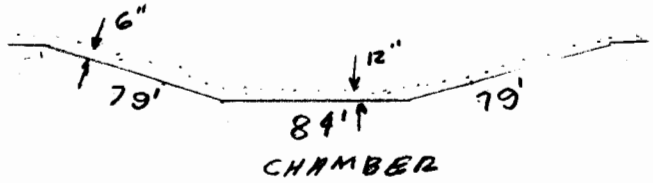
V = 112 X 1.5/27 = 6.222

15.407 X 1.5 = 23.111 T

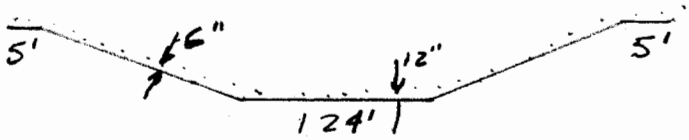
T = 200 X 23.111 = 4622

Σ = 20,146

RIGOLETS LOCK
WIDTH 84' EL. 19.0
29 SEPT 67 TFP
EARTH CHAMBER



CHAMBER



APP. CHANNEL

(22) FILTER, SHELL

$V = \frac{84 \times 1}{27} = 3.111$

$V = \frac{158 \times 0.5}{27} = \frac{2.925}{6.036}$

$V = 690 \times 6.036 = \underline{4165}$

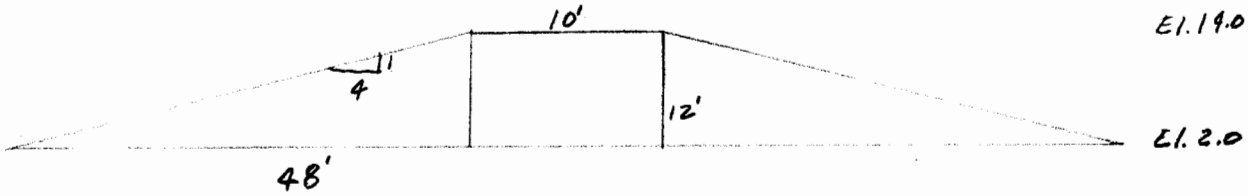
$V = \frac{124 \times 1}{27} = 4.592$

$V = \frac{112 \times .5}{27} = \frac{2.074}{6.666}$

$V = 200 \times 6.666 = \underline{1333}$

$\Sigma = \underline{5498}$

(2) BACKFILL



$A = 10 \times 12 = 120$
$A = 48 \times 12 = \frac{576}{696}$

$V = \frac{696}{27} = 25.777$

$V = 870 \times 25.777 = 22,426$

$V = 22,426 \times 2 = \underline{44,852}$

$\Sigma = 44,852 + 22,293 = \underline{67,148}$

(15) TIMBER GUIDE WALL

$L = 2 \times 690 = 1380$
400
500
2280

GOVERNMENT					SHEET 13 OF 13
PROJECT Summary Sheet No. 2 TFP					INVITATION NO.
ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	Seabrook Lock (includes rock dam) (Elev. = 13.0 ft.)				
	1/ Width 84 ft				7,633,985
	Width 100 ft				8,481,288
	Width 110 ft				9,296,524
	Chef Menteur (Elev. = 14.0 ft)				
	2/ Width 56 ft				1,714,800
	Width 100 ft				2,525,340
	Width 110 ft				2,836,340
	3/ Rigolets Lock (Elev. = 14.0 ft)				
	Width 84 ft				4,749,300
	Width 100 ft				5,377,530
	Width 110 ft				5,902,830
	1/ Total				
	2/				
	3/				

1.66

GOVERNMENT | SHEET 13 OF 13

PROJECT: Summary Sheet No. 1 TFP & OTHERS | INVITATION NO.

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	Seabrook Lock: (includes rock dam)				
	(elev. = 13.0 ft)				
	width = 84 ft				7,501,319
	width = 100 ft				8,827,675
	width = 110 ft				9,688,091
	Cher Menteur:				
	(elev. = 14.0 ft)				
	width = 56 ft				1,714,800
	width = 100 ft				2,723,997
	width = 110 ft				2,971,413
	Rigolets				
	(elev. = 14.0 ft)				
	width = 84 ft				4,630,190
	width = 100 ft				5,453,696
	width = 110 ft				5,954,658

GOVERNMENT SHEET 13 OF 13

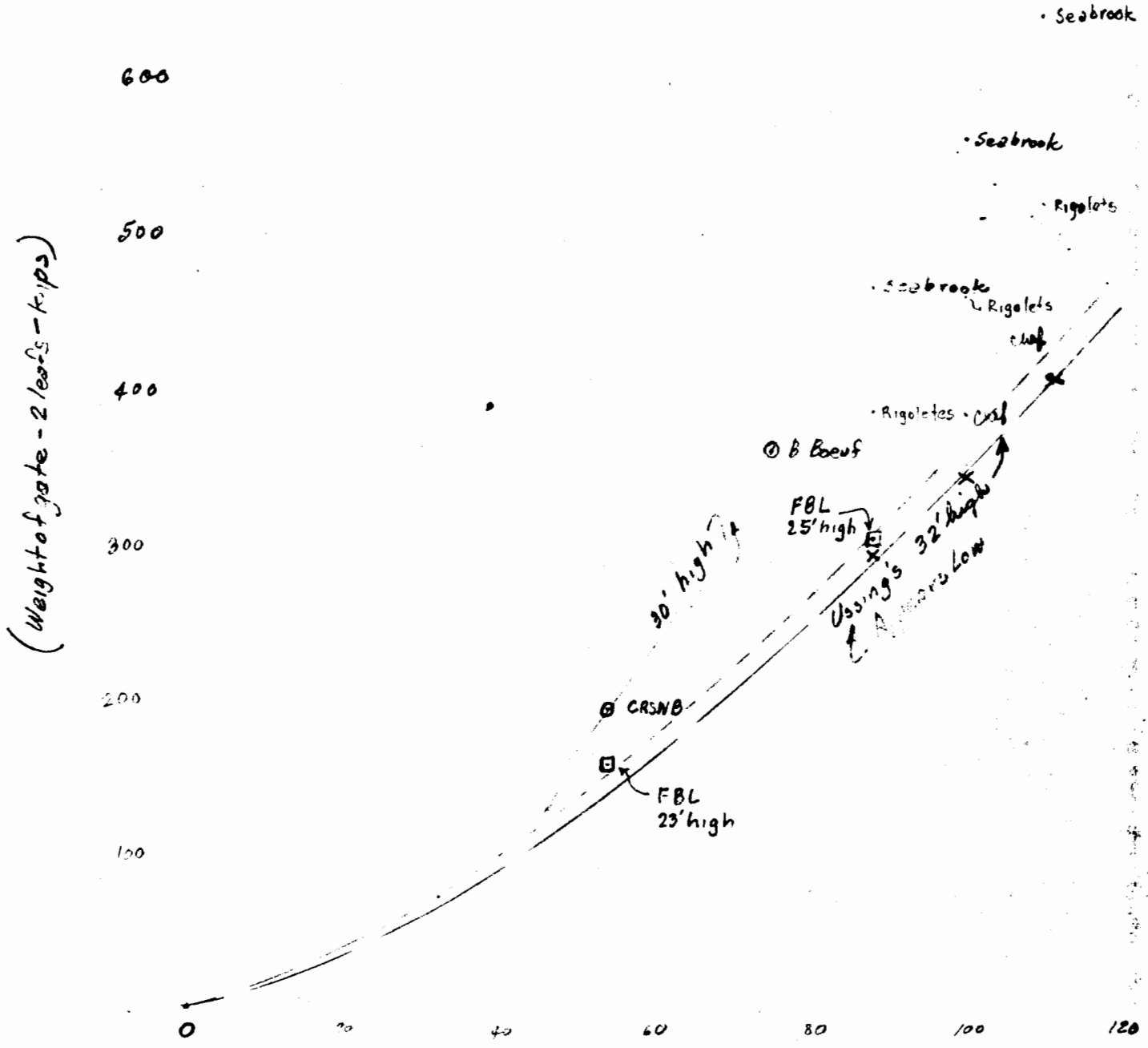
PROJECT Summary Sheet INVITATION NO.

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	Seabrook Lock: (includes rock dam)				
	(elev. = 13.0 ft.)				
	width = 84 ft				7,408,870
	width = 100 ft.				8,587,100
	width = 110 ft				9,322,700
	Chef Menteur:				
	(elev. = 14.0 ft.)				
	width = 56 ft.				1,714,800
	width = 100 ft.				2,570,900
	width = 110 ft				2,781,700
	Rigolets				
	(elev. = 14.0 ft)				
	width = 84 ft.				4,640,100
	width = 100 ft.				5,346,700
	width = 110 ft.				5,728,700
	SUPERSEDED				

Comparison of Navigation Structures
Seabrook, Rigolets, Chef Menteur

16 September 61

JSH



Improvement of Navigation [illegible]

16 Sept 1967

JH

Seabrook Lock Gates

84' x 32' high	= 2 x 465,000	= 930,000 Lbs @ 45	$418,500
100' x 32' high	= 2 x 560,000	= 1,120,000 Lbs @ .45	504,000
110' x 32' high	= 2 x 640,000	= 1,280,000 Lbs @ .45	576,000

Ripolets Lock Gate

84' x 28' high	= 2 x 385,000	= 770,000 Lbs @ .45	= $346,500
100' x 28' high	= 2 x 460,000	= 920,000 Lbs @ .45	= 414,000
110' x 28' high	= 2 x 520,000	= 1,040,000 Lbs @ .45	= 468,000

Chef Menteur Navigation Gate

56' x 26' high	= 220,000	=	= $121,860.00
100 x 26' high	= 383,000	= 383,000 Lb @ .45 + 23,100	= 195,350
110 x 26' high	= 430,000	= 430,000 Lbs @ .45 + 23,100	= 216,500.00

GOVERNMENT SHEET 7 OF 13

PROJECT Chef Menteur elev = 14.0' width = 56' INVITATION NO. RPJ Sep 67

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	Navigation Structure				
	Gate Bay & Approaches				
	Excavation	30,000	cy	1.50	45,000 ✓
	Backfill	14,100	cy	0.80	11,280 ✓
	Sand Backfill	4,000	cy	5.00	20,000 ✓
	Dewatering	job			155,000 ✓
	Concrete, Class A in walls	1654	cy	40.00	66,160 ✓
	Concrete, Class A in floor slabs	3204	cy	20.00	64,080 ✓
	Cement	6800	bbls.	5.00	34,000 ✓
	Reinforcing Steel	680,000	lb	0.175	119,000 ✓
	Pipe Handrail	1,100	lin. ft.	7.50	8,250 ✓
	Steel Sheet Piling MA-22	6,640	sq ft.	3.50	23,240 ✓
	Steel Piling 12BP53	7,590	lin. ft.	7.00	53,130 ✓
	Untreated Timber Piling CL "B"	8,580	lin. ft.	1.50	12,870 ✓
	Filter Gravel	285	cy	8.00	2,280 ✓
	Filter Sand	143	cy	8.00	1,144 ✓
	Riprap	1120	ton	10.00	11,200 ✓
	Gravel	170	cy	8.00	1,360 ✓
	Sand	170	cy	8.00	1,360 ✓
	Floodwalls (2) see Citrus for details				36,580 ✓
	Bulk heads (4)	" "			26,650 ✓
	Timber Guide Walls	" "			25,500 ✓
	Sector Gate	" "			121,860 ✓
	Upper & Lower Hinges				5,250 ✓
	Roller track, seal plates, beams				9,675 ✓
	Needle beam seats, corner protect. plates, ladders	"	"		3,000 ✓
	Subtotal				857 869
	Price level increase				220 472 ✓
	Subtotal				1,078,350 ✓
	Cathodic Protection				10,000 *
	Electrical System				90,000 *
	Sector Gate Machinery				67,500 *
	Subtotal				1,245,850 ✓
	Contingencies 20%				249,170 ✓
	Subtotal				1,495,020 ✓
	Engineering & Design 7.9%				118,110
	Supervision & Administration 6.8%				101,660 ✓
	total				1,714,800
	* 1967 Price level (1 July)				

718,054

GOVERNMENT SHEET 8 OF 13

PROJECT Chef Menteur Hurricone Barrier WIDTH 100' El. 19.0 TFP

INVITATION NO. 25 Sept 67

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	Navigation Structure				
1	Excavation	40,700	C.Y.	1.50	60,050
2	Backfill	15,200	C.Y.	0.80	12,160
3	Sand Backfill	4303	C.Y.	5.00	21,520
4	Dewatering		Job		285,000
5	Concrete, Cl. A-Walls	1978	C.Y.	40.00	79,120
6	Concrete, Cl. A-Flr. Slabs	7274	C.Y.	20.00	145,480
7	Cement	12,722	bbls	5.00	63,610
8	Reinforcing Steel	1,387,800	lb	0.175	242,870
9	Pipe Handrail	1296	L.F.	7.50	9,720
10	Steel Sheet Piling, MA 22	8320	S.F.	3.50	29,120
11	Steel Piling 12 BP 53	13,230	L.F.	7.00	92,610
12	Untreated Timber Piling-B	13860	L.F.	1.50	20,790
13	Filter Gravel	393	C.Y.	8.00	3,150
14	Filter Sand	197	C.Y.	8.00	1,580
15	Riprap	1732	Ton	10.00	17,320
16	Gravel	170	C.Y.	8.00	1,360
17	Sand	170	C.Y.	8.00	1,360
18	Floodwall				29,400
19	Bulkheads				26,650
20	Timber Guide Walls				25,500
21	Sector Gate				195,350
22	Upper & Lower Hinges				5,250
23	Roller Track, Seal Plates, Beams				9,680
24	Needle Beam Seats, Corner Protect. Plates, Ladders	10,000	lb	0.30	3,000
	Subtotal				1,281,650
	Price Level Increase				329,390
	Subtotal				1,611,040
	Cathodic Protection				27,000*
	Electrical System				126,000*
	Sector Gate Machinery				67,500*
	Subtotal				1,831,540
	Contingencies 20%				366,310
	Subtotal				2,197,850
	Engineering & Design 7.7%				169,240
	Supervision & Admin 7.2%				158,250
	Total				2,525,340
	*1967 Price Level (1 July)				

ENG FORM 1738 1 APR 51 SUPERSEDES ENG FORM 1738, 1 JAN 49, WHICH IS OBSOLETE. (TRANSLUCENT)

GPO : 1963 OF—684-802 (EM 1110-2-1302)

GOVERNMENT SHEET 8 OF 13

PROJECT Chet Menteur elev. = 14.0' width = 100' INVITATION NO. Sep 67 RPJ

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	Navigation Structure				
	Gate Bay & Approaches				
1	Excavation	43450	cy.	1.50	65,175 ✓
2	Backfill	20350	cy.	0.80	16,280 ✓
3	Sand Backfill	4,620	cy.	5.00	23,100 ✓
4	Dewatering	job			170,000
5	Concrete, Class A in walls	1960	cy.	40.00	78,400 ✓
6	Concrete, Class A in floor slabs	8820	cy.	20.00	176,400 ✓
7	Cement	16,840	bbls.	5.00	84,200
8	Reinforcing Steel	1,805,000	lb.	0.175	315,875 ✓
9	Pipe Handrail	1310	lin. ft	7.50	9,825 ✓
10	Steel Sheet Piling MA-22	8590	ft^2	3.50	30,065 ✓
11	Steel Piling 12BP53	18,810	lin. ft.	3.50	65,835 ✓
12	Untreated Timber Piling Cl. B"	15,330	lin. ft.	1.50	22,995 ✓
13	Filter Gravel	545	cy.	8.00	4360 ✓
14	Filter Sand	225	cy.	8.00	1,800 ✓
15	Riprap	2695	tons	10.00	26,950 ✓
16	Gravel	360	cy.	8.00	2880 ✓
17	Sand	360	cy.	8.00	2880 ✓
18	Floodwalls (2) See Citrus for details				36,580
19	Bulkheads (4)	" "			26,650
20	Timber Guide Walls	" "			25,500
21	Sector Gates	" "		195,350	→ 195,350
22	Upper & Lower Hinges	" "			5,250
23	Roller track, seal plates, beams	" "			9,675
24	Needle beam seats, corner protect plates, ladders	" "			3,000
	Subtotal				1,399,025
	Price level increase				359,549
	subtotal				1,758,574 ✓
	Cathodic Protection				27,000 *
	Electrical System				126,000 *
	Sector Gate Machinery				67,500 *
	Subtotal				1,979,074 ✓
	contingencies 20%				395,815 ✓
	subtotal				2,374,889
	Engineering & Design 7.9%				187,616
	Supervision & Administration 6.8%				161,492
	total				2,723,997 ✓
	* 1967 Price level (1 July)				

ENG FORM 1738 1 APR 51 SUPERSEDES ENG FORM 1738, 1 JAN 49, WHICH IS OBSOLETE. (TRANSLUCENT)

GPO : 1963 OF—684-602 (EM 1110-2-1302)

GOVERNMENT SHEET 9 OF 13

PROJECT Chef Menteur Hurricone Barrier WIDTH 110' El. 14.0 TFP INVITATION NO. 25 Sept 67

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	Navigation Structure				
1	Excavation	44,561	cy	1.50	66,850
2	Backfill	16,152	cy	0.80	12,930
3	Sand Backfill	4,418	cy	5.00	22,090
4	Dewatering		Jod		197,000
5	Concrete, Cl. A - Walls	2225	cy	40.00	89,000
6	Concrete, Cl. A - Flr. Slabs	8905	cy	20.00	178,100
7	Cement	15,304	bbls	5.00	76,520
8	Reinforcing Steel	1,669,500	lbs	0.175	292,170
9	Pipe Handrail	1,380	l.f.	7.50	10,350
10	Steel Sheet Piling, MA-22	8,800	s.f.	3.50	30,800
11	Steel Piling 12 BP 53	16,320	l.f.	7.00	114,240
12	Untreated Timber Piling - B	15,180	l.f.	1.50	22,770
13	Filter Gravel	420	c.y	8.00	3,360
14	Filter Sand	211	cy	8.00	1,690
15	Riprap	1870	Ton	10.00	18,700
16	Gravel	170	cy	8.00	1360
17	Sand	170	cy	8.00	1360
18	Floodwall				27,730
19	Bulkheads				26,650
20	Timber Guide Walls				25,500
21	Sector Gate				216,500
22	Upper and Lower Hinge				5,250
23	Roller Track, Seal Plates, Beams				9680
24	Needle Beam Seats, Corner Protect. Plates, Ladders	10,000	lb	0.30	3,000
	Subtotal				1,453,600
	Price Level Increase				373,580
	subtotal				1,827,180
	Cathodic Protection				29,400*
	Electrical System				133,000*
	Sector Gate Machinery				67,500*
	Subtotal				2,057,080
	Contingencies 20%				411,420
	Subtotal				2,468,500
	Engineering & Design 7.7%				190,100
	Supervision & Admin. 7.2%				177,740
	Total				2,836,340

*1967 Price Level (1 July)

ENG FORM 1738 1 APR 51 SUPERSEDES ENG FORM 1738, 1 JAN 49, WHICH IS OBSOLETE. (TRANSLUCENT)

GPO : 1963 OF—694-802 (EM 1110-2-1302)

GOVERNMENT SHEET 9 OF 13

PROJECT Chef Menteur elev. = 14.0' width = 110' INVITATION NO. RPJ Sep 67

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	Navigation Structure				
	Gate Bay & Approaches				
	Excavation	47,910	cy.	1.50	71,865
	Backfill	21,675	cy.	0.80	17,340
	sand Backfill	4725	cy.	5.00	23,625
	Dewatering	job			180,000
	Concrete, Class A in walls	2060	cy.	40.00	82,400
	Concrete, Class A in floor slabs	10,885	cy.	20.00	217,700
	Cement	18,080	bbls.	5.00	90,400
	Reinforcing Steel	1,937,250	lb.	0.175	339,020
	Pipe Handrail	1370	lin.ft.	7.50	10,275
	Steel Sheet Piling MA-22	9260	ft^2	3.50	32,410
	Steel Piling 12BP53	21900	lin.ft.	3.50	76,650
	Untreated Timber Piling, Cl. "B"	18,540	lin. ft.	1.50	27,810
	Filter Gravel	610	cy.	8.00	4,880
	Filter sand	305	cy.	8.00	2,440
	Riprap	2850	tons	10.00	28,500
	Gravel	380	cy.	8.00	3040
	Sand	380	cy.	8.00	3040
	Floodwalls (2) See Citrus for details				36,580
	Bulkheads (4) " "				26,650
	Timber Guide Walls " "				25,500
	Sector Gates " "			216,500	216,500
	Upper & Lower Hinges " "				5,250
	Roller track, seal plates, beams " "				9,675
	Needle beam seats, corner protect. plates, ladders " "				3,000
	Subtotal				1,534,550
	Price level increase 25.7				394,380
	Subtotal				1,928,930
	Cathodic Protection				29,400 *
	Electrical System				133,000 *
	Sector Gate Machinery				67,500 *
	Subtotal				2,158,830
	Contingencies 20%				431,766
	Subtotal				2,590,596
	Engineering & Design 7.9%				204,657
	Supervision & Administration 6.8%				176,160
	total				2,971,413
	* 1967 Price level (1 July)				

ENG FORM 1738 1 APR 51 SUPERSEDES ENG FORM 1738, 1 JAN 49, WHICH IS OBSOLETE. (TRANSLUCENT)

GPO : 1963 O—684-802 (EM 1110-2-1302)

GOVERNMENT | SHEET 1 OF 13

PROJECT: Seabrook Lock elev.= 13.0' width = 84' | INVITATION NO.

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	Lock Structure — (1961 Price Levels)				
pro 1	Dewatering	job			345,000 ✓
pro 2	Permanent Relief Wells	job			89,000 ✓
Incl pro 3	Excavation (Under Water)	23000	cy.	4.00	92,000 ✓
	Concrete:				
change 4	(Tremie Placed Slab)	7400	cy.	35.00	259,000 ✓
change 5	(Gate Bay Slab)	10500	cy.	35.00	367,500 ✓
change 6	(Gate Bay Walls)	4778	cy	50.00	238,900 ✓ change
✓ 7	(Approach Bridges)	60	cy	80.00	4,800 ✓
change 8	Cement	32,164	bbls.	6.00	192,984 ✓ change
change 9	Reinforcing Steel	2,299,200	lb.	0.17	390,864 ✓ change
? 10	Steel Sheet Piling (MZ-32)	19390	ft²	4.50	87,255 ✓
? 11	Steel Sheet Piling (MZ-38)	41,500	ft²	4.00	166,000 ✓
change pro 12	Structual Steel	380,000	lb	0.25	95,000 ✓
add length 13	Pipe Handrail	5,100	lin. ft.	6.00	30,600 ✓
✓ 14	Concrete Cylinder Piles 18"	360	lin. ft	10.00	3,600 ✓
✓ 15	Concrete Cylinder Piles 54"	13,652	lin. ft.	40.00	546,080 ✓ change
✓ 16	Concrete Cap	1220	lin. ft.	20.00	24,400 ✓
✓ 17	Timber Wales	93	MFBM	600.00	55,800 ✓ change
change Rip rap 18	Riprap 24"	10,400	tons	8.00	83,200 ✓ blocks
11 19	Shell (filter)	1,000	cy.	3.50	3,500 ✓
20	Timber Guide Walls	850	lin. ft.	140.00	119,000
21	Sheet Pile Bumper	2		21,000	42,000 ✓
22	Sheet Pile Dolphin	1		35,000	35,000 ✓
23	Sector Gates	job			418,500
	subtotal				3,689,903
	price level increase				948,305
	subtotal				4,638,208
	Cathodic Protection	lump sum			110,000 *
	Electrical System	lump sum			200,000 *
	Sector Gate Machinery	lump sum			170,000 *
	subtotal				5,118,208
	contingencies 20%				1,023,642
	subtotal				6,141,850
	Engineering & Design 7.7%				472,922
	Supervision & Administration 7.2%				442,213
	Subtotal Lock Structure (1967 Price Level)				7,056,985

* 1967 price level (1 July)

ENG FORM 1738 1 APR 51 SUPERSEDES ENG FORM 1738, 1 JAN 49, WHICH IS OBSOLETE. (TRANSLUCENT)

GPO : 1963 O—684-882 (EM 1110-2-1302)

GOVERNMENT SHEET 2 OF 13

PROJECT Seabrook Rock DAM 84' wide elev = 13' INVITATION NO.

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	Riprap	5415	tons	8.00	43,320 ✓
	Shell	49,235	cy	2.50	123,088 ✓
	Derrick Stone	8490	tons	9.00	76,410 ✓
	Steel sheet Pile MA-22	23,545	sq ft.	4.00	94,180 ✓
	subtotal				337,000 ✓
	price level increase				86,610
	subtotal				423,610 ✓
	contingencies 20%				84,722 ✓
	subtotal				508,332 ✓
	Engineering & Design 7.7%				39,142 ✓
	Supervision & Administration 7.2%				36,600 ✓
	subtotal rock dam				584,100 ✓
	Total (Lock & Rock Dam)				
	Subtotal Rock Dam	DM. citrus Back Levee Aug 67			A 577,000
	Total (Lock & Rock Dam)				7,639,000

ENG FORM 1738 1 APR 51 SUPERSEDES ENG FORM 1738, 1 JAN 49, WHICH IS OBSOLETE. (TRANSLUCENT)

GPO : 1963 OF—694-802 (EM 1110-2-1302)

GOVERNMENT SHEET 3 OF 13

PROJECT: Seabrook Lock Elev. = 13.0' Width = 100' TFP

INVITATION NO.

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	LOCK STRUCTURE				
1	Dewatering				* 399,500
2	Permanent Relief Wells				103,100
3	Excavation (Under Water)	27,424	cy	4.00	109,696
	Concrete:				
4	Tremie Placed Slab	8884	cy	35.00	310,940
5	Gate Bay Slab	13,447	cy	35.00	470,645
6	Gate Bay Walls	4819	cy	50.00	240,950
7	Approach Bridges	60	cy	80.00	4,800
8	Cement	36,126	bbls	6.00	216,756
9	Reinforcing Steel	2,608,350	lb	0.17	443,420
10	Steel Sheet Piling (MZ-32)	17,676	ft^2	4.50	79,542
11	Steel Sheet Piling (MZ-38)	44,700	ft^2	4.00	178,800
12	Structural Steel	440,000	lbs	0.25	110,000
13	Pipe Handrail	5348	l.f.	6.00	32,088
14	Concrete Cylinder Piles 18"	360	l.f.	10.00	3,600
15	Concrete Cylinder Piles 54"	13,652	l.f.	40.00	546,080
16	Concrete Cap	1,220	l.f.	20.00	24,400
17	Timber Wales	93	MFBM	600.00	55 800
18	Riprap 24"	11,840	tons	8.00	94,720
19	Shell (filter)	1480	cy	3.50	5,180
20	Timber Guide Walls	850	l.f.	140.00	119,000
21	Sheet Pile Bumper	2	ea.	21,000.	42,000
22	Sheet Pile Dolphin	1	ea.	35,000.	35 000
23	Sector Gates	Job			504 000
	Subtotal				* 4,130,017
	Price level increase				1,061,415
	Subtotal				5,191,432
	Cathodic Protection	Lump Sum			132,000 *
	Electrical System	Lump Sum			248,000 *
	Sector Gate Machinery	Lump Sum			170,000 *
	Subtotal				5,741,432
	Contingencies 20%				1,148,287
	Subtotal				6,889,719
	Engineering & Design 7.7%				530,509
	Supervision & Admin 7.2%				496,060
					7,916,288

* 1967 Price Level (1 July)

GOVERNMENT SHEET 3 OF 13

PROJECT: Seabrook Lock elev = 13.0' width = 100' INVITATION NO.

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	Lock Structure —				
1	Dewatering			379,000	379,000
2	Permanent Relief Wells			89,000	89,000
3	Excavation (Under Water)	27,100	cy	4.00	108,400
	Concrete:				
4	(Tremie Placed Slab)	9520	cy.	35.00	333,200
5	(Gate Bay Slab)	17,490	cy.	35.00	612,150
6	(Gate Baly Walls)	4185	cy	50.00	209,250
7	(Approach Bridges)	60	cy.	80.00	4,800
8	Cement	43,760	bbls	6.00	262,560
9	Reinforcing Steel	3,260,250	lbs.	0.17	554,240
10	Steel Sheet Piling (MZ-32)	19,930	ft^2	4.50	89,685
11	Steel Sheet Piling (MZ-38)	41,500	ft^2	4.00	166,000
12	Structual Steel	380,000	lb.	0.25	95,000
13	Pipe Handrail	5150	lin.ft.	6.00	30,900
14	Concrete Cylinder Piles 18"	360	lin ft	10.00	3,600
15	Concrete Cylinder Piles 54"	13,420	lin.ft.	40.00	536,800
16	Concrete Cap	1,220	lin.ft.	20.00	24,400
17	Timber Wales	74	MFBM	600.00	44,400
18	Riprap 24"	9000	tons	8.00	72,000
19	Shell (filter)	3000	cy.	3.50	10,500
20	Timber Guide Walls	850	lin.ft.	143.00	121,550
21	Sheet Pile Bumper	2		22,000	44,000
22	Sheet Pile Dolphin	1		33,000	33,000
23	Sector Gates	job			504,000
	subtotal				4,328,435
	price level increase				1,112,408
	subtotal				5,440,843
	Cathodic Protection	lump sum			132,000*
	Electrical System	lump sum			248,000 *
	Sector Gate Machinery	lump sum			170,000 *
	subtotal				5,990,843
	contingencies 20%				1,198,169
	subtotal				7,189,012
	Engineering & Design 7.7%				553,554
	Supervision & Admistration 7.2%				517,609
	Subtotal Lock Structure				8,260,175

121,550

4,189,435

*1967 price level (1 July)

GOVERNMENT SHEET 4 OF 13

PROJECT Seabrook Rock Dam 100' wide el.=13' INVITATION NO.

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	Riprap	5270	tons	8.00	42,160 ✓
	Shell	47,960	cy.	2.50	119,900 ✓
	Derrick Stone	8270	cy.	9.00	74,430 ✓
	Steel Sheet Pile MA-22	22,735	sq ft.	4.00	90,940 ✓
	subtotal				327,430 ✓
	price level increase				84,147
	subtotal				411,577 ✓
	contingencies 20%				82,315 ✓
	subtotal				493,892 ✓
	Engineering & Design 7.7%				38,030 ✓
	Supervision & Administration 7.2%				35,560
	subtotal rock dam				567,500 ✓
	Total (Lock & Rock Dam)				8,827,675
	Subtotal Rock Dam	D.M. Citrus Levee Aug 67	Back		577,000 − 12,000 = 565,000
	Total (Lock & Rock Dam)				8,481,000
					16/736 = 0.021

ENG FORM 1738 1 APR 51 SUPERSEDES ENG FORM 1738, 1 JAN 49, WHICH IS OBSOLETE. (TRANSLUCENT)

GPO : 1963 OF—684-802

GOVERNMENT SHEET 5 OF 13

PROJECT: Seabrook Lock Elev. = 13.0 Width = 110' TFP

INVITATION NO.

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	LOCK STRUCTURE				
1	Dewatering	job			433,700
2	Permanent Relief Wells	job			111,900
3	Excavation (under Water)	31,080	cy	4.00	124,320
4	Tremie Placed slab	9,942	cy	35.00	347,970
5	Gate Bay slab	16,601	cy	35.00	581,035
6	Gate Bay walls	4,851	cy	50.00	242,550
7	Approach Bridges	60	cy	80.00	4,800
8	Cement	43,250	bbls	6.00	259,500
10	Steel sheet Piling (MZ 32)	18,036	ft^2	4.50	81,162
11	Steel sheet Piling (MZ 38)	46,700	ft^2	4.00	186,800
12	Structural steel	477,660	lbs	0.25	119,415
13	Pipe Handrail	5,564	l.f.	6.00	33,384
14	Concrete Cylinder Piles 18"	360	l.f.	10.00	3,600
15	Concrete Cylinder Piles 54"	13,652	l.f.	40.00	546,080
16	Concrete Cap	1220	l.f.	20.00	24,400
17	Timber Wales	93	MFBM	600.00	55,800
18	Riprap 24"	12,740	tons	8.00	101,920
19	Shell (filter)	1780	cy	3.50	6,230
20	Timber Guide Wall	850	l.f.	140.00	119,000
21	Sheet Pile Bumper	2		21,000	42,000
22	Sheet Pile Dolphin	1		35,000	35,000
23	Sector Gates	Job			576,000
9	Reinforcing Steel	3,226,800	lb	0.17	548,556
	Subtotal				4,585,122
	Price Level Increase				1,178,377
	Subtotal				5,763,499
	Cathodic Protection	Lump Sum			144,000*
	Electrical System	Lump Sum			261,000*
	Sector Gate Machinery	Lump Sum			170,000*
	Subtotal				6,338,499
	Contingencies 20%				1,267,700
	Subtotal				7,606,199
	Engr & Design 7.7%				585,678
	Supervision & Admin 7.2%				547,647
	Subtotal Lock Structure				8,739,524
	* 1967 Price Level (1 July)				

GOVERNMENT SHEET 5 OF 13

PROJECT: Seabrook Lock elev= 13.0' width= 110' | INVITATION NO. Sept67 RPJ

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	Lock Structure —				
1	Dewatering	job			400,000 ✓
2	Permanent Relief Wells	job			89,000 ✓
3	Excavation (Under Water)	30,250	cy.	4.00	121,000 ✓
	Concrete:				
4	(Tremie Placed Slab)	10990	cy.	35.00	384,650 ✓
5	(Gate Bay Slab)	21,735	cy.	35.00	760,725 ✓
6	(Gate Bay Walls)	4320	cy.	50.00	216,000 ✓
7	(Approach Bridges)	60	cy.	80.00	4,800 ✓
8	Cement	52,310	bbls.	6.00	313,860 ✓
9	Reinforcing Steel	3,917,250	lb.	0.17	665,933 ✓
10	Steel Sheet Piling (MZ-32)	20,410	ft^2	4.50	91,845 ✓
11	Steel Sheet Piling (MZ-38)	41,500	ft^2	4.00	166,000 ✓
12	Structual Steel	380,000	lb.	0.25	95,000 ✓
13	Pipe Handrail	5200	lin ft	6.00	31,200 ✓
14	Concrete Cylinder Piles 18"	360	lin ft	10.00	3,600 ✓
15	Concrete Cylinder Piles 54"	13,420	lin ft	40.00	536,800 ✓
16	Concrete Cap	1220	lin ft	20.00	24,400 ✓
17	Timber Wales	74	MFBM	600.00	44,400 ✓
18	Riprap 24"	9,900	lb.	8.00	79,200 ✓
19	Shell (filter)	3,300	lb.	3.50	11,550 ✓
20	Timber Guide Walls	850	lin. ft.	143.00	121,550
21	Sheet Pile Bumper	2		22,000	44,000 ✓
22	Sheet Pile Dolphin	1		33,000	33,000 ✓
23	Sector Gates	job			576,000
	Subtotal				4,814,513
	price level increase				1,237,330
	subtotal				6,051,843
	Cathodic Protection	lump sum			144,000 *
	Electrical System	lump sum			261,000 *
	Sector Gate Machinery	lump sum			170,000 *
	Subtotal				6,626,843
	Contingencies 20%				1,325,369
	subtotal				7,952,212
	Engineering & Design 7.7%				612,320
	Supervision & Administration 7.2%				572,559
	Subtotal Lock Structure				9,137,091

121,550

* 1967 price level (1 July)

GOVERNMENT SHEET 6 OF 13

PROJECT Seabrook Rock Dam 110' wide elev = 13' INVITATION NO. Sep 67 RPJ

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	Riprap	5130	tons	8.00	41,040 ✓
	Shell	46,690	cy.	2.50	116,725 ✓
	Derrick Stone	8050	tons	9.00	72,450 ✓
	Steel Sheet Pile MA-22	21,925	sqft.	4.00	87,700 ✓
	subtotal				317,915 ✓
	price level increase				81,704
	subtotal				399,619 ✓
	contingencies 20%				79,924 ✓
	subtotal				479,543 ✓
	Engineering & Design 7.7%				36,925 ✓
	Supervision & Administration 7.2%				34,527 ✓
	subtotal Rock DAM				551,000 ✓
	Total (Lock & Rock Dam)			→	9,688,091
	Subtotal	D.M. Citrus Back Levee Aug 67			577,000 − 20,000 = 557,000
	Total (Lock & Rock Dam)				9,297,000
					26/736 = 0.035

GOVERNMENT | SHEET 10 OF 13

PROJECT: Rigolets Lock Elev. 14.0' Width = 84.0' TFP | INVITATION NO. CONCRETE SHEET PILE CHAMBER

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	NAVIGATION LOCK				
1	Excavation	76,000	Cy	1.50	114,000
2	Backfill	21,000	Cy	1.00	21,000
3	Dewatering	1	Jod		200,000
	Concrete				
4	Gate Bay Walls	3,522	Cy	40.00	140,880
5	Gate Bay Slabs	8,350	Cy	20.00	167,000
6	Chamber Walls	1,813	Cy	60.00	108,780
7	Cement	18,817	bbl	5.00	94,085
8	Reinforcing Steel	2,052,750	lb	0.15	307,913
9	Pipe Handrail	2,400	l.f.	7.50	18,000
	Sheet Piling, Steel				
10	MA 22	5,200	s.f.	3.50	18,200
11	Z 32	4,650	s.f.	5.25	24,412
12	Concrete Sheet Piles	40,584	l.f.	7.00	284,088
13	Concrete Batter Piles	7,000	l.f.	7.00	49,000
14	Steel Sheet Pile Bumper	2	ea.	30,000	60,000
15	Timber Guide Wall	900	l.f.	183.00	164,700
16	Floodwalls	170	l.f.	150.00	25,500
17	Bulkheads	2	ea.	32,000	64,000
18	Sector Gates				346,500
19	Misc. Structural Steel	17,000	lb	0.30	5,100
20	Riprap	12,380	Ton	8.00	99,040
21	Filter (Gravel)	840	Cy.	8.00	6720
22	Filter (Shell)	3,500	Cy.	3.50	12,250
23	Control Houses	4	ea.	8000.00	32,000
	Subtotal				2,363,168
	Price Level Increase				607,334
	Subtotal				2,970,502
	Cathodic Protection				110,000 *
	Electrical System				200,000 *
	Sector Gate Machinery				170,000 *
					3,450,500
	Contingencies 20%				690,100
	Subtotal				4,140,600
	Engineering & Design 7.9%				327,100
	Supervision & Admin. 6.8%				281,600
	Total				4,749,300

* 1967 Price Level (1 July)

ENG FORM 1738 1 APR 51 SUPERSEDES ENG FORM 1738, 1 JAN 49, WHICH IS OBSOLETE. (TRANSLUCENT)

GPO : 1963 OF—684-802 (EM 1110-2-1302)

GOVERNMENT SHEET 10 OF 13

PROJECT Rigolets elev = 14.0' width = 84.0' INVITATION NO. RPJ Sep 67

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	Navigation Lock				
ch 1	Excavation	75700	cy.	1.50	113,550 ✓
2	Backfill	21,000	cy.	1.00	21,000 ✓
ch 3	Dewatering	job			200,000 ✓
	Concrete				
ch 4	Gate Bay Walls	2930	cy.	40.00	117,200 ✓ ch
ch 5	Gate Bay Slabs	8350	cy.	20.00	167,000 ✓
ch 6	Chamber Walls	1200	cy.	60.00	72,000 ✓ ch
ch 7	Cement	17,470	bbls.	5.00	87,350 ✓ ch
ch 8	Reinforcing Steel	1,797,000	lb.	0.15	269,550 ✓ ch
ch 9	Pipe handrail	2400	lin. ft.	7.50	18,000 ✓
10	Steel Sheet Piling MA-22	5200	sq ft.	3.50	18 200 ✓
11	Steel Sheet Piling MZ-32	5350	sq ft.	5.25	28,088 ✓
ch 12	Concrete sheet Piles (2' wide)	41,050	lin ft	7.00	287,350 ✓ ch
13	Concrete Batter Piles	7900	lin. ft.	7.00	55,300 ✓
14	Steel Sheet Pile Bumper	2	each	30,000	60,000 ✓
15	Timber Guide Wall	900	lin. ft.	143.00	128,700
16	Floodwalls	170	lin. ft.	150.00	25,500 ✓
17	Bulkheads	2	each	32,000	64,000 ✓
18	Sector Gates	job		346,500	346,500
ch 19	Misc. struc Steel	17,000	lb	0.30	5100 ✓
ch 20	Riprap	12,380	tons	8.00	99,040 ✓
ch 20	Filter (Gravel)	840	cy.	8.00	6720 ✓
22	Filter (Shell)	3500	cy.	3.50	12,250 ✓
23	Control Houses	4	each	8,000.00	32,000 ✓
23	Channel Excavation	300,000	cy.	0.20	60,000 ✓
	subtotal				2,294,398
	price level increase				589,660
	subtotal				2,884,058
	Cathodic Protection	lump sum			110,000 *
	Electrical System	lump sum			700,000 *
	Sector Gate Machinery	lump sum			170,000 *
	subtotal				3,364,058
	Contingencies 20%				672,812
	subtotal				4,036,870
	Engineering & Design 7.9%				318,913
	Supervision & Administration 6.8%				274,507
	total				4,630,190
	* 1967 Price level (1 July)				

ENG FORM 1738 1 APR 51 SUPERSEDES ENG FORM 1738, 1 JAN 49, WHICH IS OBSOLETE. (TRANSLUCENT)

GPO : 1963 OF—804-802 (EM 1110-2-1302)

GOVERNMENT SHEET 11 OF 13

PROJECT: Rigolets Lock Elev.=14.0' Width = 100' TFP

INVITATION NO.: 25 Sept 67

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	NAVIGATION LOCK				
1	Excavation	91,332	cy	1.50	137,000
2	Backfill	21,000	cy	1.00	21,000
3	Dewatering	1	job		231,600
	Concrete				
4	Gate Bay Walls	4080	cy	40.00	163,200
5	Gate Bay Slabs	10,953	cy	20.00	219,060
6	Chamber Walls	1813	cy	60.00	108,780
7	Cement	23,164	bbls	5.00	115,820
8	Reinforcing Steel	2,526,900	lbs	0.15	379,040
9	Pipe Handrail	2648	l.f.	7.50	19,860
	Sheet Piling, Steel				
10	MA-22	5520	s.f.	3.50	19,320
11	Z 32	4,970	s.f.	5.25	26,100
12	Concrete Sheet Piles	40,584	l.f.	7.00	284,100
13	Concrete Batter Piles	7,000	l.f.	7.00	49,000
14	Steel Sheet Pile Bumper	2	ea.	30000	60,000
15	Timber Guide Wall	900	l.f.	183.00	164,700
16	Floodwalls	154	l.f.	150.00	23,100
17	Bulkheads	2	ea.	32,000.	64,000
18	Sector Gates				414,000
19	Misc. Structural Steel	19,700	lb.	0.30	5 910
20	Riprap	13,963	Tons	8.00	111,700
21	Filter (Gravel)	972	cy	8.00	7,800
22	Filter (Shell)	4028	cy	3.50	14,100
23	Control Houses	4	ea.	8000.	32,000
	Subtotal				2,670,590
	Price Level Increase				686,350
	Subtotal				3,356,940
	Cathodic Protection				132,000 *
	Electrical System				248,000 *
	Sector Gate Machinery				170,000 *
	Subtotal				3,906,940
	Contingencies 20%				781,400
	Subtotal				4,688,340
	Engineering & Design 7.9%				370,380
	Supervision & Admin 6.8%				318,810
	Total				5,377,530
	* 1967 Price Level (1 July)				

GOVERNMENT SHEET 11 OF 13

PROJECT Rigolets elev. = 14.0' width = 100' INVITATION NO. RPJ Sep 67

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	Navigation lock				
	Excavation	88,540	cy.	1.50	132,810 ✓
	Backfill	23,000	cy.	1.00	23,000 ✓
	Dewatering	job			231,000 ✓
	Concrete				
	Gate Bay Walls	3170	cy.	40.00	126,800 ✓
	Gate Bay Slabs	13,800	cy.	20.00	276,000 ✓
	Chamber Walls	1200	cy.	60.00	72,000 ✓
	Cement	25400	bbls.	5.00	127,000 ✓
	Reinforcing Steel	2,635,500	lb.	0.15	395,325 ✓
	Pipe handrail	2450	lin. ft.	7.50	18,375 ✓
	Steel Sheet Piling MA-22	5700	sq. ft.	3.50	19,950 ✓
	Steel Sheet Piling MZ-32	5500	sq. ft.	5.25	28,875 ✓
	Concrete Sheet Piles (2' wide)	41,050	lin. ft.	7.00	287,350 ✓
	Concrete Batter Piles	7900	lin. ft.	7.00	55,300 ✓
	Steel Sheet Pile Bumper	2		30,000	60,000 ✓
	Timber Guide Wall	900	lin. ft.	143.00	128,700 ✓ 128,700
	Floodwalls	170	lin. ft.	150.00	25,500 ✓
	Bulkheads	2		32,000	64,000 ✓
	Sector Gates	job		414,000	414,000
	Misc. Struc. Steel	17,000	lb.	0.30	5,100
	Riprap	13,680	tons	8.00	109,440
	Filter (Gravel)	1000	cy.	8.00	8,000
	Filter (Shell)	4030	cy.	3.50	14,105
	Control houses	4		8,000	32,000
	Channel excavation	300,000	cy.	0.20	60,000
	Subtotal				2,714,630
	price level increase				697,660
	subtotal				3,412,290
	Cathodic Protection	1 lump SUM			132,000 *
	Electrical System	1 lump SUM			248,000 *
	Sector Gate Machinery	1 lump SUM			170,000 *
	Subtotal				3,962,290
	Contingencies 20%				792,458
	subtotal				4,754,748
	Engineering & Design 7.9%				375,625
	Supervision & Administration 6.8%				323,323
	total				5,453,696
	* 1967 Price level (1 July)				

GOVERNMENT SHEET 12 OF 13

PROJECT: Rigolets Lock Elev. 14.0' Width = 110' TFP

INVITATION NO.: 25 Sept 67

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
1	Excavation	102,700	c.y.	1.50	154,100
2	Backfill	21,000	cy	1.00	21,000
3	Dewatering	1	Job		251,400
	Concrete				
4	Gate Bay Walls	4748	cy	40.00	189,920
5	Gate Bay Slabs	13,617	cy	20.00	272,340
6	Chamber Walls	1813	cy	60.00	108,780
7	Cement	27,745	bbls	5.00	138,730
8	Reinforcing Steel	3,026,700	lbs	0.15	454,000
9	Pipe Handrail	2861	l.f.	7.50	21,480
	Sheet Piling, Steel				
10	MA 22	5720	s.f.	3.50	20,020
11	Z 32	5170	s.f.	5.25	27,140
12	Concrete Sheet Piles	40,584	l.f.	7.00	284,100
13	Concrete Batter Piles	7,000	l.f.	7.00	49,000
14	Steel Sheet Pile Bumper	2	ea.	30,000	60,000
15	Timber Guide Wall	900	l.f.	183.00	164,700
16	Floodwall	141	l.f.	150.00	21,600
17	Bulkheads	2	ea.	32,000	64,000
18	Sector Gates				468,000
19	Misc. Structural Steel	21,400	lbs	0.30	6,420
20	Riprap	14,951	Tons	8.00	119,610
21	Filter (Gravel)	1153	cy	8.00	9230
22	Filter (Shell)	4,787	cy	3.50	16,760
23	Control Houses	4	ea.	8000.00	32,000
	Subtotal				2,954,330
	Price Level Increase				759,270
	Subtotal				3,713,600
	Cathodic Protection				144,000 *
	Electrical System				261,000 *
	Sector Gate Machinery				170,000 *
	Subtotal				4,288,600
	Contingencies 20%				857,720
	Subtotal				5,146,320
	Engineering & Design 7.9%				406,560
	Supervision & Admin 6.8%				349,950
					5,902,830
	* 1967 Price Level (1 July)				

ENG FORM 1738 1 APR 51 SUPERSEDES ENG FORM 1738, 1 JAN 49, WHICH IS OBSOLETE. (TRANSLUCENT)

GPO : 1963 OF—684-902 (EM 1110-2-1302)

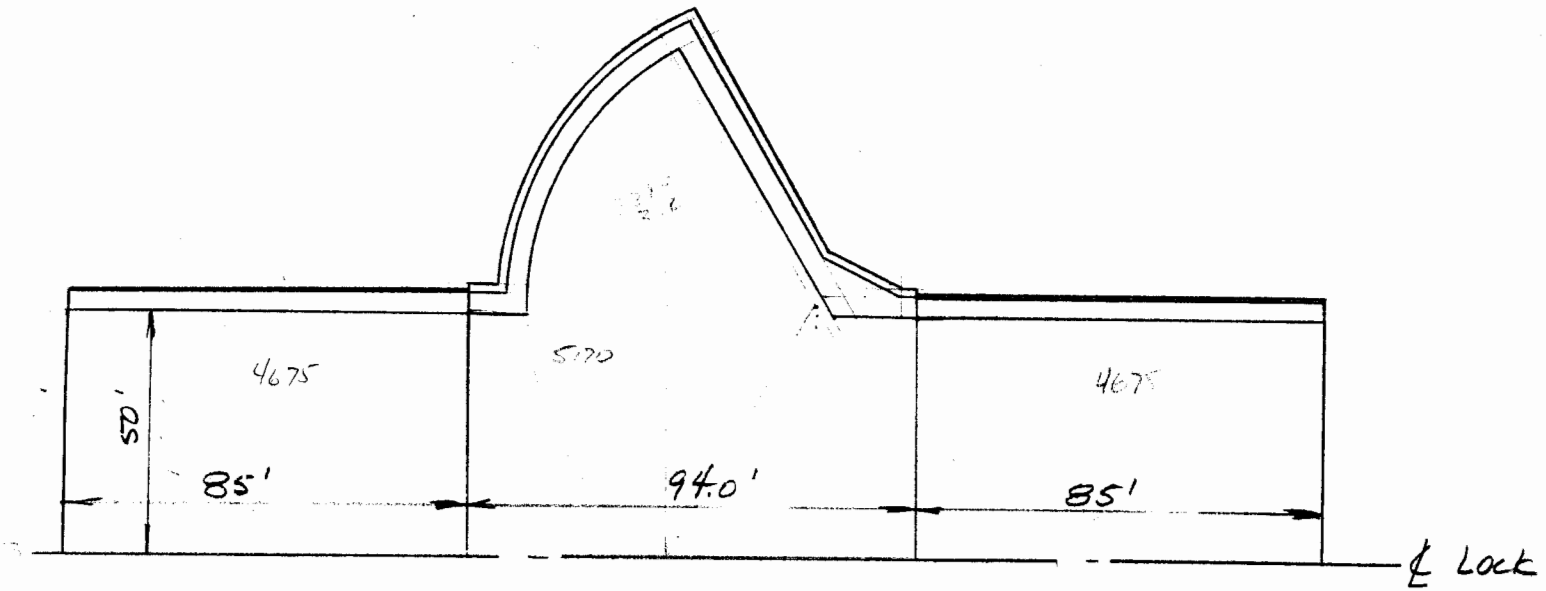
GOVERNMENT SHEET 12 OF 13

PROJECT Rigolets elev = 14.0' width = 110' INVITATION NO. RPJ Sep67

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
	Navigation lock				
	Excavation	94900	cy.	1.50	142,350
	Backfill	24350	cy.	1.00	24,350
	Dewatering	job			250,000
	Concrete				
	Gate Bay Walls	3350	cy.	40.00	134,000
	Gate Bay Slabs	17,130	cy.	20.00	342,600
	Chamber Walls	1200	cy.	60.00	72,000
	Cement	30340	bbls.	5.00	151,700
	Reinforcing Steel	3,154,500	lb.	0.15	473,175
	Pipe handrail	2500	lin.ft.	7.50	18,750
	Steel Sheet Piling MP-22	5980	sq.ft.	3.50	20,930
	Steel Sheet Piling MZ-32	5600	sq.ft.	5.25	29,400
	Concrete Sheet Piles (2' wide)	41,050	lin.ft.	7.00	287,350
	Concrete Batter Piles	7900	lin.ft.	7.00	55,300
	Steel Sheet Pile Bumper	2		30,000	60,000
	Timber Guide Wall	900	lin.ft.	143.00	127,870
	Floodwalls	170	lin.ft.	150.00	25,500
	Bulkheads	2		32,000	64,000
	Sector Gates	job		468,000	468,000
	Misc. Struc. Steel	17,000	lb.	0.30	5100
	Riprap	14490	tons	8.00	115,920
	Filter (Gravel)	1090	cy.	8.00	8720
	Filter (Shell)	4365	cy.	3.50	15,278
	Control houses	4		8,000	32,000
	Channel excavation	300,000	cy.	0.20	60,000
	Subtotal				2,984,293
	price level increase				766,963
	subtotal				3,751,256
	Cathodic Protection	1 lump sum			144,000 *
	Electrical System	1 lump sum			261,000 *
	Sector Gate Machinery	1 lump sum			170,000 *
	subtotal				4,326,256
	contingencies 20%				865,251
	subtotal				5,191,507
	Engineering & Design 7.9%				410,129
	Supervision & Administration 6.8%				353,022
	total				5,954,658
	* 1967 Price level (1 July)				

Chef Menteur

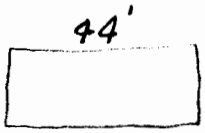
Width = 100'
Elev = 14.0'



69-38-8

CHEF MENTEUR HURRICANE BARRIER
WIDTH 100' : El. 14.0
25 SEPT 67 TFP

① EXCAVATION

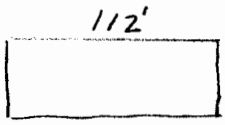


GATE BAY & APPROACH CHANNEL

a. $V = \frac{19.33 \times 44}{27} = 31.5$

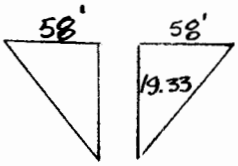
$V = (2 \times 85 + 68)\ 31.5$

$= \underline{7497}$



b. $V = \frac{112 \times 19.33}{27} = 80.183$

$V = 80.183 \times 26 = \underline{2085}$



C. $V = \frac{58 \times 19.33}{27} = 41.523$

$V = 41.523 \times 26 = \underline{1080}$

D.M. = 30,000

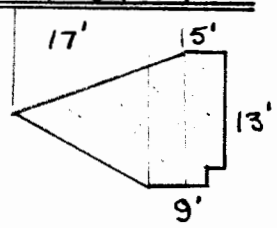
Σ = 40,700

② BACKFILL

$V = 1080$ from C. above

D.M. = 14,100
15,200

③ SAND BACKFILL



$A = 9 \times 13 = 117$

$A = \frac{10}{2} \times 8 = \frac{40}{157} \times 2 = 314$

$V = \frac{314}{27} = 11.629$

$V = 26 \times 11.629 = \underline{303}$

D.M. = 4000
4303

④ DEWATERING

$\frac{94}{68} \times \$155{,}000 = \underline{185{,}000}$

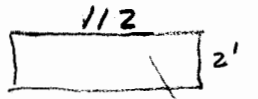
⑤ CONCRETE WALLS

$\frac{305}{255} \times 1654 = \underline{1978}$

TFP

CHEF MENTEUR HURRICANE BARRIER
WIDTH 100'; El. 14.0
25 SEPT 67 TFP

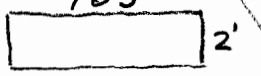
⑥ CONCRETE SLABS



GATE BAY

$V = \frac{112 \times 2}{27} = 8.296$

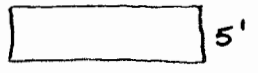
$V = 94 \times 8.296 = \underline{780}$



APPROACH BAY

$V = \frac{109 \times 2}{27} = 8.074$

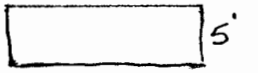
$V = 2 \times 85 \times 8.074 = \underline{1373}$



GATE BAY

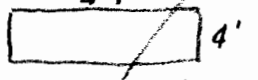
$V = \frac{44 \times 5}{27} = 8.148$

$V = 8.148 \times 68 = \underline{555}$



ADDITION TO GATE BAY

$V = \frac{112 \times 5 \times 26}{27} = \underline{540}$



APPROACH BAY

$V = \frac{44 \times 4}{27} = 6.518$

$V = 170 \times 6.518 = \underline{1109}$

$A = \frac{\pi}{4} d^2$

$= \frac{3.14}{4} \times (72)^2 = 4,069.44$

$A = \frac{120}{360} \times 4069.44 = 1,356.48$

$V = \frac{1356.48 \times 2}{27} = \underline{101}$

$\Sigma = \underline{4458}$

D.M. $= \underline{3204}$

$\underline{7662}$

⑦ CEMENT

CONCRETE,	WALLS	1978
"	SLABS	7662
		9640

CEMENT = $9640 \times 1.375 = \underline{13,255}$ bbls

⑧ REINFORCING STEEL

Wt = $9640 \times 150 = \underline{1,446,000}$ lbs

⑨ PIPE HANDRAIL

CIRCULAR ARC $63 - 38 = 25 \times 2 = 50$

RADIUS $60 - 36 = 24 \times 2 = \underline{48}$

$98 \times 2 = 196$

TFP

D.M. $= \frac{1100}{1296}$

CHEF MENTEUR HURRICANE BARRIER
WIDTH 100'; EL. 14.0
25 SEPT 67 TFP

⑩ STEEL SHEET PILING, MA-22

ARC = 63 − 37 = 26 x 2 = 52'

Approach Bay = 44 x 2 = 88'

ARC = 52 x 12 = 624 s.f.

Approach Bay = 88 x 12 = 1056 s.f.

D.M. = 6640

Σ = 8320 s.f.

⑪ STEEL PILING 12 BP 53

8 ROWS x 13 COLUMNS = 104
4 ROWS x 21 COLUMNS = 84
188

L = 188 x 30 = 5640

D.M. = 7590
13,230 L.f.

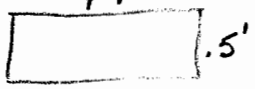
⑫ UNTREATED TIMBER PILING

100' WIDE; 20 SPACES @ 5' O.C.

21 PILES/ROW x 22 ROWS @ 30' =

13,860 L.f.

⑬ FILTER GRAVEL



$V = \frac{44 \times .5}{27} = 0.814$

$V = 0.814\left(85 + \frac{94}{2}\right)$

= 108

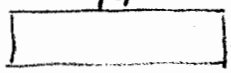
D.M. = 285
393 C.Y.

⑭ FILTER SAND

V = 54

D.M. = 143
197 C.Y.

⑮ RIPRAP



$V = \frac{44 \times 2.5}{27} = 4.074$

T = 4.074 x 1.5 = 6.111

T = 6.111 x 100 = 612

D.M. = 1120
1732 Tons

⑱ FLOODWALL

$36,580 ÷ 220 = #167 l.f.

LOCK WIDENED BY 44'

220 − 44 = 176'

Cost = 176 x 167 = #29,400

TFP

Excavation

$$\left[26(54)\left(\tfrac{1}{2}\right)(19) + 26(120)(19)\right]2 = 131{,}900$$

(13,340 + 118,560)

$$+\left[(44)(170)(18) + 44(94)(19) + (42)(x)\left(\tfrac{1}{2}\right)(14)(44)\right] = 239100$$

(134,640 + 78,580 + 25870)

371,000

371,000 ft^3 = 13,750 cu. yds + 29,700 cu yds = 43,450 cu. yds

Backfill

$$2[(4675)(18)] + [(5170)(19) + (2280)(19) + 310(5)]2$$

336,600 + 196460 + 86640 + 3100 = 623000 ft^3

623000 ft^3 = 23,100 cu. yds.

43 450 − 23100 = 20,350 cu. yds.

Sand Backfill

area = 189 ft^2 (189 ft^2)(660) = 124,750 ft^3

124,750 ft^3 = 4,620 cu. yds.

Random Backfill = 16,850 − 4620 = 12,230 cu. yds.

Concrete:

Wall (middle section)

$\pi(62)(2)(\frac{1}{6})(4) = 259$

$4(2) = 8$

$4(64.5) = 258$

$4(18.5) = 74$

$4(8) = 32$

$4(2) = 8$

639

$639(26) = 16{,}614\ ft^3$

$+ 12 \times 8 \times 2\frac{1}{2} = 240$

$16{,}854\ ft^3 = 624$ cu yds. / $\frac{1}{2}$ of 1 middle section

Wall (end sections)

$2(85)\left[(4)(1) + (1\frac{1}{2})(25) + (2\frac{1}{2})(12)(\frac{1}{2})\right] =$

$170\ [\ 4 + 37.5 + 15] = 170(56.5) = 9{,}605\ ft^3 = 355$ cu. yds

Walls (Total) =

$2[624 + 355] = 1960$ cu yds. concrete

Slabs

$109(2)(6.5)(85) = 120{,}445$

$94(112)(7.5) = 78{,}960$

$\pi(66.0)^2(\frac{1}{6})(7.5)(2) = 34{,}192$

$8(66)(7.5)(2) = 3{,}960$

$9(9)(\frac{1}{2})(2)(7.5) = 607$

$238{,}164\ ft^3 = 8820$ cu. yds.

Cement

conversion factor = 1.4 bbls cement / cu yd. concrete

$12030(1.4) = 16{,}840$ bbls. cement

Reinforcing Steel:

conversion factor 150 lb steel / cu yd concrete

(12,030)(150) = 1,805,000 lbs steel

Pipe handrail

total length = 656'

2 rails ∴ length = 1310 linear feet

Untreated Timber Piles

originally have 286 piles/9520 ft² @ L = 30'

new area = 17,000 ft²

$\frac{17000}{9520} = 1.79$ $\quad 1.79(286) = 511$ piles

30'(511) = 15330 linear feet of untreated timber piles

Steel piling

originally have 253 piles/@ L = 30'
/6520 ft²

new area = 16,145 ft²

$\frac{16,145}{6520}(253) = 627$ piles

627 piles × 30'/pile = 18,810 linear feet

Filter Gravel (12")

(1.0)(110)(134) ÷ 27 = 545 cu. yds.

Filter sand (6")

$\frac{1}{2}(110)(134) \div 27 = 225$ cu. yds.

Riprap

length for $\frac{1}{2}$ of riprap = 50+43+4 = 97'

2.5' thick

$2.5 \frac{(194)(50)}{27}(2) = 1796$ cu yds.

1796 cu yds $\times$ 1.5 $\frac{\text{tons}}{\text{cu yd.}}$ = 2695 tons riprap

Sand (6" approximately)

$(.5)\frac{(194)(50)}{27}(2) = 360$ cu yds

Gravel (6" approximately)

$(.5)\frac{(194)(50)}{27}(2) = 360$ cu. yds.

Steel Sheet Pile

440' (6') = 2640

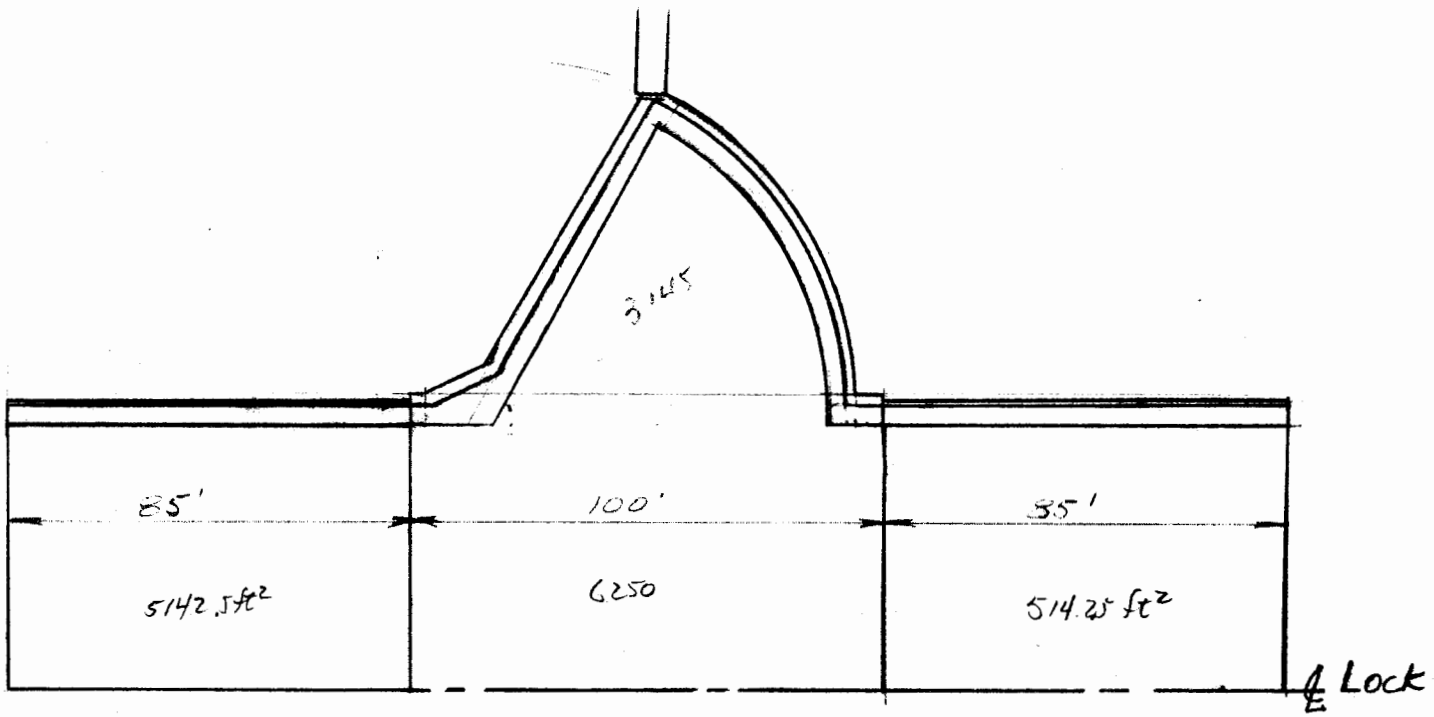
425 (14') = 5950

8590 ft^2

Dewatering = $175,000

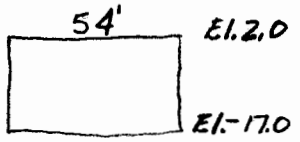
Chef Menteur

elev. = 14.0 ft.
Width = 110 ft.



CHEF MENTEUR HURRICANE BARRIER
WIDTH 110'; El. 14.0
26 SEPT 67 T.F.P.

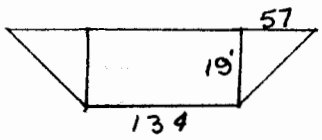
① Excavation



$V = \frac{54 \times 19}{27} = 38$

$V = 38(2 \times 85 + 100)$

$= 10{,}260$



$A = 19 \times 34 = 2546$

$A = 57 \times 19 = 1083$

3629

$V = \frac{3629 \times 32}{27} = 4301$

D.M. = 30,000

$\Sigma = 44{,}561$

② BACKFILL

$V = \frac{19 \times 24}{27} = 16.888$

$V = \frac{57 \times 19}{27} = 40.111$

57.0

$V = 57 \times 36$

$= 2052$

D.M. = 14,100

16,152

③ Sand Backfill

$V = 11.629 \times 36 = 418$

D.M. = 4000

4418

④ DEWATERING

$\frac{100}{94} \times 185 = 197{,}000$

⑤ Concrete, Walls

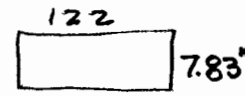
$\frac{343}{255} \times 1654 = 2225$

⑥ Concrete, Slab

$V = \frac{122 \times 7.83}{27} = 35.38$

$V = 35.38 \times 100$

$= 3538$



$A = \frac{\pi}{4} d^2 = \frac{\pi}{4} (156)^2$

$= 19{,}104$

$A = \frac{120}{360} \times 19{,}104$

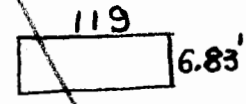
$= 6368$

78'

$V = \frac{6368}{27} = 235.851$

$V = 235.851 \times 7.83 = 1847$

$V = \frac{119 \times 6.83}{27} = 30.102$



$V = 30.102 \times 170$

$= 5118$

$\Sigma = 10503$

⑦ Cement

Concrete, Walls = 2225

" Slab = 10503

12,728

12,728 × 1.329 = 17501

⑧ Reinforcing Steel

Wt = 12,728 × 150

= 1,909,200

TFP

CHEF MENTEUR HURRICANE BARRIER
WIDTH 110'; El. 14.0
26 SEPT 67 TFP

⑨ PIPE HANDRAIL

CIRCULAR ARC 74 - 38 = 36 X 2 = 72
RADIUS 70 - 36 = 34 X 2 = 68
140

140 X 2 = 280
D.M. = 1100
1380

⑩ steel Sheet Piling MA 22

ARC 72
Approach Bay 110 - 56 = 54 X 2 = 108
180

A = 180 X 12 = 2160
D.M. = 6640
Σ = 8800 s.f.

⑪ STEEL PILING 12 BP 53

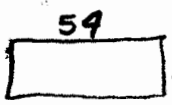
7 ROWS X 23 COLUMNS = 161
13 ROWS X 10 COLUMNS = 130
291

L = 291 X 30 = 8730
D.M. = 7590
16,320 l.f.

⑫ UNTREATED TIMBER PILING

23 PILES/ROW X 22 ROWS = 506
L = 506 X 30 = 15,180 l.f.

⑬ FILTER GRAVEL

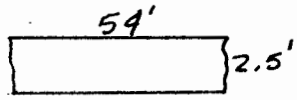


V = 54 X .5 / 27 = 1.0
V = 1.0 (85 X 100/2)
= 135
D.M. = 285
420

⑭ FILTER SAND

V = 68
D.M. = 143
211

⑮ RIPRAP



V = 54 X 2.5 / 27 = 5.0
T = 5.0 X 1.5 = 7.5
T = 75 X 100 = 750.0
D.M. = 1120
1870

⑱ FLOODWALL

LOCK WIDENED BY 54'
220 - 54 = 166
Cost = 166 X 167 = 27,722

TFP

Excavation

$2[(85)(18)(54)] + [100(19)(54)] + [(54)(19)(32)(\tfrac{1}{2})]2 = 300,670$

$+ 2[19(32)(130)] + 2[(54)(\tfrac{1}{2})(19)(32)] =$ $\underline{190,930}$

$491,600\ ft^3$

$491600\ ft^3 = 18,200$ cu. yds.

$29,700 + 18,200$ cu. yds. $= 47,910$ cu. yds.

Backfill

volume of structure

$2[(5140)(18)(2)] + 2[9395(19)] = 708,800\ ft^3 = 26,233$ cu yds.

backfill = 47,910 cu. yds. − 26,233 cu. yds. = 21,675 cu. yds.

Sand Backfill

area = $189\ ft^2 \times 675$ (ft.) = $127,580\ ft^3 = 4725$ cu. yds.

Random Backfill

17905 − 4725 = 13180 cu. yds.

Concrete:

Wall (middle section)

$\pi(69)(2)(\frac{1}{63})(^2 4) = 288$

$4(12) = 48$

$4(8) = 32$

$4(2) = 8$

$4(77) = 308$

$4(2) = 8$

692

$692^{2}(26') = 17{,}992\ ft^3$

$+ 12 \times 8 \times 1/2 = 240$

$18{,}232\ ft^3 = 675$ cu. yds / $\frac{1}{2}$ of 1 middle section

Wall (end sections)

$2(85)\left[4(1) + (1\frac{1}{2})(25) + (2\frac{1}{2})(12)(\frac{1}{2})\right] =$

$170[56.5] = 355$ cu yds.

Walls (total)

$2[675 + 355] = 2(1030) = 2060$ cu yds. concrete (walls)

Slabs

$100(8)(124) = 99{,}200$

$121(85)(2)(7) = 143{,}990$

$77^{2}(\pi)(\frac{1}{63})(8)(2) = 49{,}685$

$\frac{1}{2}(\frac{3}{6})(9)(8) = 216$

$293{,}090 = 10{,}855$ cu yds.

total concrete = $2060 + 10{,}855 = 12{,}915$

Cement

conversion factor = 1.4 bbls. cement / cu. yd. concrete

$12{,}915(1.4) = 18{,}080$ bbls cement

Reinforcing Steel

conversion factor = 150 lbs. steel / cu. yd. concrete

150 (12,915) = 1,937,250 lbs. steel

Pipe handrail

total length = 686'

2 rails ∴ length = 1370 linear feet

Untreated Timber Piles

originally have 286 piles / 9520 ft² @ L=30'

new area = 20,560 ft²

$\frac{20560}{9520}(286) = 618$ piles @ 30'/pile

30'(618) = 18,540 linear feet of untreated timber pile

Steel piling

originally have 253 piles / 6520 ft²

new area = 18,790 ft²

$\frac{18,790}{6520}(253) = 730$ piles @ 30'/pile

730(30) = 21900 linear feet of steel piling

Filter gravel (12")

1(120)(138) ÷ 27 = 610 cu yds.

Filter sand (6")

½(120)(138) ÷ 27 = 305 cu yds.

Riprap

length for $\frac{1}{2}$ of riprap = 55 + 43 + 4 = 102'

2½' thick

$$2.5\left(\frac{205)(50}{27}\right)(2) = \frac{51250}{27} = 1900 \text{ cu yds.}$$

$$1900 \text{ cu. yds} \times 1.5 \text{ tons/cu yd} = 2850 \text{ tons riprap}$$

Sand (6" approximately)

$$(.5)\frac{(205)(50)}{27}(2) = 380 \text{ cu. yds.}$$

Gravel (6" approximately)

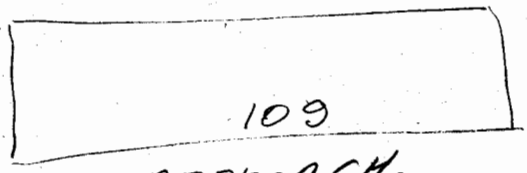
$$(0.5)\frac{(205)(50)(2)}{27} = 380 \text{ cu. yds.}$$

Steel Sheet Piling

460'(14') = 6440 ft²
470'(6') = 2820 ft²
9260 ft²

Dewatering = 1 LS

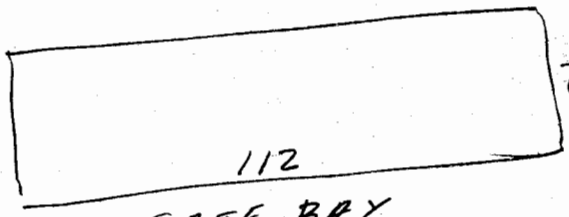
CHEF MENTEUR 100'



APPROACH BAY

$$V = \frac{109 \times 4.83}{27} = 19.498$$

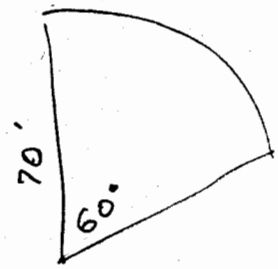
$$V = 19.498 \times 170 = 3315$$



GATE BAY

$$V = \frac{112 \times 6.83}{27} = 28.331$$

$$V = 28.331 \times 94 = 2663$$



$$A = \frac{\pi}{4} d^2 = \frac{3.14}{4}(140)^2 = 15,386$$

$$A = \frac{12}{36} \times 15,386 = 5124$$

$$V = \frac{5124 \times 6.83}{27} = 1296$$

$$\Sigma = 7274$$

- 14.0
- 18.0
4.00
.33

CHEF MENTEUR 100'

① CEMENT

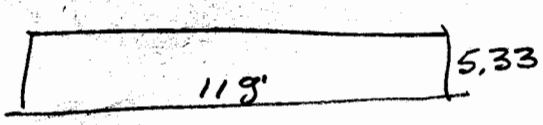
1978
7274
9252

C = 9252 x 1.375 = 12,722 bbls

⑧ RE STEEL

9252 x 150 = 1,387,800

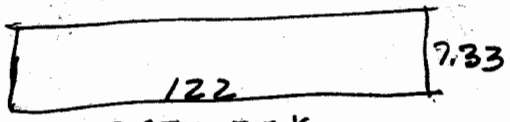
CHEF MENTEOR 400'



APPROACH BAY

$V = \frac{119 \times 5.33}{27} = 23.491$

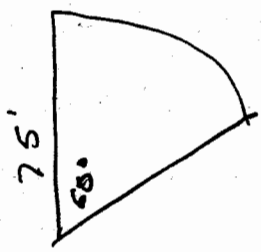
$V = 23.491 \times 170 = 3994$



GATE BAY

$V = \frac{122 \times 7.33}{27} = 33.120$

$V = 33.120 \times 100 = 3312$



$A = \frac{\pi}{4} d^2 = \frac{3.14}{4}(150)^2 = 17,663$

$A = \frac{12}{36} \times 17,663 = 5888$

$V = \frac{5888 \times 7.33}{27} = 1599$

$\Sigma = 8905$

① CEMENT

2225
8905
11,130

$C = 1.375 \times 11,130 = 15,304$ bbls

② STEEL

$11,130 \times 150 = 1,669,500$ #