(A0007460)

IFB NO. DACW29-96-B-0XXX

US Army Corps
of Engineers
New Orleans District

Southeast Louisiana, Louisiana
Orleans Parish

LAKE PONTCHARTRAIN, LA AND VICINITY
HIGH LEVEL PLAN
LONDON AVENUE OUTFALL CANAL
PARALLEL PROTECTION

FRONTING PROTECTION AT
PUMPING STATION NO. 3
ORLEANS PARISH, LOUISIANA

JULY 15, 2002

Construction Solicitation
and Specifications

EO-96-017

LAKE PONTCHARTRAIN, LA AND VICINITY
HIGH LEVEL PLAN, LONDON AVENUE OUTFALL CANAL
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ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT	UNIT PRICE	EST. AMOUNT
0001	MOBILIZATION AND DEMOBILIZATION	LUMP SUM	L.S.		
0002	ROAD CONSTRUCTION	LUMP SUM	L.S.		
0003	TRUCK WASH-DOWN RACK	LUMP SUM	L.S.		
0004	CONSTRUCTION DEWATERING	LUMP SUM	L.S.		
0005	TEMPORARY RETAINING STRUCTURE	LUMP SUM	L.S.		
0006	REMOVAL AND DISPOSAL OF CANAL SEDIMENT MATERIAL	3,333	C.Y. T.M.		
0007	INSTALL TEMPORARY SHEET PILE DAM	LUMP SUM	L.S.		
0008	REMOVE TEMPORARY SHEET PILE DAM	LUMP SUM	L.S.		
0009	LOW LEVEL COFFERDAMS	LUMP SUM	L.S.		
0010	DEMOLITION	LUMP SUM	L.S.		
0011	FURNISH AND DELIVER STEEL H-PILING (HP14x73)	25,410	L.F.		

SECTION 00010 - BIDDING SCHEDULE

LAKE PONTCHARTRAIN, LA AND VICINITY
HIGH LEVEL PLAN, LONDON AVENUE OUTFALL CANAL
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FRONTING PROTECTION AT PUMPING STATION NO. 3
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ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT	UNIT PRICE	EST. AMOUNT
0012	DRIVE STEEL H-PILING (HP 14x73)	25,410	L.F.		
0013	STRUCTURAL EXCAVATION AND BACKFILL	LUMP SUM	L.S.		
0014	FURNISH AND DRIVE TEST PILE (HP 14x73)	2	EA.		
0015	FURNISH LOAD FRAME	1	EA.		
0016	INSTALL LOAD FRAME	~~1~~	~~EA~~.		
0016AA	First Installation	1	EA		
0016AB	ALL OVER FIRST ~~LOAD FRAME~~ INSTALLATION	1	EA.		
0017	PILE LOAD TEST				
0017AA	FIRST COMPRESSION TEST	1	EA.		
0017BA	ALL OVER FIRST COMPRESSION TEST	1	EA.		
0017CA	FIRST TENSION TEST	1	EA.		
0017DA	ALL OVER FIRST TENSION TEST	1	EA.		
0018	TIMBER PILES	510	L.F.		

SECTION 00010 - BIDDING SCHEDULE

LAKE PONTCHARTRAIN, LA AND VICINITY
HIGH LEVEL PLAN, LONDON AVENUE OUTFALL CANAL
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ORLEANS PARISH, LOUISIANA

ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT	UNIT PRICE	EST. AMOUNT
0019	STEEL SHEET PILES (PMA-22 and PSA-23)	LUMP SUM	L.S.		
0020	TEMPORARY FLOOD PROTECTION	LUMP SUM	L.S.		
0021	FURNISH AND DELIVER STEEL PIPE PILES	1,400	L.F.		
0022	DRIVE STEEL PIPE PILES	1,400	L.F.		
0023	CHAIN LINK FENCE	LUMP SUM	L.S.		
0024	TRAFFIC CONTROL	LUMP SUM	L.S.		
0025	CAST-IN-PLACE STRUCTURAL CONCRETE	LUMP SUM	L.S.		
0026	TEMPORARY CONCRETE DAMS	LUMP SUM	L.S.		
0027	REPLACE SUCTION BASIN DECK	LUMP SUM	L.S.		

SECTION 00010 - BIDDING SCHEDULE

LAKE PONTCHARTRAIN, LA AND VICINITY
HIGH LEVEL PLAN, LONDON AVENUE OUTFALL CANAL
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ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT	UNIT PRICE	EST. AMOUNT
0028	STRUCTURAL STEEL AND MISCELLANEOUS METAL WORK	LUMP SUM	L.S.		
0029	ALUMINUM STOP LOGS	LUMP SUM	L.S.		
0030	MODIFY TRASH SCREEN BAY	LUMP SUM	L.S.		
0031	SLUICE GATES, OPERATOR'S AND FLOOR STANDS	LUMP SUM	L.S.		
0032	42" DIAMETER SEWER FORCE MAIN	LUMP SUM	L.S.		
0033	48" DIAMETER SEWER FORCE MAIN	LUMP SUM	L.S.		
0034	54" DIAMETER SEWER FORCE MAIN	LUMP SUM	L.S.		
0035	48" DIAMETER DRY WEATHER FLOW PIPE	LUMP SUM	L.S.		
0036	24" DIAMETER FRESH WATER INTAKE PIPE	LUMP SUM	L.S.		
0037	INSTALL DUAL SUBMERSIBLE PUMPS	LUMP SUM	L.S.		
0038	REMOVE EXISTING VACUUM PUMPS AND ACCESSORIES	LUMP SUM	L.S.		

SECTION 00010 - BIDDING SCHEDULE

LAKE PONTCHARTRAIN, LA AND VICINITY
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FRONTING PROTECTION AT PUMPING STATION NO. 3
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ITEM NO.	DESCRIPTION	EST. QUANTITY	UNIT	UNIT PRICE	EST. AMOUNT
0039	INSTALL NEW VACUUM PUMPS AND ACCESSORIES	LUMP SUM	L.S.		
0040	TEMPORARY DRY WEATHER FLOW PIPE	LUMP SUM	L.S.		
0041	ELECTRICAL WORK	LUMP SUM	L.S.		
0042	ULTRASONIC FLOWMETER	LUMP SUM	L.S.		
0043	RAILROAD INSURANCE	LUMP SUM	L.S.		

Award will be made as a whole to one bidder.

NOTE 1: Bidders shall furnish unit prices for all items listed on schedule of bid items, which require unit prices. If the bidder fails to insert a unit price in the appropriate blank for required items but does furnish an extended total or an estimated amount for such items, the Government will deem his unit price to be the quotient obtained by dividing the extended estimated amount for that line item by the quantity. IF THE BIDDER OMITS BOTH THE UNIT PRICE AND EXTENDED ESTIMATED AMOUNT FOR ANY REQUIRED ITEM, THAT BID WILL BE DECLARED NON-RESPONSIVE.

NOTE 2: THE NOTICE TO PROCEED (NTP): The successful bidder is advised that performance and payment bonds shall be submitted in accordance with the time frame in block 12B of SF 1442 after Notice of Award. The NTP will be issued immediately after verification of acceptable performance and payment bonds. Within seven (7) days after issuance of the NTP, the Contractor shall initiate a meeting to discuss the submittal process with the Area or Resident Engineer or his authorized representative. Physical work cannot start until the Accident Prevention Program, Contractor Quality Control Plan, and other submittals, which may be required, have been submitted and approved and all preliminary meetings called for under the contract have been conducted.

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SECTION 00700 – CONTRACT CLAUSE INSERTS

SECTION 00700 – CONTRACT CLAUSE INSERTS

1. COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (FAR 52.211-10 - APR 1984)

The Contractor shall be required to

(a) Commence work under this contract within 10 calendar days after the date the Contractor receives the notice to proceed,

(b) Prosecute the work diligently, and

(c) Complete the entire work ready for use not later than 850 calendar days after the date of receipt by him of notice to proceed. The time stated for completion shall include final cleanup of the premises.

(End of Clause)

NOTE. The Contractor is hereby informed that time allowed for completion of work has been established as the shortest reasonable duration and that he/she shall make any and all provisions necessary (multiple crews, overtime, concurrent operations, etc.) to accomplish the work within the available time period.

2. LIQUIDATED DAMAGES - CONSTRUCTION (FAR 52.211-12 – SEPT 2000)

(a) If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of _____ [*Contracting Officer insert amount*] for each calendar day of delay until the work is completed or accepted.

(b) If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause.

(End of Clause)

3. CONTRACT DRAWINGS AND SPECIFICATIONS (DFARS 252.236-7001 – AUG 2000)

(a) The Government will provide to the Contractor, without charge, one set of contract drawings and specifications, except publications incorporated into the technical provisions by reference, in electronic or paper media as chosen by the Contracting Officer.

(b) The Contractor shall --

(1) Check all drawings furnished immediately upon receipt;

(2) Compare all drawings and verify the figures before laying out the work;

(3) Promptly notify the Contracting Officer of any discrepancies;

(4) Be responsible for any errors that might have been avoided by complying with this paragraph (b); and

(5) Reproduce and print contract drawings and specifications as needed.

(c) In general --

(1) Large-scale drawings shall govern small-scale drawings; and

(2) The Contractor shall follow figures marked on drawings in preference to scale measurements.

(d) Omissions from the drawings or specifications or the mis-description of details of work that are manifestly necessary to carry out the intent of the drawings and specifications, or that are customarily performed, shall not relieve the Contractor from performing such omitted or mis-described details of the work. The Contractor shall perform such details as if fully and correctly set forth and described in the drawings and specifications.

(e) The work shall conform to the specifications and the contract drawings identified on the following index of drawings:

Title	File	Drawing No.
Lake Pontchartrain, LA and Vicinity, High Level Plan, London Avenue Outfall Canal, Parallel Protection, Fronting Protection at Pumping Station No. 3, Orleans Parish, LA	H-4-40591	1 thru 141

(End of Clause)

4. EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (EFARS 52.231-5000 - MAR 95)

(a) This clause does not apply to terminations. See *EFARS 52.249-5000, Basis For Settlement of Proposals*, and FAR Part 49.

(b) Allowable cost for construction and marine plant and equipment in sound workable condition, owned or controlled and furnished by a Contractor or Subcontractor at any tier shall be based on actual cost data for each piece of equipment or groups of similar serial and series for which the Government can determine both ownership and operating costs from the Contractor's accounting records. When both ownership and operating costs cannot be determined for any piece of equipment or groups of similar serial or series equipment from the Contractor's accounting records, costs for that equipment shall be based upon the applicable provisions of EP 1110-1-8, "Construction Equipment Ownership and Operating Expense Schedule," Region III. Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the Contracting Officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiations shall apply. For retroactive pricing, the schedule in effect at the time the work was performed shall apply.

(c) Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d) (ii) and FAR 31.205-36. Rates for equipment rented from an organization under common control, lease-purchase arrangements, and sale-leaseback arrangements will be determined using the schedule, except that actual rates will be used for equipment leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees.

(d) When actual equipment costs are proposed and the total amount of the pricing action exceeds the small purchase threshold, the Contracting Officer shall request the Contractor to submit either certified cost or pricing data, or partial/limited data, as appropriate. The data shall be submitted on Standard Form 1411, Contract Pricing Proposal Cover Sheet.

(End Of Clause)

NOTE1: Costs for repairs or overhauling are not allowed.

NOTE 2: A copy of the "EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE CD can be obtained from the Government Printing Office (GPO) by calling (202)512-1800 or through the Internet site www.access.gpo.gov\su_docs. Also any references in the paragraph to the manual should be changed to reference the CD.

5. PHYSICAL DATA (FAR 52.236-4 - APR 1984)

Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

(a) The indications of physical conditions on the drawings and in the specifications are the result of site investigations by surveys and borings. Field and Laboratory test results for borings 1-LUW, 2LUE and Laboratory test results for borings B-1 (1985), B-1 (1994), and B-36 are available at U.S. Army Engineer District, New Orleans, Corps of Engineers, Attn: CEMVN-ED, P.O. Box 60267, New Orleans, Louisiana 70160-0267, and access thereto may be had upon request.

(b) Weather Conditions. Data on weather conditions may be obtained from the National Weather Service.

(c) Transportation Facilities.

(1) The work on this project is located in the immediate vicinity of the City of New Orleans Sewerage and Water Board's Drainage Pumping Station No. 3. The work is also partially located within the limits of the London Avenue Outfall Canal.

(2) All streets shall be maintained in good condition throughout the contract period and restored to pre-construction conditions upon completion of the Contract. The Contractor should also be aware that truck routes and truck speed limits are subject to change and should check with the appropriate state and/or parish officials for the applicable regulations in performance of this construction work.

(3) In addition to the requirements stated above, the Contractor shall keep public highways/streets used free and clean of mud and other debris resulting from his operations. This includes furnishing and using equipment (i.e., front-end loaders and street sweepers) as necessary to clean the public highways/streets during construction periods. The Contractor shall clean all city streets used for trucking at least once daily following completion of the day's trucking operation, and at such other times as may be directed by the Contracting Officer. This is necessary to insure safe operation of all vehicles using public streets.

(4) Access shall be through dedicated city streets including North Broad Street, Florida Avenue, Abundance Street, Benefit Street, and Treasure Street.

(d) The Contractor is responsible for keeping streets free of mud, tracking, spillage and/or other surface pollution from his equipment and operations. Contractor shall take whatever means required (i.e., street cleaners, manual labor, water trucks with sprayers) as often as needed to maintain clean streets near the work site. All debris resulting from street cleaning operations shall be hauled off-site and disposed of properly.

(e) Estimates of quantities involved in certain items of work for which bids are being solicited on a lump sum or job basis have been made for the use of the Government. Copies of these quantity estimates may be viewed/obtained by contacting the District Engineer, Attn: Mrs. Diane Pecoul, same address as stated in subparagraph (a) above. It is expressly understood that the accuracy of these estimates is in no way warranted and that the furnishing of this information to a bidder will not relieve him of his responsibility to estimate the quantities involved.

6. LAYOUT OF WORK (FAR 52.236-17 - APR 1984)

The Contractor shall lay out its work from Government-established base lines and benchmarks indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the Contracting Officer. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the Contracting Officer until authorized to remove them. If such marks are destroyed by the Contractor or through its negligence before their removal is authorized, the Contracting Officer may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

7. QUANTITY SURVEYS (FAR 52.236-16 - APR 1984)

(a) Quantity surveys will be conducted, and the data derived from these surveys shall be used in computing the quantities of work performed and the actual construction completed and in place.

(b) The Government shall conduct the original and final surveys and make the computations based on them. The Contractor shall conduct the surveys for any periods for which progress payments are requested and shall make the computations based on these surveys. All surveys conducted by the Contractor shall be conducted under the direction of a representative of the Contracting Officer, unless the Contracting Officer waives this requirement in a specific instance.

(c) Promptly upon completing a survey, the Contractor shall furnish the originals of all field notes and all other records relating to the survey or to the layout of the work to the Contracting Officer, who shall use them as necessary to determine the amount of progress payments. The Contractor shall retain copies of all such material furnished to the Contracting Officer.

8. PAYMENT FOR MOBILIZATION AND DEMOBILIZATION (DFARS 252.236-7004 - DEC 1991)

(a) The Government will pay all costs for the mobilization and demobilization of all of the Contractor's plant and equipment at the contract lump sum price for this item.

(1) Sixty percent (60%) of the lump sum price upon completion of the Contractor's mobilization at the work site.

(2) The remaining forty percent (40%) upon completion of demobilization.

(b) The Contracting Officer may require the Contractor to furnish cost data to justify this portion of the bid if the Contracting Officer believes that the percentages in paragraphs (a)(1) and (a)(2) of this clause do not bear a reasonable relation to the cost of the work in this contract.

(1) Failure to justify such price to the satisfaction of the Contracting Officer will result in payment, as determined by the Contracting Officer, of-

(i) Actual mobilization costs at completion of mobilization;

(ii) Actual demobilization costs at completion of demobilization; and

(iii) The remainder of this item in the final payment under this contract.

(2) The Contracting Officer's determination of the actual costs in paragraph (b)(1) of this clause is not subject to appeal.

9. PERFORMANCE OF WORK BY CONTRACTOR (FAR 52.236-1 - APR 1984)

The Contractor shall perform on the site, and with its own organization, work equivalent to at least twenty percent (20%) of the total amount of the work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract, if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

10. CONTINUING CONTRACTS (EFARS 52.232-5001 - MAR 95)

(a) This is a continuing contract, as authorized by Section 10 of the River and Harbor Act of September 22, 1922, (33 US Code 621). The payment of some portion of the contract price is dependent upon reservations of funds from future appropriations, and from future contribution to the project having one or more

non-federal project sponsors. The responsibilities of the Government are limited by this clause notwithstanding any contrary provision of the Section 00700 Clause entitled *Payments under Fixed-Price Construction Contracts* (*FAR 52.232-5*), or any other clause of this contract.

(b) The sum of $ has been reserved for this contract and is available for payments to the Contractor during the current fiscal year. It is expected that Congress will make appropriations for future fiscal years from which additional funds together with funds provided by one or more non-federal project sponsors will be reserved for this contract.

(c) Failure to make payments in excess of the amount currently reserved, or that may be reserved from time to time, shall not entitle the Contractor to a price adjustment under the terms of this contract except as specifically provided in paragraphs (f) and (i) below. No such failure shall constitute a breach of this contract, except that this provision shall not bar a breach-of-contract action if an amount finally determined to be due as a termination allowance remains unpaid for one year due solely to a failure to reserve sufficient additional funds therefore.

(d) The Government may at any time reserve additional funds for payments under the contract if there are funds available for such purpose. The Contracting Officer will promptly notify the Contractor of any additional funds reserved for the contract by issuing an administrative modification to the contract.

(e) If earnings will be such that funds reserved for the contract will be exhausted before the end of any fiscal year, the Contractor shall give written notice to the Contracting Officer of the estimated date of exhaustion and the amount of additional funds which will be needed to meet payments due or to become due under the contract during that fiscal year. This notice shall be given not less than 45 nor more than 60 days prior to the estimated date of exhaustion.

(f) No payments will be made after exhaustion of funds except to the extent that additional funds are reserved for the contract. The Contractor shall be entitled to simple interest on any payment that the Contracting Officer determines was actually earned under the terms of the contract and would have been made except for exhaustion of funds. Interest shall be computed from the time such payment would otherwise have been made until actually or constructively made, and shall be at the rate established by the Secretary of the Treasury pursuant to Public Law 92-41, 85 STAT 97, as in effect on the first day of the delay in such payment.

(g) Any suspension, delay, or interruption of work arising from exhaustion or anticipated exhaustion of funds shall not constitute a breach of this contract and shall not entitle the Contractor to any price adjustment under the "SUSPENSION OF WORK" clause or in any other manner under this contract.

(h) An equitable adjustment in performance time shall be made for any increase in the time required for performance of any part of the work arising from exhaustion of funds or the reasonable anticipation of exhaustion of funds.

(i) If, upon the expiration of sixty (60) calendar days after the beginning of the fiscal year following an exhaustion of funds, the Government has failed to reserve sufficient additional funds to cover payments otherwise due, the Contractor, by written notice delivered to the Contracting Officer at any time before such additional funds are reserved, may elect to treat his/her right to proceed with the work as having been terminated. Such a termination shall be considered a termination for the convenience of the Government.

(j) If at any time, it becomes apparent that the funds reserved for any fiscal year are in excess of the funds required to meet all payments due or to become due the Contractor because of work performed and to be performed under the contract during the fiscal year, the Government reserves the right, after notice to the Contractor, to reduce said reservation by the amount of such excess.

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SECTION 01100 - GENERAL PROVISIONS

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1. TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

(a) This provision specifies the procedure for determination of time extensions for unusually severe weather in accordance with the Contract Clause in Section 00700, entitled Default (Fixed Price Construction) (FAR 52.249-10). In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied.

(1) The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

(2) The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the Contractor.

(b) The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The Contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAY WORK DAYS
BASED ON (5) DAY WORK WEEK

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
9	8	6	5	5	7	10	7	6	5	6	6

(c) Upon acknowledgment of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day.

(d) The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph b,

above, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the Contract Clause in Section 00700, entitled Default (Fixed Price Construction) (FAR 52.236-7).

2. DAMAGE TO WORK

The responsibility for damage to any part of the permanent work shall be as set forth in the Contract Clause in Section 00700, entitled Permits and Responsibilities (FAR 52.236-7). However, if, in the judgment of the Contracting Officer, any part of the permanent work performed by the Contractor is damaged by flood, earthquake, hurricane, or tornado which damage is not due to the failure of the Contractor to take reasonable precautions or to exercise sound engineering and construction practices in the conduct of the work, the Contractor shall make the repairs as ordered by the Contracting Officer and full compensation for such repairs will be made at the applicable contract unit price or lump sum prices as fixed and established in the contract. If, in the opinion of the Contracting Officer, there are no contract unit or lump sum prices applicable to any part of such work, an equitable adjustment shall be made pursuant to the Contract Clause in Section 00700, entitled Changes (FAR 52.243-4). Except as herein provided, damage to all work (including temporary construction), utilities, materials, equipment and plant shall be repaired to the satisfaction of the Contracting Officer at the Contractor's expense, regardless of the cause of such damage.

3. SAFETY PROVISIONS

The safety provisions as specified herein refer to the Sep 1996 edition of EM 385-1-1.

(a) Accident Investigations and Reporting. Refer to EM 385- 1-1, Section 01.D. Accidents shall be investigated and reports completed by the immediate supervisor of the employee(s) involved and reported to the Contracting Officer or his/her representative within one working day after the accident occurs. All data reported must be complete, timely and accurate. A follow-up report shall be submitted when the estimated lost time days differs from the actual lost time days.

(b) Accident Prevention Program. (See the Contract Clause in Section 00700, entitled Accident Prevention (FAR 52.236-13).) Within 15 days after receipt of Notice of Award of the contract, and at least 7 days prior to the prework conference, four copies of the Accident Prevention Program shall be submitted to the Contracting Officer for review and acceptance. The program shall be prepared in the following format:

(1) An executed LMN Form 385-7-R (Aug 99), Administrative Plan (available upon request), see Appendix A of EM 385-1-1.

(2) Executed LMN 385-6-R and Form 385-43R (Aug 99), Activity Hazard Analysis (available upon request), see Figure 1-1 of EM 385-1-1.

(3) A copy of company policy statement regarding accident prevention.

(4) When marine plant and equipment are in use under a contract, the method of fuel oil transfer shall be included on LMN Form 385-10R(Aug 99), Fuel Oil Transfer, (available upon request). (Refer to 33 CFR 156).

The Contractor shall not commence physical work at the site until the program has been accepted by the Contracting Officer, or his/her authorized representative. At the Contracting Officer's discretion, the Contractor may submit its Activity Hazard Analysis only for the first phase of construction provided that it is accompanied by an outline of the remaining phases of construction. All remaining phases shall be submitted and accepted prior to the beginning of work in each phase. Also refer to Section 1 of EM 385-1-1.

(c) Comprehensive Hazard Communication Program. The Contractor shall develop, implement, and maintain at the workplace a written, Comprehensive Hazard Communication Program (see Section 01.B.04 of EM 385-1-1) that includes identification of potential hazards as prescribed in 29 CFR Part 1910.1200 and/or 1926.59, effects of exposure and control measures to be used for chemical products and physical agents that may be encountered during the performance of work on this contract, provisions for container labeling, Material Safety Data Sheets, and employee training program, and other criteria in accordance with 29 CFR Part 1910.1200 and/or 1926.59. Training shall include communication methods and systems to be used (i.e., voice, hand signals, radios or other means), and training in the use and understanding of material safety data sheets and chemical product hazard warning labels. Prior to bringing hazardous substances, as defined in 29 CFR 1910.1200 and/or 1926.59, onto the job site, a copy of the Hazard Communication Program and the Material Safety Data Sheets of each substance shall be submitted to the Contracting Officer and made available to the Contractor's employees as part of its Accident Prevention Program. A site map will be attached to the inventory showing where the inventoried hazardous substances are stored. The inventory list and site map will be up-dated monthly to ensure accuracy.

(d) Daily Inspections. The Contractor shall perform daily safety inspections and record them on the forms approved by the Contracting Officer. Reports of daily inspections shall be maintained at the jobsite in accordance with Section 01451, "CONTRACTOR QUALITY CONTROL". The reports shall be records of the daily inspections and resulting actions. Each report shall include, as a minimum, the following:

(1) Phase(s) of construction underway during the inspection.

(2) Locations of areas where inspections were made.

(3) Results of inspections, including nature of deficiencies observed and corrective actions taken, or to be taken, date, and signature of the person responsible for its contents.

(e) Bi-Weekly Inspections. The Contractor shall also conduct bi-weekly safety inspections in the presence of the on site quality control representative. Reports, records and information shall be according to the requirements of paragraph 3(d) above.

(f) Safety Sign. The Contractor shall furnish, erect, and maintain a safety sign at the site where indicated by the Contracting Officer. The sign shall conform to the requirements of this paragraph and the drawing included at the end of this section. The lettering shall be black, the castle red, and the background white. Upon request, the Government will furnish two decals of the engineer castle. When placed on a floating plant, the sign may be half size. The sign shall be erected as soon as practicable, but not later than 15 calendar days after the date established for commencement of work. The data required shall be current.

(g) Ground Fault Protection. Electrical equipment used on this contract shall be equipped with ground fault circuit interrupters in accordance with EM 385-1-1, Section 11.C.05.

(h) Safety Fence. The Contractor shall provide, erect, and maintain a temporary safety fence in the areas shown on Dwg. No. 25.. The fabric for the safety fence shall be zinc coated hog wire mesh at least 47 inches high. Posts shall be round wood posts and shall be at least 6 1/2 feet long, 3 1/2 inches in diameter, and may be untreated. Posts shall extend at least 48 inches above ground and shall be spaced at 10 feet on center. Swing gates shall be at least 12 feet wide by 47 inches high. The swing gate frame shall be fabricated of either 1-3/8-inch O.D. tubular steel, or 1/4-inch angle iron brace with an adjustable brace wire to prevent sagging. Gates shall be fitted with hinges and shall be supported by 1-3/8- inch O.D. tubular steel posts embedded in 3-feet of concrete. The fabric from the gates shall be the same as that for the fence. All gates shall be closed and padlocked at the end of each work day. When necessary, an owner of a facility located within the limits of work will obtain keys from the levee district. The Contractor shall provide and maintain on the fence "KEEP OUT" signs every 100 feet facing out from the work. Details of the safety fencing and location shall be submitted to the Contracting Officer for approval. No separate measurement or payment will be made for this work. Payment will be included in the contract lump sum price bid for "CHAIN LINK FENCE".

(i) Security Fence. The Contractor shall provide, erect, and maintain a temporary security fence in the areas shown on Dwg. No. 25. Fencing shall consist of a 6 foot high chain link fence with three strands of barbed wire

supported on angled arms at the top. To provide access, the fence shall have a minimum 16 foot wide gate with keyed lock. The Contractor shall provide and maintain on the fence "KEEP OUT" signs every 100 feet facing out from the staging area. Details of the security fence and location shall be submitted to the Contracting Officer for approval. No separate measurement will be made for this work. Payment for all work associated with the security fence shall be distributed amongst the existing bid items.

(j) Hurricane Plan. A detailed plan for protection and evacuation of personnel and the Contractor's plant, in the event of an impending hurricane or storm, is required as an enclosure to the Contractor's Accident Prevention Program. This plan shall be submitted to the Contracting Officer, or his/her representative, for review prior to the preconstruction conference. The plan shall include at least the following:

(1) The time each phase of the plan will be put in effect. The time shall be the number of hours remaining for the storm to reach the worksite if it continues at the predicted speed and direction.

(2) The safe harbor for personnel and plant specifically identified.

(k) Hazardous Energy Protection. The Contractor shall develop, implement and maintain at the workplace, a written Control of Hazardous Energy (Lockout/Tagout) System. Refer to Section 12 of EM 385-1-1.

(l) Handling Sheet Piling: The Contractor's personnel will not be allowed to sit or place themselves on top of the sheet piling during the handling, installation, and removal of the piling.

(m) Cranes. The Contractor (including subcontractors) shall have cage boom guards, insulating links, or proximity warning devices on cranes that will be working adjacent to power lines. These devices shall not alter the requirements of any other regulation of this part - even if such device is required by law or other regulation. Insulating links shall be capable of withstanding a 1-minute dry low frequency dielectric test of 50,000 volts, alternating current (EM 385-1-1, Section 11.E.07). Calibration records or stamped date of required manufacturer inspection of proximity warning devices shall be kept on the crane. Additionally, prior to any work commencing an Activity Hazard Analysis (EM 385-1-1, Fig.1-1) identifying and satisfying EM 385-1-1, Section 11.A.02, 11.E.03, 11.E.04 and 11.E.05 requirements shall be submitted and accepted by the Contracting Officer.

4. INSPECTOR'S FIELD OFFICE

(a) The Contractor shall furnish, throughout the contract period, for the exclusive use of the Government employees, a temporary waterproof building, or trailer, to

be utilized as a field office. It shall be conveniently located at the site of construction and shall be independent of any building, or trailer, used by the Contractor. Toilet facilities and potable water shall be provided within the Inspector's office. It shall be equipped with approved electrical wiring, private telephone service, a telephone answering machine, at least one ceiling lamp receptacle, at least one double convenience outlet, and the required switches and fuses, to provide 110-volt power for lighting and operating a laptop computer and printer. It shall be equipped with an air conditioning unit to provide cooling in warm or hot weather, and a heater, properly installed and vented in accordance with the National Fire Protection Association Code, for heating in cold weather, as required. The Contractor shall make the necessary arrangements to obtain or to generate the power required to operate the air conditioning unit, lights, and laptop computer and printer, and the power or fuel required for the heater, and shall bear the cost thereof. A drafting table providing a working surface having dimensions of at least 4-feet by 6-feet (which may consist of a piece of plywood, at least 3/4-inch thick, hinged to a wall of the building with hinged legs) shall be installed in the building. The building shall have a built-in locker, extending from the floor to the ceiling, having dimensions of at least 2- feet by 5-feet, with a shelf 12-inches from the top, and one door equipped with two hinges, a hasp and a padlock. All exterior doors and window frames of the building shall be equipped with iron security guards. The door shall also be equipped with butt hinges and a cylinder lock. One draftsman's stool, two strong chairs and one desk shall be provided. The building or trailer shall conform to the following minimum requirements:

Ceiling height, not less than	6-feet 9-inches
Floor space, no less than	240 square feet
Windows, not less than	2
Doors, outside	1
Rooms	1

Screens over doors and windows; walls and ceilings shall be insulated; and interior walls finished.

The Inspector's filed office shall be mobilized to the work site and functional, including electric, water, telephone, and sewerage within 30 days of NTP, or prior to start of work at the site.

(b) The building, or trailer, shall be removed by the Contractor after completion of all work under this contract and before final acceptance thereof. No separate payment will be made for furnishing, maintaining, providing the prescribed utilities, and removing the inspector's field office, but the cost of the same shall be distributed throughout the existing bid items. In the event the Contractor fails to furnish the required facilities, the Government may elect to procure the required facilities and deduct all costs from amounts due or to become due under this contract.

(c) The Contractor shall provide daily janitorial services for this and other buildings at the site throughout the life of the contract. The cost of this service shall be distributed throughout the existing bid items and there shall be no separate payment.

(d) A copy machine and a fax machine must be furnished for use by the Government Inspector.

5. PROJECT SIGN

Prior to commencement of work, the Contractor shall construct a project sign at the site of the work at a location directed by the Contracting Officer. The sign which will identify the work with the Corps of Engineers shall be 4 feet by 6 feet in size and shall conform to the requirements of the PROJECT SIGN drawing attached at the end of these General Requirements. The lettering for the 2 feet by 4 feet section of the sign with the Corps logo shall be white, all other lettering shall be black. Lettering for the project name shall be Helvetica Bold, all other lettering shall be Helvetica Regular. No separate payment will be made for construction and erection of the project sign and all costs in connection therewith will be considered an incidental obligation of the Contractor. Upon completion of the work, the sign shall become the property of the Contractor and shall be removed from the job site.

6. RIGHTS-OF-WAY

The rights-of-way required for the work to be constructed under this contract, within the limits indicated on the drawings, have been obtained by the Government and are provided without cost to the Contractor. If the Contractor proposes a deviation from the Government furnished rights-of-way for his convenience, the Contractor shall notify the Contracting Officer or his/her representative in writing of these intentions to use alternative rights-of way. A proposed deviation to the Government furnished rights-of-way may require the Contractor to secure additional real estate interest and environmental compliance coordination and documentation. There is no guarantee that environmental compliance will be obtained; therefore, the Contractor shall assume all risks and liabilities associated with pursuing alternative rights-of-way. The Contractor shall reimburse the Government for actual expenses incurred for assistance in completing or attempting to complete additional environmental coordination and documentation. The maximum reimbursement amount shall be limited to $100,000. Any delays resulting from completing such additional rights-of-way and environmental coordination and documentation shall not be made the basis of any Contractor claim for increase in the contract cost and/or increase in contract time. No work shall be initiated using the additional rights-of-way until the Contractor receives written notification from the Contracting Officer that environmental coordination and documentation are complete.

a. Additional Real Estate Clearances. The Contractor shall submit a letter to the Contracting Officer, confirming that he has obtained additional real estate interest for his own convenience. The Contractor shall indicate that he/she has utilized sound and legal real estate practices, and has acquired this additional real estate at his/her own risk and liability, and at no cost to the Government. The Contractor shall also indicate the availability of rights-of-entry to perform environmental compliance on the additional real estate interests.

b. Additional Environmental Compliance. The proposed work, as defined by these specifications and as shown on the drawings, is in compliance with all applicable Federal and state environmental laws and regulations. The Contractor is cautioned that any alternative or additional rights-of-way used in construction of this project are subject to all applicable Federal and state environmental laws and regulations. Compliance with these laws and regulations may require additional NEPA (National Environmental Policy Act) documents, cultural resources surveys, water quality certification, coordination with the Louisiana State Historical Preservation Officer, modification of the Federal consistency determination, etc. The Government is ultimately responsible for environmental compliance; therefore, the Government will determine the additional environmental coordination and documentation necessary for a proposed deviation to the Government furnished rights-of-way. The Contracting Officer will advise the Contractor of the additional environmental coordination and documentation that must be completed. Unless notified otherwise by the Government, the Contractor shall be responsible for obtaining any additional environmental coordination and documentation. The Government will offer advice and assistance to the Contractor in obtaining the additional environmental coordination and documentation. Depending on the environmental impact of the proposed deviation, obtaining the coordination and documentation may not be approved or could take as much as 180 days for approval by the Government. The Contractor shall submit copies of his/her environmental coordination and documentation to the Contracting Officer for review and approval before work commences on alternative or additional rights-of-way. Government assistance in obtaining additional environmental clearances does not relieve the Contractor of responsibility for complying with other Federal, state or local licenses and permits.

7. CERTIFICATES OF COMPLIANCE

Any certificates required for demonstrating proof of compliance of materials with specification requirements shall be executed in three (3) copies. Each certificate shall be signed by an official authorized to certify on behalf of the manufacturing company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the

Contractor from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet specified requirements.

8. ENVIRONMENTAL LITIGATION

(a) If the performance of all or any part of the work is suspended, delayed, or interrupted due to an order of a court of competent jurisdiction as a result of environmental litigation, as defined below, the Contracting Officer, at the request of the Contractor, shall determine whether the order is due in any part to the acts or omissions of the Contractor or a Subcontractor at any tier not required by the terms of this contract. If the order is not due in any part to acts or omissions of the Contractor (or a Subcontractor at any tier) other than as required by this contract, such suspension, delay, or interruption shall be as if ordered by the Contracting Officer under the Contract Clause in Section 00700, entitled Suspension of Work (FAR 52.242-14). The period of such suspension, delay or interruption shall be considered unreasonable, and an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) as provided in that clause, subject to all the provisions thereof.

(b) The term "environmental litigation", as used herein, means a lawsuit alleging that the work has an adverse effect on the environment or that the Government has not duly considered, either substantively or procedurally, the effect of the work on the environment.

9. UTILITIES AND IMPROVEMENTS

(a) All known utilities within the limits of the work, such as pipes, communication lines, power lines, etc., that would interfere with construction work will be removed, modified or relocated by local interests or utility companies at no cost to the Contractor unless otherwise noted in the plans and/or specifications. The Contractor, however, shall cooperate with the authorities or company representatives and shall conduct his/her operations in such manner as to result in a minimum of inconveniences to the owners of said utilities. The Contractor shall notify each utility owner by certified mail 45 days, 15 days, and again 72 hours prior to the date utilities must be moved and provide a copy of these notifications to the Contracting Officer.

(b) Any unidentified pipes or structures which may be found within the limits of the work during the course of construction shall not be disturbed nor shall construction or excavation be performed at these locations unless and until approved by the Contracting Officer. Payment for ordered excavation, if any, will be made in accordance with the Contract Clause in Section 00700, entitled Differing Site Conditions (FAR 52.136-2).

10. PERMISSIBLE HOURS OF OPERATIONS

The Contractor shall limit his/her hours of operation to the hours between 7:00 a.m. to 7:00 p.m., Monday through Friday. No work will be allowed on Saturdays or Sundays or legal holidays without the consent of the government.

11. IDENTIFICATION OF GOVERNMENT-FURNISHED PROPERTY (FAR 52.245-3 1984 APR)

a. The government will furnish to the Contractor the property identified in the Schedule to be incorporated or installed into the work or used in performing the contract. The Contractor shall verify its quantity and condition and acknowledge receipt in writing to the Contracting Officer within 24 hours of delivery any damage to or shortage of the property as received. All such property shall be installed or incorporated into the work at the expense of the Contractor, unless otherwise indicated in this contract.

b. Each item of property to be furnished under this clause shall be identified in the Schedule by quantity, item, and description.

c. The Contractor shall make all provisions to load, deliver to the project site, store and install the government-furnished property listed below.

Government-Furnished Property Schedule

The following equipment will be furnished by the Government:

Description	Estimated Value
Four (4) Each Butterfly Gates * Shafts, Bonnet (Shaft Covers) Motors and Actuators Only	$27,500.00/each
Approximate Weight	5,400 lbs./each

*Furnished in one (1) complete unit each. The gate shaft, bonnet, actuators and motors are assembled as a single unit.

d. The property listed above is located in the Orleans Levee District's Field yard on Franklin Avenue at Lakeshore Drive and is being stored until ready for installation. The Contractor shall make all provisions for loading the Government furnished equipment at the specified location and transporting it to the job site using the appropriate means of transportation. Contact Mr. Al Wethern at 243-4045 or Cell # 214-4789 for access into the field yard.

e. The Contractor shall notify the Contracting Officer five (5) days prior to proceeding to load and transport the Government-furnished property.

12. U.S ARMY CORPS OF ENGINEERS CRD-C STANDARDS

CRD-C standards can be found at
http://www.wes.army.mil/sl/mtc/handbook/handbook.htm

13. AGGREGATE SOURCES

(a) Concrete aggregates meeting the quality requirements of these specifications have been produced from the sources listed below:

(Source list date: January 2001)

Producer	Nearest Town to Pit*	Type**	Pit Designation
A. B. Chisum Gravel Co.	Sicily Island, LA	S	A. B. Chisum Sand & Gravel
American Sand & Gravel Co.	Hattiesburg, MS	S, G	Plant R
American Sand & Gravel Co.	Hattiesburg, MS	G	Plant E
American Sand & Gravel Co.	Hattiesburg, MS	S	Plant F
Blain Sand & Gravel, Inc.	Georgetown, MS	S, G	Bailey Pit
B. & M. B., Inc.	Jackson, LA	S, G	Dudley Pit
B. & M. B., Inc.	Wakefield, LA	S, G	Island Pit
B. & M. B., Inc.	Jackson, LA	S, G	Thompson Pit
Bunch Gravel Co. #1	Clinton, LA	S, G	Bunch Gravel Plant
Bunch Gravel Co. #2	Darlington, LA	S, G	Bunch Gravel Plant
Fleniken Sand and Gravel Co.	Clinton, LA	S, G	Fleniken Sand & Gravel (Spears Lease)
Jackson Ready-Mix Concrete Co.	Pit # 715-11	Crystal Springs, MS	S, G
Lambert Gravel Co., Inc.	Clinton, LA	S, G	Billups Pit (B 1)
Lambert Gravel Co., Inc.	Bains, LA	S, G	Harvey Garrett & Butler lease (G-2)
Martin Marietta Aggregates	Smithland, KY	CLS	Three Rivers Quarry
Mears Sand & Gravel Co. Leases	Watson, LA	S, G	Penny & Easterly
Meridian Aggregate Co.	Watson, LA	S, G	Plant 1
Meridian Aggregate Co.	Watson, LA	S, G	Plant 6 & 6c
Meridian Aggregate Co.	Watson, LA	S, G	Plant 9
Pine Bluff Sand & Gravel Co. Quarry	Delaware, AR	SS, CSS	River Mountain
Standard Gravel Co. 7)	Pearl River, LA	S, G	Nicholson Plant (Nic-

Standard Gravel Co.	Enon, LA	S, G	Enon Pit (C-10 & CZ-30 leases)
Texas Industries, Inc.	DeRidder, LA	S, G	Anacoco Creek Plant
Texas Industries, Inc.	Watson, LA	S, G	Clemons Plant
Texas Industries, Inc.	Grangeville, LA	S, G	Denkman Plant
Texas Industries, Inc. Plant	Grangeville, LA	S, G	Harvel/Hartner/Dunn
Texas Industries, Inc. Operation	Pearl River, LA	S, G	Honey Island (Pit #1)
Texas Industries, Inc. Operation	Pearl River, LA	S, G	Honey Island (Pit #2)
Texas Industries, Inc.	Ball, LA	S, G	Paradise Plant
Texas Industries, Inc.	Perryville, LA	S, G	Perryville Plant
Texas Industries, Inc.	Enon, LA	G	Price Plant
Texas Industries, Inc.	Woodworth, LA	S, G	Woodworth Plant
Tower Rock Stone Co. Co.	Ste. Genevieve, MO	LS, CLS	Tower Rock Stone
Tower Rock Stone Co.	Scott City, MO	LS, CLS	Grays Point Quarry
Trinity Materials, Inc.	Grangeville, LA	G	Plant #383
Trinity Materials, Inc. lease)	Watson, LA	S, G	Plant 392 (Easterly
Vulcan Materials Co.	Lake City, KY	CS	Reed Quarry

* "Nearest Town to Pit" according to LDOTD Official State Highway Map and Rand McNally Road Atlas copyrighted 2000.

**Type: CS = Crushed stone CLS = Crushed limestone CSS = Crushed sandstone
G = Gravel LS = Limestone S = Sand
SS = Sandstone

(b) Concrete aggregates may be furnished from any of the above listed sources or at the option of the Contractor may be furnished from any other source designated by the Contractor and approved by the Contracting Officer, subject to the conditions hereinafter stated and as specified in Section 03301.

(c) After the award of the contract, the Contractor shall designate in writing only one source or one combination of sources from which he/she proposes to furnish aggregates. If the Contractor proposes to furnish aggregates from a source or from sources not listed above, he/she may designate only a single source or single combination of sources of aggregates. If a source for coarse and/or fine aggregate so designated by the Contractor is not approved for use by the

Contracting Officer, the Contractor may not submit for approval other sources but shall furnish the coarse and/or fine aggregate, as the case may be, from a source listed above at no additional cost to the Government.

(d) Approval of a source of concrete aggregate is not to be construed as approval of all material from that source. The right is reserved to reject materials from certain localized areas, zones, strata, or channels, when such materials do not conform to the quality requirements of ASTM C 33-02, Concrete Aggregates. Aggregate gradations shall be in accordance with the specified requirements of Section 03301. Materials produced from any source, including those listed above, shall also meet all the requirements of Section 03301 of the Technical Specifications.

(e) It is the Contractor's responsibility to determine that the aggregate source or combination of sources selected is capable of supplying the quantities and gradations needed and at the rates needed to maintain the scheduled progress of the work. The inability of a source or combination of sources to maintain the necessary volume shall not be the basis for any claim for a time extension.

14. STATE TAXES

(a) The bid submitted in response to this Invitation shall not include any amount whatever for payment of any of the following taxes, fees or charges:

(1) The Louisiana "Severance Tax" imposed by LSA R.S. 47:631 and made applicable to the dredging of fill material from rivers and bodies of water within the State of Louisiana by the Severance Tax Regulations promulgated by the Collector of Revenue dated 31 March 1968.

(2) Any amounts claimed by the Louisiana Department of Wildlife and Fisheries for the privilege of removing fill from the water bottoms of the State of Louisiana.

(b) If the Contractor is required to pay or bear the burden of any tax, fee, or charge described in paragraphs a(1) and/or a(2) above, the contract prices shall be increased by the amount which the Contractor is required to pay to the State of Louisiana; provided, however, that no increase in contract price shall be made for any liability the Contractor may incur as a result of his/her fault or negligence or his/her failure to follow the instructions of the Contracting Officer (CO).

(c) The Contractor shall promptly notify the Contracting Officer of all matters pertaining to taxes, fees, or charges as described herein which reasonably may be expected to affect the contract price and shall at all times follow the directions and instructions of the Contracting Officer in regard to the payment of such taxes, fees, or charges.

(d) Before any increase in contract price becomes effective in accordance with the provisions of this clause, the Contractor shall warrant in writing that no amount of such taxes, fees, or charges was included in the contract price as a contingency reserve or otherwise.

(e) In addition to the costs allowed by subparagraph b, the Contracting Officer may also allow an increase in contract price for costs or expenses which accrue to the Contractor as a result of any directions or instructions received from the CO.

15. REQUIRED INSURANCE (RAILROADS)

(a) Before commencing any work under this contract adjacent to or on the premises of the Railroad Companies, the Contractor shall procure and maintain in force, so long as work shall continue upon such premises, and at its sole expense, comprehensive general and automobile liability insurance with contractual liability endorsement and products and completed operation hazards included, which shall provide the following kinds and amounts of insurance:

(1) Contractor's Public Liability and Property Damage Liability Insurance. Similar insurance in the same amounts will be provided by or in behalf of any subcontractors to cover their operations.

Combined Single Limit for Bodily Injury Liability, Property Damage Liability and Physical Damage to Property - $2,000,000 per occurrence.

*Aggregate Limit - $6,000,000 for the term of the policy.

*For AMTRAK - Aggregate Limit - $12,000,000 for the term of the policy.

(2) Contractor's Protective Public Liability and Property Damage Liability Insurance. This insurance will be required in addition to the above when any work is performed by subcontractor.

Combined Single Limit for Bodily Injury Liability, Property Damage Liability and Physical Damage to Property - $2,000,000 per occurrence

*Aggregate Limit - $6,000,000 for the term of the policy.

*For AMTRAK - Aggregate Limit - $12,000,000 for the term of the policy.

(3) Railroad's Protective Public Liability and Property Damage Liability Insurance. This insurance policy will name the individual Railroad Companies involved as insured with respect to the operations of the Contractor or any subcontractor employed by the Contractor and shall be

on the form of Railroad Protective Policy as accepted by the Association of American Railroads and Mutual Insurance Rating Bureau.

Combined Single Limit for Bodily Injury Liability, Property Damage Liability and Physical Damage to Property - $2,000,000 per occurrence.

*Aggregate Limit - $6,000,000 for the term of the policy.

*For AMTRAK - Aggregate Limit - $12,000,000 for the term of the policy.

(b) The Contractor shall not commence any of the said work until evidence of such insurance is furnished to the Contracting Officer and the Railroad Companies. Required notification shall be in a form satisfactory to the railroad. In addition, the Contractor shall furnish evidence of a commitment by the Insurance Company to notify the Contracting Officer and the Railroad Companies in writing of any material change or cancellation is of such required insurance for any reason at least 30 days before such change or cancellation is effective.

(c) The Contractor will be required to provide the Railroad Companies with a certificate of insurance to which will be attached on endorsement, the form of which will be furnished by the Railroad Companies and prepared by the Insurer.

16. WORK ON OR ADJACENT TO RAILROAD

The following will apply to contract operations on or adjacent to the premises of the Railroad Companies:

(a)The Contractor shall, before entering upon the premises of a Railroad Company, contact the COR.

(b) The Contractor shall fully coordinate his work with the Contracting Officer's Representative to not effect the operation of the Railroad Companies. The Contractor shall notify the Contracting Officer's Representative (COR) in writing 30 days in advance of commencing work.

(c) The Contractor shall comply with all established pertinent regulations and requirements of the Interstate Commerce Commission and the Railroad Companies as set forth herein.

(d) The Contractor shall perform all work adjacent to or on the property of the Railroad Companies so as not to interrupt or delay the operation of trains over the tracks in use, or to interfere with communications and signal lines adjacent to said tracks or upon said premises except under arrangements between the Contractor and the Railroad Companies. During the progress of such work, the Contractor shall maintain liaison with the Railroad Company's officers and

representatives as may be designated by the Railroad Companies so as to ascertain the time of passage of trains at the site of the work, and to clear the railroad tracks and facilities of men, equipment and obstructions to permit free flow of railroad traffic.

(e) The Contractor shall, at all times during the period of construction, keep the railroad tracks and roadbed free of materials, earth, mud, rocks and other debris.

(f) The Contractor shall keep all equipment, tools and materials stored at least 25-feet from the center line of any usable track. Explosives or other highly flammable substances will not be stored on Railroad Companies right-of-way without the prior approval of the Railroad Companies' representative.

(g) Flagging Protection or Watchman Services. The Contractor shall be responsible for arranging with the Railroad Company for flagging protection or watchman service, which is required whenever his/her equipment and/or men are working within 50-feet of the centerline of any operable track, or over, under or adjacent thereto. Flagging or watchman service will also be required whenever boom equipment machinery is working closer to the track centerline than boom length (horizontally extended and at right angles to the track) plus 15-feet. The Contractor shall give 72 hours advance notice to the Railroad's Division Superintendent in order that flagging protection or watchman service can be arranged and provided. No work shall be undertaken until said flagman or watchmen are at the job site.

(h) The Contractor shall remove all tools, equipment and materials from the Railroad Companies premises promptly upon completion of work, restoring premises to the same state and condition as when the Contractor entered thereon.

(i) The Contractor shall remove any liens against the Railroad Companies' property arising from performance of work hereunder by the Contractor or any subcontractor.

(j) The Contractor agrees to release, defend and indemnify the Railroad Companies from and against all loss, damage, claims, costs, expenses and liability for bodily injury or the death of any persons and loss of or damage to any property and loss of use thereof (including but not limited to employees, subcontractors, agents, invitees and the property of each party hereto) arising out of or in any way connected with the work under said agreement upon or adjacent to Railroad Companies property, whether or not caused or contributed to by the presence or operation of Railroad Companies trains, engines, cars or other equipment, structures or facilities of the Railroad Companies or any other party, or by negligence or alleged negligence on the part of the Railroad Companies agents, employees, contractors, subcontractors or invitees. In the event any part of the provisions of this section are determined by any statutory

enactment or judicial decision to be void or unenforceable, then this section shall not fail in its entirety but will be unenforceable to the extent permitted by law. This provision shall include any other railroad company using Railroad Companies' property with Railroad Companies' consent and any affiliate, subsidiary or lessor of the Railroad Companies.

(k) Inspection Services. The Railroad Companies will furnish such watching, flagging and inspection services as outlined below during construction, all cost of which is to be reimbursed by the local sponsors.

(1) Flagging Service. This service will be provided during all times that tracks are or may probably be occupied or fouled by materials, equipment or work of the Contractor. Any encroachment closer than 50-feet horizontally from centerline of track and any crane positioned such that drop of its boom can so encroach upon horizontal clearances shall be considered a condition requiring flagging services. The Railroad Company will provide flagging service with one man normally required at all times when the Contractor is performing the work which requires this service, but sufficient time must be given so arrangements can be made. If work is done at points separated by more than one mile it is likely that more than one flagman will be required.

(2) Watchman Service. The purpose of this service is to insure that Contractor's operations do not damage railroad facilities nor foul operations unless flagging service has been arranged. The watchman assigned will flag trains if they deem necessary, but such service is intended to eliminate the need of unplanned flagging. Such service will be required at all times that work is done (or crane boom can fall) within 15-feet of centerline of track when any work is done in Railroad's embankment under or adjacent to track or when work is done above any track. In general, one watchman will be expected to cover work within a one mile stretch along the tracks. Work more widely scattered will require additional watchmen.

(l) Before commencing any work under the contract whether on or adjacent of the rights-of-way of the Railroad Companies, the Contractor and applicable subcontractors shall procure and keep in effect during the period of such work, at the Contractor's own cost and expense insurance in accordance with the above General Provision entitled "REQUIRED INSURANCE (RAILROAD)." Payment for furnishing the required insurance will be made at the contract lump sum price for "Railroad Insurance".

(m) Railroad trestle shall not be used by the Ocntractor or any of his subcontractors as a means of crossing a canal.

(n) Payment:

(1) No measurement or payment will be made for flagging and watchman services, and that all costs in connection therewith will be included in the contract prices for which the services are incidental.

(2) The estimated cost of flagging is $387 per day based on a 12-hour work day. This cost includes the base pay for the flagman, overhead, and includes an estimated $30 per diem charge for travel expenses, meals and lodging. The charge to the Contractor by the Railroad will be the actual cost based on the rate of pay for the Railroad's employees who are available for flagging service at the time the service is required.

(3) Work by a flagman in excess of 8 hours per day or 40 hours per week, but not more than 12 hours a day will result in overtime pay at 1 and ½ times the appropriate rate. Work by a flagman in excess of 12 hours per day will result in overtime at 2 times the appropriate rate. If work is performed on a holiday, the flagging rate is 2 and ½ times the normal rate.

(4) Railroad work involved in preparing and handling bills will also be charged to the Contractor. Charges to the Contractor by the Railroad shall be in accordance with applicable provisions of Subchapter B, Part 140, Subpart I and Subchapter G, Part 646, Subpart B of the Federal-Aid Policy Guide issued by the Federal Highway Administration on December 9, 1991, including all current amendments. Flagging costs are subject to change. The above estimates of flagging costs are provided for information only and are not binding in any way.

(5) The Contractor will review and sign the Railroad flagman's time sheet (Form 11123), attesting that the flagman was present during the time recorded. Flagmen may be removed by the Railroad if form is not signed. If flagman is removed, the Contractor will not be allowed to re-enter the Railroad right-of-way until the issue is resolved. Any complaints concerning flagman or flagmen must be resolved in a timely manner. If need for flagman or flagmen is questioned, please contact Railroad's Engineer Grade Separation Structures (404) 529-1641.

Point of Contact at Railroad:

Mr. John Darrington
504 – 942 - 3255

17. COMMERCIAL WARRANTY

The Contractor agrees that the standard commercial equipment furnished under this contract shall be covered by the most favorable commercial warranties the

manufacturer gives to any customer for such equipment, and that the remedies provided herein are in addition to and do not limit any rights afforded to the Government by any other clause of this contract. Two copies of the warranties shall be furnished by the Contractor to the Contracting Officer. Warranty period shall begin at the time of final acceptance.

18. ACCESS PLAN

The Contractor shall submit an access plan to be reviewed and approved by the Contracting Officer to include, as a minimum, the following:

(a) Layout drawings showing the location of all equipment, office structures, toilets, and storage areas for materials.

(b) Show mobilization and demobilization routing and locations of large equipment, such as draglines, cranes, barges etc. while on the jobsite.

(c) Show waterway channels or canals used to mobilize and demobilize equipment and materials and show access routes and docking areas of all marine equipment with respect to the jobsite.

19. PAYMENT FOR MATERIALS STORED OFFSITE

Pursuant to the Contract Clause in Section 00700, entitled Payments Under Fixed Price Construction Contracts (FAR 52.235-5), materials delivered to the Contractor at locations other then the site of the work may be taken into consideration in making progress payments if included in invoices for payment estimates and if all the conditions of the Contract Clauses are fulfilled. Payment for items delivered to locations other than the work site shall be limited to materials which have been approved (if required by the Technical Specifications) and fabricated to the point where they are identifiable to an item of work required under this contract. Such payment shall be made only after receipt of paid or receipted invoices or invoices with canceled check showing title to the items by the prime contractor. These invoices must show the dollar value of the materials and labor incorporated into them. The delivery size shall be acceptable to the Government and the materials shall be available for inspection by the Government prior to any consideration for payment. Payment for materials delivered offsite is limited to the following items:

20.1 Steel H-piles
20.2 Test Piles
20.3 Steel Sheet Piles (Permanent)
20.4 Timber Piles
20.5 Steel Pipe Piles
20.6 Sluice Gates, Operators and Floor Stands.

20. PRE-BID SITE VISIT

The site will be open for Pre-Bid Inspection by Bidders. All site visits will be coordinated through:

Mr. Domingo J. Elguezabal
New Orleans Area Engineer
P. O. Box 60267
Suite 186
New Orleans, LA 70160-0267

Telephone: 504-862-1200

21. VIDEOTAPE AND PHOTOGRAPHIC DOCUMENTATION

21.1 The pre-construction condition of the staging areas public roads and existing structures shall be verified/documented by use of Contractor furnished surveys, photos & videos at the Contractor's expense. The Contractor shall notify the Orleans Levee District (OLD), City of New Orleans Department of Streets, The New Orleans Sewerage and Water Board (NOS&WB), the Contracting Officer and Pepper & Associates, Inc at least 72 hours in advance. of the pre-construction survey so that they may provide a representative if they so desire. All pre- and post-construction surveys, photos, or videos shall be submitted to the Contracting Officer for distribution to the necessary parties involved prior to the acceptance of work. No separate measurement or payment will be made for pre- and post-construction surveys, photos, or videos; cleaning, repairing, and restoring roads and staging areas to pre-construction conditions.

21.2 Videotapes shall be VHS. Photographs shall be in color, 3 1/2" x 5" in size minimum and shall have glossy finish. The Contractor shall provide one copy of the videotapes and one copy of each photograph with its negative to the Contracting Officer for his records and use. The Contractor shall also provide one (1) copy of the videotapes and one (1) copy of the photographs to the Sewerage and Water Board and also to Pepper and Associates, Inc. Send both copies to Pepper and Associates, Inc., 2748 Metairie Lawn Drive, Suite F, Metairie, Louisiana 70002, for distribution. A self-adhesive label on the reverse of each picture shall identify the location, describe the photographed object and indicate the date of the photograph. All the information on the label shall be typewritten in black. Payment for the work specified in subparagraph (a) and (b) above will be included in the Contract Lump Sum price for "Mobilization and Demobilization".

22. OPERATIONS AND MATERIAL STORAGE AREA

22.1 The Contractor shall be permitted to use approved areas shown on the drawings within the Right-Of-Way (ROW) as construction staging and storage areas.

22.2 Temporary buildings (storage sheds, shops, offices, etc.), may be erected by the Contractor only with the approval of the Contracting Officer, and shall be built at no cost to the Government. Such temporary buildings and utilities shall remain the property of the Contractor and shall be removed by him at his expense upon completion of the work.

22.3 No equipment or material shall be placed where access to the station will be obstructed.

22.4 No materials or equipment may be placed over underground structures whenever such storage or use may impair effectiveness or limit maintenance or impose excessive loading.

22.5 The Contracting Officer may order moving of materials or equipment even from places where approval has been granted, if it becomes necessary to the operation of the Sewerage and Water Board's facilities because of things unforeseen at the time of approval, such as breakdowns, failures, etc. The Contractor will be compensated under the Contract Clause in Section 00700 entitled, Changes (FAR 52.243-4).

23. FLOOD PROTECTION PLAN

Hurricane season extends from 1 June to 30 November. The Contractor shall develop and submit for approval, plans including methods, equipment, materials and actions to close breaches in the flood protection in the event that a hurricane threatens the area. Plans for closing breaches in the flood protection shall be updated semi-annually to reflect status of construction progress. Prior to removing any existing levee protection, the Contractor shall have an approved plan of interim protection before any existing flood protection is reduced, as specified in Section 02413, Temporary Flood Protection.

23.1 In the event of an impending hurricane or storm, the Contractor shall complete a closure of all breaches in the flood protection within 24 hours after being directed to do so by the Contracting Officer. The closure shall be made with steel sheet piling.

23.2 The stockpiling of emergency closure materials is required. Storage of materials and equipment to perform the closures shall be adjacent to where they would be used or other readily accessible areas acceptable to the Contracting Officer.

24. COORDINATION OF WORK

24.1 The Contractor shall contact the following utility companies and/or agencies by certified mail with a copy to the CO and coordinate work requiring utilities

identifications, and relocations. The Contractor shall notify the companies or agencies, 45 days, 15 days and again 72 hrs. prior to date of required work which will impact those utilities. Any difficulty encountered, when attempting to contact the company, shall be promptly brought to the attention of the Contracting Officer. Any impacts or delays resulting form a failure of the contractor to provide proper notification shall be borne by the Contractor and shall not be the basis of a claim against the government.

24.1.1 Entergy:

24.1.1.1 Gas:

Mr. Wayne Burlett
527 Magnolia St.
New Orleans, LA 70112
Telephone No. 504-595-3584

24.1.1.2 Overhead Electrical:

Mr. Malcolm Lear
3734 Tulane Ave.
New Orleans, LA 70119
Telephone No. 504-595-3828

24.1.1.3 Underground Electrical:

Mr. Malcolm Lear
3734 Tulane Ave.
New Orleans, LA 70119
Telephone No. 504-595-3828

24.1.1.4 Transmission:

24.1.1.4.1 Mr. Barry Canzoneri
639 Loyola Ave.
New Orleans, LA 70113
Telephone No. 504-576-6373

24.1.1.4.2 Mr. Hal Drez
639 Loyola Ave.
New Orleans, LA 70113
Telephone No. 504-576-6102

24.1.2 Bell South:

24.1.2.1 Underground & Overhead Telephone Lines:

Mr. Ronald Griffin
BE&K Telecommunications
6230 Chef Menteur Highway
New Orleans, Louisiana 70126
Telephone No. 504–246-6705

24.1.3 Cox Communications:

Mr. Steve Sippel
668 Distributors Row, Suite E
Harahan, LA 70123
Telephone No. 504-734-7345 Ext. 2364

24.1.4 Sewerage & Water Board of New Orleans:

24.1.4.1 Sewerage & Drainage:

Mr. Joseph Becker
2300 Peoples Ave.
New Orleans, LA 70112
Telephone No. 504-942-3880

24.1.4.2 Water:

Mr. Hadi Amini
2300 Peoples Ave.
New Orleans, LA 70112
Telephone No. 504-942-3870

24.1.4.3 Underground & Overhead Electrical:

Mr. Gary Sarrat
8800 South Claiborne Ave.
New Orleans, LA 70112
Telephone No. 504-865-0450

24.1.5 Department of Public Works:

24.1.5.1 Mr. Elmer Darwin
1300 Perdido St.
Room 6W03

New Orleans, LA 70112

24.1.5.2 Mr. Jim Webb
1300 Perdido St.
Room 6W02
New Orleans, LA 70112

24.1.6 Networks:

24.1.6.1 City Street Lights:

Mr. Edward Arnold
Telephone No. 504-565-6260
1300 Perdido St.
Room 2W89
New Orleans, LA 70112

24.1.7 Orleans Levee Board:

Mr. Stevan Spencer, Chief Engineer
Orleans Levee District
Administration Bldg., Suite 202
New Orleans Lakefront Airport
New Orleans, LA 70126
Telephone No. 504-243-4045

24.1.8 Sprint:

Mr. McCoy Ingalls
3065 Cumberland Circle
Atlanta, GA 30339
Telephone No. 404-649-5340

24.1.9 Norfolk Southern Railroad

2101 St. Ferdinand Street
New Orleans, Louisiana 70117

Mr. D. C. Orison
175 Spring Street S.W.
2nd Floor, Suite E
Atlanta, Georgia 30303
Telephone No. 404-658-2309

24.2 All utilities not designated for removal and relocation shall remain in service at all times unless prior arrangements to do otherwise, with authorities having

jurisdiction, is made by the Contractor.

24.3 The Contractor shall be required to work around all existing or relocated poles, manholes and other structures, underground and above ground utilities, and overhead electrical lines unless specifically specified that those utilities will be removed and relocated.

24.4 The Contractor shall coordinate his work with the Regional Transit Authority (R.T.A.) and New Orleans Fire Department. The following individuals shall be contacted for this purpose:

24.4.1 Mr. Eric Stevens
of Regional Transit Authority
6700 Plaza Drive
New Orleans, LA 70126
504-827-7920

24.4.2 Mr. David Delyea
of New Orleans Fire Department
317 Decatur St.
New Orleans, LA 70130
504-565-7800

25. NORMAL OPERATION OF DRAINAGE PUMPING STATION NO. 3.

25.1 Drainage Pumping Station No. 3 is an operating integral part of the Drainage System of the City of New Orleans. Therefore, the Sewerage and Water Board can reduce the pumping capacity of Drainage Pumping Station No. 3 by only 1,000 cfs at a time. The Contractor shall furnish a detailed construction plan to the Contracting Officer for his approval showing how this requirement will be met. The Contractor shall allow thirty (30) days for review and approval. If the Contractor's Construction Plan, sequence of construction and/or methods require the use of the existing structure of Pumping Station No. 3 for any purpose, he shall perform engineering analysis and calculations to show that the purpose for which he intends to use the existing structure will not jeopardize the structural integrity of the pumping station. Any damages, direct or indirect, caused to the property of the Sewerage and Water Board, including pumps and machinery and to the property of others due to the Contractor's failure to comply with this requirement or negligence in calculations shall be the sole responsibility of the Contractor.

25.2 The Sewerage and Water Board's drainage pumping system is an intricate network of canals and pumping system located throughout Orleans Parish. The pumping system has both the flexibility and capability of manipulating and moving flows from an overloaded portion in the system to a lightly loaded portion to allow use of pumping capacity available in such areas of the system.

25.3 The term "dry weather flow" is hereby defined as that flow which occurs when

there is no precipitation over the drainage basin which contributes runoff to the drainage ditches, pipes and canals which are connected to the canal under consideration; all other flows shall be considered "wet weather flows".

25.4 The terms upstream and downstream when used in these specifications are hereby defined as follows:

25.4.1 Upstream: Direction pointing away from Pumping Station No. 3 on suction side and point to Pumping Station No. 3 on discharge side regardless of the direction of the flow in the canal.

25.4.2 Downstream: Direction pointing away from Pumping Station No. 3 on discharge side and pointing to Pumping Station No. 3 on suction side regardless of the direction of the flow in the canal.

26. FLOODING, DAMAGES & EVACUATION REQUIREMENTS

26.1 The nature and scope of the work under this contract requires the Contractor to perform work within the discharge basin of Drainage Pumping Station No. 3. Even though the Contractor shall be allowed to construct a temporary sheet pile dam with a dewatering system and as specified elsewhere, the construction area is still subject to flooding caused by one or a combination of all of the occurrences specified below:

26.1.1 Ongoing construction within the system.

26.1.2 Routine maintenance and testing of equipment.

26.1.3 A partial or complete breakdown of any pumping station.

26.1.4 Any unusually high tide in Lake Pontchartrain which may overtop the temporary sheet pile dam and backflow into the work area.

26.1.5 The temporary butterfly gates may be opened thereby backflooding the work area.

26.1.6 Normal operation of the pumps at times of a precipitation event over other drainage areas within the drainage system.

27. EVACUATION REQUIREMENTS

27.1 The Contractor shall monitor local weather forecasts and schedule his operations in the discharge basin and discharge canal accordingly in order to minimize the extent of delays and damage to both temporary and permanent construction.

27.2 The Contracting Officer or designated Pumping Station personnel, will notify the Contractor or his designated personnel at the project site fifteen minutes prior to:

27.2.1 The S&WB's intention of starting the pumps to pump the wet weather flow.

27.2.2 The S&WB's intention of opening the temporary butterfly gates.

27.2.3 All other times when the S&WB must operate any pump in Pumping Station No. 3, which may adversely affect the progress of the Contractor's work.

Note: The Contractor will operate the temporary butterfly gates while he is on site and working. The Contractor will release control of the butterfly gates to personnel of the Sewerage & Water Board upon leaving the site.

27.3 The fifteen minute advanced notice shall be given only during working hours and shall be communicated in person or by telephone and the Contractor's evacuation of the discharge basin shall commence immediately upon notification. The Contractor shall be responsible for removing all his equipment, personnel and loose materials from the discharge basin within this fifteen minute period. Any loss or damage to equipment and materials left in the discharge basin or injury to personnel after expiration of the fifteen minute advance notice will be the sole responsibility of the Contractor and no compensation for such losses, damages or injuries will be made by the Government.

27.4 Damage caused to permanent work performed by the Contractor in the discharge basin as a result of pumping station operations and/or as a result of overtopping of the temporary sheet pile dam will be compensated by an equitable adjustment under the Contract Clause in Section 00700 entitled, Changes (FAR 52.234-4). For the purpose of this adjustment, the permanent work is hereby defined as any part of construction under this contract which when completed will remain in place and become an integral component of the proposed expansion. The Contractor will be compensated for time and materials required to return the work area to pre-flood conditions each time the area is flooded according to this requirement.

27.5 Due to the fact that Drainage Pumping Station No. 3 will be operated periodically during construction upon 15 minutes notice to pump dry or wet weather flow, the Contractor shall be required to perform all major construction operation (i.e., demolition, pile removal, pile driving, concrete placement, etc.) in the suction and discharge basins from above or directly adjacent to the existing basins. All major equipment such as cranes, excavators, concrete placement equipment, etc. should be remotely positioned on contractor-designed temporary work platforms. Only small equipment, hand-operated equipment, tools and materials which can

expeditiously removed shall be placed directly within the confines of the basins. All equipment must be removed from the discharge basin at the end of each work day.

27.6 The Contractor shall prepare and submit a detailed evacuation plan to the Contracting Officer, for approval, detailing his intentions for the evacuation of personnel, equipment and materials during various phases of work (i.e. demolition, slab construction, T-Wall construction pile driving, etc.) for approval not later than forty-five (45) days prior to beginning work within the discharge basin.

28. TEMPORARY SHEET PILE DAM

28.1 A temporary dam will be constructed across the entire width of the Discharge Basin to allow for a dewatered work area. The top of the dam will be El 4.00 NGVD as mandated by the Sewerage and Water Board of New Orleans. The dam will consist of cantilevered steel sheet piles with four 60" x 72" electrically operated butterfly control gates. There will also be an access walkway at El 6.00 NGVD attached to the dam to allow manual operation of the temporary butterfly gates.

28.2 The Government furnished butterfly gates will allow canal water to flood the dewatered work area (existing discharge basin) so that the pump discharge bells can be rapidly submerged. The pump discharge bells must be sealed in order to allow priming of the horizontal pumps. Once the pumping begins, if there is more flow than the open butterfly gates can accommodate, the excess flow will spill over the top of the temporary dam.

29. PUBLIC CONVENIENCE

29.1 No materials or other obstructions shall be placed within fifteen (15') feet of fire hydrants, and shall be accessible at all times.

29.2 During the progress of the work, the convenience of the public, Sewerage and Water Board's employees, and the residents along the street shall be provided Convenient access to driveways, houses and buildings along the street shall be maintained at all times. Temporary approaches to and crossings of intersecting streets and sidewalks shall be provided for and kept in good condition. Warning signs shall be furnished and installed as needed. The Contractor shall submit a plan showing warning sign locations to the Contracting Officer for approval. No separate measurement or payment will be made for this work and all costs shall be included in items to which the work is incidental.

30. GENERAL LIMITATIONS

30.1 General. The Contractor shall conduct the work under this contract in such manner and sequence that will assure the stability, safety of workmen and the general public and insure the non-interference to traffic. It is not the intention of these specifications to outline the exact time sequence of construction. The

Contractor shall submit, for approval, a plan outlining his proposed sequence of construction, allowing a minimum of 30 days for approval.

30.2 General Limitations. The phases of construction will have certain limitations. These General Limitations are as follows:

30.2.1 No work shall begin until all of the utilities are field located and all arrangements necessary for the protection thereof, have been made.

30.2.2 The Sewerage and Water Board can only reduce the pumping capacity of Drainage Pumping Station No. 3 by 1000 cfs at a time. Therefore, only one (1) - one thousand (1000) cfs pump or both five hundred (500) cfs pumps can be taken out of service at any one time.

30.2.3 The Contractor is advised that the lateral earth pressure acting on the west wall of the Marigny Canal is presently in equilibrium with the forces acting on the east wall of the Marigny Canal and the pile supported bottom slab of the existing discharge canal. The pile supported concrete bottom slab of the existing discharge basin provides a part of the counteracting force required to maintain the state of equilibrium.

The Contractor shall design and install the temporary retaining structures, in the planning of his construction sequence, and in the placement of temporary retaining structures such that the forces presently in a state of equilibrium will not be unbalanced due to the removal of the existing concrete bottom slab or any other structures required to construct this project according to the plans and specifications.

The temporary retaining structure is required to provide flood protection at Elevation 13.90 NGVD on both sides of the discharge basin until construction of the sluice gate structure and its tie into the existing canal floodwalls is completed.

30.2.4 Monoliths T1, I1 and I3 shall be completed prior to relocating the 48 inch diameter Sewer Force Main.

30.2.5 Existing 48 inch sewer force main shall not be removed prior to completing installation of relocated force main.

30.2.6 No work on concrete discharge tube shall begin prior to completion of relocated 48 inch sewer force main and removal of existing 48 inch sewer force main.

30.2.7 To minimize seepage through pervious stratum beneath the excavation, the Contractor will not be allowed to remove the concrete discharge basin slab and excavate for foundation for more than one monolith

or structure at a time. Once the foundation has been excavated the Contractor will pour a six (6") inch thick concrete stabilization slab. The foundation pile driving shall be accomplished by cutting holes in the existing concrete. A 2 foot wide strip of concrete bottom will be allowed to be removed to drive the sheet pile cut-off wall.

30.2.8 With the exception of concrete discharge tubes for Pumps A and B, only one pump may be taken out of service for the concrete discharge tubes. For example until work on concrete discharge tube for Pump C is complete and pump is connected and operational, the work on Pump D or Pump E concrete discharge tube shall not begin.

31. SERVICE INTERRUPTION TO EXISTING SEWER FORCE MAIN

31.1 The Contractor shall simultaneously construct both connections to the existing sewer force main at the terminus points shown in the plans.

31.2 The Contractor shall complete both connections within a time period not to exceed forty-eight (48) continuous hours, as measured from the time the force main flow is stopped to the time the force main flow is resumed.

31.3 Sewer Force Main Sequence of Construction:

31.3.1 Construct new sewer force main while existing sewer force main remains operating.

31.3.2 Complete the hydrostatic testing of the newly installed sewer force main between the dished heads shown in the plans.

31.3.3 Contractor to coordinate with Sewerage and Water Board of New Orleans before interruption of existing sewer force main service.

31.3.4 Install a Line-Stop valve as manufactured by Flowserve or an approved equal on the existing sewer force main at the Westside terminus as shown in the plans. Line stopping of the existing sewer force main may be stopped at this terminus of the force main connection only. The Westside portion of the sewer force main to be replaced shall then be dewatered into the nearby sewage collection system.

31.3.5 Simultaneously, while dewatering the Westside terminus of the sewage force main, dewater the existing force main on the East side of the Discharge Basin into the Florida Avenue Canal between the temporary containment dams shown in the plans.

Note: The Contractor will be required to remove all storm drainage water between the temporary containment dams on order to accommodate

the sewage dewatered from the force main segment on the Eastside of the Discharge Basin.

31.3.6 Remove the portion of the existing sewer force main at both terminus points necessary for tie-in to the new sewer force main.

31.3.7 Remove the dished heads from the newly constructed sewer force main and connect the new sewer force main to the existing sewer force main as required by the plans. Connection shall be made simultaneously at each end of the newly constructed sewer force main.

31.3.8 Remove Line-Stop valve at the West terminus connection. Fasten a blind flange to the line stop fitting.

31.3.9 Put the sewer force main back in service.

31.3.10 Dispose of the sewage within the temporary containment dams into the existing sewerage system at a rate acceptable to the Sewerage and Water Board. A rate of disposal acceptable to the Sewerage and Water Board will be any rate which does not overload the disposal site.

31.3.11 Remove the existing sewer force main between the limits shown in the plans according to Section 02221 "SELECTIVE DEMOLITION".

31.4 DISPOSAL OF SEWAGE

The service interruption will be done by personnel of the Sewerage and Water Board in cooperation with the contractor. The service interruption will be done at a mutually agreed upon time, weather permitting. The Contractor is cautioned that a "Service Interruption" does not necessarily mean that there will be zero sewage flow. The valves do not completely stop all sewage flow. The Contractor shall be responsible for providing all means necessary for dewatering the sewer force main on both East and West sides of the Discharge Basin as outlined below:

A) The West Side of the Discharge Basin.

The sewage dewatered from the existing West side segment of the sewer force main shall be directed into the existing sewage collection system at a rate not to exceed the capability of the existing sewage collection system at the discharge point.

B) The East Side of the Discharge Basin.

The sewage dewatered from the existing East side segment of the sewer force main shall be pumped into the Florida Avenue canal between two (2) temporary containment dams installed in the canal as shown in the plans and according to these specifications. Temporary containment

dams shall be constructed of earthen materials, at locations shown in the plans,and be removed when the sewage contained within the dams is acceptably disposed of by the Contractor. Dams constructed of wood or steel sheeting will not be allowed. Each containment dam shall span the width of the Florida Avenue Canal and be constructed to the elevation shown in the plans. The temporary dams are positioned in such locations as to receive and store 833,000 gallons of sewage. The Florida Avenue Canal is twenty five (25') feet wide and approximately seven (7") feet deep.

The estimated dry weather flow rate in the existing sewer force main ranges from minimum of approximately 7 MGD to a maximum of approximately 15 MGD. Flow rates during wet weather are anticipated to be much higher. The dewatering shall be done such that any spilled sewage can be contained and later reintroduced into the sewer system.

Furthermore, it shall also be the Contractor's responsibility to provide all means required for capturing any bypassed sewage at all of the affected pumping station and reintroducing it back into the sewer system. The affected pumping stations and their approximate "operational" capacities and run times are as follows:

Station	Capacity - GPM	Average Run Time
Lakewood South	500-1000	2.5 hr/day
SPS 4	2000-3000	12 hr/day
SPS 9	2000-4000	6.5 hr/day
SPS 18	1000-2000	13 hr/day
SPS 19	2000-4000	24 hr/day
SPS 20	1000-1500	12 hr/day
SPS 21	1000-2000	13 hr/day
SPS 22	1000-2000	24 hr/day
City Park	200-400	1.5 hr/day

The Board's operations department personnel will continue monitoring the sewage elevation at the above affected pumping stations during shut down. Board's operation personnel shall open any required bypass valves if at any time bypassing is required at any of the affected pumping stations due to high sewage levels. Due to strict requirements of the Consent Decree with USEPA, it shall be the Contractor's responsibility to contain all bypassed sewage in confined area(s) and reintroduce it back into the sewer system by any required means once the system is back in service, at not additional cost to the contract.

The Board's Environmental Affairs Department will determine when all bypassed sewage has been reintroduced into the sewage collection system, and their decision shall be final.

The cost associated with dewatering the existing force main on both sides of the Discharge Basin, including pumping, building and removing temporary containment dams, capture and containment of sewage in the Florida Avenue Canal, disposal of captured sewage and all other costs associated with making the changeover from the existing sewage force main to the new sewage force main shall be distributed in the appropriate bid items.

32. VERIFICATION OF EXISTING GRADES

Prior to beginning construction, the Contractor shall check all existing elevations at the tie in points of the new construction to the existing structures. Any discrepancies shall be reported to the Contracting Officer immediately.

33. VIBRATION MONITORING

An independent testing laboratory, retained by the New Orleans Sewerage and Water Board, will monitor vibrations during pile driving operations and/or demolition. The Contractor shall notify the Contracting Officer and the New Orleans Sewerage and Water Board by certified mail at least 3 days prior to starting any pile driving operations or demolition.

33.1 If at any time a reading of 0.20 inches per second is recorded by any receiver, the technician will notify the Contractor immediately. The Contractor will record the activity and location causing the reading.

33.2 If at any time a reading of 0.25 inches per second or greater is recorded by any receiver, the technician will notify the Contractor immediately and the affecting construction activity shall be suspended until the Contractor has taken action to reduce the vibrations below an acceptable limit. An acceptable limit is below 0.20 inches per second.

34. AS-BUILT DRAWINGS

The Contractor shall furnish two (2) sets of marked up blue lines to the Contracting Officer as "As-Built" drawings upon completion of the Contract. The blue lines shall be 28" x 40" in size and shall show all field changes made in order to complete the Contract.

(1) The "As-Built" drawings shall show all construction, equipment, mechanical and electrical systems and connections as installed or built.

(2) The work under this contract will not be considered "complete" until "As-Built" drawings, prepared to the satisfaction of the Contracting Officer, are received.

(3) No separate measurement or payment will be made for furnishing "As-Built" Drawings as specified above. Payment shall be distributed throughout the appropriate bid items.

35. MONITORING RAILROAD CROSSING

The Contractor will be required to monitor the track (top of rail) of the Railroad Bridge that crosses the London Avenue Outfall Canal and the Railroad Embankment East and West of the Bridge abutments.. Monitoring will be by means of recorded elevations taken once every ten (10) working days at Ten(10) distinct locations listed below.

Location No. 1&2: Top of rail of both the southernmost Railroad Track and the adjacent track directly above the East Bridge abutment.

Location No. 3&4: Top of rail of both the southernmost Railroad Track at the adjacent track at the center of the Bridge Crossing.

Location No. 5&6: Top of rail of both the southernmost Railroad Track and the adjacent track directly above the West Side Bridge abutment.

Location No. 7&8: Top of rail of the southernmost Railroad Track and the adjacent track twenty (~~20~~ 20') feet West of the West Bridge abutment.

Location No. 9&10 Top of rail of the southernmost Railroad Track and the adjacent track twenty(20') feet East of the East Bridge abutment.

The Contractor will record the elevation of these Ten(10) points before beginning construction in order to arrive at a baseline reference elevation for the Railroad Crossing and Railroad Embankment, and also during construction in order to monitor settlement of the Railroad Embankment and the Railroad Crossing. All recorded elevations shall be reported in writing to the COR. The Contracting Officer will record the elevations and monitor the settlement for unacceptable values. Unacceptable values shall be when the tracks are more than One(1") inch or more out of horizontal alignment within a Sixty Two(62') foot length of track or when Three Quarter(3/4") inch or more elevation differential exhists between adjacent tracks. When unacceptable settlement of the Railroad Embankment or the Railroad Crossing occurs, the CO will require the Contractor to cease operations and to review and alter the construction dewatering plan in a manner which will bring the settlement values within acceptable levels. The CO may also explore other remedies should unacceptable settlement occurs. The COR may require the contractor to take additional readings of these ten(10) points or other points at times other than those stated above in order to gather additional settlement information. There will be no direct payment made for this task.

36. YEAR 2000 COMPLIANCE

In accordance with FAR 39.106, the Contractor shall ensure that with respect to any design, construction, goods, or services under this contract as well as any subsequent task/delivery orders issued under this contract (if applicable), all information technology contained therein shall be Year 2000 compliant. Specifically, the Contractor shall:

(1) Perform, maintain, and provide an inventory of all major components to include structures, equipment, items, parts, and furnishings under this contract and each task/delivery order which may be affected by the Year 2000 compliance requirement.

(2) Indicate whether each component is currently Year 2000 compliant or requires an upgrade for compliance prior to Government acceptance.

37. ADVERTISEMENT OF TRAFFIC DETOURING PLAN

It shall be the responsibility of the Contractor to furnish a traffic detour map adequate to show the detour routes, barricades and non-affected routes in the project area. The map shall conform to Section 02845 "TRAFFIC CONTROL" and shall be approved by the CO.

The Contractor will be responsible for advertising the traffic detouring plan including date of starting and the duration of the traffic detouring.

The map along with the description of the detouring plan shall be prominently advertised in the Times Picayune at least five (5) working days before start of installation of detouring devices.

There will be no direct pay for this task.

Section Table of Contents

SECTION 01330 - SUBMITTAL PROCEDURES

SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUBMITTAL IDENTIFICATION DEFINITIONS

Data

Submittals which provide calculations, descriptions, or documentation regarding the work.

Drawings

Submittals which graphically show relationship of various components of the work, schematic diagrams of systems, details of fabrication, layouts of particular elements, connections, and other relational aspects of the work.

Instructions

Preprinted material describing installation of a product, system or material, including special notices and material safety data sheets, if any, concerning impedances, hazards, and safety precautions.

Schedules

Tabular lists showing location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work.

Statements

A document, required of the Contractor, or through the Contractor, from a supplier, installer, manufacturer, or other lower tier Contractor, the purpose of which is to confirm the quality or orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel, qualifications, or other verifications of quality.

Reports

Reports of inspections or tests, including analysis and interpretation of test results.

Certificates

Statement signed by an official authorized to certify on behalf of the manufacturer of a product, system or material, attesting that the product, system or material meets specified requirements. The statement must be dated after the award of the contract,

must state the Contractor's name and address, must name the project and location, and must list the specific requirements which are being certified.

Samples

Samples, including both fabricated and unfabricated physical examples of materials, products, and units of work as complete units or as portions of units of work.

Records

Documentation to record compliance with technical or administrative requirements.

Operation and Maintenance Manuals

Data which forms a part of an operation and maintenance manual.

1.2 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.2.1 Government Approved

Governmental approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause in section 00700 entitled, Specifications And Drawings For Construction (FAR 52.236-21), they are considered to be "shop drawings." Any reference to Government approval by the Contracting Officer (CO) includes the approving authority of the CO, the Administrative Contracting Officer (ACO), or the Contracting Officer's representative (COR).

1.2.2 Information Only

All submittals not requiring Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.3 APPROVED SUBMITTALS

The Contracting Officer's approval of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the CQC requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work. After submittals have been approved by the Contracting Officer, no resubmittal for the

purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.4 DISAPPROVED SUBMITTALS

The Contractor shall respond to all concerns expressed by the Contracting Officer and promptly make any corrections necessary to address those concerns. The Contractor shall promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause in Section 00700 entitled, Changes (FAR 52.243-4), shall be given promptly to the Contracting Officer.

1.5 MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for submittal requirements as specified herein. Payment for the work covered under this section shall be distributed throughout the existing bid items. Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall submit all items listed on the Submittal Register (ENG Form 4288) or specified in the other sections of these specifications. The Contractor shall make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Submittals shall be made in the respective number of copies and to the respective Area Office address listed in the Contract Clause in Section 00700, entitled Site Visit Assistance (Construction) (FAR 52.236-27). Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) representative and each item shall be stamped, signed, and dated by the CQC representative indicating action taken. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon

completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

3.2 SUBMITTAL REGISTER (ENG FORM 4288)

At the end of this section is one set of ENG Form 4288 listing items of equipment and materials for which submittals are required by the specifications; this list may not be all inclusive and additional submittals may be required. Columns "c" thru "q" have been completed by the Government. The Contractor shall complete columns "a", "b", and "r" thru "w", and return 4 completed copies to the Contracting Officer for approval within 14 calendar days after Notice to Proceed for approval. The approved submittal register will become the scheduling document and will be used to control submittals throughout the life of the contract. The submittal register and the progress schedules shall be coordinated. The Contractor shall maintain an effective submittal control system by reviewing and updating the register every thirty (30) days and submitting updated copies to the Resident Engineer every sixty (60) days.

3.3 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 30 calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delays, damages or time extensions will be allowed for time lost in late submittals.

3.4 TRANSMITTAL FORM (ENG FORM 4025)

The sample transmittal form (ENG Form 4025) attached to this section shall be used for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

3.5 SUBMITTAL PROCEDURE

Submittals shall be made as follows:

3.5.1 Procedures

Procedures for submittals will be stipulated by the Contracting Officer at the preconstruction conference.

3.5.2 Deviations

For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025 shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

3.6 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "SUBMITTAL REGISTER."

3.7 GOVERNMENT APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. Five (5) copies of the submittal will be retained by the Contracting Officer and 2 copies of the submittal will be returned to the Contractor.

3.8 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

3.9 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

Contractor

(Firm Name)

_____ Approved

_____ Approved with corrections as noted on submittal data and/or attached sheets(s).

SIGNATURE: _____

TITLE: _____

DATE: _____

SUBMITTAL REGISTER
(ER 415-1-10)

CONTRACT NO.
DACW29-96-X-XXXX

TITLE AND LOCATION SELA Orleans Parish DPS No. 3 1997 Improvements

CONTRACTOR

SPECIFICATION NUMBER
DACW29-96-X-XXXX

ACTIVITY NO	TRANSMITTAL NO.	ITEM NO	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL: DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	CLASSIFICATION: INFORMATION ONLY	CLASSIFICATION: GOVERNMENT APPROVED	REVIEWER	CONTRACTORS SCHEDULE DATES: SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CONTRACTOR ACTION: CODE	CONTRACTOR ACTION: DATE	SUBMIT TO GOVERNMENT	GOVERNMENT ACTION: CODE	GOVERNMENT ACTION: DATE	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.
		1	01352-1.4.1	Environmental Pollution Control Plan	X										X	ED									
		2	01356	Strom Water Pollution Prevention Plan	X										X	ED									
		3	01451-3.2.1	Quality Control Plan	X										X	ED									
		4	01501	Base Course Mix Design	X										X	ED GM									
		5	01501	Wearing Course Mix Design	X										X	ED GM									
		6	01501	Binder Course Mix Design	X										X	ED GM									
		7	01572-3.1	Wash Down Rack		X									X	ED CD									
		8	02081-1.4.1	Sediment Removal, Sampling and Disposal Plan	x										x	ED									
		9	02081-1.4.2	Sampling and Analytical Results	x									x		ED									
		10	02081-1.4.3	Written Verification Of The Proper Disposal Of Materials	x									x		ED									
		11	02081-1.4.4	Maqnifests If Required	x									x		ED									
		12	02145-1.4.1	Shop Drawings	x	x									x	ED CD									
		13	02172-1.4(1)	Installation Shop Drawings	x	x									x	ED CD									
		14	02221-1.4	Demolition Plan											X	CD									
		15	02242-1.7	Dewatering System	x	x									x	ED CD									

NOTE: THIS REGISTER IS NOT NECESSARILY COMPLETE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEVELOPING A COMPREHENSIVE REGISTER.

NAME, STEP (ER 415-1-10)

CONTRACT NO. DACW29-96-X-XXXX

TITLE AND LOCATION: LA Orleans Parish DPS No. 3 1997 Improvements

CONTRACTOR

SPECIFICATION NUMBER DACW29-96-X-XXXX

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					DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	INFORMATION ONLY	GOVERNMENT APPROVED		SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.
		16	02252-1.3	Design Calculations	X										X	ED CD									
		17	02252-1.3	Shop Drawings	X	X									X	ED CD									
		18	02315-1.5.1	Equipment Description	X									X	X	ED FS									
		19	02315-1.5.2	H-Pile Shop Drawings		X									X	CD									
		20	02315-1.5.3	Delivery, Storage and Handling Plans	X									X		CD									
		21	02315	Material Test Certificates	X									X		CD									
		22	02315-1.5.4	Driving Records	X									X		CD									
		23	02320-2.1	Source Approval	X										X	ED FS									
		24	02320-2.1	Test Results Acceptance Test	X						X				X	CD									
		25	02355-1.5	Test Procedures and Equipment	X **										X	CD ED-FS									
		26	02355-1.5	Driving Records	X										X	CD									
		27	02360-1.4	Preservative Treatment Certificate	X									X		CD									
		28	02360-1.4	Equipment Description	X										X	CD ED-FS									
		29	02360-1.4	Driving Records	X								X	X		CD									
		30	02411-1.8.1	Equipment Description	X										X	CD ED-FS									

ENG FORM 4288-R, MAR 95 EDITION OF SEP 93 IS OBSOLETE

(Proponent CEMP-CE)

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(ER 415-1-10)

CONTRACT NO.
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TITLE AND LOCATION SELA Orleans Parish DPS No. 3 1997 Improvements

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					DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	INFORMATION ONLY	GOVERNMENT APPROVED		SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.
		31	02411-1.8.2	Shop Drawings	X	X					X				X	CD									
		32	02411-1.8.3	Material Test Certificates	X						X			X		CD									
		33	02411-1.8.4	Driving Records	X								X	X		CD									
		34	02413-1.6	Design Calculations	X										X	ED CD									
		35	02413-1.6	Shop Drawings	X	X									X	ED CD									
		36	02450-1.5	Accident Prevention Plan											X	CD									
		37	02450-1.5.3	Safe Practices Manual										X		CD									
		38	02450-1.12.3	Inspection Reports						X				X		CD									
		39	02451-1.5.1	Equipment Description	X									X		CD ED-FS									
		40	02451-1.5.2.1	Shop Drawings	X	X									X	CD									
		41	02451-1.5.2.2	Mill Test Reports	X					X				X		CD									
		42	02451-1.5.2.3	Materials Test Reports	X					X				X		CD									
		43	02451-1.5.2.4	Welding Procedures	X					X				X		CD									
		44	02451-1.5.2.5	Weld Inspector Qualifications	X						X			X		CD									
		45	02451-1.5.3	Delivery, Storage & Handling Plan	X										X	CD									

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(ER 415-1-10)

TITLE AND LOCATIO[illegible] .LA Orleans Parish DPS No. 3 1997 Improvements

CONTRACTOR

CO[illegible] NO.
DACW29-96-X-XXXX

SPECIFICATION NUMBER
DACW29-96-X-XXXX

ACTIVITY NO.	TRANS-MITTAL NO.	ITEM NO.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL: DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	CLASSIFICATION: INFORMATION ONLY	GOVERNMENT APPROVED	REVIEWER	CONTRACTORS SCHEDULE DATES: SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CONTRACTOR ACTION: CODE	DATE	SUBMIT TO GOVERNMENT	GOVERNMENT ACTION: CODE	DATE	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.
		46	02451-1.5.4	Placement Plans	X	X									X	CD									
		47	02451-1.5.5	Driving Records	X								X		X	CD									
		48	02830	Material Certificates	X						X			X		CD									
		49	02922-1.3	Invoices & Certifications	X						X				X	CD									
		50	03101-1.6.2	Shop Drawings	X	X								X		CD									
		51	03101-1.6.3	Inspection Reports						X				X		CD									
		52	03101-1.6.1	Manufacturer's Data	X										X	CD									
		53	03150-1.5.1	Procedures For Splicing	X									X		CD									
		54	03150-1.5.2	Manufacturer's Test Reports	X					X				X		CD									
		55	03150-1.5.3	Water Stop For Inspection	X							X		X		CD									
		56	03210-1.5.1	Shop Drawings	X	X									X	CD									
		57	03210-1.5.2	Test Reports	X					X					X	CD									
		58	03210-1.5.3	Disposition Records	X								X	X		CD									
		59	03301-1.5.1	Mix Design	X										X	ED GM									
		60	03301-1.5.2	Batch Plant Data	X				X						X	ED GM									

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TITLE AND LOCATION SELA Orleans Parish DPS No. 3 1997 Improvements

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					DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STAMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	INFORMATION ONLY	GOVERNMENT APPROVED		SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.
		61	03301-1.5.3	Concrete Mixer Data	X				X						X	ED GM									
		62	03301-1.5.4	Equipment and Methods	X				X						X	ED GM									
		63	03301-1.5.5	Placing Equipment and Methods	X				X						X	ED GM									
		64	03301-1.5.6	Testing Technicians	X				X		X				X	ED GM									
		65	03301-1.5.7	Joint Treatment	X				X						X	ED GM									
		66	03301-1.5.8	Curing and Protection	X				X						X	ED GM									
		67	03301-1.5.10	Hot Weather Placing					X						X	ED GM									
		68	03301-1.5.11	Aggregate	X				X						X	ED GM									
		69	03301-1.5.18	Non Shrink Grout	X							X			X	ED GM									
		70	03301-1.5.19	Mixture proportions	X										X	ED GM									
		71	03301-1.5.21	Latex Bonding Agent	X							X			X	ED GM									
		72	03301	Joint Cleanup Mathod	X										X	ED GM									
		73	03410-1.5.1	Design Calculations & Shop Drawings	X	X									X	CD ED									
		74	03500-1.4	Brochures & Shop Drawings	X	X									X	CD									
		75	03501-1.4	Shop Drawings	X	X									X	CD									

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TITAL SUBMITTAL REGISTER
(ER 415-1-10)

CONTRACT NO.
DACW29-96-X-XXXX

TITLE AND LOCATION: LA Orleans Parish DPS No. 3 1997 Improvements

CONTRACTOR

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DACW29-96-X-XXXX

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					DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	INFORMATION ONLY	GOVERNMENT APPROVED		SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.
		76	04051-2	Brick Samples	X							X			X	CD									
		77	05501-1.4.1	Shop Drawings	X	X									X	CD									
		78	05501-1.4.2	Material List	X	X									X	CD									
		79	05501-1.4.3	Schedule of Welding Procedure	X			X							X	CD									
		80	05501-1.4.4	Certificates	X						X			X		CD									
		81	05501-1.4.5	Welding Procedure Specification	X										X	CD									
		82	05501-1.4.6	Qualification Reports	X					X					X	CD									
		83	05501-1.4.7	Procedure Qualification Report	X						X				X	CD									
		84	05501-1.4.8	Inspector Qualification Certification	X						X				X	CD									
		85	05501-1.4.9	Non Destructive Testing Procedure	X				X						X	CD									
		86	09940-1.4.1.1	Qualifications and Experience	X						X				X	CD									
		87	09940-1.4.1.2	Accident Prevention Plan					X						X	CD									
		88	09940-1.4.1.3	Confined Space Procedures					X						X	CD									
		89	09940-1.4.1.3.1	Certificates of Calibration	X						X				X	CD									
		90	09940-1.4.1.4	Respiratory Protection Program	X										X	CD									

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SUBMITTAL REGISTER
(ER 415-1-10)

CONTRACT NO. DACW29-96-X-XXXX

TITLE AND LOCATION SELA Orleans Parish DPS No. 3 1997 Improvements

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SPECIFICATION NUMBER DACW29-96-X-XXXX

ACTIVITY NO	TRANSMITTAL NO.	ITEM NO	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL: DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	CLASSIFICATION: INFORMATION ONLY	CLASSIFICATION: GOVERNMENT APPROVED	REVIEWER	CONTRACTORS SCHEDULE DATES: SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CONTRACTOR ACTION: CODE	CONTRACTOR ACTION: DATE	SUBMIT TO GOVERNMENT	GOVERNMENT ACTION: CODE	GOVERNMENT ACTION: DATE	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.
		91	09940-1.4.1.5	Airborne Sampling Plan	X										X	CD									
		92	09940-1.4.1.6	Ventilation Assessment	X										X	CD									
		93	09940-1.4.1.7	Medical Surveillance Plan	X										X	CD									
		94	09940-1.4.1.8	Waste Classification, Handling and Disposal	X										X	CD									
		95	09940-1.4.2	Paint & Thinners	X							X			X	CD									
		96	11285-1.4	Equipment Lists	X										X	ED									
		97	11285-1.4	Manufacturers Literature	X	x									X	ED CD									
		98	11285-1.4	Shop Drawings	X	X									X	CD ED									
		99	11285-1.4	Meterial Certifications	X	X					X			X		CD									
		100	15002-1.5	Material Certifications	X						X				X	CD									
		101	15002-1.5	Coating Inspection Records									X	X		CD									
		102	15002-1.5	Testing Records									X	X		CD									
		103	15002-1.5	Shop Drawings	X	X									X	CD									
		104	15002-1.5	Hydrostatic Test Results	X								X		X	CD									
		105	15003-1.4	Shop Drawings and Data	X	X									X	CD									

NOTE: THIS REGISTER IS NOT NECESSARILY COMPLETE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEVELOPING A COMPREHENSIVE REGISTER.

STEF.
(ER 415-1-10)

CONTRACT NO.
DACW29-96-X-XXXX

TITLE AND LOCATIO. ELA Orleans Parish DPS No. 3 1997 Improvements

CONTRACTOR

SPECIFICATION NUMBER
DACW29-96-X-XXXX

ACTIVITY NO	TRANSMITTAL NO.	ITEM NO	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL									CLASSIFICATION		REVIEWER	CONTRACTORS SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
					DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	INFORMATION ONLY	GOVERNMENT APPROVED		SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y.	z.
		106	15003-1.4	Operation and Maintenance Manuals	X	X									X	CD									
		107	15004-1.4	Shop Drawings & Data	X	X									X	CD									
		108	15004-1.4	Drawings & Equipment Menuals		X	X							X		CD	CD								
		109	15005-1.5	Shop Drawings, Data & Catalog Cuts	X	X									X	CD	CD								
		110	15004-3.1	Hydrostatic Test Results	X								X		X	CD									
		111	16001-5	High Voltage Cable	X	X									X	ED-GE									
		112	16001-5	Low Voltage Cable	X	X									X	ED-GE									
		113	16001-5	Transformers	X	X					X				X	ED-GE									
		114	16001-5	Lighting Fixtures	X	X									X	ED-GE									
		115	16001-5	Convenience Outlets and Switches	X	X									X	ED-GE									
		116	16001-5	Motor Starters and Disconnect Switches	X	X									X	ED-GE									
		117	16001-5	Splices, Terminations, Splice & Cable Suppor Racks & Hardware	X	X									X	ED-GE									
		118	16001-5	Control & Specialty Cables	X	X									X	ED-GE									
		119	16001-5	Conduit & Cable Stub-up & Installation	X	X									X	ED-GE									
		120	16001-5	O & M Manuals	X	X	X	X							X	ED-GE									

ENG FORM 4288-R, MAR 95 EDITION OF SEP 93 IS OBSOLETE

(Proponent CEMP-CE)

NOTE: THIS REGISTER IS NOT NECESSARILY COMPLETE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEVELOPING A COMPREHENSIVE REGISTER.

SUBMITTAL REGISTER
(ER 415-1-10)

CONTRACT NO.
DACW29-96-X-XXXX

TITLE AND LOCATION SELA Orleans Parish DPS No. 3 1997 Improvements

CONTRACTOR

SPECIFICATION NUMBER
DACW29-96-X-XXXX

ACTIVITY NO	TRANSMITTAL NO.	ITEM NO	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL								CLASSIFICATION		REVIEWER	CONTRACTORS SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
					DATA	DRAWINGS	INSTRUCTIONS	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	INFORMATION ONLY	GOVERNMENT APPROVED		SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	o.	p.	q.	r.	s.	t.	u.	v.	w.	x.	y	z.
		121	16001-5	Control Cables	X										X	EDGE									
		122	16001-5	Test Results - Secondary System	X					X					X	EDGE									
		123	16001-5	Test Results - Wiring & Cable	X					X	X				X	EDGE									
		124	16001-5	Remote Control Consoles	X	X									X	EDGE									
		125	16001-5	Field Test - MCC, Transform., Swtichgear, Circuit Break., etc.	X			X					X		X	EDGE									
		126	16001-5	Test Records	X									X		EDGE									

ENG FORM 4288-R, MAR 95 EDITION OF SEP 93 IS OBSOLETE PAGE 1 OF ___ (Proponent CEMP-CE)

NOTE: THIS REGISTER IS NOT NECESSARILY COMPLETE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEVELOPING A COMPREHENSIVE REGISTER.

Section Table of Contents

SECTION 01352 - ENVIRONMENTAL PROTECTION

SECTION 01352 - ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all labor, materials and equipment, and performing all work required for the prevention of environmental pollution and the handling, removal, transportation and disposal of any hazardous and/or regulated solid waste generated during and as the result of construction operations under this contract except for those measures set forth in other provisions of these specifications. For the purpose of this specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to man; or degrade the utility of the environment for esthetic and recreational purposes. The control of environmental pollution requires consideration of air, water, and land, and involves noise, solid waste-management, management of radiant energy and radioactive materials, as well as other pollutants including hazardous wastes, materials, substances and chemicals.

1.2 APPLICABLE REGULATIONS

In order to prevent, and to provide for abatement and control of any environmental pollution arising from construction activities in the performance of this contract, the Contractor and his subcontractors shall comply with the Louisiana Pollution Discharge Elimination System (LPDES) General Permit requirements as specified in Section 01356, all applicable Federal, State, and Local laws, and regulations as well as USACE regulations concerning environmental pollution control and abatement and any regulations referred to in the following paragraphs. For hazardous wastes, materials, substances and chemicals applicable regulations shall include, but are not limited to: USACE EM 385-1-1, Louisiana Administrative Code (LAC), Title 33, Environmental Quality, Part V, Hazardous Waste and Hazardous Materials, and LAC Title 33, Environmental Quality, Part VII, Solid Waste Regulations, 29 CFR 1910 Occupational Safety and Health Standards, 29 CFR 1910.1200 Hazard Communication 40 CFR 260 Hazardous Waste Management Systems:General, 40 CFR 261 Identification and Listing of Hazardous,Waste, 40 CFR 262 Generators of Hazardous Waste, 40 CFR 263 Transporters of Hazardous Waste, 40 CFR 264 Owners and Operators of Hazardous Waste, Treatment, Storage, and Disposal Facilities, 40 CFR 265 Interim Status Standard for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, 40 CFR 266 Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities, 40 CFR 268 Land Disposal Restrictions, 40 CFR 279 Standards for the Management of Used Oil, 40 CFR 355 Emergency Planning and Notification, 40CFR 372 Toxic Chemical Release Reporting Community Right To Know, 49 CFR 171-178 Hazardous Materials Requirements.

1.3 MEASUREMENT AND PAYMENT

1.3.1 Environment Protection

No separate measurement or payment will be made for environment protection. Payment for the work covered under this section shall be distributed throughout the existing bid items.

1.3.2 Hazardous/Regulated Waste

If the Contractor generates hazardous and/or regulated solid wastes through his/her actions, no separate measurement or payment will be made for handling, removal, transportation and disposal of hazardous and/or regulated solid wastes. Payment for the work associated with and the disposal of hazardous/regulated solid waste generated by the Contractor shall be distributed throughout the existing bid items.

If the Contractor uncovers an existing hazardous/regulated waste not Contractor generated, not shown on the drawings, and not specified herein, the Contractor shall notify the COR immediately. Payment for handling, removal, transportation and disposal of hazardous and/or regulated solid wastes not Contractor generated, not shown on the drawings, and not specified herein will be made as an equitable adjustment in contract price under the Contract Clause in Section 00700, entitled *Changes (FAR 52.243-4)*.

1.4 QUALITY CONTROL

1.4.1 General

The Contractor shall establish and maintain quality control for environment protection to assure compliance with contract specifications and maintain records of his quality control for all construction operations including but not limited to the following:

(1) Submit plan of Environment Pollution Control. For Contractor work activities (such as painting, metal finishing, etc.) that will involve bringing hazardous chemicals, hazardous substances or hazardous materials onto the project site, include in the plan a Hazard Communication Program and Safe Storage Plan. For Contractor activities that anticipate generation of hazardous wastes at the project site, include in the plan a waste identification / determination and waste disposal plan. For Contractor on-site activities that pose a risk of an oil or hazardous substance spill, include in the plan a Spill Reporting and Response Plan.

(2) Procure applicable Federal, State, and Local regulations on pollution control.

(3) Air Pollution - Checks made on dust, smoke, and noise.

(4) Water Pollution - Checks made on disposal of water, oil, etc.

(5) Land Pollution - Checks made on disposal of debris, restoration of temporary construction sites, etc.

(6) Training Course for Employees.

1.4.2 Reporting

The original and two copies of these records, as well as the records of corrective action taken, shall be furnished the Government daily. Format of report shall be as prescribed in Section 01451, "CONTRACTOR QUALITY CONTROL".

1.5 NOTIFICATION

The Contracting Officer will notify the Contractor in writing of any non-compliance with the foregoing provisions and the action to be taken. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess cost of damages by the Contractor.

1.6 SUBCONTRACTORS

Compliance with the provisions of this section by subcontractors will be the responsibility of the Contractor.

1.7 IMPLEMENTATION

Within 10 days after receipt of Notice of Award, or otherwise directed below, the Contractor shall:

(1) Submit in writing his/her proposals for implementing environmental pollution control at the project site, disposal of debris, non-hazardous wastes and hazardous wastes generated at the project site as well as storage and management of regulated materials, substances and chemicals brought onto and used at the project site.

(2) Meet with representatives of the Contracting Officer to develop mutual understanding relative to compliance with this provision and administration of the environmental pollution control program.

(3) If applicable, submit a plan for the handling, removal, transportation and disposal of hazardous and/or regulated solid wastes generated because of the Contractor's operation.

1.7.1 Environmental Assessment of Contract Deviations

The Contractor is advised that deviations from the drawings or specifications (e.g., proposed alternate borrow areas, disposal areas, staging areas, alternate access routes, etc.) could result in the requirement for the Government to reanalyze the project from an environmental standpoint. Deviations from the construction methods and procedures indicated by the plans and specifications, which may have an environmental impact will require an extended review, processing, and approval time by the Government. The Contracting Officer reserves the right to disapprove alternate methods, even if they are more cost effective, if the Contracting Officer determines that the proposed alternate method will have an adverse environmental impact.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 PROTECTION OF LAND RESOURCES

3.1.1 General

The land resources within the project boundaries and outside the limits of permanent work performed under this contract shall be preserved in their present condition or be restored to a condition after completion of construction that will appear to be natural and not detract from the appearance of the project. The Contractor shall confine his/her construction activities to areas defined by the plans or specifications, including borrow areas to be cleared. The following additional requirements are intended to supplement and clarify the requirements of Section 00700, Contract Clauses entitled Cleaning Up *(FAR 52.236-12);* Protection Of Existing Vegetation, Structures, Equipment, Utilities, And Improvements *(FAR 52.236-9)*; and Operations And Storage Areas *(FAR 52.236-10)*.

3.1.2 Prevention of Landscape Defacement and Tree Damage

Except in areas to be cleared and as provided in paragraph 3.1.3, the Contractor shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without the approval of the Contracting Officer. Felling of trees shall be performed in such a manner as to avoid damage to trees to be left standing. Where trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's operations or equipment; adequate protection measures shall be implemented. A tree protection zone shall be constructed around all trees that may be affected by construction activities. The tree protection zone shall be established by placing metal posts and

temporary construction safety fencing around trees below the trees' canopy drip edge. The Contactor shall not store any material, equipment, backfill, drive any machinery, or cause any changes to the existing grade around trees and their respective canopy drip edges. Native material shall not be displaced into uncleared areas, all excess native material shall be removed from the construction site. All monuments and markers shall be protected before beginning operations near them, or properly removed and stored by the Contractor during construction, and repositioned after construction. Landscape features damaged by the Contractor's equipment or operations shall be replaced or restored to their original condition. The Contractor shall secure the services of a licensed arborist to assess any damage to trees that occur as a result of construction activities. The Contractor shall submit to the Contracting Officer, for review and approval, a written report from the licensed arborist on the inflicted damage, as well as a proposed remediation plan of action, or if required the replacement of affected trees. The plan of action shall identify measures such as proper pruning and bark tracing to restore the damaged trees, or tree replacement options. No separate measurement and payment will be made for all work required to implement tree protection zone measures around all trees within the construction limits that are to remain. The Contractor shall include any and all costs for tree protection zone measures in the contract prices for items to which the work is incidental thereto. Should the services of a licensed arborist be required as a result of damages due to the actions of the Contractor, all services, material, labor and equipment to implement the remediation plan and restore and or replace the affected trees shall be accomplished by the Contractor at no additional cost to the Government.

3.1.3 Temporary Excavation and Embankments

If the Contractor proposes to construct temporary roads or embankments and excavation for plant and/or work areas, the Contractor shall obtain approval of the Contracting Officer prior to start of such temporary work.

3.1.4 Post-Construction Cleanup or Obliteration

The Contractor shall obliterate all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, and stockpiles of excess or waste materials upon completion of construction.

3.1.5 Recording and Preserving Historical and Archeological Finds

All items having any apparent historical or archeological interest that are discovered in the course of any construction activities shall be carefully preserved. The Contractor shall leave the archeological find undisturbed and shall immediately report the find to the Contracting Officer so that the proper authorities may be notified.

3.2 PROTECTION OF WATER RESOURCES

3.2.1 Contamination of Water

The Contractor shall not pollute lakes, ditches, rivers, bayous, canals, groundwater, waterways, or reservoirs with fuels, oils, bitumens, calcium chloride, insecticides, herbicides, or other similar materials harmful to fish, shellfish, or wildlife, or materials which may be a detriment to outdoor recreation.

3.2.2 Disposal of Materials

The methods and locations of disposal of materials, wastes, effluents, trash, garbage, oil, grease, chemicals, etc., within the right-of-way limits shall be such that harmful debris will not enter lakes, ditches, rivers, bayous, canals, groundwater, waterways, or reservoirs by erosion, and thus prevent the use of the area for recreation or present a hazard to wildlife.

3.2.3 Erosion Control

Surface drainage from cuts and fills within the construction limits, whether or not completed, and from borrow and waste disposal areas, shall, if turbidity producing materials are present, be held in suitable sedimentation ponds or shall be graded to control erosion within acceptable limits. Temporary erosion and sediment control measures as specified in Section 01356, shall be provided and maintained until permanent drainage and erosion control facilities are completed and operative. The area of bare soil exposed at any one time by construction operations shall not exceed that necessary to perform the work. Stream crossings by fording with equipment shall be limited to control turbidity and in areas of frequent crossings temporary culverts or bridges shall be installed. Any temporary culverts or bridges shall be removed upon completion of the project. Fills and waste area shall be constructed by selective placement to eliminate silts or clays on the surface that will erode and contaminate adjacent streams.

3.3 PROTECTION OF FISH AND WILDLIFE

The Contractor shall at all times perform all work and take such steps required to prevent any interference of disturbance to fish and wildlife. The Contractor will not be permitted to alter water flows or otherwise disturb native habitat adjacent to the project area that are critical to fish or wildlife. Any time a colony of nesting birds is discovered in the course of any construction activities, the colony should not be disturbed (i.e., no work within 1,500 feet), and the Contractor shall immediately report the finding to the Contracting Officer so that the U.S. Fish and Wildlife Service or the Louisiana Department of Wildlife and Fisheries may be notified.

3.4 JANITOR SERVICES

The Contractor shall furnish daily janitorial services for all the offices, shops, laboratories, or other buildings being used by the Contractor or Government employees, whether existing or Contractor furnished, and perform any required maintenance of the facilities and grounds during the life of the contract. Toilet facilities shall be kept clean and sanitary at all times. Services shall be performed at such a time and in such a manner to least interfere with the operations but will be accomplished only when the buildings are in daily use. Services shall be accomplished to the satisfaction of the Contracting Officer. The Contractor shall also provide daily trash collection and cleanup of the buildings and adjacent outside areas, snow removal as required, and shall dispose of all discarded debris, aggregate samples and concrete test samples in a manner approved by the Contracting Officer.

3.5 DISPOSAL OF NON-REGULATED DEBRIS

All debris resulting from construction operations on this contract shall be disposed of in accordance with 02221-3.2.

3.6 DISPOSAL OF HAZARDOUS AND/OR REGULATED SOLID WASTES

If any hazardous or regulated solid wastes will be generated as a result of the Contractor's operations, the Contractor shall submit a plan that details the proper handling, removal, transportation and disposal of such wastes. The plan shall identify what types of hazardous and/or regulated solid wastes will be generated and shall list the hazards involved with each waste. All waste generated on-site by the Contractor must be properly identified within 30 days of generation. No regulated wastes shall be allowed to accumulate on-site for more than 90 days. Regulated solid wastes are those listed in the Louisiana Administrative Code (LAC), Title 33, Environmental Quality, Part VII, Solid Waste Regulations (Feb 93). The plan shall include Material Safety Data Sheets (MSDS), if applicable, for all wastes expected to be generated. The plan shall include, but not be limited to the following:

(a) Hazardous waste shall be place in closed containers and shall be shielded adequately to prevent dispersion of the waste by wind or water. Any evidence of improper storage shall be cause for immediate shutdown of the project until corrective action is taken.

(b) Nonhazardous waste shall be stored in containers separate from hazardous waste storage areas.

(c) All hazardous waste shall be transported by a licensed transporter in accordance with Louisiana Administrative Code (LAC), Title 33, Environmental Quality, Part V, Hazardous Waste and Hazardous Materials and 49 CFR 171, Subchapter C.

(d) All nonhazardous waste shall be transported in accordance with local regulations regarding waste transportation.

(e) In addition to the number of manifest copies required by LAC Title 33, one copy of each manifest will be supplied to the Contracting Officer prior to transportation

(f) The plan shall identify what types of hazardous and/or regulated solid wastes will be generated and shall list the hazards involved with each waste.

3.6.1 Hazardous Wastes

For the handling, removal, transportation and disposal of any generated hazardous wastes, the plan shall conform to the requirements of 40 CFR 260-268, 49 CFR 171-178 as well as other applicable Federal, State and local regulations. All employees of the Contractor of his/her Subcontractors that will be directly involved in the handling and/or removal of hazardous wastes shall be trained in accordance with 29 CFR 1910.120. In addition, the employees shall have undergone a medical evaluation in accordance with 29 CFR 1910.120. The Contractor shall include copies of employees' certifications and medical examinations as part of the plan specified herein. The plan shall also address the proper Personnel Protective Equipment (PPE) that the employees will be required to wear during the handling and removal of hazardous wastes. The Contractor shall obtain an EPA ID# and Hazardous Waste Disposal Manifests and shall sign the manifests as the generator. Wastes shall be transported via state and Federal approved hazardous waste transporter and treated, stored or disposed of at a RCRA permitted treatment, storage and disposal (TSD) facility. Copies of licenses and certifications of the transporter and TSD shall be included in the plan. The plan shall list the name and address of each transporter and TSD to be utilized. The Contractor shall be responsible for any sampling and analysis required by the TSD for characterization purposes. The Contractor shall submit to the Contracting Officer completed copies of all Hazardous Waste Disposal Manifests within five (5) days after ultimate disposal at the TSD. Other regulations applicable to the handling, removal, transportation and disposal of hazardous wastes are: 40 CFR 261 "Identification and Listing of Hazardous Wastes"; 40 CFR 262 "Standards Applicable to Generators of Hazardous Wastes"; 40 CFR 268 "Land Disposal Restrictions"; and, Louisiana Administrative Code (LAC), Title 33, Environmental Quality, Part V., Hazardous Waste and Hazardous Materials (December 31, 1993).

3.6.2 Regulated Solid Wastes

For the handling, removal, transportation and disposal of any generated regulated solid wastes, the plan shall conform to the requirements of Louisiana Administrative Code (LAC), Title 33, Environmental Quality, Part VII., Solid Waste Regulation (February 1993). Solid wastes shall be transported to a Federal and state approved TSD, oil recycler or Industrial Type I Landfill. The Contractor shall identify in the plan how he/she intends to dispose of each solid waste. The plan shall include the name, address, licenses and certifications of each disposal facility that will be used. If

disposal manifests are required, the Contractor shall sign them as the generator. The Contractor shall be responsible for any sampling and analyses that may be required by the disposal facility(ies) for characterization purposes. Licenses and certifications of the transporter and disposal facilities shall be included in the plan. The Contractor shall submit to the Contracting Officer a completed copy of any waste disposal manifests within five (5) days after ultimate disposal.

3.6.3 Laboratory Accreditation

All laboratory testing for waste determinations shall be performed by a laboratory which has Accreditation-Applied status with the Louisiana Department of Environmental Quality (LDEQ) laboratory certification program. The name and address of the laboratory shall be included in the Waste Classification, Handling, and Disposal Plan."

3.7 MAINTENANCE OF POLLUTION CONTROL FACILITIES

During the life of this contract the Contractor shall maintain all facilities constructed for pollution control under this contract as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created. Early in the construction period the Contractor shall conduct a training course that will emphasize all phases of environmental protection.

3.8 REPORTING OF POLLUTION SPILLS

In the event that an oil spill or chemical release occurs during the performance of this contract, the Contractor is required to contact the National Response Center, telephone number 1-800-424-8802 as soon as possible, or if telephone communication is not possible, the nearest U.S. Coast Guard office may be contacted by radio to report the spill, (33 CFR 153.203). The Contractor shall comply with any instructions from the responding agency concerning containment and/or cleanup of the spill.

Section Table of Contents

Section 01356 -STORM WATER POLLUTION PREVENTION PLAN

SECTION 01356 -STORM WATER POLLUTION PREVENTION PLAN

PART 1 GENERAL

1.1 SCOPE

The work specified in this section consists of the Contractor implementing, and diligently pursuing all measures required in the Storm Water Pollution Prevention Plan (SWPPP). The SWPPP consists of this section, 01356, and any and all attachments including existing and future signed certification statements. The purpose of the SWPPP is to control soil erosion and the resulting sediment to the extent necessary to prevent sediment from leaving the contract rights-of-way and prevent pollution of any water body caused by the runoff from the areas of construction activities under this contract, under the terms of Permit No. LAR100000 (copy attached at the end of this section), and as specified herein and shown on the drawings. The requirements of these specifications are supplemental to and shall become part of the overall Environmental Protection Plan required by Section 01352 - ENVIRONMENTAL PROTECTION. The Contractor shall review the SWPPP to determine requirements for compliance. In addition, the Contractor shall ascertain that his subcontractors have reviewed the plan, and that they comply with its provisions. The Contractor shall ensure that all subcontractors sign, *"Certification Statements #2 and #3" (attached at the end of this section).*

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 4439	(2001) Standard Terminology for Geosynthetics
D 4491	(1999a) Standard Test Method for Water Permeability of Geotextiles by Permittivity
D 4533	(1991) Standard Test Method for Trapezoid Tearing Strength of Geotextiles
D 4632	(1991) Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
D 4751	(1999a) Standard Test Method for Determining Apparent Opening Size of a Geotextile
D 4873	(2001) Standard Test Method for Identification, Storage, and Handling of Geosynthetic Rolls

1.3 MEASUREMENT AND PAYMENT

1.3.1 SWPPP

No separate measurement or payment will be made for work required by this section, except as specified in paragraphs 1.3.2 for SWPP. Price and payment shall be distributed amongst the existing items.

1.3.2 Silt Fence(Option 1)

Measurement for silt fences satisfactorily placed will be made by the linear foot. Payment for silt fences as specified herein will be made at the contract unit price per linear foot for "Silt Fences." Price and payment shall constitute full compensation for furnishing all plant, labor, materials and equipment, including geotextile fabric, and performing all operations necessary for the placement and maintenance of silt fences throughout the contract period, including final dressing and cleanup.]

1.3.3 Truck Wash-Down Racks

Measurement and payment for truck wash-down racks will be as specified in Section 01572.

1.4 DEFINITIONS

Construction Owner - The construction owner is the party that has operational control over plans and specifications including the ability to make changes to those items. The New Orleans District (Government) is the construction owner.

Construction Operator - The construction operator is the party having day-to-day operational control over those activities at a project site which are necessary to ensure compliance with the SWPPP or other permit conditions. The Contractor is the construction operator.

Notice of Intent (NOI) – A document that is completed and submitted to the Louisiana Department of Environmental Quality (LDEQ) as application for coverage to discharge under the Permit No. LAR100000. (Copy provided at the end of this section.)

Notice of Termination (NOT) – A document that is completed and submitted to the LDEQ to terminate permission to discharge under the Permit No.

LAR100000. The NOT should be filed when the permittee is no longer the Construction operator of the contract, or when termination of stormwater discharge has been accomplished. (Copy provided at the end of this section.)

1.5 GENERAL

The Contractor shall implement the Storm Water Pollution Prevention Plan (SWPPP) specified in a manner which will meet the requirements of Section 01352 ENVIRONMENTAL PROTECTION, and the requirements of the Louisiana Pollution Discharge Elimination System (LPDES) permit, Permit No. LAR100000, effective October 1, 1999.

1.5.1 Environmental Assessment of Contract Deviations

The Contractor is advised that deviations from the Storm Water Pollution Prevention Plan (SWPPP) could result in the requirement for the Government to reanalyze the project from an environmental standpoint. Deviations from the Storm Water Pollution Prevention Plan erosion control requirements as specified herein and as shown on the drawings which may have an environmental impact will require an extended review, processing, and approval time by the Government.

1.5.2 Notice Of Intent

Upon preparation of a complete SWPPP, the NOI will be submitted by the Government to the (LDEQ) as application for the Contractor's coverage under the terms of Permit No. LAR100000. If a specific LPDES permit applicable to this construction item has been received from the LDEQ in response to the NOI, a copy of the specific LPDES permit, as well as a copy of the Government's NOI, will be provided to the Contractor at the Pre-construction Conference. The Contractor shall make any necessary modification to this SWPPP; attach the Construction Owner / Operator certification statement provided at the end of this section to the SWPPP; and certify by signing the statement as the Construction Operator. The Contractor shall then submit a NOI to the LDEQ as application for his/her coverage under the terms of Permit No. LAR100000 prior to initiating any construction activities. Certified mail is recommended for Contractor's proof of submittal. A copy of the Contractor's NOI submittal shall be provided to the Contracting Officer's representative at the time of submittal. LDEQ will provide a specific LPDES permit to the Contractor in response to that NOI submittal. The NOI's of both the Contractor and the Government, as well as the specific permits in response to the NOI, shall be posted at the job site by the Contractor. (Forms are attached at the end of this Section.)

1.6 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the

Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

1.6.1 Certificates, G

The Contractor shall submit the manufacturer's certification of compliance for the geotextile used on the silt fence. All brands of geotextile that are used in construction shall be accepted on the following basis. At least 30 days prior to installation, the Contractor shall furnish to the Contracting Officer, in duplicate, a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the geotextile. The certificate shall contain the signer's title, the name and address of the Contractor, the contract number, and the project name and location. The mill certificate or affidavit shall attest that the geotextile meets the chemical, physical, and manufacturing requirements stated in this specification. Geotextiles shall not be delivered to the site until the geotextile certificates are approved by the Contracting Officer.

1.6.2 Samples, G

A 5-foot by 5-foot sample of each geotextile that the Contractor plans to use shall accompany the certificate. If seams are used, then an additional 5-foot by 5-foot sample containing a sample seam in the center of the geotextile sample shall be submitted with the certificate.

1.7 RECORD RETENTION REQUIREMENTS

Records of the NOI as well as any data use to complete it, the SWPPP, and any reports required by Permit No. LAR100000 shall be retained by the permittee for at least three years from the date that the site is finally stabilized. Certification of the SWPPP by the Contractor or any sub-contractor is required in accordance with Permit No. LAR100000. Copies of required certification statements are attached at the end of this section.

1.7.1 Plan Accessibility

A copy of the SWPPP required by the permit, including a copy of the permit language, shall be retained at the construction site (or other local location accessible to the State Administration Authority and the public) from the date of construction initiation to the date of stabilization. The permittee with day-to-day operational control over SWPPP implementation shall have a copy of the plan available at a central location on-site for the use of all operators and those identified as having responsibilities under the plan whenever they are on the construction site. A notice shall be posted near the main entrance to the construction site with the following information: (1) the LPDES permit number for the project or a copy of the NOI if a permit has not yet been assigned; (2) the name and telephone number of a local contact person; (3) a brief description of

the project; and (4) the location of the SWPPP if the site is inactive or does not have an on-site location to store the plan.

1.7.2 Activity Records

The dates of the following activities shall be recorded:

(1) major grading activities occurred

(2) construction activities temporarily or permanently ceased

(3) stabilization measures were initiated

1.7.3 LDEQ Correspondence

Any written correspondence concerning the NOI, NOT, SWPPP, or discharges from any facility covered under Permit No. LAR100000, shall be identified by permit number, if one has been assigned. The following is the LDEQ mailing address:

Louisiana Department of Environmental Quality
Office of Environmental Services
P.O. Box. 82135
Baton Rouge, LA 70884-2135

Attn: Permits Division

1.8 MAINTENANCE AND SURVEILLANCE FEES

In accordance with the Contract Clause in Section 00700 entitled *Permits And Responsibilities (FAR 52.236-7)*, the Contractor shall, without additional expense to the Government, be responsible for paying any state required annual maintenance and surveillance fee for work associated with coverage under Permit No. LAR100000

1.9 EROSION AND SEDIMENT CONTROLS

The controls and measures required for controlling sediment during construction are described below.

1.9.1 Stabilization Controls

The stabilization practices to be implemented shall include fertilizing and seeding as specified in Section 02922 or any other temporary measure to restrict erosion from the construction site. On the daily CQC Report, the Contractor shall record the dates when the major grading activities occur, (e.g., clearing and grubbing, excavation, embankment, and grading); when construction activities temporarily or permanently cease on a portion of the site; and when stabilization practices are initiated. Except

as provided in paragraphs 1.9.1.1 and 1.7.2, stabilization practices shall be initiated as soon as practicable, but no more than 14 days, in any portion of the site where construction activities have temporarily or permanently ceased.

1.9.1.1 Unsuitable Conditions

Where the initiation of stabilization measures by the fourteenth day after construction activity [ternporarily or] permanently ceases is precluded by unsuitable conditions caused by the weather, stabilization practices shall be initiated as soon as practicable after conditions become suitable.

1.9.1.2 No Activity for Less Than 21 Days

Where construction activity will resume on a portion of the site within 21 days from when activities ceased (e.g., the total time period that construction activity is temporarily ceased is less than 21 days), then stabilization practices do not have to be initiated on that portion of the site by the fourteenth day after construction activity temporarily ceased. Stabilization practices shall be initiated on that portion of the site by the fourteenth day in the case where construction activities will not resume within 21 days after construction activities have ceased

1.9.2 Structural Controls

Structural practices shall be implemented to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Structural practices shall be implemented in a timely manner during the construction process to minimize erosion and sediment runoff. Structural practices shall include the following devices. [Location and details of installation and construction are shown on the drawings.]

1.9.2.1 Silt Fence Barrier (Option 1)

The Contractor shall provide silt fences as a temporary structural practice to minimize erosion and sediment runoff. Silt fences shall be properly installed, as shown on the contract drawings, to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g. clearing and grubbing, excavation, embankment, and grading). Silt fences shall be installed in the locations indicated on the drawings. (Final removal of silt fence barriers shall be upon approval by the Contracting Officer.)

1.9.2.2 Truck Wash-Down Racks

See Section 01572

PART 2 PRODUCTS

2.1 COMPONENTS FOR SILT FENCE BARRIER

2.1.1 Filter Fabric

The geotextile shall comply with the requirements of ASTM D 4439, and shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide, and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistance to deterioration due to ultraviolet and heat exposure. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0 to 120 degrees F. The filter fabric shall meet the following requirements:

FILTER FABRIC FOR SILT SCREEN FENCE		
PHYSICAL PROPERTY	TEST PROCEDURE	REQUIREMENT
Grab Tensile	ASTM D 4632	100 lbs. min.
Elongation (%)	ASTM D 4632	30 % max.
Trapezoid Tear	ASTM D 4533	55 lbs. min.
Permittivity	ASTM D 4491	0.2 sec-1
AOS (U.S. Std Sieve)	ASTM D 4751	20-100

2.1.2 Silt Fence Wooden Posts and Steel T-Posts

The Contractor may use either rounded wooden posts or steel T-posts for silt fence construction. Wooden posts utilized for silt fence construction, shall [conform to the contract drawings] [have a minimum 3-1/2 inch diameter, and shall have a minimum length of 7 feet,] and shall be either oak or pine wood. Steel T-posts utilized for silt fence construction, shall have a minimum weight of 1.33 pounds per linear foot and a minimum length of 7 feet.

2.1.3 Mill Certificate or Affidavit

A mill certificate or affidavit shall be provided attesting that the fabric and factory seams meet chemical, physical, and manufacturing requirements specified above. The mill certificate or affidavit shall specify the actual Minimum Average Roll Values and shall identify the fabric supplied by roll identification numbers. The Contractor shall submit a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the filter fabric.

2.1.4 Identification Storage and Handling

Filter fabric shall be identified, stored and handled in accordance with ASTM D 4873.

PART 3 EXECUTION

3.1 INSTALLATION OF SILT FENCE BARRIER

The silt fence shall be located and installed as indicated on the contract drawings. Filter fabric shall be from a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are unavoidable, filter fabric shall be spliced together at a support post, with a minimum 6 inch overlap, and securely sealed. A trench shall be excavated approximately 4 inches wide and 4 inches deep on the upslope side of the location of the silt fence. The 4-inch by 4-inch trench shall be backfilled and the soil compacted over the filter fabric. The geotextile shall be attached to the land side of the post with wire or other method recommended by the manufacturer and such that a six inch length of geotextile is left unattached at the bottom of the post, the unattached geotextile embedded in the trench and the trench backfilled. It is the responsibility of the Contractor to maintain the integrity of the silt fence. Any deficiencies shall be immediately corrected by the Contractor. The silt fence shall be promptly repaired or replaced should it become damaged or otherwise ineffective. The silt fence is to remain in place upon completion of the project, or as directed by the Contracting Officer. It's maintenance shall be continual for that period of time for which excavated materials are placed in the area of the silt fence.

3.2 INSTALLATION OF TRUCK WASH-DOWN RACKS

Operation of truck wash-down racks shall not include use of detergents. Sediments resulting from operation of truck wash-down racks shall not be permitted to pollute any receiving waters. Sediments shall be utilized in the job or disposed of as construction debris. Sediment retention measures shall be utilized as described in Section 01572.

3.4 MAINTENANCE

The Contractor shall maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures. The following procedures shall be followed to maintain the protective measures.

3.4.1 Silt Fence Barrier Maintenance

Silt fences shall be inspected in accordance with paragraph 3.5. Any required repairs shall be made promptly. Close attention shall be paid to the repair of damaged silt fence resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits shall be removed when deposits reach one-third of the height of the barrier. Sediments shall be utilized in the job or disposed of as construction debris. When a silt fence is no longer required, it shall be removed. The immediate area occupied by the fence and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be seeded in accordance with Section 02922 FERTILIZING AND SEEDING.

3.5 INSPECTIONS

3.5.1 General

The Contractor shall inspect disturbed areas of the construction site, areas used for storage of materials that are exposed to precipitation that have not been finally stabilized, stabilization practices, structural practices, other controls, and area where vehicles exit the site at least once every fourteen (14) calendar days, before anticipated storm events (or series of storm events such as intermittent showers over one or more days) expected to cause a significant amount of runoff, and within 24 hours of the end of any storm that produces 0.5 inches or more rainfall at the site. Where sites have been finally stabilized, such inspection shall be conducted at least once every two weeks.

3.5.2 Inspections Details

Disturbed areas [and areas used for material storage that are exposed to precipitation] shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the SWPPP shall be observed to ensure that they are operating correctly. Discharge locations or points shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles exit the site shall be inspected for evidence of offsite sediment tracking.

3.5.3 Inspection Reports

For each inspection conducted, the Contractor shall prepare a report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the SWPPP, maintenance performed, and actions taken. The report shall be furnished to the Contracting Officer within 24 hours of the inspection as a part of the Contractor's daily CQC REPORT. A copy of the inspection report shall

be maintained on the job site. Sample inspection reports (Exhibit D-2, Exhibit D-3, Exhibit D-4, and Table D-5) are included at the end of this section.

3.6 NOTICE OF TERMINATION

Upon stabilization and elimination of all storm water discharges authorized by Permit No. LAR100000, or where the operator of all storm water discharges at a facility changes, a Notice of Termination (NOT) shall be certified and submitted by the Contractor to the Permits Division at the LDEQ. A copy of the NOT form is provided at the end of this section. Certified mail is recommended for proof of the NOT submittal. The NOT shall be submitted within 30 days of stabilization or assumption of full control of the SWPPP by another operator/permittee over all areas of the site that have not been finally stabilized.

ADDITIONAL INFORMATION

****

(HERE THE DESIGNER/TECHNICAL MANAGER SHALL PROVIDE PROJECT-SPECIFIC INFORMATION

Specific Information that must be included here in the Contractors/Technical Manager SWPPP includes the following:
(Each item shall be titled as below and described in a separate paragraph to be readily distinguishable for the reader.)

****

(a) Job description. [Prepare within one paragraph, a brief description of the construction activity. Any offsite disposal and stockpiling must be included.]

(b) Activity sequence. [Prepare, within one paragraph, a description of the intended sequence of major activities which disturb soils for major portions of the site (e.g., grubbing, excavation, grading, utilities, and infrastructure installation, etc.]

(c) Disturbed area. [Describe, within one paragraph, the estimates of (1) the total area of the site and (2) the total area of the site that is expected to be disturbed by excavation, grading, or other off-site activities including off-site borrow and fill areas.]

(d) Runoff coefficient. [Describe, within one paragraph, an estimate of the runoff coefficient of the site for both the pre-construction and post-construction conditions and data describing the soil or the quality of any discharge (storm water/sediments) from the site.]

(e) Location. [Provide a general location map and a site map indicating drainage patterns and approximate slopes anticipated after major grading activities, areas of soil disturbance, and outline of areas which will not be disturbed, the location of major structural and nonstructural controls identified in the SWPPP, the location of areas where stabilization practices are expected to occur, locations of off-site material, waste borrow or equipment storage areas, surface waters (including wetlands) and locations where storm water is discharged to a surface water. Designer can simply prepare a paragraph that refers to location of map(s) in existing plans displaying where all of these described construction activities will occur.]

(f) Associated discharges. [In one paragraph, describe the location and description of any discharge (stormwater or other) associated with industrial activity other than construction. If there are none it should be so stated.]

(g) Name of receiving waters / wetlands / special aquatic sites. [In one paragraph, describe the nearest waterbody named on topographic maps to the construction site that will receive storm water discharges from the job. (Designation of distant downstream water bodies are not appropriate.) Any special aquatic site / wetland receiving stormwaters from the construction site shall be identified and the area affected shall be identified (wooded wetlands, freshwater marsh, etc.) and quantified.]

(h) Permit requirements. [In one paragraph state that permit requirements are described in the copy of Permit No. LAR100000 attached at the end of this section.]

(i) Endangered or threatened species concerns. [(*A request should be made to PM-R for the appropriate wording for this paragraph, contact PM-RP at 862-2675.*) Information on whether listed or threatened species and/or critical habitat are found in proximity to the construction activity and whether such species may be affected by the applicant's storm water discharges or storm water discharge-related activities.]

(j) National Register of Historic Places concerns. [(*A request should be made to PM-R for the appropriate wording for this paragraph, contact PM-RP at 862-2675.*) Information on whether the storm water discharges or storm water discharge-related activities from the construction site would have an effect on a property that is listed or eligible for listing under the National Historic Register and, where effects may occur, any written agreements with the State Historic Preservation Officer (SHPO) to mitigate these effects.]

****

The following pages shall be included here and shall be part of the SWPPP.

****

(1) Notice of Intent Form(blank copy)

(2) Notice of Termination form (blank copy)

(3) Inspection Report Forms (Exhibits D-2, D-3, D-4, and Table D-5)

(4) Certification Statements #1, #2, and #3 (blank copies)

(5) Contractor's Modifications to SWPPP

CERTIFICATION STATEMENT #1

Any person, including the construction owner/operator, signing documents under Part VI.G. of Permit No. LAR100000 (submitting NOIs, preparing SWPPPs, maintaining, or making revisions to the SWPPPs) shall make the following certification.

(Contract Title)
(Permit Number)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Construction Owner/Operator: _____

Address: _____

_____ Telephone No: _____

Signature: _____ Title _____ Date: _____

CERTIFICATION STATEMENT #2

Any Contractor or subcontractor implementing any part of this plan must prepare and sign a copy of the following certification.

(Contract Title)
(Permit Number)

I certify, under penalty of law, that I understand the terms and conditions of the Louisiana Pollutant Discharge Elimination System (LPDES) general permit that authorizes storm water discharges associated with construction activity from the construction site identified as part of this certification.

Firm Name: _____

Address: _____

_____ Telephone No: _____

Signature: _____ Title_____ Date: _____

CERTIFICATION STATEMENT #3

Any Contractor or subcontractor that does not meet the definition of "operator" that will conduct activities that may impact the effectiveness of the SWPPP control measures must prepare and sign the following certification.

(Contract Title)
(Permit Number)

I certify, under penalty of law, that I will coordinate, through the contractor, owner, or directly, with the Contractor (s) identified in the pollution prevention plan having responsibility for implementing storm water control measures to minimize any impact my actions may have on the effectiveness of these storm water control measures.

Firm Name: _____

Address: _____

_____ Telephone No: _____

Signature: _____ Title _____ Date: _____

CONTRACTOR'S MODIFICATIONS TO SWPPP

Section Table of Contents

SECTION 01451 – CONTRACTOR QUALITY CONTROL

SECTION 01451 - CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 3740	(2001) Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
E 329	(2000b) Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause in Section 00700, entitled Inspection Of Construction (FAR 52.246-12). The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with quality requirements specified in the contract. The project superintendent in this context shall mean the individual with the responsibility for the overall management of the project including quality and production.

3.2 QUALITY CONTROL PLAN

3.2.1 General

The Contractor shall furnish for review by the Government, not later than 15 days after receipt of notice of award, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause in Section 0700, entitled Inspection Of Construction (FAR 52.246-12). The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. The Government will consider an interim plan for the first 30 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.2 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

(a) A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project superintendent.

(b) The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.

(c) A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Government.

(d) Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01330, "SUBMITTAL PROCEDURES".

(e) Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by the Contracting Officer.)

(f) Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

(g) Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

(h) Reporting procedures, including proposed reporting formats.

(i) A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there is frequently more than one definable feature under a particular section. This list will be agreed upon during the coordination meeting.

3.2.3 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.4 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and after acceptance by the Government of the CQC Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 14 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm

mutual understandings and/or address deficiencies in the CQC system or procedures that may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 General

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure contract compliance. The Contractor shall provide a CQC organization that shall be at the site at all times during progress of the work and with complete authority to act necessary to ensure compliance with the contract. All CQC staff members shall be subject to acceptance by the Contracting Officer.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within his/her organization at the site of the work who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a construction person with a minimum of 3 years in related work. This CQC System Manager shall be on the site at all times during construction and will be employed by the prime Contractor. The CQC System Manager shall be assigned as System Manager but may not have duties as project superintendent in addition to quality control. An alternate for the CQC System Manager will be identified in the plan to serve in case of the System Manager's absence. The requirements for the alternate will be the same as for the designated CQC System Manager.

3.4.3 CQC Personnel

In addition to CQC personnel specified elsewhere in the contract, the Contractor shall provide as part of the CQC organization specialized personnel to assist the CQC System Manager for the following areas: civil, materials technician, submittals clerk. These individuals may be employees of the prime or subcontractor; be responsible to the CQC System Manager; be physically present at the construction site during work on their areas of responsibility; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan.

Experience Matrix

Area	Qualifications
a. Civil Graduate	Civil Engineer with 2 years experience in the type of work

	being performed on this project or technician with five yrs related experience
b. Submittals	Submittal Clerk with 1 yrs experience
c. Concrete, Pavements and Soils	Materials Technician with two yrs experience for the appropriate area

3.4.4 Additional Requirement

In addition to the above experience and education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management For Contractors". This course is periodically offered at the New Orleans District and other Corps of Engineers districts

3.4.5 Organizational Changes

The Contractor shall maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5 SUBMITTALS

Submittals shall be made as specified in Section 01330 SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals comply with the contract requirements.

3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of work as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

(a) A review of each paragraph of applicable specifications.

(b) A review of the contract drawings.

(c) A check to assure that all materials and/or equipment have been tested, submitted, and approved.

(d) Review of provisions that have been made to provide required control inspection and testing.

(e) Examination of the work area to assure that all required preliminary work has been completed and complies with the contract.

(f) A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

(g) A review of the appropriate activity hazard analysis to assure safety requirements are met.

(h) Discussion of procedures for controlling quality of the work ,including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

(i) A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

(j) Discussion of the initial control phase.

(k) The Government Quality Assurance personnel shall be notified at least 48 hours in advance of beginning the preparatory control phase. The Contractor shall submit a written agenda of the topics to be discussed at the preparatory meeting on the day prior to the meeting date. This phase shall include a meeting conducted by the CQC System Manager and attended by a government representative, the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

(a) A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

(b) Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.

(c) Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

(d) Resolve all differences.

(e) Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

(f) The Government shall be notified at least 24 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

(g) The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work that may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if the quality of on-going work is unacceptable, if there are changes in the applicable CQC staff, onsite production supervision or work crew, if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product that conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation

and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. Depending upon the workload by the Government inspecting agency, acceptance or rejection of the Contractor proposed testing laboratory is usually done approximately 60 to 120 days after notification is received from the Contractor. The certification will be valid for two years. The Contractor shall perform the following activities and record and provide the following data:

(a) Verify that testing procedures comply with contract requirements.

(b) Verify that facilities and testing equipment are available and comply with testing standards.

(c) Check test instrument calibration data against certified standards.

(d) Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

(e) Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2 Testing Laboratories

3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of $3500.00 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Corps of Engineers Laboratory, f.o.b., at the following address:

For All Materials Except Painting Materials and Quality Assurance Concrete Test Cylinders:

U.S. Army Engineer Waterways Experiment Station
3909 Halls Ferry Road
Vicksburg, Mississippi 39180-6199

For Painting Materials:

Physical address:

U.S. Army Construction Engineering Research Laboratory
2902 Newmark Drive
Champaign, Illinois 61821

Mailing address:

U.S. Army Construction Engineering Research Laboratory
P.O. Box 9005
Champaign, Illinois 61826-9005

For Quality Assurance Concrete Test Cylinders:

U.S. Army Corps of Engineers
New Orleans District
Soils and Materials Processing Unit
Room 105
Foot of Prytania Street
New Orleans, Louisiana 70118

Concrete test cylinders shall only be delivered on Federal workdays between 8:30 AM and 3:00 PM. Coordination for each specific test, exact delivery location, and dates will be made through the Area Office. Details on the soils and materials testing

laboratory and additional instructions for delivery of the QA samples will be given at the preconstruction conference.

3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

Near the completion of all work or any increment thereof established by a completion time stated in the Special Contract Requirement entitled Contract Clause in Section 00700 entitled, Commencement, Prosecution, And Completion of Work (FAR 52.221.10) or stated elsewhere in the specifications, the CQC System Manager shall conduct an inspection of the work and develop a punch list of items which do not conform to the approved drawings and specifications. Such a list of deficiencies shall be included in the CQC documentation, as required by paragraph 3.9, entitled "Documentation", and shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2 Pre-Final Inspection

The Government will perform this inspection to verify that the structure is complete. A Government Pre-Final Punch List may be developed as a result of this inspection. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at this inspection. Additional Government personnel including, but not limited to, those from the New Orleans District, Mississippi Valley Division, and local interest may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the

Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the Contract Clause in Section 00700 entitled, Inspection Of Construction (FAR 52.246-12).

3.9 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

(a) Contractor/subcontractor and their area of responsibility.

(b) Operating plant/equipment with hours worked, idle, or down for repair.

(c) Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

(d) Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.

(e) Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.

(f) Submittals reviewed, with contract reference, by whom, and action taken.

(g) Off-site surveillance activities, including actions taken.

(h) Job safety evaluations stating what was checked, results, and instructions or corrective actions.

(i) Instructions given/received and conflicts in plans and/or specifications.

(j) Contractor's verification statement. These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 12 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days

shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.10 SAMPLE FORMS

Sample forms for guidance in preparing the CQC Plan are enclosed at the end of this section.

3.11 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

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SECTION 01501 – ROAD CONSTRUCTION

SECTION 01501 – ROAD CONSTRUCTION

PART 1 GENERAL

1.1 SCOPE

The work required under this section shall generally consist of the construction of a portion of bituminous roadway according to the plans and these specifications. Work shall include but not be limited to performing all excavations and installing all aggregate base course, and bituminous surface course required to complete this item.

1.2 MEASUREMENT AND PAYMENT

No separate measurement will be made for road construction. Payment for road construction will be made at the contract lump sum price for "ROAD CONSTRUCTION". Price and payment shall constitute full compensation for furnishing all plant, equipment, labor and material required to excavate, construct subbase and base courses and install bituminous surface course according to the plans and specifications.

1.3 APPLICABLE PUBLICATIONS

The following publications referred to hereafter by basic designation only, form a part of this specification to the extent indicated.

The Applicable Provisions of the "General Specifications for Street Paving of the City of New Orleans" 1995 Edition.

Specific sections contained in the "General Specifications for Street Paving of the City of New Orleans" as listed below apply to this work:

PART V	ASPHALTIC PAVEMENT
PART III	BASE AND SUBBASE COURSES
ASTM D 2940	(1998) STANDARD SPECIFICATIONS FOR GRADED AGGREGATE MATERIAL FOR BASES AND SUBBASES FOR HIGHWAYS AND AIRPORTS

1.4 SUBMITTALS

The Contractor shall submit, for the Contracting Officer's approval, the mix designs for wearing course and binder course. Submittals shall be according to the provisions of Section 01330 "SUBMITTAL PROCEDURES".

1.5 QUALITY CONTROL

1.5.1 General

The Contractor shall establish and maintain quality control of road construction in order to assure compliance with contract requirements, and maintain records for his quality control for all roadway, base course and bituminous course work.

1.5.2 Disposition

The Contractor shall identify the location and disposition of all materials removed.

PART 2 PRODUCTS

2.1 SUBBASE

Subbase material shall be non-plastic granular material conforming to paragraph 2.1.1 of Section 02320. Density requirements called for in this section shall be for the top twelve (12") inches which for the purposes of this specification is considered to be subbase.

2.1.1 Density

Subbase density requirements shall be ninety-five (95%) percent of maximum density at optimum moisture when measured according to the provisions of Paragraph C302.04 of the General Specifications for Street Paving of the City of New Orleans.

2.2 BASE COURSE

Aggregate Base Course shall be crushed concrete or stone conforming to the requirements of ASTM D 2940. The required density shall be ninety-five (95%) of maximum density at optimum moisture according to the provisions of Paragraph C302.04 of the General Specifications for Street Paving of the City of New Orleans.

2.3 BITUMINOUS SURFACE COURSE

This work consists of furnishing and constructing asphalic concrete wearing and binder courses on a prepared and approved base and subbase course in accordance with the lines, grades and typical sections contained in the plans and these specifications and provisions of Part V of "The General Specifications for Street Paving of the City of New Orleans".

2.3.1 Binder Course

The thickness of the Binder Courses shall be as shown on the drawings, and shall be Type 3 mix in accordance with the City of New Orleans General Specifications.

2.3.2 Wearing Course

The Wearing Course shall be one and one-half (1-1/2") inches thick and shall be type 3 mix in accordance with the City of New Orleans General Specifications.

2.3.3 Tack and Prime Coat

Tack Coat and Prime Coat, as required, shall be furnished and applied in accordance with Section C504 and C505 of the City of New Orleans General Specifications.

2.3.4 Sampling and Testing

All sampling, testing and acceptance of work required by this item shall be according to the provisions of "The General Specifications for Street Paving of the City of New Orleans" 1995 edition.

PART 3 EXECUTION

3.1 EXCAVATION

The Contractor shall perform all required excavation, disposal, placement and compaction of materials required to construct the roadway according to the plans and these specifications. All material excavated shall become the property of the Contractor and shall be removed from the project site.

SECTION 01572 – TRUCK WASH-DOWN RACKS

SECTION 01572 – TRUCK WASH-DOWN RACKS

PART 1 GENERAL

1.1 SCOPE

The work specified in this section consists of the Contractor designing, implementing and maintaining approved truck wash-down rack(s) at the construction site in the location as shown on the drawings.

1.2 REFERENCES

STORM WATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITIES

PERMIT NO. LAR100000 (1999) Authorization To Discharge Under The Louisiana Pollutant Discharge Elimination System

1.3 MEASUREMENT AND PAYMENT

No measurement will be made for the temporary truck wash-down rack designed, constructed and maintained by the Contractor. Payment for the temporary truck wash-down rack, including its maintenance and removal, will be made at the contract lump sum price for "TRUCK WASH-DOWN RACK". Price and payment shall constitute full compensation for furnishing the design, and all plant, labor, equipment, and material to complete the work as specified herein and as shown on drawings.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1. Truck Wash-Down Rack.

The Contractor shall design, submit to the Contracting Officer for approval, and provide a hard-surfaced truck wash-down rack to be located at a point of egress from the construction site onto city streets during construction operations to eliminate mud and debris transported onto public roads. All trucks utilized for hauling shall be pressure washed on the wash-down rack prior to departing the construction site. The truck wash-down rack shall be sized and located within the rights-of-way for the access road per the Contractor's proposed equipment and construction site layout.

1. The hard surfaced truck wash-down rack shall consist of a Contractor designed steel grated structure, wooden timber crane mats, or an equivalent method.

2. All truck wash-down rack wastewater and sediment shall be intercepted before draining offsite. The water shall be ponded on site and the sediment removed and disposed of before the wastewater reaches the existing subsurface drainage system.

3. Upon completion of the hauling operation, the Contractor shall remove the truck wash-down rack and all appurtenances from the construction site.

4. The area where the truck wash-down rack was located shall be restored to the condition or better than prior to construction activities. All aggregate place between the wash-down rack and the roadway shall be removed.

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SECTION 02081 - REMOVAL AND DISPOSAL OF CANAL SEDIMENT MATERIAL

SECTION 02081 - REMOVAL AND DISPOSAL OF CANAL SEDIMENT MATERIAL

PART 1 GENERAL

1.1 SCOPE

The work specified in this section includes the removal and disposal of material that covers the existing canal concrete lining in accordance with the requirements specified herein and in accordance with Section 01352 – Environmental Protection. The work also includes sampling and analysis of the material to ensure disposal in an industrial landfill. The material to be removed from the above the existing canal concrete lining includes sands, silts, clays and shell and rip rap. Logs and other obstructions may also be present.

1.2 MEASUREMENT AND PAYMENT

1.2.1 MEASUREMENT. Measurement will be made for removal, disposal, sampling, and analysis of the material covering the existing concrete canal lining by cubic yards as measured in approved hauling vehicles. Approval and accepted truck measurement shall be according to the provisions of LSSRB paragraph 109.01.

1.2.2 PAYMENT. Payment for removal, disposal, sampling and analysis of the material covering the existing concrete canal lining shall be per cubic yard of material removed in approved vehicles as measured according to the provisions in 1.2.1 above. Price and payment shall constitute full compensation for furnishing all plant, labor, material, laboratory services, collection/packaging/shipping of QA samples to the SWD laboratory, pre-treatment of materials prior to transportation and disposal, and all operation and equipment necessary for performance and completion of the work in this section.

1.3 APPLICABLE PUBLICATIONS

The publications listed below form a part of this specification to the extent specified herein. The publications are referred to in the text by the basic designation only.

ENVIRONMENTAL PROTECTION AGENCY (EPA) STANDARDS

EPA/SW-846, 3d Ed	Test Methods for Evaluating Solid Waste Physical/Chemical Methods

STATE OF LOUISIANA REGULATIONS

Louisiana Administrative Code (LAC), Title 33, Environmental Quality, Part V, Hazardous Waste Regulations

Louisiana Administrative Code (LAC), Title 33, Environmental Quality, Part VII, Solid

Waste Regulations

LOUISIANA STANDARD SPECIFICATIONS FOR
ROADS AND BRIDGES (LSSRB) 2000 EDITION

109 Measurement and Payment

ENGINEERING MANUAL

EM 200-1-1 (1994) Requirements for the Preparation of Sampling and Analysis Plans

1.4 SUBMITTALS

1.4.1 Sediment Removal, Sampling and Disposal Plan

The Contractor shall prepare a plan for removal, sampling and analysis activities, transportation and disposal of the material above the existing canal concrete lining. The Contractor shall include in the plan the name, address, and telephone number of the Corps validated HTRW laboratory he intends to use for sampling and analysis operations. The plan shall list any other sampling methods not specified in this section that may be required by the landfill for waste profiling. The plan shall also include the name, address and telephone number of the State approved Industrial Landfill which he intends to use for disposal of the material. Sediment sampling and testing shall follow appropriate environmental protocols such as detailed in EM 200-1-3 and performed by individuals trained and experienced with HTRW-type of environmental investigation.

1.4.2 Sampling and Analytical Results

The Contractor shall submit the analytical results to the Contracting Officer immediately upon receipt from the laboratory.

1.4.3 Verification of Proper Disposal of Materials

The Contractor shall supply the Contracting Officer written verification that the materials have been disposed of in a State approved industrial landfill within five (5) days of the date of disposal. This written verification shall be signed by a representative of the industrial landfill.

1.4.4 Manifests

If the material is manifested for disposal, the Contractor shall submit a copy to the Contracting Officer along with the written verification specified in paragraph 1.4.3.

1.5 QUALITY CONTROL

1.5.1 General

The Contractor shall establish and maintain quality control for operations under this section in order to assure compliance with contract requirements and maintain records of his quality control for materials, equipment and sampling and disposal operations.

1.5.2 Reporting

The original and two copies of these records, as well as the records of corrective action taken, shall be furnished the Government daily. Format of this report shall be as prescribed in Section 01451, "CONTRACTOR QUALITY CONTROL".

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 SAMPLING AND ANALYSIS

Prior to transportation and disposal of the material above the existing concrete canal lining, the Contractor shall take one (1) composite sample of eight (8) discrete samples taken throughout the material of the lining material in accordance with this section for each of the parameters listed below except for volatile organics, or for any other parameters required by the landfill. All samples shall be taken in the presence of the quality assurance representative. The contractor shall give at least 72 hours advanced notice to the government prior to any sampling. The sample shall be a discrete sample taken in a manner that would fully represent the material. The sampling effort will determine if the material is characteristically a hazardous waste prior to transportation to the disposal site. The Contractor shall use a Corps' validated HTRW laboratory to conduct all sampling and analysis activities. If the laboratory accredited by LDEQ and validated by the corps is not currently validated for the analytical parameters listed below, he may request validation by following the requirements of EM 200-1-1(1 Jul 94). The validation process may take up to twelve (12) weeks. The analytical laboratory the Contractor intends to utilize must be approved by the Contracting Officer before any sampling and analysis activities begin. For volatile organic parameter, a representative grab sample shall be collected for analysis.

3.1.1 Analytical Tests Required

Sampling techniques, analytical techniques, apparatus used, and sample collection, handling and preservation techniques shall be in strict accordance with EPA SW-846 methods for each sampling protocol listed below. The analytical tests to be conducted shall consist of the following:

(a) Toxicity Characteristic Leaching Procedure (TCLP) for the following:

Arsenic, Barium, Cadmium, EPA Solid Waste 846

Chromium, Lead, Selenium, Silver	Method 6010A
Mercury	EPA Solid Waste 846 Method 7471A

(b) Toxicity Characteristic Leaching Procedure (TCLP) for Organics:

Volatile Organics	EPA Solid Waste 846 Method 8240B
Semi-Volatile Organics	EPA Solid Waste 846 Method 8270B
PCBs/Pesticides	EPA Solid Waste 846 Method 8080
Chlorinated Herbicides	EPA Solid Waste 846 Method 8150B
Total Petroleum Hydrocarbons (TPH)	Modified California Department of Health Services Method (Modified Method 8015)

3.1.2 Sample Chain of Custody and Transportation

All sampling, labeling, transportation, and chain of custody procedures shall follow the EPA protocols established by the validated laboratory chosen by the Contractor.

3.1.3 Data Report

The Contractor shall provide to the Contracting Officer and the landfill, the sampling results he receives from the laboratory immediately upon receipt. The Government will review the results to determine if the material exhibits characteristics of a hazardous waste. The material is characteristically a hazardous waste if it exceeds the regulatory limits shown in Section 4903, Chapter 49 of LAC, Title 33, Environmental Quality, Part V, Hazardous Waste Regulations. If the material does not exhibit any of the hazardous characteristics and the landfill approves disposal, it shall be disposed of in the industrial landfill. If the material is determined to be characteristically hazardous and is not accepted by the landfill, the Contractor shall dispose of the material at a certified temporary storage and disposal facility (TSD). For bidding purposes, the Contractor shall assume the material does not exhibit any hazardous characteristics and will be disposed of in an approved industrial landfill. If the material is determined to be a characteristically hazardous waste, an equitable adjustment will be made under the Contract Clause in Section 00700 entitled Differing Site Conditions (FAR 52.246-12).

The Contractor shall not transport the material off-site unless approved and directed to do so by the Contracting Officer.

3.1.4 Quality Assurance (QA) Samples

The Contractor shall collect a QA sample for every sediment sample taken in the same manner as specified in Paragraph 5. The QA sample shall be sent to a USACE QA laboratory via overnight delivery. This QA sample will be analyzed to evaluate the Contractor laboratory's performance. The Contractor shall coordinate with the QA laboratory not less than five (5) working days before sampling to assure that the QA laboratory is alerted to receive the QA sample and process it within the time limits specified by applicable EPA regulations and guidelines. The Contractor shall contact the following for the address of Fort Worth District's designated contract laboratory for QA samples:

U.S. Army Corps of Engineers
Missouri River Division Laboratory
420 S. 18th Street
Omaha, NE 68102-2586

3.2 TRANSPORTATION AND DISPOSAL REQUIREMENTS

The Contractor shall provide all services necessary for the disposal of the material. These services shall include all necessary personnel, labor, transportation, packaging, detailed analyses (manifesting or completing waste profile sheets), equipment, and reports. The Contractor shall also pre-treat the material as necessary for transportation or required by the industrial landfill. The Contractor shall obtain a Certificate of Waste Disposal or other form of written verification from the landfill to prove that the final disposal of the material has been accomplished. The certificate of written verification shall be submitted to the Contracting Officer as specified in paragraph 4.3. The Contractor shall comply with state and local requirements for transportation of the material, including obtaining any required permits, licenses, and approvals. The Contractor shall show evidence that the disposal facility meets all state and federal requirements. High-density overlay may also be used. All canal sediment shall be transported in watertight trucks.

3.3 SPILL RESPONSIBILITY

The Contractor shall be solely responsible for any and all spills or leaks and associated costs during the performance of this contract which occur as a result of or are contributed to by the actions of its employees or subcontractors. The Contractor shall cleanup such spills or leaks to the satisfaction of the Contracting Officer's Representatives and regulators in a manner that complies with applicable federal, state, and local laws and regulations.

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SECTION 02172 - TEMPORARY SHEET PILE DAM

SECTION 02172 - TEMPORARY SHEET PILE DAM

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all plant, equipment, labor and materials and performing all operations required for the installation and final removal of the Temporary Steel Sheet Pile Dam including installation of electrically and manually operated butterfly gates, fabrication of catwalks, handrails, etc., according to the plans and these specifications.

1.2 MEASUREMENT AND PAYMENT

No separate measurement will be made for fabrication, installation, maintenance, operation of, removal and final disposition of the temporary sheet pile dam. Payment will be at the contract lump sum price for "INSTALL TEMPORARY SHEET PILE DAM" and "REMOVE TEMPORARY SHEET PILE DAM" and shall include the furnishing of all plant, labor, materials, and equipment required to install, operate, and finally remove the temporary sheet pile dam including steel sheet piles, Government furnished butterfly gates, operators, all electrical work required to make the gates operable, miscellaneous metal work, etc.

1.3 RELATED WORK SPECIFIED ELSEWHERE

Materials and work for installation and removal of temporary sheet pile dam is specified in the following listed sections:

Removal of Concrete Canal Bottom - Section 02221 "SELECTIVE DEMOLITION".

Steel Sheet Piling - Section 02411 "STEEL SHEET PILES".

Stairs, Catwalks and Handrails - Section 05501 "STRUCTURAL STEEL AND MISCELLANEOUS METAL WORK".

Butterfly Gates, Actuators, Etc - Section 11285 "SLUICE GATES, BUTTERFLY GATES, OPERATORS AND FLOOR STANDS".

Electrical - Section 16001 "ELECTRICAL WORK".

1.4 SUBMITTALS

The Contractor shall submit shop drawings, pile driving equipment information, records, etc. for approval as required in the appropriate section. All submittals shall be according to Section 01330 "SUBMITTAL PROCEDURES".

The submittals shall contain as a minimum, the following information:

(1) Detailed layout of the temporary sheet pile dam on standard (28" x 40") sheets. These drawings shall clearly show all pertinent dimensions and locations of the sheet piles, catwalks, butterfly gates, electrical wiring, ingress and egress plan and any pertinent information necessary for understanding the Contractor's plan.

1.5 QUALITY CONTROL

Requirements for material tests, workmanship and other requirements shall be according to the appropriate section in which the work requirements are found.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 DISPOSITION OF TEMPORARY DAM

Upon removal of the Temporary Dam, the material and items which make up this installation shall be disposed of as follows:

(1) The catwalks, hand railings, stairs, steel sheet piling and other miscellaneous items and metal work shall become the property of the Contractor and shall be removed from the site and disposed of according to the provisions of Section 02221 "SELECTIVE DEMOLITION".

(2) The butterfly gates and actuators shall be carefully removed, cleaned with a high pressure water spray and delivered to the Sewerage and Water Board's facility at 8800 South Claiborne Avenue, New Orleans, Louisiana. Call 865-0514 at least 24 hours ahead of delivery in order for the Sewerage and Water Board to make arrangements for receipt.

3.2 FURTHER REQUIREMENTS

It shall be the Contractor's responsibility to maintain the butterfly gates free of silt and other debris in order that they are free for operation at all times.

3.3 OPERATION OF THE TEMPORARY BUTTERFLY GATES

The Contractor will operate the temporary Butterfly gates while he is on site and working. The Contractor will release control of the gates to personnel of the Sewerage and Water Board upon leaving the site.

Section Table Of Contents

SECTION 02173 – LOW LEVEL COFFERDAMS

SECTION 02173 – LOW LEVEL COFFERDAMS

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all plant, equipment, labor and materials and performing all operations in connection with the installation of low level cofferdams according to the sequence of construction and elevations shown in the plans.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 02411 "STEEL SHEET PILING"

Section 05501 "METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS"

1.3 MEASUREMENT AND PAYMENT

Measurement and payment for low level cofferdams when installed according to the plans and specifications including special corners, transitions, tee sections etc., shall be according to the following:

There will be no measurement for this item of work. Payment shall be included in the lump sum price for "LOW LEVEL COFFERDAMS".

1.4 MODIFICATIONS TO DESIGN

All modifications to the design or layout of the low level cofferdams must be submitted to the Contracting Officer for approval. The revised design and/or layout shall be designed and stamped by a registered professional engineer. All design calculations must reflect the criteria that the minimum tip elevation for the sheet piling used in the low level cofferdams shall be minus (-) 30.0 NGVD for excavation elevations inside the cofferdam of minus (-) 9.5 NGVD and minus (-) 38.0 NGVD for excavation elevations inside the cofferdam of minus (-) 14.5 NGVD.

PART 2 PRODUCTS

See Section 02411 "STEEL SHEET PILING"

PART 3 EXECUTION

See Section 02411 "STEEL SHEET PILING"

Section Table Of Contents

SECTION 02221 - SELECTIVE DEMOLITION

SECTION 02221 - SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all equipment, material and labor to perform all operations necessary for demolition, removal and disposal of existing structures, specified herein in accordance with these specifications and according to the contract drawings. Demolition includes but is not limited to timber decking, steel support I-beams, existing concrete in outfall canal, existing sewer force main, steel exhaust bell housings, timber piles, vacuum pumps and accessories, vacuum piping and various other items outlined and shown in the plans.

1.2 MEASUREMENT AND PAYMENT

1.2.1 Suction Basin Deck Demolition

No separate measurement or payment will be made for demolition required for the removal of the suction basin deck. Payment shall be included in the contract lump sum price for "REPLACE SUCTION BASIN DECK". Price and payment shall constitute full compensation for the work required by this section and shall include the furnishing of all plant, equipment, labor and materials required to complete this item.

1.2.2 Other Demolition

No measurement will be made for demolition required by this section, excluding demolition of the components of the suction basin deck. Payment will be made under the contract lump sum price for "DEMOLITION". Price and payment shall constitute full compensation for furnishing all plant, labor, materials, and equipment to complete the demolition as specified in this section.

1.3 RELATED WORK SPECIFIED ELSEWHERE

Section 01352	"ENVIRONMENTAL PROTECTION"
SECTION 01100	GENERAL PROVISIONS, entitled "COORDINATION OF WORK".

1.4 SUBMITTALS

A minimum of 30 days prior to commencement of the work, the Contractor shall submit for approval his proposed plan to accomplish the work specified herein. This proposal shall include but not be limited to the following:

(1) Demolition. Methods and equipment to be used.

(2) Protection of New Construction. Methods and equipment used to ensure the new construction is not damaged during demolition operations.

(3) Protection of Persons and Property. Methods for maintaining safety of persons, vehicles, and other property in the vicinity of the construction site during demolition. This includes protection of vehicles and pedestrians from flying debris. Also included is any required coordination with affected utilities or agencies.

(4) Disposition Site. Documentation demonstrating the disposal site is in compliance with all applicable Federal, State and local laws.

1.5 QUALITY CONTROL

1.5.1 General

The Contractor shall establish and maintain quality control for demolition operations to assure compliance with contract requirements, and maintain records for his quality control for all demolition operations including but not limited to the following:

(1) Demolition. Location and identification of all items to be demolished, percentage of demolition completed, and methods of demolition. This includes methods of pulling foundation piles and sheet pile walls.

(2) Safety Protection and Access. Procedures for assuring the safety of persons and property subject to damage and injury resulting from demolition operations. Provisions for maintenance of access around the site of demolition work.

(3) Disposition of Materials. Method and location of disposition; and damage to existing structures or improvements.

1.5.2 Reporting

The original and two copies of those records and tests, as well as the records of corrective action taken, shall be furnished the Government daily. Format of this report shall be prescribed in Section 01451, "CONTRACTOR QUALITY CONTROL".

1.6 GENERAL REQUIREMENTS

The Contractor shall ensure the work covered herein is performed in a safe and orderly manner. The Contractor shall submit his demolition procedures for approval to the Contracting Officer. The use of explosives will not be permitted.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 REQUIRED ITEMS TO BE REMOVED

(1) The timber decking including timber nailers and steel I-beam supports.

(2) The existing outfall canal concrete bottom, concrete retaining walls and brick walls.

(3) An existing sewer force main, access manhole, pile supports, piles, concrete caps, etc., where indicated.

(4) Existing steel exhaust bell housings.

(5) Selected existing timber piles as required.

(6) Constant duty dry weather flow pipe.

(7) Vacuum Pumps and Accessories

(8) Vacuum Piping, gages, etc.

(9) Various other miscellaneous items required by the plans but not specifically listed in this specifications.

3.2 DISPOSAL OF MATERIALS

All removed material shall become the property of the Contractor and shall be disposed of by removal from the site. Such disposal shall comply with all applicable Federal, State, and local laws. The Government is not responsible for the protection and safekeeping of any materials retained by the Contractor. The Contractor shall submit to the Contracting Officer written evidence that he has obtained from the property owner permission for disposal on private property. The written evidence shall consist of an authenticated copy of the conveyance under which the Contractor acquired the property rights and access therein prepared and executed in accordance with the laws of the State of Louisiana.

Section table of Contents

SECTION 02242 – DEWATERING

SECTION 02242 - DEWATERING

PART 1 GENERAL

1.1 SCOPE

The work provided for herein consists of furnishing all plant, equipment, labor and materials; performing all operations required for designing, furnishing, installing, and operating a system to dewater the excavated area or area inside of temporary retaining structures; maintaining these areas free from water during construction operations; rewatering the area under controlled conditions at the termination of the dewatering and removing the system.

1.2 MEASUREMENT AND PAYMENT

No separate measurement will be made for dewatering. Payment for dewatering will be made at the contract lump sum price for "CONSTRUCTION DEWATERING". Price and payment shall constitute full compensation for furnishing all plant, labor, material, and equipment; designing, furnishing, installing, maintaining, operating, flooding, rewatering, and removing the dewatering facilities; maintaining the dewatered area; and all work incidental thereto including construction of dikes, sumps, installation of wellpoints, jet eductors, wells, pumps, piezometers, removal of wellpoints, jet eductors, wells, and piezometers, plugging holes, maintaining protection dikes and closure structures, protection of slopes and all other work which may be necessary to accomplish the specified dewatering results and which is not specified to be paid for separately. Fifty percent of the lump sum price will be paid when installation of the dewatering system has been completed, tested, evaluated, and the piezometric level of the ground water has been lowered to the limits and elevations as specified. Forty percent of the lump-sum price will be prorated on the basis of the estimated number of months that dewatering system will be required and will be paid monthly. The remaining 10 percent of the lump-sum price will be paid when the dewatering system has been removed as required herein and cleanup in connection therewith has been completed.

1.3 DEFINITIONS

(1) Dewatering defines the lowering of the ground water below the slopes and bottom of the excavation to ensure dry, firm working conditions and the reduction to safe levels of any hydrostatic uplift pressures in any confined foundation strata and/or aquifers which is necessary to ensure the stability and integrity of the foundation.

(2) Dewatering system defines the machinery, equipment, and appurtenances necessary for and related to the accomplishment of dewatering, and the collection and disposal of all surface water within the protected area.

(3) Flooding of the excavation is defined as the controlled process of filling the excavation with water to a specified elevation and at a specified rate.

(4) Unwatering is defined as the process of removing all water within an excavation.

(5) Rewatering is defined as the controlled process of placing water in the completed structure and/or excavation to its naturally occurring elevation at a specified rate when the construction is completed and the dewatering system is no longer required.

1.4 DESIGN

The dewatering system shall be designed and stamped by a Registered Professional Engineer. The dewatering system shall be designed using accepted professional methods of engineering design consistent with the best current practice.

1.5 MODIFICATIONS TO DESIGN

All modifications to the initial dewatering system design shall be designed and stamped by a Registered Professional Engineer and submitted for review and approval prior to implementation. The Registered Professional Engineer shall be present at the Contractor Quality Control preparatory and initial inspections. The Contractor shall, as a part of the Quality Control plan, furnish a signed statement by the design Professional Engineer stating that the installation is in conformance with the approved design.

1.6 DEWATERING REQUIREMENTS

The dewatering system shall be of a type and capacity to accomplish all requirements specified herein.

(1) The dewatering system shall be designed, installed, and operated to dewater the excavation for canal stages up to and including elevation 4.0 NGVD at the construction site. The dewatering system must also include standby pumping and power supply such that a continuously operable system is available during power outages, pump failures, etc. In order to assure that the standby system is brought on-line in sufficient time to prevent foundation damage, the system shall be either- manned 24-hours a day, including weekends and holidays, by personnel capable of operating the system or a Contracting Officer approved automated system, which assures the requirements of Paragraphs 1.6.2 and

1.8.5 are maintained. The automated system shall be capable of producing a hardcopy of readings indicating these requirements are met. These readings shall be reported to the Contracting Officer within 12 hours after they are obtained. The automated system shall have notification capabilities such that operator personnel will respond within 30 minutes to verify that the system is operating properly.

(2) The water level shall be maintained continuously as specified above so that construction operations can be performed without interruption due to wet conditions.

(3) No upward or vertical or lateral flow of ground water into the excavated area will be permitted at any time. The dewatering system shall be designed, constructed/installed, and operated at all times, including unwatering, rewatering, and/or flooding so as to prevent movement and/or piping of the foundation, excavation slopes, and fill materials. The system shall be operated as necessary during dewatering, unwatering, flooding, and rewatering so as to maintain piezometric levels, within the dewatered area, at or beneath the elevation of the water level in the excavation.

(4) The system may consist of wells, jet eductors, wellpoints, pumps, standby pumps, sumps, sump pumps, ditches, and necessary appurtenances capable, at all canal stages less than or equal to the design stage defined in (1), of intercepting seepage before it exits on any interior surface or excavation face and of providing control of surface water. The system shall be operated as required in (3) above to prevent flooding filter materials and fresh concrete; and shall be designed to control a rainfall intensity six (6) inches in twenty four (24) hours. Protection of all slopes will be required to prevent erosion under normal surface runoff and construction conditions. Slope protection may include proper drainage, mulching, vegetation, geosynthetics, etc.

(5) Unwatering of an excavation need not be accomplished by sumping alone, but may utilize sumping in addition to positive dewatering accomplished with a system meeting the requirements of subparagraph (5) above. Unwatering shall at all times fulfill the requirements of subparagraph (4) above.

(6) Rewatering and/or flooding of the area shall be accomplished by directing surface and ground water into the area. The dewatering system shall be kept operating during such conditions, with dewatering effluent being directed into the excavation. Protection of slopes and excavation surfaces shall be provided as necessary to prevent erosion during flooding operations. No upward or lateral flow of ground water into the excavation will be permitted.

(7) Burying of headers will be allowed only in areas and to depths absolutely necessary for protection against damage at construction equipment crossings.

(8) A piezometer system shall be installed by the Contractor to monitor phreatic surface elevations and to monitor piezometric elevations to evaluate the effectiveness of the dewatering system in fulfilling the requirements specified herein. The Contractor shall make a minimum of two (2) readings per piezometer, per 24-hour period, a minimum of 8 hours apart, based on a 7-day week. These piezometer readings, along with corresponding canal stage readings, shall be recorded and reported to the Contracting Officer within 12 hours after they are obtained.

(9) The piezometer system shall consist of a minimum of 16 piezometers. Four piezometer stations, consisting of two piezometers each, shall be located within the temporary sheet pile dam. At each station, one piezometer shall be tipped in sands located between approximate El –16 and El –26, and the second piezometer tipped between approximate El - 41 and El –60. In addition, four piezometer stations shall be located outside of the excavation area. At each station, two piezometers will monitor the sand deposits delineated above. Each station shall be positioned at complimentary locations near the station inside of the excavation. Within individual excavations for walls, two additional piezometer stations shall be positioned at opposite ends of the excavation. Each station shall consist of two piezometers monitoring the sand deposits delineated above.

(10) The dewatering system shall include mechanical means, such as an in-line Venturi meter for measuring the effluent from each wellpoint segment and/or each well as well as the total effluent of the dewatering system. Devices and techniques used in measurement shall be standard in the industry. The frequency of measurements shall coincide with the requirements for piezometers stated in subparagraph (9) above.

(11) The dewatering system shall be designed, installed, and operated in a manner which will preclude removal of materials from the foundation by the pumping operation (hereafter referred to as "sanding"). After installation, each well, jet eductor, or wellpoint segment shall be individually pump tested at maximum design flow rate to verify acceptability with respect to sanding. The dewatering system shall be designed and constructed/installed so as to permit periodic measuring of sanding characteristics of each well and/or wellpoint segment. Any well or wellpoint segment found sanding at a rate exceeding 1 pint per 25,000 gallons of effluent at any time during this contract shall be replaced at no additional cost to the Government.

(12) The rate of unwatering or rewatering the excavation shall meet the Contracting Officers requirements for operation of Drainage Pumping Station No. 3, yet provide for a stable excavation. Additional provisions and requirements for emergency flooding are specified in Section 01100 General Provisions

paragraphs entitled "FLOODING, DAMAGES AND EXCAVATION REQUIREMENTS".

1.7 SUBMITTALS

Submittals shall be in accordance with Section 01330 – "SUBMITTAL PROCEDURES". The Contractor shall submit an original and 6 copies of its complete dewatering design package with details of the proposed dewatering facilities to the Contracting Officer for review and approval by the Contracting Officer. These details must be presented in the form of shop drawings, including the type of system, planned layout and sizes of wells, jet eductors and/or wellpoints, headers, including all lengths requiring burial, collectors, ditches, piezometers, sumps and pumps; number, type, location, elevation, proposed method of installation, and proposed methods of testing of piezometers; facilities for measuring the flow of water pumped from each well and/or wellpoint segment of the dewatering system; facilities and proposed schedule for monitoring of sanding; provisions for disposal of water from the dewatering system; and plan of operation including flooding and rewatering plans. This submittal shall include the design capacity of each well and/or wellpoint segment at the design stage, and shall be submitted no later than 60 days prior to installation of the system. The Contracting Officer's initial review of the Contractor's proposed dewatering facilities will not exceed thirty (30) calendar days and will be for the purpose of determining (1) the acceptability of the general design concept and layout of the system; (2) the gross capacity of the system at the design stage; and (3) the acceptability of the flooding and rewatering plans. The design and installation procedure of the individual components of the system need not be submitted for review, as the performance of the complete system remains a responsibility of the Contractor. If the Contracting Officer determines, based on the above-mentioned review, that the system appears adequate to accomplish the required results, the system will be approved for installation. If the Contracting Officer's review determines that the Contractor's proposed dewatering facilities are either inadequate or inappropriate to accomplish the required results, the Contractor will be so notified in writing, and the basis for rejection will be included. Subsequent approval of the plan for installation, either as submitted or revised as a result of the review, should not be interpreted as the Government accepting responsibility for the performance of the dewatering system and shall not relieve the Contractor of full responsibility for the proper design, installation, maintenance, operation, and actual performance of both the individual system components and the entire system. After approval of installation, the Contractor shall install the entire dewatering system and shall make no alteration to the planned system without the prior written approval of the Contracting Officer. If, during the progress of the work, the installed dewatering system proves inadequate to meet the requirements specified, including piezometers, the Contractor shall, at its expense, furnish, install, and operate such additional dewatering facilities and/or make such changes, either in features of the system or the plan of operation, as may be necessary to perform the required dewatering without additional cost to the Government.

1.8 GENERAL CRITERIA

All permanent work under this contract except as otherwise specified shall be carried on in areas free of water. The Contractor shall design, furnish, install, operate, and maintain such facilities necessary to accomplish the following:

(1) Collect and dispose of all surface water in the protected area regardless of source.

(2) Control and dispose of all surface water around the periphery of the excavation areas to prevent such water from entering the excavation.

(3) Lower and maintain the water table in pervious and semi-pervious strata at least 3 feet below the bottom of the excavation, but not more than 5 feet within the confines of the temporary retaining structures or excavated area.

(4) Install and monitor construction piezometers inside the temporary retaining structure or excavated area.

(5) Relieve excess hydrostatic pressures in all pervious and semi-pervious foundation layers as outlined below.

A. The deep sand strata between approximate elevation (-) 41 and (-) 60.

Bottom of Excavation (Elev. In Ft.)	Water Depth Above Bottom of Excavation (Ft.)	Required Limits of Piezometric Head (Elev. In Ft.)
(-) 14.5	0	From (-) 2.5 to (-) 4.0
(-) 11.5	0	From (+) 2.5 to (+) 1.0
(-) 9.5	0	From (+) 2.5 to (+) 1.0

B. The shallow sand strata between approximate elevation (-)16 and (-) 26

Bottom of Excavation (Elev. In Ft.)	Water Depth Above Bottom of Excavation (Ft.)	Required Limits of Pizometric Head (Elev. In Ft.)
(-) 14.5	0	From (-) 14.0 to (-) 15.5
(-) 11.5	0	From (-) 8.5 to (-) 10.0

(-) 11.5	7	From (-) 3.0 to (-) 4.5
(-) 9.5	0	From (-) 6.0 to (-) 7.5
(-) 9.5	5	From (-) 2.0 to (-) 3.5

1.9 QUALITY CONTROL

1.9.1 General

The Contractor shall establish and maintain quality control for all dewatering operations to assure compliance with contract requirements and maintain records of his quality control for all construction operations, including but not limited to the following:

(1) Designing.

(2) Fabrication and workmanship.

(3) Installation, operation, and removal.

(4) Monitoring free water surface and piezometric elevations.

(5) Measuring effluent from dewatering system.

(6) Monitoring of sanding.

1.9.2 Reporting

An original and two (2) copies of these records and tests, as well as the corrective action taken, shall be furnished the Government daily. Format of the report shall be as prescribed in Section 01451 – "CONTRACTOR QUALITY CONTROL". Reports of operation and inspection shall include the following data: piezometric elevation, canal stages, time of operation of each pump, time of operation of each wellpoint segment and/or each well, effluent discharge, sanding rates, problems encountered, proposed actions, and any other pertinent data.

1.10 INITIAL TESTING

Upon installation of the system, the Contractor shall test and evaluate the completed system to demonstrate that the system is, in fact, capable of performing the intended dewatering operation as outlined herein. This testing shall include complete falling-head tests to be conducted on each piezometer. The Contractor shall give the

Contracting Officer 24-hour advance notice of its intention to perform testing. The documentation of results of the test shall be provided to the Contracting Officer within 48 hours of completion.

1.11 GROUND WATER QUALITY

Ground water quality testing was done and the results of those tests are shown at the end of this section.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 OPERATION

The Contractor shall perform dewatering and maintain the work areas in a dry condition as long as are necessary for the work under this contract. Once an area is dewatered, it shall be maintained in a dewatered condition until all work in that area is completed, unless flooding is directed by the Contracting Officer or pumping station personnel. In the event that flooding is deemed necessary by the Contracting Officer or pumping station personnel, the protected area shall be flooded in accordance with the sequence of flooding proposed by the Contractor and approved by the Contracting Officer. However, the Contractor shall not flood the protected areas without the approval of the Contracting Officer or pumping station personnel. If flooding is directed by the Contracting Officer or pumping station personnel, the Contractor will be compensated for damages in accordance with the applicable requirements of the General Provision entitled "DAMAGES TO WORK", and the Contract Clause in Section 00700 entitled *Changes(FAR 52.243-4)* If flooding occurs because of the Contractor's fault, negligence, or convenience, all costs resulting from such flooding shall be borne by the Contractor. Commencement of dewatering subsequent to flooding will be subject to prior approval of the Contracting Officer.

3.2 MAINTENANCE AND SERVICING

The Contractor shall be responsible for the maintenance, servicing, and repairs of the entire dewatering system and appurtenances during the life of the contract, including replacement of any and all wells, jet eductors, wellpoints and piezometers performing unsatisfactorily.

3.3 REMOVAL

The dewatering facilities required to maintain a dry condition within the protected area shall be maintained until completion of the work within the protected area, and then shall be completely removed. However, no dewatering facilities of any kind shall be removed without prior approval of the Contracting Officer. All wells, jet eductors,

wellpoints, pumps, and appurtenances employed in the dewatering system and all materials other than earth shall remain the property of the Contractor and shall be removed from the site of the work. All holes created by removal of dewatering facilities shall be plugged in accordance with LADOTD water well closure criteria as stated in Chapter III of "Water Well Rules, Regulations, and Standards, State of Louisiana, dated November 1985". Any approvals of the implementation and/or removal plans by the Contracting Officer do not shift the responsibility for the removal of the system from the contractor to the Government. Nor does it relieve the contractor of his responsibility to provide a removal plan, which comports with industry standards and prudent construction practices.

CERTIFICATE OF ANALYSIS

Sample Description: Sample from S&WB, Pump Sta. #3, Well 04/27/99

Test Parameters & Units	Test Results	Date & Time Analyzed/Analyst
Alkalinity, mg/L as $CaCO_3$	1,300	04/30/99 1052 G. Lohman
Calcium, mg/L	160	04/30/99 1117 G. Lohman
Chlorides, mg/L	4,550	04/29/99 1008 G. Lohman
Dissolved Sillica, mg/L	46.3	05/03/99 1700 G. Lohman
Fluoride, mg/L	0.93	04/30/99 1024 G. Lohman
Iron, mg/L	137	05/03/99 0855 M. Blum
Hardness, mg/L	1,600	04/30/99 1102 G. Lohman
Potassium, mg/L	124	05/06/99 1054 M. Blum
Magnesium, mg/L	292	04/30/99 1117 G. Lohman
Manganese, mg/L	4.0	05/03/99 0931 M. Blum
Sodium, mg/L	2,710	05/06/99 1026 M. Blum
Nitrate, mg/L as N	1.9	04/30/99 0940 G. Lohman
Sulfate, mg/L	19	04/30/99 1005 G. Lohman
Total Phosphorus, mg/L as P	1.90	05/05/99 1524 G. Lohman
Total Coliform, #/100 ml	<10, VHCG	04/27/99 1655 L. Landry
Total Dissolved Solids,mg/L	9,687	05/03/99 1700 L. Landry

VHCG = very high confluent growth

* Note: Only 10 ml of sample was able to be filtered for total coliform

METHODOLOGY

References: Methods for Chemical Analysis of Water and Wastes, U.S.E.P.A. 600/4-79-020,1983

Alkalinity	Method 310.1
Calcium	Method 215.1
Chlorides	Method 325.3
Dissolved Sillica	Method 370.1
Fiuoride	Method 340.1
Iron	Method 236.1
Hardness	Method 130.2
Potassium	Method 258.1
Magnesium	Method 242.1
Manganese	Method 243.1
Sodium	Method 273.1
Nitrate	Method 353.3
Sulfate	Method 375.4
Total Phosphorus	Method 365.1
Total Dissolved Solids	Method 160.1

Standard Method for the Examination of Water and Wastewater, 18th Edition, 1992

Total Coliform Method 9222B

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SECTION 02252 - TEMPORARY RETAINING STRUCTURES

SECTION 02252 - TEMPORARY RETAINING STRUCTURES

PART 1 GENERAL

1.1 SCOPE

This work shall consist of designing, furnishing, installing, maintaining and subsequently removing all temporary retaining structures required to provide protection while installing the required sewer force main on the East and West sides of the London Avenue outfall canal. The Contractor shall be solely responsible for the design, layout, construction, maintenance and subsequent removal and disposal of all elements of the temporary retaining structures.

1.2 MEASUREMENT AND PAYMENT

There will be no measurement for work specified in this section. Payment will be made at the contract lump sum price for "Temporary Retaining Structures". Price and payment shall constitute full compensation for furnishing all plant, labor, materials, and equipment; designing, furnishing, installing, maintaining, and removing the temporary retaining structures and all other work incidental thereto.

1.3 SUBMITTALS

Submittals shall be in accordance with Section 01330 - "SUBMITTAL PROCEDURES". No work shall proceed until the submittals have been reviewed and approved by the Contracting Officer. The Contractor shall submit an original and 4 copies of its complete design package consisting of the following for review not to exceed thirty (30) calendar days by the Contracting Officer:

(1) Design calculations.

(2) Shop Drawings. A detailed layout of temporary retaining structures on standard size (28" x 40") sheets. These shop drawings shall bear the stamp and signature of the Registered Professional Engineer. These drawings shall clearly show:

(a) All pertinent dimensions and locations of these structures with reference to the project centerline (Wall-line, Baseline, etc.).

(b) Material grade, weight, length and designation of steel sheet pile section(s) used.

(c) Bracing details.

(d) Excavation sequence and procedure.

(e) Provisions made for dewatering, indicating stage of excavation vs. necessary drawdown, water loading conditions, soil loads and equipment loads.

(f) Any other items incidental or significant to this work.

1.4 DESIGN CALCULATIONS

1.4.1 Design Procedures

The Contractor shall follow design procedures using the wedge-type method of developing soil pressure for estimating the external forces, set forth in "Steel Sheet Piling Design Manual" excluding the Danish Rules Method published by U.S. Steel Corp.; the "Pile Buck Inc.™ Steel Sheet Pile Design Manual"; or the Free Earth or Fixed Earth methods in the Virginia Tech Dept. of Civil Engineering paper "An Engineering Manual for Sheet Pile Walls" dated November 1987. The design performed by the Contractor must evaluate the overall stability and sizing of the sheet piling and other structural elements for the temporary retaining structures. The Contractor shall use and rely upon the soil borings, design shear strength profile(s) and unit weight data presented in the plans and/or in the figure(s) attached at the end of this section for its design. The structure shall meet all the requirements of Corps of Engineers Safety Manual EM 385-1-1 for fall protection and ingress and egress.

1.4.2 Sheet Pile Wall Design

The design of the sheet pile wall shall be developed using a method of analysis indicated in paragraph 1.4.1, with the safety factor applied to the soil strengths on both sides of the wall, such as a free earth or fixed earth method. The soil properties used shall be those presented in the drawings.

1.4.2.1 Loads

The minimum safety factor used in the geotechnical design for the determination of overturning tip elevation and sheet pile section modulus is 1.30 in the short term (Q) case analysis and 1.0 for the long term (S) shear strength cases.

1.4.2.2 Design of Anchors and Deadmen

In the design of anchors and deadmen the designer shall develop a minimum safety factor of 2.0 for the soil resistance against pull out.

1.4.2.3 Retaining Wall Members

The structural design of the temporary retaining structure excluding the sheet pile shall be designed using industry standards. The earth pressures for the structural design of these wall

members shall be based upon a wedge-type method applying a safety factor chosen by the designer which shall be no lower than 1.0.

1.4.2.4 Designs and Modifications

All designs and any subsequent modifications to the design presented above shall be performed, certified and stamped by a Registered Professional Engineer and submitted to the Contracting Officer for review and approval. The Registered Professional Engineer shall be present at the Contractor Quality Control preparatory and initial inspections. The Contractor shall, as a part of the Quality Control, furnish a signed statement by the design Professional Engineer stating that the installation is in conformance with the approved design.

1.5 QUALITY CONTROL

1.5.1 General

The Contractor shall establish and maintain quality control for all operations to assure compliance with contract specifications and maintain records of its quality control for all construction operations, including but not limited to the following:

(1) Designing.

(2) Materials (type, strength, etc.)

(3) Fabrication, installation and workmanship.

(4) Interlock (inspection and strength).

(5) Placing (location, alignment, etc.).

(6) Driving (hammer, tip el., top el.).

(7) Cutting.

(8) Welding.

1.5.2 Reporting

The original and two (2) copies of these records and tests, as well as the corrective action taken, shall be furnished the Government daily. Format of the report shall be as prescribed in Section 01451 - "CONTRACTOR QUALITY CONTROL".

PART 2 PRODUCTS

2.1 SHEET PILING

The sheet pile shall be hot rolled sheet pile.

PART 3 EXECUTION

3.1 REMOVAL OF MATERIAL

3.1.1 Removal Criteria

The temporary retaining structures shall not be removed until suitable backfill, between the finished structure and the steel sheet pile wall of the temporary retaining structures, is satisfactorily placed and compacted to an elevation approximately one (1') foot below the finished surface. Nor, shall the temporary retaining structures be removed until the completed permanent structure and/or excavations are rewatered. Where voids are induced by removal operations, the Contractor shall pump out all seepage and rainwater and backfill to within 3 feet of the ground surface with a tremie-placed slurry. The slurry shall consist of one part cement, two parts bentonite and six parts sand mixed with enough water to produce a slurry viscous enough to thoroughly fill the voids but have no less than 12 pounds of solids per gallon. The upper 3 feet shall be filled with suitable backfill. [Suitable backfill and compaction requirements shall be as defined in Section 02320 - "STRUCTURAL EXCAVATION AND BACKFILL"]. All Contractor-furnished temporary retaining structures shall be removed from the site of work upon completion of work.

3.1.2 Safety

The removal of the temporary retaining structures shall be accomplished in a manner not injurious to the properties adjacent to and in the proximity of the project excavations.

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SECTION 02315 - STEEL H-PILING

SECTION 02315 - STEEL H-PILING

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all plant, equipment, labor and materials, and performing all operations in connection with the installation of new steel H-piling in accordance with these specifications and applicable drawings.

1.2 MEASUREMENT

1.2.1 Furnishing and Delivering

Permanent piles will be measured for payment for furnishing and delivering by the linear foot of piles required as determined by the results of the pile load tests and furnished to the Contractor. No payment will be made for lengths of piles exceeding required lengths.

1.2.2 Driving

The permanent pile lengths will be determined from the results of pile load tests. Permanent piles will be measured for payment for driving on the basis of lengths, to the nearest tenth of a linear foot, along the axis of each pile acceptably in place below the cut off elevation.

1.3 PAYMENT

1.3.1 Furnishing and Delivering

Payment for furnishing and delivering the required lengths of permanent H-piles will be made at the contract unit price per linear foot for "FURNISH AND DELIVER STEEL H-PILING (HP 14 X 73)", with price and payment constituting full compensation for all costs of furnishing and delivering piles to the work site.

1.3.2 Driving

Payment for driving permanent piles, measured as specified in paragraph 1.2.2, will be made at the contract unit price per linear foot for "DRIVE STEEL H-PILING (HP 14 X 73)", with price and payment constituting full compensation for costs of handling, driving, measuring heave, redriving heaved piles, cutting off piles at the cutoff elevation, compiling and submitting pile driving records, backfilling voids around piles, and any other items incidental to driving piles to the required elevation.

1.3.3 Pulled Piling

Piling which are directed to be pulled and found to be in good condition and then redriven will be paid for by an equitable adjustment under the Contract Clause in Section 00700 entitled "CHANGES (FAR 52.243-4)". Piling pulled and found to be damaged through no fault of the Contractor will be paid for under the Contract Clause in Section 00700 entitled "CHANGES (FAR 52.243-4)".

1.3.4 Misaligned or Misplaced Piles

When a pile is driven but not acceptably placed or driven out of alignment and pulled at the direction of the Contracting Officer, no payment will be made for either originally furnishing and driving such pile or for the operation of pulling. If the pile is undamaged and it is acceptably redriven at the direction of the Contracting Officer, it will then be paid for at the contract unit price.

1.3.5 Filling Voids Around Driven Piles

No separate payment will be made for backfilling voids around piles with fill material. All costs in connection therewith shall be included in the contract unit price for driving piles covered in paragraph 1.3.2.

1.4 APPLICABLE PUBLICATIONS

The following standards of the issues listed below and referred to thereafter by basic designation only form a part of this specification to the extent indicated by the references thereto:

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A 36	(2001) Standard Specification for Carbon Structural Steel
A706	(2001) Standard Specification for Low Alloy Steel Deformed and Plain Bars for Concrete Reinforcement

1.5 SUBMITTALS

The Contractor shall submit descriptions of pile driving equipment, shop drawings, test procedures, test reports and certificates, pile driving records and other required submittals to the Contracting Officer for approval as required. Submittals and associated work not satisfactory to the Contracting Officer will be rejected.

1.5.1 Equipment Descriptions

Complete descriptions of pile driving equipment including hammers, extractors, protection caps and other installation appurtenances shall be submitted for approval prior to commencement of work.

1.5.2 Shop Drawings

Shop drawings for H-piling shall show complete dimensions and details of piling and shall show the driving sequence and location of piling. Shop drawings shall include details and dimensions of templates and other temporary guide structures for installing the piling, and shall provide details of the method of handling piling to prevent permanent deflection.

1.5.3 Materials Test Certificates

Material test certificates shall be submitted for each shipment and identified with specific lots prior to installing piling. Identification data should include piling type, dimensions, chemical composition, mechanical properties, section properties, heat number and mill identification mark.

1.5.4 Driving Records

Records of the pile driving operations shall be submitted after driving is completed. All driving records shall be submitted on LMV form 461-R.

1.6 QUALITY CONTROL

1.6.1 General

The Contractor shall establish and maintain quality control for pile driving operations to assure compliance with contract specification and maintain records of his quality control for all construction operations including, but not limited to, the following:

(1) Driving of H-piling. The record shall include the pile number or identification, location, size, length, elevation of tip, cut-off and top of pile, the number of blows and ram drop (in inches) required for each foot of penetration throughout the entire length of the pile, and the number of blows per inch for the last 18 inches of penetration. The record shall include the type and size of the hammer, the rate of operation, the type and dimensions of driving helmet, the cap-block and pile cushion used. The location and elevation of any obstruction or unusual occurrence encountered during driving shall be recorded and immediately reported to the Contracting Officer. His directed action shall also be recorded.

(2) Recording uplift and vertical tolerances after driving, pulled and redriven piles, and removal and disposal of damaged piles.

(3) Cutting and splicing of piling (welding).

(4) Plumbness of piling.

(5) Penetration depth.

(6) Stockpiling.

1.6.2 Reporting

The original and two copies of these records and tests, as well as the records of corrective action taken, shall be furnished to the Government daily. Format of the report shall be as prescribed in Section 01451, "CONTRACTOR QUALITY CONTROL".

1.7 QUALITY ASSURANCE

Requirements for material tests, workmanship and other measures for quality assurance shall be as specified herein and in Section 05501, "METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS". All steel H-piling and appurtenant materials shall be tested and certified by the manufacturer to meet the specified chemical, mechanical and section property requirements prior to delivery to the site.

1.8 DELIVERY, STORAGE AND HANDLING

Materials delivered to the site shall be in a new and undamaged condition and shall be accompanied by certified test reports. The manufacturer's logo and mill identification mark shall be stamped on each unspliced piling at a minimum of two locations. All piling shall be stored and handled in the manner recommended by the manufacturer to prevent permanent deflection, distortion or damage to the interlocks. Storage of piling should also facilitate required inspection activities.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 H-Piles

Steel for H-piling shall conform to the requirements of ASTM A 36. The H-piling shall be of the shape and sections shown on the drawings. Piling shall have standard square ends, unless otherwise specified or directed. Lengths of piling shall be as shown on the drawings. All steel H-piling shall be furnished full length.

2.1.2 Tension Dowels

Tension dowels shall be installed on steel H-piles, as required. Tension dowels shall be 3-1" diameter steel bars welded to 1/2" x 6" x 10" steel plates and attached to the required H-pile as shown in the plans. Tension Dowels shall conform to the requirements of ASTM A706.

PART 3 EXECUTION

3.1 PILE DRIVING EQUIPMENT

The Contractor shall select the proposed pile driving hammer and driving system as specified and submit it to the Contracting Officer for approval as required in paragraph 4.1. Final approval of the proposed hammer and driving system is subject to the satisfactory completion and approval of pile tests. Changes in the selected pile driving system will not be allowed after the system has been approved by the Contracting Officer except as directed by the Contracting Officer. No additional contract time will be allowed for Contractor proposed changes in the approved driving system.

3.1.1 Pile Driving Hammers

Pile driving hammers shall be of the impact type.

3.1.1.1 Impact Hammers

H-piling shall be driven by an approved steam, air or diesel drop, single-acting, double-acting, or differential-acting pile driving hammer. The size and capacity of the hammer shall be as recommended by the manufacturer for the pile weights and soil formations to be penetrated. The hammer shall be operated at all times at the steam or air pressure and at the speed recommended by the manufacturer. Boiler or compressor capacity shall be sufficient to operate the hammer continuously at full rated speed. Hammers shall have a gage to monitor hammer bounce chamber pressure for diesel hammers or pressure at the hammer for air and steam hammers. This gage shall be operational during the driving of piles and shall be mounted in an accessible location for monitoring by the Contractor and Contracting Officer. Two spare operational bounce chamber read out units shall be available on site. The Contractor shall provide bounce chamber pressure gage correction tables and charts for the type and length of hose to be used with the pressure gage to the Contracting Officer. The Contractor shall submit the following information for each impact hammer proposed:

(1) make and model;

(2) ram weight (pounds);

(3) anvil weight (pounds);

(4) rated stroke (inches);

(5) rated energy range (foot-pounds);

(6) rated speed (blows per minute);

(7) air pressure, hammer, and compressor (pounds per square inch);

(8) rated bounce chamber pressure curves or charts, including pressure correction chart for type and length of hose used with pressure gage (pounds per square inch);

(9) pile driving cap, make, and weight (pounds);

(10) cushion block, dimensions, and material type; and,

(11) power pack description.

3.1.1.2 Vibratory Hammers

The use of vibratory hammers will not be allowed.

3.1.2 Pile Driving Leads

Impact hammers shall be supported and guided with fixed extended leads or fixed underhung leads. Two intermediate supports for the pile in the leads shall be provided to reduce the unbraced length of the pile during driving and pulling.

3.1.3 Pile Extractors

Pile extractors may be vibratory and/or impact pile driving hammers. Impact hammers are required for pulling piles not extractable with vibratory hammers.

3.1.4 Jetting Equipment

Jetting shall not be allowed.

3.1.5 Following

Piles are not to be followed.

3.1.6 Pre-drilling

Piles are not to be pre-drilled.

3.2 PERMANENT PILES

3.2.1 Lengths

The estimated quantities of piles listed in the bidding schedule to be furnished by the Contractor are given for bidding purposes only. The Contracting Officer will determine the actual lengths of piles required to be driven below cutoff elevation for the various locations in the work and will furnish the Contractor a quantities list indicating lengths and locations of all piles to be furnished and placed. This service pile length determination will be made from the results of pile load tests.

3.3 PLACING

H-piling shall be driven as accurately as practicable in the correct locations, true to line both laterally and longitudinally and to the vertical or batter lines, all as indicated in the drawings. A lateral deviation from the correct location at the cut-off elevation of not more than 3 inches will be permitted. A variation in slope of not more than 1/4-inch per foot of longitudinal axis will be permitted. The correct relative position of group piling shall be maintained by the use of templates or by other approved means. Any H-pile driven out of correct location shall be pulled and redriven by the Contractor at no additional cost to the Government.

3.4 DRIVING

H-piling shall be driven by an approved steam, air or diesel drop, single acting, double-acting, or differential- acting pile driving hammer. The size and capacity of the hammer shall be as recommended by the manufacturer for the pile weights and soil formations to be penetrated. No drilling or jetting will be allowed before or during driving operations without Contracting Officer's written approval. The hammer shall be operated at all times at the steam or air pressure and at the speed recommended by the manufacturer. Boiler or compressor capacity shall be sufficient to operate the hammer continuously at full rated speed. To determine ram drop, the Contractor shall attach a scale (in inches) to the pile hammer and an indicator on the pile ram (see drawing at end of this section). Installation of both devices shall be in such a manner that displacement of the ram will be indicated on the scale. Both the scale and the indicator shall be easily legible to observers on the ground during operations. Piling shall be protected during driving by a cushion and cap of approved design. Pile drivers shall have firmly supported leads extending to the lowest point the hammer must reach to maintain the hammer in proper alignment at all times. Each pile shall be driven continuously and without voluntary interruption except for splicing until the required depth of penetration has been attained. Deviation from this procedure will be permitted only in case the driving is stopped by causes which could not reasonably have been anticipated. Any pile that cannot be driven to the required depth because of an obstruction shall, as directed by the Contracting Officer, be pulled and another pile driven adjacent thereto, be cut off and used, or be abandoned

as directed by the Contracting Officer. Where voids adjacent to the steel H-piling are induced by pile driving or pulling operations, the Contractor shall pump out all seepage and rain water and backfill to within 3 feet of the ground surface with a tremie-placed slurry. The slurry shall consist of one part cement, two parts bentonite, and six parts sand mixed with enough water to produce a slurry viscous enough to thoroughly fill the voids. The upper 3 feet of the hole shall be filled with earth. The Contractor shall make observations to detect any uplift of piling already driven and uplifted piling shall be backdriven to the original penetration, at no additional cost to the Government. Piling shall not be driven within 100 feet of concrete less than 7 days old nor within 30 feet of concrete less than 28 days old. The Contractor shall provide every facility for the Contracting Officer to inspect and record data relative to pile driving operations. This data shall include blows and ram drop (in inches) per foot of pile penetration, final tip elevation, and blows per inch prior to seating.

3.4.1 Scale

A scale (inches) shall be fixed to the hammer's ram guide and a pointed indicator on the ram, near the scale, to allow a reading of the ram drop (see example diagram at the end of this section). Installation of both scale and indicator shall be in such a manner that the drop of the ram can be read by observing the highest and the lowest position of the indicator and scale. Both the scale and the indicator shall be easily legible to observers on the ground during operations. The Contractor shall record in the pile driving record the ram drop of the pile hammer when recording the blows per foot as specified in paragraph 3.2.

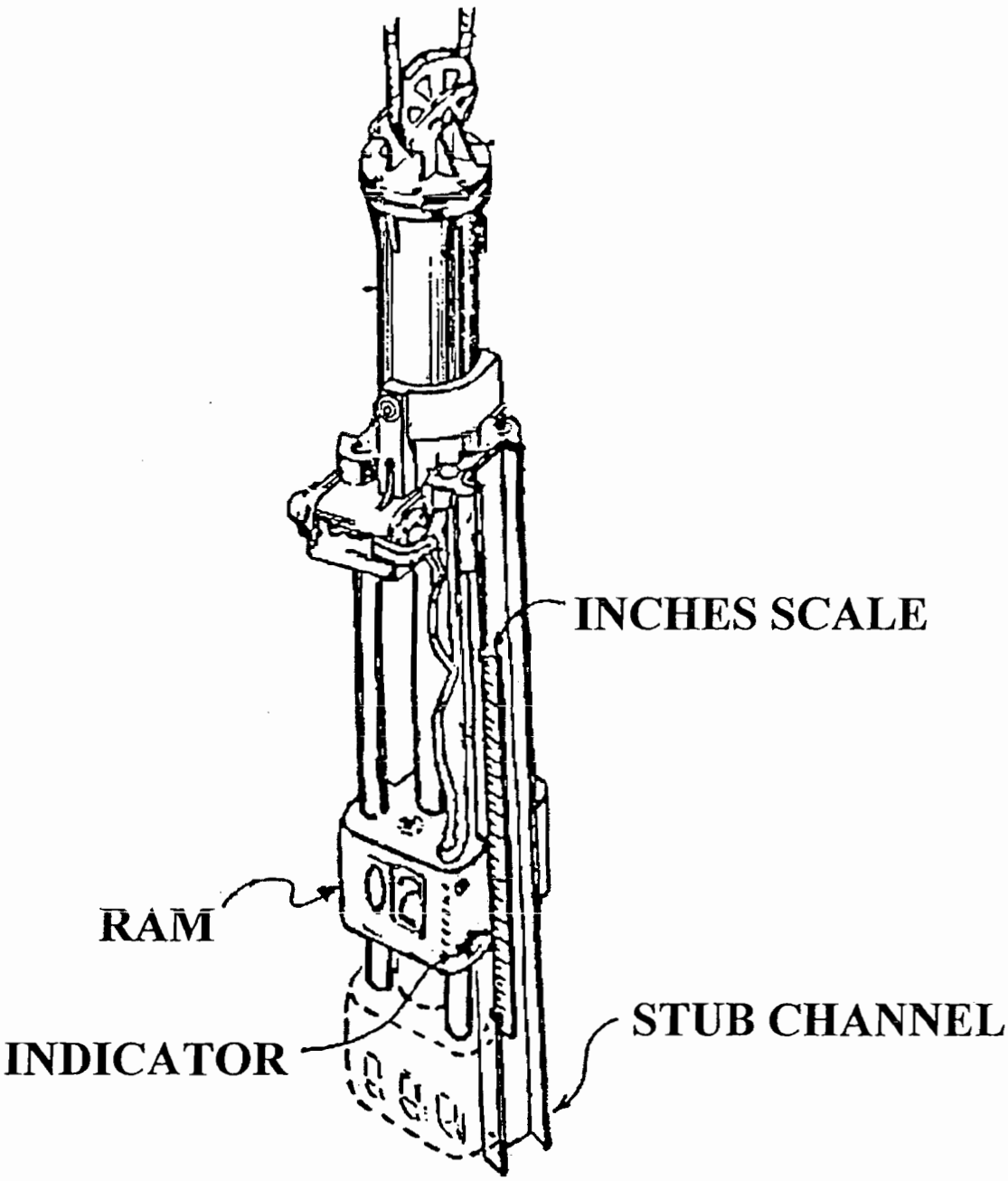
3.5 DAMAGED AND MISPLACED PILING

Any pile which is damaged because of internal defects or by improper handling or driving, or which is otherwise damaged by fault of the Contractor so as to impair it for its intended use, or any pile driven out of proper location, shall be removed and replaced. All work of removal and cost of replacement shall be borne by the Contractor at no additional expense to the Government. The Contracting Officer may require the Contractor to pull certain selected piling after driving for inspection to determine the condition of the piling. Any pile so pulled and found to be damaged to such extent as, in the opinion of the Contracting Officer, would impair its usefulness in the completed structure, shall be removed from the site of the work and the Contractor shall furnish and drive a new pile to replace the damaged pile. Piling pulled and found to be sound and in a satisfactory condition as determined by the Contracting Officer's Representative shall be redriven. Any holes which remain as a result of pulling operations shall be filled as specified in paragraph 3.4.

3.6 VIBRATION MONITORING

An independent testing laboratory retained by the Sewerage and Water Board of New Orleans will monitor vibrations during pile driving operations. The Contractor shall

give the government at least 72 hours advanced notice before beginning pile driving operations.



PILE HAMMER

FIGURE 1.

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SECTION 02320 - STRUCTURAL EXCAVATION AND BACKFILL

SECTION 02320 - STRUCTURAL EXCAVATION AND BACKFILL

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all plant, labor, equipment and materials, and performing all operations in connection with all excavation, backfilling as required to complete this project. Work required by this section shall consist of the excavation, removal and disposal of all excavated material not expressly designated for removal under any other section. All material required and used to backfill all excavations not expressly backfilled according to other requirements of these specifications shall be granular and shall conform to the material specifications below.

1.2 MEASUREMENT AND PAYMENT

1.2.1 Structural Excavation and Backfill

No separate measurement or payment will be made for structural excavation and backfill.

1.2.2 Payment

Payment for structural excavation and backfill will be made at the contract lump sum price for "STRUCTURAL EXCAVATION AND BACKFILL". Price and payment shall constitute full compensation for furnishing all plant, labor, materials, and equipment to complete the work as specified herein and as shown on the drawings.

1.3 REFERENCES

The following publications of the issues listed below, but referred to before and thereafter by the basic designation only, form a part of this specification to the extent indicated by the references thereto:

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARD.

D 422 (1963) Standard Test Method for Particle – Size Analysis of Soils

D 698 (2000) Standard Test Methods for Laboratory Compaction Characteristics for Soil Using Standard Effort (12,400 Ft.-Lbf/Ft)

U.S. ARMY CORPS OF ENGINEERS ENGINEER MANUAL.

1.4 QUALITY CONTROL

The Contractor shall establish and maintain quality control for excavation operations to assure compliance with contract requirements and maintain records of his quality control for all construction operations including but not limited to the following:

(1) Equipment. Type, size, and suitability for construction of the prescribed work.

(2) Structural Excavation. Check grade, slopes, and dimensions for compliance with design sections.

(3) Grade Tolerances. Check fills to determine if placement conforms to prescribed grade and design section.

(4) Construction. Layout, maintaining existing drainage, moisture control, thickness of layers, spreading and compacting.

(5) Classification of soils, placing and compacting of granular fill, and density tests.

(6) Control Testing.

The Contractor shall perform all control testing such as particle size analysis. No separate measurement and payment will be made for control testing required in this paragraph. The Contractor shall include any and all costs for control testing in the contract prices for items of work to which the work is incidental thereto.

1.4.1 Reporting

The original and two copies of these records of inspections and tests, as well as the records of corrective action taken, shall be furnished the Government daily. Format of the report shall be as prescribed in Section 01451, "CONTRACTOR QUALITY CONTROL".

2.1 MATERIALS

All backfill shall be granular material according to the following requirements

2.1.1. Backfill Material

contain more than a total of 15% clay and silt passing a No. 200 sieve; and shall meet the following gradation requirements.

U. S. Sieve	Percent Passing (By Weight)
1/2"	100%
No. 10	75 - 100%
No. 200	0 - 15%

The granular material shall be obtained from commercial sources approved by the Contracting Officer.

2.1.1.1 Density Requirements

All granular material shall be placed in lifts no greater than eight (8") inches before compaction. Density shall be ninety-five (95%) percent of maximum density within plus or minus (±) 3% of optimum moisture according to ASTM D698. The minimum frequency of density testing shall be one (1) test per lift of fill.

2.1.2 Suitable From Excavation

Granular or non-granular material not classified as unsuitable as described in paragraph 3.4

2.2 EQUIPMENT

Equipment for compaction shall conform to the requirements herein.

2.2.1 Hand Tampers

Hand tamping shall be used in the compaction of structural fill within three feet of any floodwall or structure and near floodwalls and structures where vehicular equipment cannot be used. These hand tampers should be power driven, hand operated type.

2.2.2 Alternative Compaction Equipment

The Contractor may propose for use alternative types of compaction equipment not included in these specifications. The suitability of the alternative equipment must be demonstrated to the Contracting Officer by a field test conducted by and at the expense of the Contractor. The alternative compaction equipment must be capable of properly compacting the soil so that no planes of weakness or laminations are formed in the fill. Additionally, the alternative compaction equipment must not detrimentally affect any adjacent structure. The field test shall consist of compacting a minimum of three layers of an area of embankment with the alternative type equipment.

2.2.3 Miscellaneous Equipment

Scarifiers, disks, spring-tooth or spike-tooth harrows, spreaders, power tampers and other equipment shall be of types suitable for the required construction. Sprinkling equipment shall be designed to apply water uniformly and in controlled quantities to variable widths of surface.

PART 3 EXECUTION

3.1 STRUCTURAL EXCAVATION AND BACKFILL

3.1.1 General

The Contractor shall make all excavations required for the construction of the structure. Suitable material from required structural excavation shall be used in the semi compacted backfill. Materials determined to be unsuitable by the Contracting Officer shall be ordered wasted.

3.1.2 Structural Backfill

Structural Backfill is defined as any soil material which is placed within the limits of the structural excavation and the final grade as indicated on the drawings, and as herin specified. Structural Backfill shall also include soil material placed behind the steel sheetpile bulkhead. The Contractor shall fill all excavations to grades shown on the drawings. Structural backfill shall not be placed against concrete structures for a minimum of 14 days after the concrete is placed. The contractor may at his expense place fill sooner if he furnishes and tests cylinders to demonstrate that the concrete has achieved 75% of its design capacity.

3.1.3 Granular Backfill

The structure shall be backfilled with compacted granular material (non plastic) to the final grade elevations shown on the drawings.

3.2 DEWATERING AND PRESSURE RELIEF

It shall be the responsibility of the Contractor to devise and execute construction procedures which will maintain the excavation in a dry and stable condition throughout the construction period. For Dewatering requirements see Section 02242 "DEWATERING".

3.3 EXCAVATION IN CANAL ABOVE CONCRETE CANAL LINING

Excavation of all material occurring in the London Avenue Canal above the existing concrete canal lining shall be according to Section 02081 "REMOVAL AND DISPOSAL OF CANAL SEDIMENT MATERIAL".

3.4 UNSUITABLE MATERIALS

Materials, which are classified as unsuitable backfill, are defined as material containing organic matter, sticks, branches, roots, brick, concrete, rock, and other debris.

3.5 FROZEN MATERIALS

Under no circumstances shall frozen earth, snow or ice be placed in the fill. The Contracting Officer may require the wasting of frozen material.

3.6 DRESSING

The fill shall be brought to not less than the prescribed design cross section at all points. Unreasonable roughness of surface shall be dressed out to permit fertilizing and seeding operations.

3.7 SHORING

The Contractor shall provide all necessary shoring, bracing, sheeting, underpinning, and/or supports as may be required for construction of structures. A design and the method of installing the proposed shoring shall be submitted to the Contracting Officer for approval at least 30 days prior to its actual intended use. Upon completion of the structure, the Contractor shall remove the shoring at the direction of the Contracting Officer or his representative. The void created by the shoring removal shall be backfilled and the surface area shall be treated to match the existing surface prior to the installation of the shoring. Excavations more than 5 feet deep shall be shored unless shown otherwise on the drawings. Additional requirements for shoring shall be in accordance with Section 25 "Excavations" of EM 385-1-1, the Corps of Engineers Safety Manual.

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SECTION 02355 - PILE LOAD TEST

SECTION 02355 - PILE LOAD TESTS

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all plant, equipment, labor, and materials, and performing all operations in driving, testing, pulling, and removing of steel H-piles, in accordance with these specifications and as shown on the drawings. Test methods described herein are generally in accordance with ASTM D 1143 and D 3689. The Contractor shall submit his plan for conducting tests to the Contracting Officer for approval a minimum of 30 days prior to the beginning of the tests. The test pile site is located on the drawings. Steel H-piles are specified in Section 02315.

1.2 REFERENCES

The following publications, referred to thereafter by basic designation only, form a part of this specification to the extent indicated:

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 1143	(1994) Method of Testing Piles Under Static Axial Compressive Load
D 3689	(1995) Standard Test Method for Individual Piles Under Static Axial Tensile Load

1.3 MEASUREMENT AND PAYMENT

1.3.1 Furnishing and Driving Test Pile

Measurement for furnishing and driving test piles shall be per each test pile driven in place. Payment for two (2) test piles and all costs in connection therewith will be made at the contract unit price for "FURNISH AND DRIVE TEST PILE (HP 14 X 73)". Price and payment shall constitute full compensation for furnishing all plant, labor, equipment, and materials for furnishing and driving test piles; for furnishing and removing the casing including any excavation and all operations incidental thereto.

1.3.2 Furnishing and Installing Load Frame

1.3.2.1 Furnishing Load Frame. No separate measurement will be made for furnishing the load frame. Payment for all costs in connection therewith will be included in the contract unit price for "FURNISH LOAD FRAME." Price and payment shall constitute full compensation for furnishing all plant, labor,

equipment, and materials necessary to furnish the load frame, and all operation incidental thereto.

1.3.2.2 Installing Load Frame. Installation of the load frame will be measured by the number of times a frame is successfully installed and finally removed. Payment for installation of the load frame will be made at the applicable contract unit price for "INSTALL LOAD FRAME." Price and payment shall constitute full compensation for furnishing all plant, labor, equipment, and materials necessary to successfully install and finally remove the load frame to facilitate testing of Test Piles, and all operations incidental thereto.

First Installation

1.3.3 Pile Test

Pile tests will be measured by the number of pile test performed. Payment for pile test will be made at the applicable contract unit price for "FIRST COMPRESSION TEST" or "FIRST TENSION TEST". Price and payment shall include calibration of the extensometers, load cell, and hydraulic jack; furnishing, placing and removing test loads and test equipment; and all operations incidental thereto.

1.3.4 Additional Load Testing

Any additional installation of the load frame, or additional compression and/or tension tests will be paid for at the applicable contract unit price for "ALL OVER FIRST ~~LOAD FRAME~~ INSTALLATION", "ALL OVER FIRST COMPRESSION TEST"" or "ALL OVER FIRST TENSION TEST", whichever is applicable.

1.3.5 Sequence of Testing Piles

The Contractor shall drive test piles TP-1 and TP-2 to their required tip elevation. The Contractor shall then install one (1) loading frame for testing TP-1 only. After testing of TP-1 has been completed and the results have been studied by the Contraction Officer, a decision regarding the advisability of installing a loading frame and testing TP-2 will be made.

The Contracting officer will be the sole judge as to the advisability of testing TP-2.

If TP-2 is load tested, the contractor shall install the second loading frame and perform the load test on TP-2 according to the plans and these specifications.

Upon completion of load testing the Contractor shall remove all test piles and loading frames according to these specifications.

1.4 QUALITY CONTROL

1.4.1 General

The Contractor shall establish and maintain quality control for all operations to assure compliance with the contract requirements and maintain records of his quality control for all construction operations including, but not limited to, the following:

(1) Facilities and personnel providing for installation and reading by the Contractor of all measuring devices.

(2) Compression test (pile number, location); loading frames and description (number, size, type, and location of supporting piles); sequence and method of loading; records of measurements, and driving records.

(3) Tension test (pile number, location); description of loading yoke and yoke installation (number, size, type, and location of supporting piles); sequence and method of loading; records of measurements, and driving records.

1.4.2 Reporting

The original and two copies of these records and tests, as well as records of corrective action taken, shall be furnished to the Government daily. Format of reports other than test data shall be as prescribed in Section 01451, "CONTRACTOR QUALITY CONTROL".

1.5 SUBMITTALS Submit testing procedures, testing apparatus,

The Contractor shall furnish all data from each pile tested within 24 hours after completion of each test. Blow counts shall be recorded for each foot of each test pile and, in addition, the Contractor shall complete revised LMN Form 1119 (Pile Driving Report) and furnish copies to the Contracting Officer. The Pile Driving Report shall include, but not necessarily be limited to, unusual driving conditions, interruptions or delays during driving and any other information considered pertinent. Pile test data shall be recorded for all items shown in paragraph 1.7. Copies of these forms shall also be furnished to the Contracting Officer.

1.6 TEST MEASUREMENT

Measurements of compression and tension loads, deflections and settlements, of the test piles and reports on all test piles shall be made by the Contractor. The lengths of the steel service piles as determined by the result of the load tests shall be determined by the Contracting Officer and furnished to the Contractor within 20 days after receipt of the last test report.

1.7 REPORTS

The report of the load test shall include the following items where applicable:

1.7.1 General

(1) Project Identification

(2) Location

1.7.2 Pile Installation Equipment

(1) Make, model, type, and size of hammer

(2) Weight of hammer and ram

(3) Stroke of ram

(4) Rated energy and operating speed of hammer

(5) Type and thickness of cap blocks and pile cushions

(6) Weight and dimensions of drive-cap and follower

1.7.3 Test and Support Piles

(1) Identification of test pile(s)

(2) Type of piles

(3) Pile material including basic specifications

(4) Dimensions of pile

(5) Pile weight as driven

(6) Which piles vertical-batter

(7) Degree of batter

(8) Driven length

(9) Embedded length

(10) Tested length, and

(11) Final elevation of piles butt referenced to fixed datum (identify datum)

1.7.4 Pile Installation - Test and Support.

(1) Date driven

(2) Pre-excavation or jetting - depth, size, pressures, duration, etc.

(3) Operating of hammer during final driving

(4) Driving log, blows per foot

(5) Final penetration resistance, blows per inch

(6) Description of special installation procedures used, and

(7) Notation of any unusual occurrences during installation

1.7.5 Pile Testing

(1) Date tested

(2) Type of test pile

(3) Type of load application apparatus

(4) Number of support piles of each test

(5) Instrumentation used to measure pile movement

(6) Special testing procedures used

(7) Temperature and weather conditions during test

(8) Tabulation of all load-time-movement reading

(9) Gages, scales, and reference points identified

(10) Adjustment made to field data and explanation

(11) Notation of any unusual occurrences during test, and

(12) Test jack and other required calibration reports

PART 2 PRODUCTS

2.1 TYPES AND PROPERTIES

Steel H-piles shall conform to the requirements of Section 02315. Tip elevations are shown in paragraph 3.1.3.

PART 3 EXECUTION

3.1 PLACING TEST PILE

3.1.1 Placement

Test piles TP1 and TP2 shall be driven vertically to the tip elevation and at the locations shown on the drawings. A variation from the vertical of not more than 1/4-inch per foot of longitudinal axis will be permitted, in accordance with Section 02315.

3.1.2 Casing

All test piles shall be driven within a twenty-four (24") inch diameter excavated steel casing which will extend from the existing ground elevation to the pile cut-off elevation of minus (-)13.72.

3.1.3 Tip Elevation

Tip elevation of all test piles shall be as outlined below:

TP-1	-	(-) 83.7 NGVD
TP-2	-	(-) 93.0 NGVD

3.1.4. Service Load

(a) Service Load in Compression = 65 Tons

(b) Service Load in Tension = 50 Tons

3.2 DRIVING TEST PILE

The service pile driving procedures specified in Section 02315 also apply to the driving of test piles. The hammer used for driving the test piles shall be the same hammer that will be used to drive the service piles.

3.3 TEST PILE LOADING

3.3.1 Scope

This part covers procedures for testing vertical foundation piles to determine the response of the pile to a static compressive or tensile load applied axially to the pile. Determination of the allowable compression and tensile load for the pile is made by the incremental loading and measurement of the pile deformation.

3.3.1.1 Compression and Tension Tests

Test piles TP1 and TP2 shall be furnished in the lengths required and driven at the location shown on the drawings. A minimum time period of twenty-one (21) days shall be allowed to elapse between driving of the piles and the initiation of a compression test. There will be no payment nor additional time granted for delays incurred between driving of test piles and initiation of pile tests. A minimum time of 14 days shall elapse between the compression and tension test of any single pile.

The Contractor will drive two (2) test piles (TP1 and TP2). The Contractor will be required to test TP-1 in both compression and tension. Should the contracting officer feel it necessary, the Contractor will be required to also test TP-2 in compression and tension.

3.3.2 General Procedures

The Contractor shall provide and be responsible for furnishing all necessary apparatus, measuring equipment, and personnel to install, test, and extract the test piles described within this specification in its entirety. The recording and reporting of all data shall be the responsibility of the Contractor. However, the Contracting Officer's representative shall have free access to the pile test data at any time. A Government representative (engineer) will be present during the load tests. The Contractor shall provide the Contracting Officer 72 hours notice prior to initiating each pile load test in order that arrangements may be made to have a Government representative present during the test. The reduction, analysis, and interpretation of the test data will be accomplished by Government personnel after completion of each pile test. Additional pile tests may be required as determined by the Contracting Officer. In order to prevent disturbances to the instrumentation readings, construction activities, equipment movement, or operation of construction equipment, will not be permitted within 200 feet of any load test in progress.

3.3.3 Loading Frames

For illustration purposes, the loading frames for applying known compressive loads to a pile are shown on the drawings. Loading frames shall be constructed so that the loads are applied axially to minimize eccentric loading. Design considerations such as sizes, numbers, and material of specific beams, support piles, bearing plates, etc., shall be the responsibility of the Contractor and subject to approval of the Contracting Officer. Included with his plan for conducting the tests, the Contractor shall submit computations used in the design of the loading frame. The computations shall be certified by a registered professional engineer. For the compression test, a steel bottom bearing plate of appropriate thickness for the loads involved shall not be less than the size of the pile butt, nor less than the area covered by the base of the hydraulic jack. A top bearing plate shall have a size not less than the load cell head, nor less than the total width of the reactor beam(s). The support piles for the loading frame shall be placed as far from the test piles as practicable, but in no case less than a clear distance of 8-feet (2.4 m). The box or platform shall be loaded with any suitable material such as soil, rock, concrete, steel, or water filled tanks with a total

weight (including that of the test beams(s) and box or platform) at least 10 percent greater that the anticipated maximum test load. The anticipated maximum test load is three times the service load.

3.3.4 Apparatus for Applying Pile Load and Measuring Movement

All equipment related to the load test (extensometers, level, load cell, hydraulic jack, scales, mirrors, etc.) and testing shall be furnished and operated by the Contractor. Typical apparatus setup is depicted on the drawings. The hydraulic jack shall be equipped with a pressure reading gage calibrated in tons and with a ram having a spherical bearing head to minimize eccentric loading. The jack shall be capable of maintaining constant loads between load changes and shall be calibrated prior to the test so that the load applied is controllable to within 5 percent. The load cell (non-self-leveling) shall be an electric strain gage type equipped with a readout device. Load cells shall be calibrated prior to the test to an accuracy within 2 percent of the applied load. The changing and maintaining of loads on each test pile shall be done utilizing the load cell as the primary loading device and pressure gage on the jack as a backup. However, both readings shall be recorded. Extensometers shall be used to measure pile movement and shall have dial gages with stems having at least a 2-inch (50 mm) travel, or sufficient gage blocks shall be provided to allow this travel with shorter gage stems. Gages shall be read to an accuracy of 0.001-inch (0.025 mm). Smooth bearing surfaces perpendicular to the direction of the measurements shall be provided for by the gage stems. The hydraulic jack, load cell, and extensometers shall be calibrated both before the start and after the completion of the testing program, by a certified testing laboratory for both the loading and unloading cycles and calibration curves furnished to the Contracting Officer. The calibration curves shall be load cell strain readings versus load in tons. In developing the calibration curves, the load cell shall be placed above the jack in the testing machine and the loads shall be applied through the ram to the load cell to the testing machine in the actual working manner of the field loading system. Two reference beams, one on each side of the pile, shall be independently supported with supports firmly embedded in the ground at a clear distance of not less than 8-feet (2.5 m) from the test pile, and 7 to 8 feet (2.1 to 2.5 m) from the support piles. Reference beams shall be of sufficient stiffness to prevent excessive deflections. Reference beam stakes shall have firmly embedded in the ground. If steel reference beams are used, one end of each beam shall be free to move as the length of the beams change with temperature variations. As a backup to the extensometers, an engineer's level and scale shall be used to check the movement of the test pile. The level shall also be used to check the movement of the support piles. Scales used to measure pile movements shall read to 1/64th of an inch or to 0.01 inch (0.25 mm). Target rods shall read 0.001 foot (0.3 mm). All dial gages, scales, and reference points shall be clearly marked with a reference number or letter to assist in recording data accurately. Readings from the surveyor's level may be taken on a target rod or a scale and shall be referenced to two permanent benchmarks located outside the immediate test area or the surveyor's level shall be mounted on an object of fixed elevation (for example, a driven pile) outside of the immediate test area. Readings

shall be taken on two fixed points or scales on opposite sides of the pile or pile cap or on a single fixed point or scale in the center of the pile top or pile cap. Readings shall be taken on a sufficient number of support piles and on the reference beams to establish if there is any movement. A tarpaulin of minimum dimension of 12-feet x 12-feet shall be installed by the Contractor to protect at all times the instrumentation, measuring system, and prevent adverse temperature variations.

3.3.5 Loading Procedure and Measurement of Pile Movement

After the test piles are driven, the Contractor shall allow a time period of not less than 21 days to elapse before loading the test piles. Apply loads to the piles in increments of 25 percent of the anticipated service load until 200 percent of the service load is reached or until failure, which ever occurs first. The rate of application and removal of load shall be 2 tons per minute. The Contractor shall take readings of time, load, and movement and record them for each load increment or load decrement. When the 25 percent increment has been reached, the Contractor shall maintain the load for 2 hours and readings shall be taken at the 2 minute, 8 minute, 15 minute, 30 minute, 60 minute, and 120 minute intervals. After the application of loads equal to 50, 100, and 150 percent of the test load, remove the applied load in each case in decrements equal to the loading increments with 20 minutes between decrements. After removing each total applied load, reapply the load to the previous load level in increments equal to 50 percent of the test load with 20 minutes between increments. When the previous load level has been obtained, increase load in 25 percent increments to the next load level. When 200 percent of the service load has been applied and failure has not occurred, allow the 200 percent service load to remain on the pile for 24 hours, except in the event that the average rate of settlement is greater than 0.01 in/hour, hold the total load on the pile for 48 hours. During this time, readings shall be taken every hour. After the required holding time, remove the load in decrements of 50 percent of the service load with 1 hour between decrements. After the load has been applied and removed in accordance with the above, reload the pile to 200 percent of the service load in increments of 50 percent, allowing 20 minutes between increments. The Contractor shall then increase the load in increments of 10 percent of the service load until failure occurs or the applied load reaches 300 percent of the service load. The time lapse between increments shall be 20 minutes. If failure does not occur, hold the full load for 2 hours at which time remove the load in four equal decrements, allowing 20 minutes between decrements. For purposes of stopping pile tests in progress, failure is achieved when the full extent of the extensometers is reached. If failure occurs before the load reaches 300 percent of the service load then the load shall be removed in 4 equal decrements allowing 20 minutes between decrements. Test apparatus shall not be removed from the pile until approval is received from the Government representative. To illustrate the loading and pile measurement procedures, a sample test schedule is provided following this paragraph.

SAMPLE OF COMPRESSION PILE TEST SCHEDULE

Load (Tons)	Elapsed Time	Incremental Time	Remarks
0	0:00	0 min.	
16.3	0:04	4 min.	25% service load
	0:06	2 min.	
	0:12	8 min.	
	0:19	15 min.	
	0:34	30 min.	
	1:04	60 min.	
	2:04	120 min.	
32.5	2:08	4 min.	50% service load
	2:10	2 min.	
	2:16	8 min.	
	2:23	15 min.	
	2:38	30 min.	
	3:08	60 min.	
	4:08	120 min.	
16.3	4:12	4 min.	Decrement 25%
	4:32	20 min.	
0	4:36	4 min.	Decrement 25%
	4:56	20 min.	
32.5	5:03	7 min.	Increment 50%
	5:23	20 min.	
48.8	5:27	4 min.	75% service load
	5:29	2 min.	
	5:35	8 min.	
	5:42	15 min.	
	5:57	30 min.	
	6:27	60 min.	
	7:27	120 min.	
65.0	7:31	4 min.	100% service load
	7:33	2 min.	
	7:39	8 min.	
	7:46	15 min.	
	8:01	30 min.	
	8:31	60 min.	
	9:31	120 min.	
48.8	9:35	4 min.	Decrement 75%
	9:55	20 min.	
32.5	9:59	4 min.	Decrement 50%
	10:19	20 min.	

SAMPLE OF COMPRESSION PILE TEST SCHEDULE

Load (Tons)	Elapsed Time	Incremental Time	Remarks
0	10:26	7 min.	Decrement 0%
	10:46	20 min.	
32.5	10:53	7 min.	Increment 50%
	11:13	20 min.	
65.0	11:20	7 min.	Increment 100%
	11:40	20 min.	
81.3	11:44	4 min.	125% service load
	11:46	2 min.	
	11:52	8 min.	
	11:59	15 min.	
	12:14	30 min.	
	12:44	60 min.	
	13:44	120 min.	
97.5	13:48	4 min.	150% service load
	13:50	2 min.	
	13:56	8 min.	
	14:03	15 min.	
	15:28	30 min.	
	14:48	60 min.	
	15:48	120 min.	
81.3	15:52	4 min.	Decrement 125%
	16:12	20 min.	
65.0	16:16	4 min.	Decrement 100%
	16.36	20 min.	
32.5	16:43	7 min.	Decrement 50%
	17:03	20 min.	
0	17:10	7 min.	Decrement 0%
	17:30	20 min.	
32.5	17:37	7 min.	Increment 50%
	17:57	20 min.	
65.0	18:04	7 min	Increment 100%
	18:24	20 min.	
97.5	18:31	7 min.	Increment 150%
	18:51	20 min.	
113.8	18:55	4 min.	175% service load
	18:57	2 min.	
	19:03	8 min.	
	19:10	15 min.	
	19:25	30 min.	

SAMPLE OF COMPRESSION PILE TEST SCHEDULE

Load (Tons)	Elapsed Time	Incremental Time	Remarks
	19:55	60 min.	
	20:55	120 min.	
130.0	20:59	4 min.	200% service load.
	21:01	2 min.	Continue to hold load for 24 hours.
	21:07	8 min.	If settlement is greater than .01
	21:14	15 min.	load for 48 hours.
	21:29	30 min.	inch/hour hold
	21:59	60 min.	
	22:59	120 min.	
	23:59	3 hr.	
	0:59	4 hr.	
	1:59	5 hr.	
	19:5	23 hr.	
	20:5	24 hr.	
97.5	21:06	7 min.	Decrement 150%
	21:26	20 min.	
	21:46	40 min.	
	22:06	60 min.	
65.0	22:13	7 min.	Decrement 100%
	22:33	20 min.	
	22:53	40 min.	
	23:13	60 min.	
32.5	23:20	7 min.	Decrement 50%
	23:40	20 min.	
	0:00	40 min.	
	0:20	60 min.	
0	0:27	7 min.	Decrement 0%
	0:47	20 min.	
	1:07	40 min.	
	1:27	60 min.	
32.5	1:34	7 min.	Increment 50%
	1:54	20 min.	
65.0	2:01	7 min.	Increment 100%

SAMPLE OF COMPRESSION PILE TEST SCHEDULE

Load (Tons)	Elapsed Time	Incremental Time	Remarks
	2:21	20 min.	
97.5	2:28	7 min.	Increment 150%
	2:48	20 min.	
130.0	2:55	7 min.	Increment 200%
	3:15	20 min.	
136.5	3:17	2 min.	Increment 210%
	3:37	20 min.	
143.0	3:39	2 min	Increment 220%
	3:59	20 min.	
149.5	4:01	2 min.	Increment 230%
	4:21	20 min.	
156.0	4:23	2 min.	Increment 240%
	4:43	20 min.	
162.5	4:45	2 min.	Increment 250%
	5:05	20 min.	
169.0	5:07	2 min.	Increment 260%
	5:27	20 min.	
175.5	5:29	2 min.	Increment 270%
	5:49	20 min.	
182.0	5:51	2 min.	Increment 280%
	6:11	20 min.	
188.5	6:13	2 min.	Increment 290%
	6:33	20 min.	
195.0	6:35	2 min.	Increment 300%
	6:55	20 min.	
	7:15	40 min.	
	7:35	60 min.	
	7:55	80 min.	
	8:15	100 min.	
	8:35	120 min.	
145.3	8:45	10 min.	
	9:05	20 min.	
97.5	9:15	10 min.	
	9:35	20 min.	
48.8	9:45	10 min.	
	10:05	20 min.	
0	10:15	10 min.	
	10:35	20 min.	

END OF TEST

Loading and unloading time increments have been rounded upward to the nearest whole minute. Service load = 65.0 tons in compression.

SAMPLE OF TENSION PILE TEST SCHEDULE

Load (Tons)	Elapsed Time	Incremental Time	Remarks
0	0:00	0.0 min.	
12.5	0:04	2 min.	25% service load
	0:10	2 min.	
	0:17	8 min.	
	0:32	5 min.	
	1:02	30 min.	
	1:02	60 min.	
	2:02	120 min.	
25.0	2:04	2 min.	50% service load
	2:06	2 min.	
	2:12	8 min.	
	2:19	15 min.	
	2:34	30 min.	
	3:04	60 min.	
	4:04	120 min.	
12.5	4:06	2 min.	Decrement 25%
	4:26	20 min.	
0	4:28	2 min.	Decrement 0%
	4:48	20 min.	
25.0	4:52	4 min.	Increment 50%
	5:12	20 min.	
37.5	5:14	2 min.	75% service load
	5:16	2 min.	
	5:22	8 min.	
	5:29	15 min.	
	5:44	30 min.	
	6:14	60 min.	
	7:14	120 min.	
50.0	7:16	2 min.	100% service load
	7:18	2 min.	
	7:24	8 min.	
	7:31	15 min.	
	7:46	30 min.	
	8:16	60 min.	
	9:16	120 min.	
37.5	9:18	2 min.	Decrement 75%
	9:38	20 min.	
25.0	9:40	2 min.	Decrement 50%
	10:00	20 min.	
0	10:04	4 min.	Decrement 0%
	10:24	20 min.	
25.0	10:28	4 min.	Increment 50%
	10:48	20 min.	
50.0	10:52	4 min.	Increment 100%

SAMPLE OF TENSION PILE TEST SCHEDULE

Load (Tons)	Elapsed Time	Incremental Time	Remarks
	11:12	20 min.	
62.5	11:14	2 min.	125% service load
	11:16	2 min.	
	11:22	8 min.	
	11:29	15 min.	
	11:44	30 min.	
	12:14	60 min.	
	13:14	120 min.	
75.0	13:16	2 min.	150% service load
	13:18	2 min.	
	13:24	8 min.	
	13:46	30 min.	
	14:16	60 min.	
	15:16	120 min.	
62.5	15:18	2min.	Decrement 125%
	15:38	20 min.	
50.0	15:40	2 min.	Decrement 100%
	16:00	20 min.	
25.0	16:04	4 min.	Decrement 50%
	16:24	20 min.	
0	16:28	4 min.	Decrement 0%
	16:48	20 min.	
25.0	16:52	4 min.	Increment 50%
	17:12	20 min.	
50.0	17:16	4 min.	Increment 100%
	17:36	20 min.	
37.5	17:40	4 min.	Increment 150%
	18:00	20 min.	
87.5	18:02	2 min.	175% service load
	18:04	2 min.	
	18:10	8 min.	
	18:17	15 min.	
	18:32	30 min.	
	19:02	60 min.	
	20:02	120 min.	
100.0	20:04	2 min.	200% service load
	20:06	2 min.	Continue to hold
	20:12	8 min.	load for 24 hrs.
	20:19	15 min	If settlement is
	20:34	30 min	greater than
	21:04	60 min	.01 in/hr, hold
	22:04	120 min.	load for 48 hrs.
	23:40	3 hr.	
	0:04	4 hr.	

SAMPLE OF TENSION PILE TEST SCHEDULE

Load (Tons)	Elapsed Time	Incremental Time	Remarks
	1:04	5 hr.	
	19:04	23 hr.	
	20:04	24 hr.	
75.0	20:08	4 min.	Decrement 150%
	20:28	20 min.	
	20:48	40 min.	
	21:08	60 min.	
50.0	21:12	4 min.	Decrement 100%
	21:32	20 min.	
	21:52	40 min.	
	22:12	60 min.	
25.0	22:16	4 min.	Decrement 50%
	22:36	20 min.	
	22:56	40 min.	
	23:16	60 min.	
0	23:20	4 min.	Decrement 0%
	23:40	20 min.	
	0:00	40 min.	
	0:20		
	0:24	4 min.	Increment 50%
	0:44	20 min.	
50.0	0:48	4 min.	Increment 100%
	1:08	20 min.	
75.0	1:12	4 min.	Increment 150%
	1:32	20 min.	
100.0	1:36	4 min.	Increment 200%
	1:56	20 min.	
105.0	1:57	1 min.	Increment 200%
	2:17	20 min.	
110.0	2:18	1 min.	Increment 220%
	2:38	20 min.	
115.0	2:39	1 min.	Increment 230%
	2:59	20 min.	
120.0	3:00	1 min.	Increment 240%
	3:20	20 min.	
125.0	3:21	1 min.	Increment 250%
	3:41	20 min.	
130.0	3:42	1 min.	Increment 260%
	4:02	20 min.	
135.0	4:03	1 min.	Increment 270%
	4:23	20 min.	

SAMPLE OF TENSION PILE TEST SCHEDULE

Load (Tons)	Elapsed Time	Incremental Time	Remarks
140.0	4:24	1 min.	Increment 280%
	4:44	20 min.	
154.0	4:45	1 min.	Increment 290%
	5:05	20 min.	
150.0	5:06	1 min.	Increment 300%
	5:26	20 min.	
	5:46	40 min.	
	6:06	60 min.	
	6:26	80 min.	
	6:46	100 min.	
	7:06	120 min.	
112.5	7:11	5 min.	
	7:31	20 min.	
75.0	7:36	5 min.	
	7:56	20 min.	
37.5	8:01	5 min.	
	8:21	20 min.	
0	8:26	5 min.	
	8:46	20 min.	

END OF TEST

Loading and unloading time increments have been rounded upward to the nearest whole minute. Service load – 50.0 tons in tension.

3.3.6 Additional Load Cycles

Any load cycles not accomplished in accordance with these specifications shall be redone at the direction of the Contracting Officer, at no additional cost to the Government.

3.4 REMOVAL OF PILES

After the pile tests are completed and accepted at each site, all support piles, and test piles, and casing shall be pulled and removed from the test site. The remaining holes in the ground shall be filled to within 2 feet of the ground surface with the cement-bentonite-sand slurry specified in 02411-9.5. The upper 2 feet of the hole shall be filled with material similar to the surrounding material and compacted to similar density.

Section Table of Contents

SECTION 02360 - TIMBER PILES

SECTION 02360 - TIMBER PILES

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all plant, equipment labor, and materials, and performing all operations in connection with performing surveys, and the installation of round treated timber piles in accordance with these specifications and as shown on the drawings.

1.2 QUALITY CONTROL

1.2.1 General

The Contractor shall establish and maintain quality control for driving casings, timber piles to assure compliance with contract specifications and maintain records for his quality control for all construction operations including, but not limited to the following:

(1) Wood species and grade.

(2) Accurate placement, driving and alignment of piling.

(3) Check locations, elevations and dimensions of existing conditions, new structures and grades.

(4) Driving record. The record shall include the pile number or identification, location, size, length, elevation of tip, cut-off top of pile, the number of blows and ram drop (in inches) required for each foot of penetration throughout the entire length of the pile, and the number of blows per inch for the last 18 inches of penetration, predrilling depth, size of predrilling, and type of predrilling. The record shall include the type and size of the hammer, the cap-block and pile cushion used. The location and elevation of any obstruction or unusual occurrence encountered during construction shall also be recorded.

(5) Recording uplift and vertical tolerances after driving; pulled and redriven piles; and removal and disposal of damaged piles.

(6) Inspection on delivery of materials for damage and defects. The Contractor is to certify that all materials are in compliance with applicable specifications.

(7) Checking all operations required to install the piles and certifying compliance with applicable sections of the specifications.

1.2.2 Reporting

The original and two copies of these records and tests, as well as corrective action taken, shall be furnished the Government daily. Format of report shall be as prescribed in Section 01451, "CONTRACTOR QUALITY CONTROL".

1.2.3 Inspection

Piles will be inspected either at the shipping point or at the site of the work, as determined by the Contracting Officer. Facilities shall be made available to the inspector for proper inspection of each pile throughout its length. Piles damaged after inspection may be subsequently rejected if damage is deemed sufficient for rejection by the Contracting Officer. All rejected materials shall be removed as directed and replaced at no additional cost to the Government.

1.3 APPLICABLE PUBLICATIONS

The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto:

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARDS.

D 25 (1999) Standard Specification for Round Timber Piles

SOUTHERN PINE INSPECTION BUREAU (SPIB) PUBLICATION.

Grading Rules (Mar 15, 1977; including Supplements 1 through 12).

U.S. DEPARTMENT OF COMMERCE, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST). FORMERLY NATIONAL BUREAU OF STANDARDS. PRODUCTION STANDARDS (PROD. STD.)

PS 20-70 American Softwood Lumber Standard Amended 1986

AMERICAN WOOD PRESERVER'S ASSOCIATION (AWPA) STANDARDS.

C1 (2000) All Timber Products-Preservative Treatment by Pressure Processes

C3 (1999) Piles - Preservative Treatment by Pressure Processes

M4 (2001) Standard for Care of Preservative Treated Wood Products

P8 (2001) Standards for oil borne preservatives

1.4 SUBMITTALS

1.4.1 Equipment Descriptions.

Descriptions of all pile driving equipment to be employed in the work shall be submitted for approval prior to commencement of pile installations. This shall include details of the pile hammer, power plant, leads, cushion material, and helmet.

1.4.2 Driving Record.

A record of the driving of piles containing information as required in paragraph 1.2.1.(4) shall be submitted to the Contracting Officer daily.

1.4.3 Pile placement Plans.

Pile placement plans shall be submitted to the Contracting Officer for approval.

1.4.4 Preservative Treatment Certificate

A certificate from an approved testing organization attesting that the piles and timbers to be used in the work have been given the preservative treatment required by these specifications shall be submitted to the Contracting Officer prior to commencement of work. The Quality Mark of the American Wood Preservers Association (AWPA) affixed to piles will be accepted in lieu of a certificate.

1.5 HANDLING OF PILES.

Special care shall be taken in supporting piles to prevent the inducing of excessive bending stresses. Handling of treated piles should be in accordance with AWPA M4. Piles shall be carefully handled without dropping or breaking of outer fibers or penetrating the surface with tools. Peaveys, cant hooks, pikes, and other pointed tools shall not be used in handling timber piles.

1.6 MEASUREMENT

lengths from pile test?

Timber piles will be measured for payment on the basis of lengths along the axis of the pile in place below the cut-off elevation and shall be limited to the lengths as shown on the drawings. Pile lengths will be measured to the nearest tenth of a foot. The portion of any pile driven below the tip elevation shown on the drawings will not be measured for payment unless overdriving is directed by the Contracting Officer. Pulled piles shall be measured for payment on the basis of lengths along the axis of the pile pulled above the cut-off elevation. Redriving of piles will be measured in accordance with the provisions stated hereinabove for originally driving the piles. There will be no measurement for pile cut-offs.

1.7 PAYMENT

1.7.1 Driven Piles

Payment for the measured length of timber piles acceptably driven will be made at the contract unit price per linear foot for "TIMBER PILES". Price and payment includes all items incidental to furnishing and driving the timber piles as specified herein.

1.7.2 Pulled Piles

1.7.2.1 Inspection Piles

Each timber pile pulled at the direction of the Contracting Officer for inspection and found to be in good condition, will be paid for at the applicable unit price for driving the pile in its original driven position plus 50 percent of the contract unit price for the length of pile pulled which shall constitute payment for pulling. Payment for a pulled pile shall include backfilling the pile hole if required. Undamaged pulled piles when redriven acceptably will be paid for at 50 percent of the contract unit price for furnishing and driving the measured length of piles redriven, which price and payment shall constitute payment for redriving only. Pulled piles which are damaged through no fault of the Contractor shall be replaced by a new pile which will be paid for at the contract unit price for the length acceptably driven.

1.7.2.2 Damaged Piles

When a pile is pulled for inspection and found to be damaged due to Contractor negligence, no payment will be made for originally furnishing and driving such pile or for the operation of pulling and it shall be replaced by a new pile which will be paid for at the contract unit price for the length acceptably driven.

1.7.2.3 Misaligned or Misplaced Piles

When a pile is driven but not acceptably placed or driven out of alignment and pulled at the direction of the Contracting Officer, no payment will be made for either originally furnishing and driving such pile or for the operation of pulling. If the pile is undamaged and it is acceptably redriven at the direction of the Contracting Officer, it will then be paid for at the contract unit price.

1.7.3 Cut-offs

There will be no payment made for pile cut-offs. All pile cut-offs shall become the property of the Contractor and shall be disposed of off-site at the Contractor's expense.

PART 2 PRODUCTS

2.1 TIMBER PILES

Piles shall conform to ASTM D 25, Class B Douglas fir or Southern pine, clean-peeled untreated, 38 inch minimum butt circumference (measured 3 feet from the butt) and a minimum tip diameter of 7-inch, single length, and other requirements as shown on the drawings and /or specified in specifications.

2.2 PRESERVATIVE TREATED PILES

The preservative treatment of piles shall be in accordance with AWPA C1, except as modified and supplemented by AWPA C3. Piles shall receive a treatment of creosote or creosote-coal tar solution with a retention of 12 pcf.

2.3 COPPER NAPTHENATE

Copper Napthenate for brush treatment of piles shall conform to AWPA P8.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Pile Driving Equipment.

3.1.1.1 Pile Driving Hammers.

The pile driver to be used for this work shall be of sufficient design to handle loads imposed upon it under the extreme conditions anticipated without danger of tipping, overturning or structural and/or mechanical failure. The hammer shall be steam or air, single acting type. The size or capacity of hammers shall be as recommended by the manufacturer for the pile weights and soil formation to be penetrated. The maximum driving energy of hammers shall be 15,000 foot-pounds for piles of any length.

3.1.1.2 Driving Cap and Cap Block.

A driving cap of an approved design and capable of protecting pile heads, minimizing energy absorption and transmitting hammer energy uniformly and consistently to piles shall be used. The driving cap shall fit snugly on the top of piles and shall employ a cushion block to prevent impact damage to piles. The cap block may be a solid block with the grain parallel to the pile axis and enclosed in a close-fitting steel housing. The thickness of the block shall be suitable for the length of pile to be driven and the character of subsurface material to be encountered.

3.1.1.3 Pile Collars.

Collars of bands for protecting pile butts against splitting, brooming and other damage while being driven shall be of an approved design.

3.1.2 Permanent Piles.

3.1.2.1 Driving.

A complete and accurate record of the driven piles shall be compiled by the Contractor for submission to the Contracting Officer. This record shall include the information indicated in subparagraph 1.2.1(4). During driving, hammers shall be operated at all times at the rate and conditions recommended by the hammer manufacturer. Each pile shall be driven continuously and without interruption until the required depth of penetration has been attained. Deviation from this procedure will be permitted only when driving is stopped by causes which could not have been reasonably anticipated. The blow counts shall not exceed 30 blows per linear foot. Piles shall be driven to the full penetration required where practical to do so without damage to the piles. If found impractical to drive any pile to the depth required, such pile shall be cut-off and abandoned or pulled as directed by the Contracting Officer. Driving piles beyond the point of refusal, as indicated by excessive bouncing of the hammer or kicking of the pile, shall not be attempted. The Contractor may have to reduce the amount of energy per blow used to drive piles based on recommendation of the testing lab when vibration readings exceed velocities of 0.25 in/sec. to avoid damage to the surrounding buildings. Piles which have uplifted after driving shall be backdriven to grade after a conclusion of driving in that general area. After driving is completed, all piles shall be "headed", or cut-off, as required for the pile load test. Cut-offs shall become the property of the Contractor and shall be removed and disposed of at his expense. Any voids caused by driving shall be backfilled in accordance with Section 02320, "Structural Excavation and Backfill".

3.1.2.2 Scale

A scale (inches) shall be fixed to the hammer's ram guide and a pointed indicator on the ram, near the scale, to allow a reading of the ram drop (see diagram at the end of this section). Installation of both scale and indicator shall be in such a manner that the drop of the ram can be read by observing the highest and the lowest position of the indicator and scale. Both the scale and the indicator shall be easily legible to observers on the ground during operations. The Contractor shall record the ram drop of the pile hammer when recording the blows per foot as specified in paragraph 1.2.1(4).

3.1.2.3 Jetting.

Jetting shall not be used to assist driving the piles.

3.1.2.4 Predrilling.

The Contractor shall predrill if a maximum of 25 blows/ft. is reached or if the pile is susceptible to being damaged. If required, predrilling shall be accomplished using a bit no larger in diameter than 85% of the pile top diameter. No predrilling will be allowed within 10 feet above the final tip elevation.

3.1.3 Damaged Piles.

Pile damaged as a result of internal defects or improper driving below the cutoff elevations so as to impair them for their intended use, shall be removed and replaced. All work of removal and cost of replacement shall be borne by the Contractor at no additional expense to the Government. The Contracting Officer may require the Contractor to pull certain selected piles after driving for inspection to determine the condition of the piles. Any pile so pulled and found to be damaged to such extent as, in the opinion of the Contracting Officer, would impair its usefulness in the completed structure, shall be removed from the site of the work and the Contractor shall furnish and drive a new pile to replace the damaged pile at no additional cost to the Government. Piles pulled and found to be sound and in a satisfactory condition as determined by the Contracting Officer's Representative shall be redriven and will be paid for in accordance with paragraph 9.4. Any holes which remain as a result of pulling operations shall be filled as specified in 02355-3.3.

3.1.4 Lengths

The lengths of piles shall be as indicated on the drawings. To provide for "heading", or cutting off normal after driving, piles shall be furnished in lengths at least one foot greater than the lengths shown to be below the cut-off elevation.

3.1.5 Placement

Piles shall be accurately placed in the correct locations and alignments both laterally and longitudinally and to the vertical or batter lines as shown on the contract drawings. A lateral deviation from the correct location at the cut-off elevation of not more than 3 inches will be permitted. A variation in alignment of not more than 1/4-inch per foot of longitudinal axis will be permitted. Piles incorrectly placed shall be pulled and redriven. Piles shall be driven to the lengths shown on the drawings.

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SECTION 02411 - STEEL SHEET PILING

SECTION 02411 - STEEL SHEET PILING

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all plant, equipment, labor and materials and performing all operations in connection with the installation of Contractor furnished permanent steel sheet piling in accordance with these specifications and applicable drawings.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section 05501, "METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS".

1.3 MEASUREMENT AND PAYMENT

1.3.1 Permanent and Temporary Steel Sheet Piling

Measurement and payment for permanent and temporary steel sheet piling, except for fabricated piles, such as special corners, transitions, tee sections, and rolled corners, will be measured as outlined below:

1.3.1.1 There will be no measurement for the temporarily driven steel sheet piles (PZ-27 and PZ-40) used in the temporary sheet pile dam. Payment shall be included in the contract lump sum price for "INSTALL TEMPORARY SHEET PILE DAM."

1.3.1.2 There will be no measurement for the temporarily driven steel sheet piles (PZ-27 and PMA-22) used in the low level coffer dams. Payment shall be included in the contract lump sum price for "LOW LEVEL COFFERDAMS".

1.3.1.3 There will be no measurement for the permanent piles (PMA-22 and PSA-23) for the cut off wall. Payment for the steel sheet pile cut off wall acceptably installed and accepted shall be per the contract lump sum price for "STEEL SHEET PILES (PMA-22 AND PSA-23)."

Payment for all acceptably driven and accepted temporary and permanent steel sheet piles shall include the furnishings of all plant, equipment, labor and materials, including all required tee's, fabricated sections, corners, transitions, polled corners and final removal of all temporary steel sheet piling.

1.3.2 Pulled Permanent Piles

Pulled permanent piles, when pulled at the direction of the COR will be paid for under the contract clause in Section 00700 entitled Changes (FAR 52.243-4). Redriving of such permanent piles shall be paid for according to the same section of the specification.

1.3.3 Pulled Temporary Piles

Pulled temporary piles, when pulled at the direction of the COR will be paid for under the contract clause in Section 00700 entitled Changes (FAR 52.243-4). Redriving of such permanent piles shall be paid for according to the same section of the specification.

1.3.4 Miscellaneous Items

No separate measurement or payment will be made for void backfill.

1.4 APPLICABLE PUBLICATIONS

The following standards of the issues listed below and referred to thereafter by basic designation only from a part of this specification to the extent indicated by the references thereto:

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARDS

A 36	(2001) Standard Specification for Carbon Structural Steel
A 325	(2002) Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 KSI Minimum Tensile Strength
A 328	(2000) Standard Specification for Steel Sheet Piling
A 490	(2002) Standard Specification for Structural Bolts, Alloy Steel, Hear Treated, 150KSI minimum Tensile Strength

1.5 QUALITY ASSURANCE

Requirements for material tests, workmanship and other measures for quality assurance shall be as specified herein and in Section 05501, "METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS".

1.5.1 Materials Tests

Sheet piling and appurtenant materials shall be tested and certified by the manufacturer to meet the specified chemical, mechanical and section property requirements prior to delivery to the site.

1.6 SUBMITTALS

The Contractor shall submit descriptions of sheet piling driving equipment, shop drawings, test procedures, test reports and certificates, sheet piling driving records and other submittals to the Contracting Officer for approval as specified in section 01330-"SUBMITTAL PROCEDURES". Submittals and associated work not satisfactory to the Contracting Officer will be rejected.

1.6.1 Equipment Descriptions

Complete descriptions of sheet piling driving equipment including hammers, extractors, protection caps and other installation appurtenances shall be submitted for approval prior to commencement of work.

1.6.2 Shop Drawings

Shop drawings for sheet piling, including fabricated sections, shall be submitted for approval and shall show complete piling dimensions and details, driving sequence and location of installed piling. Shop drawings shall include details and dimensions of templates and other temporary guide structures for installing piling, and shall provide details of the method of handling piling to prevent permanent deflection, distortion or damage to piling interlocks.

1.6.3 Materials Test Certificates

Materials test certificates shall be submitted for each shipment and identified with specific lots prior to installing piling. Identification data should include piling type, dimensions, section properties, heat analysis number, chemical composition, mechanical properties and mill identification mark.

1.6.4 Driving Records

Records of the sheet piling driving operations shall be submitted after driving is completed. These records shall provide a system of identification which shows the disposition of approved piling in the work, driving equipment performance data, piling penetration rate data, piling dimensions and top and bottom elevations of installed piling. All driving records shall be submitted on LMV form 461-R.

1.7 QUALITY CONTROL

1.7.1 General

The Contractor shall establish and maintain quality control for pile driving operations to assure compliance with contract specifications and maintain records of his quality control for all construction operations including, but not limited to, the following:

(1) Accurate location, alinement and plumbness of piling.

(2) Full and proper engagement of interlocks.

(3) Driving (pile hammer and rate of operation).

(4) Final position; depth of penetration; tip and cut- off elevations.

(5) Uplift and vertical tolerances after driving.

(6) Location and elevation of any obstruction encountered and action directed by Contracting Officer.

(7) Pulled piles and redriving.

(8) Length of cover plate and weld size.

(9) Manufacture and driving of fabricated sections.

(10) Cutting and splicing (welding).

(11) Stockpiling and storage.

(12) Removal and disposal of damaged piles.

1.7.2 Reporting

The original and two copies of these records and tests, as well as the records of corrective action taken, shall be furnished the Government daily. Format of the report shall be as prescribed in Section 01451, "CONTRACTOR QUALITY CONTROL".

1.8 DELIVERY, STORAGE AND HANDLING

Materials delivered to the site shall be new and undamaged and shall be accompanied by certified test reports. The manufacturer's logo and mill identification mark shall be provided on the sheet piling as required by the referenced specifications. Sheet piling shall be stored and handled in the manner recommended by the manufacturer to prevent permanent deflection, distortion or damage to the interlocks. Storage of sheet piling should also facilitate required inspection activities.

PART 2 MATERIALS

2.1 STEEL SHEET PILING

Steel for sheet piling shall conform to the requirements of ASTM A 328. Sheet piling, including special fabricated sections, shall be of the type and dimensions indicated on the drawings, and be of a design such that when in place they will be continuously interlocked throughout their entire length. All sheet piling shall be provided with standard pulling holes located approximately 4-inches below the top of the pile, unless otherwise shown or directed. Steel sheet piling shall be hot rolled and shall have the properties equivalent to those listed in the following table:

PROPERTIES OF SECTIONS

Type of section	Nominal web thickness (inches)	Section modulus (in^3/ft of wall)	Moment of inertia (in^4/ft of wall)	Nominal section depth (inches)	Minimum interlock strength (lbs/lin in)	Theoretical Driving width (inches)
PZ 22	0.375	18.1	154.7	9	N/A	22
PZ 27	0.375	30.2	276.3	12	N/A	18
PMA 22	0.375	5.4	13.7	3.25	N/A	19.63
PSA 23	0.375	24	4.1	1.343	N/A	16
PZ 40	0.50	60.7	805.4	16.1	N/A	19.69

2.1.1 Substitute Sheet Piling Submittals

When proposing substitute piling, the Contractor shall submit, for approval, the following items at no additional cost to the Government:

(1) Complete shop drawings of the proposed sections showing the dimensions and details of the alternate piling including all fabricated and corner sections.

(2) A complete layout of the alternate sheet piling. The P.I. Stations, I-wall transitions and gate monolith lengths shall remain unchanged. Typical concrete I-wall monolith lengths may be altered to better accommodate the substitute piling driving widths. It shall be the Contractor's responsibility to make any adjustments necessary in his formwork so that the architectural treatment of the concrete is properly maintained.

2.2 SHEET PILING LENGTHS

All new sheet piling shall be provided in full lengths.

2.3 FABRICATED SECTIONS

Fabricated sections, including special corners, transition piles and tee sections, shall conform to the requirements stated herein, the details shown on the drawings and the piling manufacturer's recommendations for fabricated sections. Metalwork fabrication for sheet piling sections shall conform to the requirements of Section 05501. Steel plates and angles used to fabricate the special sections shall conform to ASTM A 36.

2.4 BOLTED CONNECTIONS

The bolted connections for fabricated sections specified above shall be made from 7/8" diameter high strength bolts meeting the requirements of ASTM A 325, Type 3, or ASTM A 490, Type 3. The bolts shall be spaced on 6 inch centers for the length of the section except for 2 feet at each end where they are spaced on 3 inch centers. Welding of the longitudinal joint will not be allowed. Shop drawings and details for the fabricated sections shall be submitted to the Contracting Officer for approval.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Placing and Driving

3.1.1.1 Placing

Any excavation required within the area where sheet pilings are to be installed shall be completed prior to placing sheet pilings. Pilings shall be carefully located as shown on the drawings or directed by the Contracting Officer. Pilings shall be placed as true to line as possible. Suitable temporary wales, templates, or guide structures shall be provided to insure that the piles are placed and driven to the correct alignment. Piles shall be placed in a plumb position with each pile interlocked with adjoining piles for its entire length, so as to form a continuous diaphragm throughout the length of each run of piling wall. Interlocks shall be properly engaged. The Contractor's personnel shall not sit or place themselves on top of the sheet piling during the handling, installation, and removal of the piling.

3.1.1.2 Driving

All piles shall be driven to the depths shown on the drawings and shall extend to the cut-off elevation indicated. A tolerance of 1 1/2-inches above or below the indicated cut-off elevation will be permitted. Pilings shall be driven by approved methods so as not to subject the pilings to damage and to insure proper interlocking throughout their lengths. Pile hammers shall be maintained in proper alignment during driving operations by use of leads or guides attached to the hammer. A protecting cap shall be employed in driving,

when required, to prevent damage to the tops of pilings. Pilings damaged during driving or driven out of interlock shall be removed and replaced. All piles shall be driven without the aid of a water jet, unless otherwise authorized. Adequate precautions shall be taken to insure that piles are driven plumb. Sheet piling shall not be driven more than 1/4-inch per foot out of plumb in the plane of the wall nor more than 1/8-inch per foot out of plumb perpendicular to the plane of the wall. If at any time the forward or leading edge of the piling wall is found to be out-of- plumb more than 1/4-inch per foot in the plane of the wall or 1/8- inch per foot perpendicular to the plane of the wall, the assembled piling shall be driven to the required depth and tapered pilings shall be provided and driven to interlock with the out-of- plumb leading edge or other approved corrective measures shall be taken to insure the plumbness of succeeding pilings. The maximum permissible taper for any tapered piling shall be 1 1/4-inch per foot of length. Unless specifically indicated otherwise, each run of piling wall shall be driven to grade progressively from the start and pilings in each run shall be driven alternately in increments of depth to the required depth or elevation. On each day of sheetpile driving, the Contractor shall stab only the number of piles that can be driven to grade by the end of the day, and all piling stabbed shall be driven to grade by the end of each working day except that the last two piles may remain tapered up to receive the next days piles. No pile shall be driven to a lower elevation than those behind it in the same run except when the piles behind it cannot be driven deeper or in areas where there will be wall penetrations or obstructions are encountered. In this case, piling will be allowed to remain above final grade until the obstruction is removed or the penetration is completed. Alternately, if it is determined that an obstruction cannot be removed, the Contractor shall make such changes in design alinement of the pile structure as may be deemed necessary by the Contracting Officer to insure the adequacy and stability of the structure. Payment for the additional labor and materials necessitated by such changes will be made by an equitable adjustment under the Contract Clause in Section 00700 entitled, Changes (FAR 52.243-4). If the piling next to the one being driven tends to follow below final grade, it may be pinned to the next adjacent piling. The Contractor is advised that buried stumps or similar debris may be encountered periodically on the sheet pile wall alinement and appropriate consideration should be given to hard driving conditions should they occur. If obstructions restrict driving a piling to the specified penetration, the obstructions shall be removed or penetrated with a chisel beam. If the Contractor demonstrates that removal or penetration is impractical the Contractor shall make changes in the design alignment of the piling structure as directed by the Contracting Officer to insure the adequacy and stability of the structure. Pilings shall be driven to depths shown on the drawings and shall extend up to the elevation indicated on the drawings for the top of pilings. Piles shall not be driven nor pulled within 100-feet of concrete less than 7 days old nor within 30- feet of concrete less than 28 days old.

3.1.2 Emergency Locking System on Pile Driving Head

All pile driving equipment shall be equipped so as to prevent piles from falling when a single or multiple power failure occurs after the pile driving head is attached to the pile. The jaws of vibratory hammers shall be equipped with devices such that upon loss of hydraulic pressure, the jaws will not release the pile.

3.1.3 Cutting Off and Splicing

Piles extending above grade in excess of the specified tolerance, and which cannot be driven deeper, shall be cut off to the required grade. The Contractor shall also trim the tops of piles excessively battered during driving, when directed to do so, at no cost to the Government. Cut-offs shall become the property of the Contractor and shall be removed from the worksite. Piles driven below the elevations indicated for the top of piles and piles which, because of damaged heads, have been cut off to permit further driving and are then too short to reach the required top elevation, shall be extended to the required top elevation by welding an additional length, when directed, without cost to the Government. Should splicing of additional lengths be necessary, the splice shall consist of an approved butt joint with a weld that fully penetrates the web. Welded extensions shall be a minimum of 6-inches in length. Piles adjoining spliced piles shall be full length unless otherwise approved. When piles are to be driven in sections and spliced together, they shall be delivered on site in full lengths and cut for splicing only after delivery. Only those portions of the originally uncut pile shall be spliced together to form the final in-place full-length pile. Splices for these piles shall conform to the details shown on the drawings. Welding of splices shall conform to the requirements of Section 05501. Ends of pilings to be spliced together shall be squared before splicing to eliminate dips or camber. Pilings shall be spliced together with concentric alignment of the interlocks so that there are no discontinuities, dips or camber at the abutting interlocks. Spliced pilings shall be free sliding and able to obtain the maximum swing with contiguous pilings. The Contractor may cut holes in the piles for bolts, rods, drains or utilities at locations and of sizes shown on the drawings or as directed. All cutting shall be done in a neat and workmanlike manner. Bolt holes in steel piling shall be drilled or may be burned and reamed by approved methods, which will not damage the remaining metal. Holes, other than bolt holes, shall be reasonably smooth and of the proper size for rods and other items to be inserted.

3.1.4 Inspection of Driven Piling

The Contractor shall inspect the interlocked joints of driven pilings extending above ground. Pilings found to be damaged or driven out of interlock shall be removed and replaced at the Contractor's expense.

3.1.5 Pulling and Redriving

The Contractor may be required to pull selected piles after driving, for test and inspection, to determine the condition of the piles. Any pile so pulled and found to be damaged to the extent that its usefulness in the structure is impaired shall be removed from the work and the Contractor shall furnish and drive a new pile to replace the damaged pile. Piles pulled and found to be in satisfactory condition shall be redriven.

3.1.6 Void Backfill

Where voids adjacent to the steel sheet piling are induced by pile driving or pulling operations, the Contractor shall pump out all seepage and rain water and backfill with a tremie-placed slurry. The slurry shall consist of one part cement, two parts bentonite, and six parts sand mixed with enough water to produce a slurry viscous enough to thoroughly fill the voids. The resulting slurry shall have no less than 12 pounds of solids per gallon.

3.2 VIBRATION MONITORING

An independent testing laboratory retained by the Sewerage and Water Board of New Orleans will monitor vibrations during pile driving operations according to paragraph 01100-33. The Contractor shall give the government at least 72 hours advanced notice before beginning pile-driving operations.

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SECTION 02413 - TEMPORARY FLOOD PROTECTION

SECTION 02413 - TEMPORARY FLOOD PROTECTION

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all plant, labor, materials, equipment, and performing all operations necessary for designing, installing, and removing temporary flood protection, and incidental work as required or specified herein. Temporary flood protection will become necessary when areas in the temporary earth retaining structures within the existing flood protection falls below elevation (+)13.90 NGVD for unavoidable reasons during the life of this project.

1.2 MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for work required by this section. Payment will be made at the contract lump sum price for "TEMPORARY FLOOD PROTECTION." Price and payment shall include the furnishing of all plant, labor, design services and material necessary to provide temporary flood protection for the life of this contract.

1.2.1 Emergency Closures

Payment for all work required for the installation and removal of the required emergency closures during impending high water or storm tidal surges will be made under the Contract Clause in Section 00700 entitles Changes (FAR 52.243-4).

1.3 QUALITY CONTROL

1.3.1 General

The Contractor shall establish and maintain quality control for temporary flood protection operations to assure compliance with contract requirements and maintain records of his quality control for all construction operations including but not limited to the following:

(1) Equipment - Type, size, and suitability for construction of the prescribed work.

(2) Construction - Layout, excavation, drainage.

1.3.2 Reporting

The original and two copies of these records of inspections and tests, as well as the records of corrective action taken, shall be furnished to the Government daily. Format of the report shall be as prescribed in Section 01451, CONTRACTOR QUALITY CONTROL".

1.4 GENERAL

The Contractor shall indemnify and hold the Government harmless against any loss or damage sustained by him arising out of or attributable to failure of temporary flood protection structures of his own design.

(1) No work on temporary flood protection will be allowed prior to receipt of written approval by the Contracting Officer.

(2) The Contractor's construction of the temporary flood protection shall in no way affect the stability of the existing flood protection.

1.5 DESIGN

Work required for construction may require temporary flood protection. The design and layout of temporary flood protection shall be the sole responsibility of the Contractor and shall comply with the following:

(1) The design calculations shall be performed by a registered professional engineer licensed to practice in the State of Louisiana. The Contractor shall submit six (6) copies of the professional engineer's design along with the Contractor's drawings showing the layout of his proposed temporary flood protection with all pertinent dimensions and material types and sizes to be used for the construction of such structures, to the Contracting Officer for approval. The Contractor's design shall also include materials he plans to use for the temporary flood protection. All materials selected by the Contractor shall meet the requirements of applicable sections of these Specifications.

(2) The Contractor's design of the temporary flood protection shall be such that it will insure stability and integrity of any new or existing flood protection structures. Revisions to the Contractor's design and layout shall be submitted to the Contracting Officer for approval at no additional cost to the Government prior to implementation of revisions.

(3) In addition to his responsibility for the design and layout of the temporary flood protection, the Contractor shall also be responsible for construction, maintenance and subsequent removal and disposal of the temporary flood protection systems. All excavated materials shall become the property of the Contractor and shall be disposed of at a location off of the project site in accordance with Section 02070.

(4) The existing concrete canal lining shall not be removed or damaged for the purpose of temporary flood protection construction.

1.6 SUBMITTALS

The Contractor shall submit detailed drawings to the contracting officer on standard 26" x 36" drawings of the following:

(1) Drawing showing location, configuration and storage area for materials required for temporary flood protection.
(2) Detailed calculation performed by a Louisiana Professional Engineer showing the adequacy of his plan for temporary flood protection.
(3) Type, size and suitability of equipment to be used in the performance of this item of work.
(4) Construction sequencing showing necessary excavation, drainage and layout of temporary flood protection.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 TEMPORARY FLOOD PROTECTION REQUIREMENTS.

3.1.1 Hurricane Season

Hurricane season extends from 1 June to 30 November. During this period all temporary flood protection shall be a minimum elevation of (+) 13.90 NGVD. Areas below elevation 13.90 NGVD will be considered breaches in the protection. The Contractor will be permitted to allow an area in the existing flood protection to fall below elevation (+) 13.90 NGVD only if that area can be closed with stockpile steel sheet piles in a maximum of twenty-four (24) continuous hours. The sheet pile materials for closing such breaches shall be stockpiled at the site in accordance with paragraph 5.1.2. Plans for closing breaches in the floodwall shall be updated at the beginning of hurricane season and periodically throughout the hurricane season to reflect the status of construction progress. The Contractor shall develop & submit for approval, plans, including methods, equipment, materials and actions to close breaches in the event that a hurricane threatens the area. Prior to removing any existing flood protection, the Contractor shall have the plan of interim protection approved.

3.1.1.1 Emergency Closure

In the event of an impending hurricane or storm, the Contractor shall complete a closure of all breaches in the flood protection within 24 hours after being directed to do so by the Contracting Officer. The closure of breaches shall provide flood protection to a height of (+) 13.90 NGVD. The closure shall be made with steel sheet piling.

3.1.1.2 Stockpiling

The stockpiling of emergency sheet piling is required. Storage of materials and equipment to perform the closures shall be adjacent to where they would be used or other readily accessible areas acceptable to the Contracting Officer.

3.2 INSTALLATION

The Contractor shall make all provisions required for the construction of temporary flood protection.

3.3 WATER REMOVAL

The Contractor shall provide, maintain, and operate, for the life of the project, pumps of adequate capacities to remove water that may find its way into the areas protected by the temporary protection. The discharge from pumps shall be into the outlet channel on the floodside.

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SECTION 02450 - DIVING

SECTION 02450 - DIVING

PART 1 GENERAL

1.1 SCOPE

The work provided for herein consists of furnishing all plant, labor, equipment, and materials, and performing all operations necessary for diving services required for the installation of the temporary steel sheet pile dam.

1.2 MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for diving services. Payment for the work covered under this section will be distributed throughout the existing bid items.

1.3 SAFETY INDOCTRINATION

The Contractor shall be responsible for initiating and maintaining a safety and health program which complies with the safety and health references described in paragraph 1.4. The program shall include initial indoctrination and continuing training for all employees who shall work under this contract.

1.4 HEALTH REFERENCES

Equipment and procedures shall comply with the most stringent of the following for the particular application:

EM 385-1-1 (Sep 1996)	U.S. Army Corps of Engineers Safety and Health Requirements Manual
ER 385-1-86	Underwater Diving
NAVSEA 0994-LP-001-0921	Safety practices of the Association of Diving Contractors

1.5 ACCIDENT PREVENTION PLAN

1.5.1 General

A written, comprehensive accident prevention plan for all diving activities shall be submitted to and approved by, the New Orleans District Diving Coordinator prior to commencing diving operations. A copy of the approved plan shall be maintained on-site during all dives.

1.5.2 Requirements

The accident prevention plan shall include the following at a minimum:

(1) An executed form LMN 385-7-R, Oct 95, Administrative Plan;

(2) An executed form LMN 359-R, Jan 95, Activity Hazard Analysis;

(3) A proposed dive operations plan for each separate dive, in accordance with Section 30.A.13 of EM 385-1-1. Included shall be the procedure of dive operations when navigation traffic is present.

(4) Copies of the required First Aid and CPR certification, Diver Certifications and physical examination reports.

1.5.2.1 Sample

Item 1.5.2(2) above of the Accident Prevention plan refers to statement of the hazards which are anticipated in conjunction with the dive and what precautions will be taken to prevent these hazards from developing into an accident. A typical group of entries may be:

ACTIVITY HAZARD ANALYSIS	
Safety Hazard	Precautionary Action Taken
Air Compressor Failure	Back-up supply of either a bailout bottle or second hose connected to a separate air supply.
Driver Incurring Air Embolism	Dive crew must be trained in emergency first aid procedure. Local ambulance and Med-Evac Helicopter phone numbers are posted. Nearby hyperbaric chambers have been located and confirmed.
Decompression Sickness	Dives will not be performed at depths that required decompression.
Exposure to Current	Exposure to Current Diver is tethered to floating plant and voice communications are maintained at all times when the surface supply system is used. Line-pull signals must be maintained when SCUBA is used.
Power Equipment Mishandling	Power equipment will be energized/deenergized only upon specific verbal request of diver or proper line-pull signals.

1.5.3 Submittal Requirements

One copy of the Contractor's "Safe Practices Manual" shall be submitted for review prior to the first dive. This manual will be retained by the District Diving Coordinator and will not be returned.

1.6 MEDICAL FITNESS TO DIVE

The Contractor shall insure that all divers are medically fit to dive. This shall include a physical examination within the past twelve months, or following any physical injury, which may affect the diver's fitness if such an injury has occurred within the past twelve months. The results of the physical examination shall be submitted as part of the Accident Prevention Plan specified in paragraph 16. In addition, the Dive Supervisor shall verify the divers' health and well being at the dive site before allowing the diver to enter the water.

1.7 DIVING CONTRACTOR EXPERIENCE

The Contractor shall employ the services of a diving contractor that has at least 5 years experience in lock gate replacement or refurbishment work.

1.8 DIVER'S EXPERIENCE AND QUALIFICATIONS

Divers shall be experienced at the depth they will be diving, the task to be performed, and the equipment to be used. All divers, including standby divers, shall be qualified divers. Qualification shall consist of certification of successful completion of training by a recognized commercial diving school, or a certified record of past diving experience. Copies of the certification for each diver shall be provided by the Contractor prior to diving operations as part of the Accident Prevention Plan specified in paragraph 1.5.

1.9 DESCRIPTION OF DIVING SERVICES

The Contractor shall determine the methods used to accomplish the work, with full regard for safety and efficiency.

1.10 REQUIRED SAFETY EQUIPMENT FOR NON-DIVERS

Except for the diver in the water and the stand-by diver, all personnel on the dive team shall wear safety equipment (flotation aids, hard hats, hearing and eye protection, etc.) as required by EM 385-1-1. The stand-by diver is exempt from the requirement for flotation aids, but is required to wear a hard hat. When no divers are in the water, all dive team personnel shall wear the required safety equipment without exception.

1.11 FIRST AID AND CPR CERTIFICATION

All members of the dive team shall be certified to administer first aid and cardiopulmonary resuscitation (CPR). Copies of the certification cards shall be submitted as part of the Accident Prevention Plan.

1.12 MAINTENANCE OF DIVING EQUIPMENT

1.12.1 General

All maintenance to be performed on diving equipment shall be performed on non-duty hours. All diving equipment shall be delivered to the worksite in a ready-to-operate condition, with the exception of loading fuel in the compressors. An equipment inspection, held jointly by the dive supervisor and the District Dive Coordinator or his authorized representative, shall be held before beginning diving operations. The form for this inspection shall be the "Safety Inspection Checklist for Diving Operations", which is attached to the end of this section.

1.12.2 Equipment Inspection

Any equipment, which is brought to the worksite after the initial inspection, shall be also inspected before being placed into service. This also applies to equipment removed from the worksite and returned at a later time.

1.12.3 Inspection Reports

Inspection reports shall include as a minimum, the following:

(1) The phase of work underway during the inspection. If other work is being performed by others in conjunction with the diving services, the phase of work for these other activities shall be included.

(2) The locations or areas where the safety inspections were performed.

(3) The results of the safety inspections, including the nature of deficiencies observed and corrective actions taken.

(4) The date and time of the inspection; and

(5) The signatures of the personnel responsible for the contents of the inspection report.

PART 2 PRODUCTS

2.1 DIVING EQUIPMENT

2.1.1 General

All diving equipment shall be provided and used by the Contractor, including any special equipment, which may be required for a given dive. Normal equipment shall be provided at no additional cost to the Government, and shall include: two -way communications; air compressors and ancillary equipment; bail-out bottles; harnesses; helmets; hoses; fuel; knives; hand and/or power tools; boarding ladders; rope; underwater cutting and welding equipment; etc. Special equipment shall include water-jet pumps and equipment. Despite the provision of bailout bottles as normal equipment, the use of SCUBA for normal operations or emergencies shall not be allowed without the prior approval of the New Orleans District Diving Coordinator, Mr. William Clendenon, Chief Safety and Security, (504) 862-1995.

2.1.2 Air Supply Requirements

Divers using surface-supplied air shall be provided with a primary air supply of at least 4.5 cubic feet per minute at all depths, and a backup air supply in compliance with Section 30.C.06 of EM 385-1-1.

PART 3 EXECUTION

3.1 DIVING CONDITIONS

Divers may be expected to encounter conditions which affect the ease or safety of operations. Some of the conditions which may be encountered are: reduced or zero visibility; cold water; night dives; unpredictable currents; and confined spaces. The Contractor shall notify the Contracting Officer at least two (2) days in advance of all dive operations.

3.2 DIVE TEAMS

3.2.1 Four-man Dive Teams

3.2.1.1 General

A four-man dive team shall be used whenever entry into confined spaces is not anticipated. The Contractor may provide additional, personnel for his own convenience, at no additional cost to the Government.

3.2.1.2 Requirements

A four-man dive team consists of one dive supervisor, two divers, and one tender. Assignments may be rotated among the certified divers if desired in order to limit bottom time for any given diver for safety reasons. If such rotation is to occur, this fact must be stated in the diving operations plan. One diver is designated as a stand-by diver, who shall be wearing his normal equipment (except helmet) and prepared to enter the water whenever the primary diver is in the water. The stand-by diver is not allowed to work as a tender or have any other duties while the primary diver is in the water. If the stand-by diver is required to enter the water, the dive supervisor may act as a tender.

3.2.1.3 Manning Levels

Manning levels for dive teams are listed in Appendix N of EM 385-1-1.

3.2.1.4 Diver Communication

The divers shall have two-way radio communication with the surface at all times.

3.2.2 Five-Man Dive Teams

3.2.2.1 General

A five-man dive team shall be used whenever entry into confined spaces is anticipated. The Contractor may provide additional, personnel for his own convenience, at no additional cost to the Government.

3.2.2.2 Requirements

A five-man dive team consists of one dive supervisor, two divers, and two tenders. Assignments may be rotated among the certified divers if desired in order to limit bottom time for any given diver for safety reasons. If such rotation is to occur, this fact must be stated in the diving operations plan. One diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.

3.2.2.3 Manning Levels

Manning levels for dive teams are listed in Appendix N of EM 385-1-1as modified by Section 30.

3.2.2.4 Diver Communication

The divers shall have two-way radio communication with the surface at all times.

3.3 SHIFT DIVING

Should the nature of the diving operations require twenty-four hour operations, the Contractor shall provide two complete dive teams for such operations. Each dive team shall work a twelve-hour shift. No dive team personnel may work two or more consecutive shifts, including the dive supervisor. The second shift may use the same equipment used by the first shift. If separate equipment is used for the second shift, then an additional equipment inspection shall be performed.

3.4 DECOMPRESSION DIVES

Decompression dives will not be performed.

3.5 RECORD-KEEPING

A record of all dives shall be kept. In addition, a completion report shall be prepared following all inspection or survey dives, which includes a description of the condition of all items surveyed or inspected. Clear, readable sketches shall be prepared to supplement the text descriptions. A copy of each diver's log shall be submitted to the District Dive Coordinator or his authorized representative.

Section Table of Contents

SECTION 02451 - STEEL PIPE PILES

SECTION 02451 - STEEL PIPE PILES

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all plant, equipment, labor, and materials required to perform all operations in connection with the installation and removal of steel pipe piles in accordance with these specifications and drawings.

1.2 MEASUREMENT

Steel pipe piles will be measured for payment on the basis of lengths along the axis of the pile in place. Pile lengths will be measured to the nearest tenth of a foot. The portion of any pile driven below the tip elevation shown on the drawings will not be measured for payment unless over-driving is directed by the Contracting Officer. Piles pulled for inspection shall be measured for payment on the basis of lengths along the axis of the pile pulled. Redriving of piles will be measured in accordance with the provisions stated hereinabove for originally driving the piles.

1.3 PAYMENT

1.3.1 Furnishing and Delivering

Payment for furnishing and delivering the required length of steel pipe piles measured as specified above will be made at the contract unit price per linear foot for "FURNISH AND DELIVER STEEL PIPE PILES". The payment shall constitute full compensation for all costs of coating, furnishing and delivering pipe piles to the work site.

1.3.2 Driving

Payment for driving pipe piles measured as specified above will be made at the contract unit price per linear foot for "DRIVE STEEL PIPE PILES". The price and payment shall constitute full compensation for all costs for handling, driving, measuring, heave, re-driving heaved piles, cutting off piles, compiling and submitting pile driving records and any other items incidental to driving steel pipe piles.

1.3.3 Pulled Piles

1.4.3.1 Inspection Piles

Each steel pipe pile pulled at the direction of the Contracting Officer for inspection and found to be in good condition will be paid for at the original driven position plus 50 percent of the contract unit price for the length pulled which shall constitute payment for pulling. Payment for a pulled pile or casings shall include backfilling the pile hole if required. Undamaged pulled piles when redriven acceptably, will be paid for at 50

percent of the contract unit price for furnishing and driving the measured length of piles redriven, which price and payment shall constitute payment for redriving only. Pulled piles which are damaged through no fault of the contractor shall be replaced by a new pile which will be paid for at the contract unit price for the length acceptably driven.

1.3.3.2 Damaged Piles

When a pile is pulled for inspection and found to be damaged due to contractor negligence, no payment will be made for originally furnishing and driving such pile or for the operation of pulling and it shall be replaced by a new pile which will be paid for at the contract unit price for the length acceptably driven.

1.3.3.3 Misaligned or Misplaced Piles

When a pile is driven but not acceptably placed or driven out of alignment and pulled at the direction of the Contracting Officer, no payment will be made for either originally furnishing and driving such pile or for the operation of pulling. If the pile is undamaged and it is acceptably redriven at the direction of the Contracting Officer, it will then be paid for at the contract unit price.

1.3.4 Filling Voids Around Driven Piles

No separate payment will be made for backfilling voids around piles with fill material. All costs in connection therewith shall be included in the contract unit price for driving piles covered in paragraph 1.3.2.

1.4 APPLICABLE PUBLICATIONS

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A 252	(1998) Standard Specification for Welded And Seamless Steel Pipe Piles

AMERICAN WELDING SOCIETY (AWS)

AWS D-1.1	(2002) Structural Welding Code-Steel

1.5 SUBMITTALS

1.5.1 Equipment Descriptions

The Contractor shall submit descriptions of pile driving equipment, delivery, storage and handling methods, placement plans, driving records, quality control records, and other submittals to the Contracting Officer for approval in accordance with Sectio 01300 "SUBMITTAL PROCEDURES" as required. Submittals shall be adequately detailed to thoroughly depict intended methods or processes. Submittals not satisfactory to the Contracting Officer will be rejected. Complete descriptions of pile driving equipment, including hammers, power packs, extractors, leads, and other appurtenances shall comply with the requirements of paragraph 3.1.1 and shall be submitted for approval at least 30 days prior to commencement of work.

1.5.2 Pile Fabrication

1.5.2.1 Shop Drawings

Shop drawings for piles shall provide details and dimensions of all shop and field fabrications. The Contractor shall provide splice details and location.

1.5.2.2 Mill Test Reports

Certified copies of mill test reports shall be submitted for each material shipment and be identified with specific lots. Test reports shall indicate all pertinent data on strength, ductility, notch toughness, chemical analysis, heat treatment, and NDT.

1.5.2.3 Materials Test Reports

Certified copies of material test reports shall be submitted for all required material tests, noting the specific standards followed in the performance of tests.

1.5.2.4 Welding Procedure Specifications (WPS)

A welding procedure specification for each field weld shall be submitted to the Contracting Officer and approved before fabrication is commenced.

1.5.2.5 Weld Inspector Qualifications

For field welds the welding inspector qualifications shall be submitted for information prior to performing field welds.

1.5.3 Delivery, Storage, and Handling Plans

Plans for the proposed methods of delivery, storage, and handling of piles shall comply with the requirements of paragraphs 1.7.1 and 1.7.2 and shall be submitted for review and approval at least 30 days prior to delivery of piles to the job site.

1.5.4 Placement Plans

Placement plans shall show the proposed methods for controlling location and alignment of piles as required in paragraph 3.1.2.1 and shall be submitted for review and approval at least 30 days prior to delivery of piles to the job site.

1.5.5 Driving Records

Original records of pile driving operations of each pile driven shall be submitted daily. Recorded data for piles shall include the data specified in paragraph 3.1.2.2, unusual driving conditions, interruptions or delays during driving, and any other pertinent information. The format for driving records shall be in accordance with the format provided by the Contracting Officer.

1.5.6 Reporting

The original and two copies of these records and tests, including the records of corrective action taken, shall be furnished to the Government daily. Format of the reports shall be as prescribed in Section 1451, "CONTRACTOR QUALITY CONTROL".

1.6 QUALITY CONTROL

Requirements for materials, tests, machinery, workmanship, and other measures required for quality control shall be as specified in these specifications. The Contractor shall provide continuous inspection of all operations for quality control and record the results for submission to the Contracting Officer in order to show compliance with the contract requirements. The Contractor's quality control records shall include but not be limited to the following items:

(1) materials;
(2) delivery, storage, and handling;
(3) placing (location, alignment, etc.);
(4) driving records;
(5) cutting;
(6) record keeping;
(7) splices; — Full length?
(8) welding;

1.7 DELIVERY, STORAGE, AND HANDLING

1.7.1 Delivery and Storage

Materials delivered to the site shall be in a new and undamaged condition and shall be accompanied by certified test reports. The manufacturer's logo and mill identification mark shall be stamped on each unspliced pile at a minimum of two

locations. Delivery and storage plans shall be submitted for approval as specified in paragraph 1.5.3. Piles and casings shall be stacked during delivery and storage so that each pile is maintained in a straight position and is supported every 10 feet or less along its length (ends inclusive) to prevent exceeding the maximum permissible camber or sweep. Piles shall not be stacked more than 10 feet high unless approved by the Contracting Officer.

1.7.2 Handling

The method of handling piles and casings shall be submitted for approval as required in paragraph 1.5.3. Piles shall be lifted using a cradle or multiple point pick-up to ensure that the maximum permissible sweep is not exceeded due to insufficient support, except that a one-point pick-up may be used for lifting piles that are not extremely long. Piles shall not be dragged across the ground. The Contractor shall inspect the camber, and sweep of piles for damage before transporting them from the site storage area to the driving area. Sweep shall be checked by placing piles and casings on a firm, level surface and rotating them. The maximum permissible sweep shall be 2 inches over the length of the pile. The Contractor shall, in the presence of the Government inspector, check piles and casings for damages and excessive sweep immediately prior to placement. Damaged piles or piles with sweep exceeding 2 inches will be rejected for use and replaced at no additional cost to the Government.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Steel

Steel for pipe piles shall conform to the requirements of ASTM A252-GRADE2.

2.1.2 Pipe Piles

Pipe piles shall be twelve inch (12") inside diameter with ½" wall thickness. All pipe piles shall be delivered and driven in one piece, full length.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Pile Driving Equipment

The Contractor shall select the proposed pile driving equipment and submit descriptions of the proposed equipment for approval. Equipment approval will be based on wave equation analysis and the engineering judgement of the Contracting Officer. Stress predicated by wave equation analysis shall not exceed 0.80 Fy of the

steel. Final approval of the proposed equipment is subject to the satisfactory completion and approval of pile tests. Changes in the selected pile driving system will not be allowed after the system has been approved by the Contracting Officer except as directed by the Contracting Officer. No additional contract time will be allowed for Contractor proposed changes in the approved driving system.

3.1.1.1 Pile Driving Hammers

Pile driving hammers shall be of the impact type hammer.

3.1.1.1.1 Impact Hammers

Pipe piles shall be driven by an approved steam, air or diesel drop, single-acting, double acting, or differential-acting hammer. The size and capacity of the hammer shall be as recommended by the manufacturer for the pile weights and soil formations to be penetrated. The hammer shall be operated at all times at the steam or air pressure and at the speed recommended by the manufacturer. Boiler or compressor capacity shall be sufficient to operate the hammer continuously at full rated speed. Hammers shall have a gage to monitor hammer bounce chamber pressure for diesel hammers or pressure at the hammer for air and steam hammers. frequency. This gage shall be operational during the driving of piles and shall be mounted in an accessible location for monitoring by the Contractor and Contracting Officer. Two spare operational bounce chamber read out units shall be available on site. The contractor shall provide bounce chamber pressure gauge correction tables and charts for the type and length of hose to be used with the pressure gauge to the Contracting Officer. The Contractor shall submit the following information for each impact hammer proposed:

(1) make and model;

(2) ram weight (pounds);

(3) anvil weight (pounds);

(4) rated stroke (inches);

(5) rated energy range (foot-pounds);

(6) rated speed (blows per minute);

(7) air pressure, hammer, and compressor (pounds per square inch);

(8) rated bounce chamber pressure curves or sharts, including pressure correction chart for type and length of hose used with pressure gage (pounds per square inch);

(9) pile driving cap, make, and weight (pounds);

(10)cushion block, dimensions, and material type; and

(11)power pack description

A scale (inches) shall be fixed to the hammer's ram guide and a pointed indicator on the ram, near the scale, to allow a reading of the ram drop. Installation of both scale and indicator shall be in such a manner that the drop of the ram can be read by observing the highest and the lowest position of the indicator and scale. Both the scale and the indicator shall be easily legible to observers on the ground during operations. The Contractor shall record the ram drop of the pile hammer when recording the blows per foot as specified in the Pile Driving Record.

3.1.1.1.2 Vibratory Hammers

The use of vibratory hammers will not be allowed.

3.1.1.2 Pile Driving Leads

Impact hammers shall be supported and guided with fixed extended leads or fixed underhung leads. Two intermediate supports for the pile in the leads shall be provided to reduce the unbraced length of the pile during driving and pulling.

3.1.1.3 Pile Extractors

Pile extractors may be vibratory and/or impact pile driving hammers. Impact hammers are required for pulling piles not extractable with vibratory hammers. For the use of the vibratory hammer, weight indicator shall be attached to the crane during extraction.

3.1.1.4 Jetting Equipment

Jetting will not be allowed.

3.1.1.5 Following

A follower will not be allowed.

3.1.1.6 Pre-drilling

Piles shall not be pre-drilled.

3.1.2 Permanent Piles

3.1.2.1 Placement

Pile placement plans shall be submitted for approval as required in paragraph 1.5.4. Piles shall be placed accurately in the correct location and alignments, both laterally and longitudinally, and to the vertical lines as shown in the drawings. The Contractor shall establish a permanent base line during pile driving operations to provide for inspection of pile placement by the Contracting Officer. The base line shall be established prior to driving test piles and shall be maintained during the installation of the permanent piles. Prior to driving and with the pile head seated in the hammer, the Contractor shall ensure that each pile has been aligned correctly. A final lateral deviation from the correct location at the cut-off elevation of not more than 3" will be permitted for vertical piles. A final variation in alignment of not more than ¼ inch per foot of longitudinal axis will be permitted. The correct relative position of all piles shall be maintained by the use of templates or by other approved means. Piles and casings not located properly or exceeding the maximum limits for rotation, lateral deviation, and/or variation in alignment shall be pulled and redriven at a location directed by the Contracting Officer at no additional cost to the Government.

3.1.2.2 Driving

Piles shall not be driven within 100 feet of concrete less than 7 days old or within 30 feet of concrete less than 28 days old. A complete and accurate driving record of piles shall be compiled and submitted as required in paragraph 1.5.5. The driving record for impact hammers shall include pile dimensions and location, pile identification number, date driven, original pile length, tip elevation, description of hammer used, rate of hammer operation, length of bounce pressure hose, number of blows required for each foot of penetration throughout the entire length of each pile and for each inch of penetration in the last foot of penetration, total driving time in minutes and seconds for each pile, and other pertinent information as required or requested by the Contracting Officer. When driving long piles of high slenderness ratio, special precautions shall be taken to ensure against overstressing and leading away from a plumb or true position. The hammers shall be operated at all times at the speed and under the conditions recommended by the manufacturer subject to the approval of the Contracting Officer. Once the pile driving has begun, all conditions (such as alignment, batter, cushions, etc.) shall be kept constant. Each pile shall be driven continuously and without interruption until the required depth of penetration has been attained. Deviation from this procedure will be permitted only when driving is stopped by causes that reasonably could not have been anticipated. Jetting shall not be used to assist driving piles. A pile that cannot be driven to the required depth because of an obstruction shall be pulled and redriven or shall be cut and abandoned, whichever is directed by the Contracting Officer. When driving piles in clusters or under conditions of relatively close spacing, observations shall be made to determine heave. Heaved piles shall be backdriven to the original depth of penetration without additional cost to the Government. Piles damaged or impaired for use during driving shall be pulled and replaced with new piles or shall be cut off and abandoned and new piles driven as directed by the Contracting Officer without additional cost to the Government. The Contracting Officer may require that any pile be pulled for

inspection. Piles pulled at the direction of the Contracting Officer and found to be in suitable condition shall be redriven at a location directed by the Contracting Officer and payment therefore will be made in accordance with paragraph 1.3.2. Piles pulled at the request of the Contracting Officer and found to be damaged shall be replaced by new piles at the Contractor's expense. After piles are driven, they shall be cut off square at the indicated cutoff elevation. Any voids occurring around piles shall be backfilled with a cement-sand-bentonite slurry as specified in paragraph 02411-3.1.6.

3.1.2.3 Damaged Piles

Driving of piles shall not subject them to damage. Piles which are damaged by reason of internal defects or by improper driving so as to impair them for the purpose intended shall be removed and replaced. The Contracting Officer may require the Contractor to pull certain piles after driving for inspection to determine the condition of the piles or casings. Any pile so pulled an found to be damaged to such extent as, in the opinion of the Contracting officer, would impair its usefulness in the pile test program, shall be removed from the site and the Contractor shall furnish and drive a new pile to replace the damaged piles. Piles pulled and found to be sound and in a satisfactory condition as determined by the Contracting Officer's Representative shall be redriven. Any holes which remain as a result of pulling operations shall be filled with the materials specified in paragraph 3.2.

3.1.2.4 Coating Requirements

For coating requirements, see Section 09940 "PAINTING".

3.2 VOID BACKFILL

Where voids are induced by pile driving or pulling and removal operations, the Contractor shall backfill the voids with a tremie-placed cement-bentonite-sand slurry as specified in 02411-3.1.6.

Section Table of Contents

SECTION 02830 - CHAIN LINK FENCING AND GATES

SECTION 02830 - CHAIN LINK FENCING AND GATES

PART 1 GENERAL

1.1 SCOPE

This section covers the furnishing of all materials, labor, tools and equipment and performing all work required to install a totally new galvanized coated chain link fence and gates as located and detailed on the drawings and as specified herein.

1.2 MEASUREMENT AND PAYMENT

No measurement will be made for chain link fence as required by this section. Payment, excluding the chain link fence required for replacing the suction basin deck, will be made at the contract lump sum price for "CHAIN LINK FENCE". Price and payment will include full compensation for furnishing all plant, labor, materials and equipment to complete the chain link fence installation. Payment for the chain link fence required for replacing the suction basin deck shall be included in the contract price for "REPLACE SUCTION BASIN DECK".

1.3 APPLICABLE PUBLICATIONS

CHAIN LINK FENCE MANUFACTURER'S INSTITUTE (CLFMI)

Standard Guide for Metallic-Coated Steel Chain Link Fence & Fabric

Industrial Steel Guide for Fence Rails, Posts, Gates and Accessories

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARDS

A 121	(1999) Standard Specification for Zinc-Coated (Galvanized) Steel Barbed Wire
A 153	(2001) Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware
A 392	(1996) Standard Specification for Zinc-Coated Steel Chain Link Fence Fabric
A 1011	(2002) Standard Specification for steel, sheet and strip, hot rolled, carbon, structural, high strength low alloy and high strength low alloy with improved formability
C 150	(2002) Standard Specification for Portland Cement

F 567	(2000) Standard Specification for Installation of Chain Link Fence
F 626	(1996) Standard Specification for Fence Fittings
F 669	(1992) Strength Requirements for Metal Posts and Rails for Industrial Chain Link Fence
F 1043	(2000) Standard Specification for strength and protective coatings on metal industrial chain link fence framework

FEDERAL SPECIFICATIONS (FED. SPEC.)

RR-F-191/3 Fencing, Wire and Post, Metal (Chain-Link Fence Accessories)

1.4 SYSTEM DESCRIPTION

Chain link fencing system shall be comprised of all or a combination of post (terminal and intermediate), post with mounting plate, fencing, gate framework and fabric, braces, rails, stretcher bars, truss rods, tension wire, tension bars, gate rollers, gate latches, gate stops, gate keepers, post caps, stretcher bar bands, cross bracing wires or posts, clips, post extension arms and barbed wire.

1.5 SUBMITTALS

The Contractor shall submit for information only, manufacturer's detailed technical data and specifications for materials, fabrication and installation. Include catalog cuts for gate hardware, post caps and extension arms.

1.6 QUALITY CONTROL

The Contractor shall provide chain link fences and gates as complete units produced by a single manufacturer including necessary erection accessories, fittings and fastenings.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Chain-Link Fabric

Chain-link fabric shall be 9-gage, 2-in. mesh, coated with 2 oz. zinc per sq. ft. Fabric height shall be as shown on the drawings and described herein.

2.1.2 Posts

The posts shall be in accordance with the drawings.

2.1.3 Concrete

Concrete shall be as specified in SECTION 03301.

2.1.4 Post Braces and Truss Rods

For each gate, corner, pull, or end post, the Contractor shall provide truss rods with turnbuckles or other equivalent provisions for adjustment.

2.1.5 Posts, Braces, Rails and Gate Frames - Option

Steel pipe manufactured from steel conforming to ASTM A 1011, cold-rolled and coated with a minimum of 0.9 ounce of zinc per square foot, a minimum of 15 micrograms of zinc per square inch and a minimum of 0.3 mils cross link polyurethane acrylic exterior coating may be furnished in lieu of H- or round posts. Steel pipe shall be of the same external dimension as round posts in Fed. Spec. RR-F-191/3 for the respective uses with minimum wall thickness as follows:

Outside Dimension, Inches	Wall Thickness, Inches
1.66	0.111
1.90	0.120
2.375	0.130
2.875	0.160

2.1.6 Accessories

Accessories shall be standard with the manufacturer and galvanized in accordance with ASTM A 153.

2.1.6.1 Gates

The Contractor shall provide either intermediate members and diagonal truss rods or tubular members as necessary to provide rigid construction, free from sag or twist for gate leaves. Attach gage fabric to the gate frame by methods standard with the manufacturer except that welding will not be permitted. Arrange latches for padlocking so the padlock will be accessible from both sides of the gate regardless of the latching arrangement.

2.1.6.2 Barbed Wire

Barbed wire shall be double stranded, 4 point, 14-gage wire, zinc coated or aluminum coated to match fabric.

2.1.6.3 Reinforcing Wire

Reinforcing wire shall be a minimum of 7-gage steel coil spring wire aluminum or zinc-coated to match fabric.

2.1.6.4 Tie Wire

Tie wire shall be preformed clips of 6-gage, zinc coated steel wire to be used for attaching fabric to intermediate posts.

2.1.6.5 Hog Rings

Hog rings shall be preformed rings of 8-gage, zinc-coated steel wire for attaching fabric to top and bottom reinforcing wires.

PART 3 EXECUTION

3.1 EXAMINATION

The Contractor shall examine the conditions under which the fence and gates are to be installed, and shall not proceed with the work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

The Contractor shall install fencing in accordance with ASTM F567 and as follows:

3.2.1 Setting Posts

Check each post for vertical and top alignment, and hold in position during placement and finishing operations.

3.2.2 Post Spacing

Posts shall be spaced as shown on the drawings.

3.2.3 Top Rails

Run rail continuously through post caps. Provide expansion couplings as recommended by fencing manufacturer.

3.2.4 Brace Assemblies

Install braces so posts are plumb when diagonal rod is under proper tension.

3.2.5 Tension Wire

Install tension wires by weaving through the fabric and tying to each post with not less than 6 ga. galvanized wire, or by securing the wire to the fabric.

3.2.6 Fabric

Leave approximately two (2) inches between finish grade and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.

3.2.7 Stretcher Bars

Thread through or clamp to fabric 4 inches o.c., and secure to post with metal bands spaced 15 inches o.c.

3.2.8 Gates

Install gates plumb, level, and secure for full opening without interference. Install anchors as shown on the drawings. Adjust hardware for smooth operation and lubricate where necessary. The swing gate hinges shall accommodate a 180° rotation.

3.2.9 Tie Wires, Line Post

Use U-shape wire, conforming to diameter of pipe to which attached, clasping pipe and fabric firmly with ends twisted at least two (2) full turns. Bend wire to minimize hazard to persons or clothing.

3.2.10 Fasteners

Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

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SECTION 02845 - TRAFFIC CONTROL

SECTION 02845 - TRAFFIC CONTROL

PART 1 GENERAL

1.1 SCOPE

This work shall consist of installing and maintaining for the life of the project and finally removing all temporary signs, barricades and all other traffic aids. The Contractor shall also be responsible for replacing all damaged signs and barricades, etc. during the life of this contract.

1.2 MEASUREMENT AND PAYMENT

There will be no measurement for any work specified in this section. Payment will be made at the contract lump sum price for "TRAFFIC CONTROL". Price and payment shall include the furnishing of all plant, equipment, labor and material required to install, maintain and remove this item.

1.3 RELATED WORK SPECIFIED ELSEWHERE

Section 01352	"ENVIRONMENTAL PROTECTION"
SECTION 01100	GENERAL PROVISIONS, entitled "COORDINATION OF WORK".

1.4 REFERENCES

The publications listed below form a part of this specification to the extent referenced.

GENERAL SPECIFICATIONS FOR STREET PAVING FOR THE CITY OF NEW ORLEANS. 1995 EDITION.

C729	Traffic Signs and Devices

1.5 GENERAL

A Traffic Control Plan is shown on the drawings. Any changes to this plan which the Contractor proposes shall meet the requirements of the Manual of Uniform Traffic Control Devices (MUTCD) and shall be approved by the City of New Orleans Department of Streets and the Contracting Officer prior to implementing or adopting any changes.

1.6 QUALITY CONTROL

All temporary traffic signs, barricades and traffic aids required by the plans and these specifications may be supplemented by additional signs as required throughout the life of the contract. The Contractor's quality control personnel shall daily check all signs,

barricades and traffic aids throughout the life of this project for conformance with the drawings and specifications. Any non-conformance shall be corrected by the Contractor.

PART 2 PRODUCTS (Not Applicable)

All materials for temporary traffic signs, devices and markings shall conform to Section C729 of the General Specifications for Street Paving for the City of New Orleans.

PART 3 EXECUTION (Not Applicable)

INDEX

SECTION 02922 - FERTILIZING AND SEEDING

SECTION 02922 - FERTILIZING AND SEEDING

PART 1 GENERAL

1.1 SCOPE

The work provided for herein consists of furnishing all plant, labor, equipment, and materials, and performing all operations necessary for finished dressing, fertilizing and seeding areas as specified herein and as indicated on the drawings. Fertilizing and seeding of the disturbed areas shall be performed upon completion of construction. The period of the year in which fertilizing and seeding operations are performed in a particular area will determine the seeding specification in Table I which shall be followed for that area. Only one of the seeding specifications listed in Table I will be required.

1.2 MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for "FERTILIZING AND SEEDING". All costs associated with the completion of this section shall be distributed throughout the bid items.

1.3 SUBMITTALS

The Contractor shall submit the following items in accordance with the Section 01330, "SUBMITTAL PROCEDURES".

1.3.1 Fertilizer

Duplicate signed copies of invoices from suppliers shall be furnished. Invoices shall show quantities and percentage of nitrogen, phosphorus, and potash. Upon completion of the project, a final check of the total quantity of fertilizer used will be made against total area treated, and if minimum rates of application have not been met, an additional quantity of material sufficient to make up the minimum application rate shall be distributed as directed.

1.3.2 Seed

The Contracting Officer shall be furnished duplicate signed copies of statements certifying that each container of seed delivered is labeled in accordance with the Federal Seed Act and is at least equal to the requirements specified in paragraph 2.1.3. This certification shall be obtained from the supplier and shall be furnished on or with all copies of seed invoices.

1.4 QUALITY CONTROL

1.4.1 General

The Contractor shall establish and maintain quality control for finished dressing, fertilizing, and seeding operations and shall maintain records of his quality control for all construction operations including, but not limited to, the following:

(1) Preparation of Ground Surface

Location and quality of finished dressing, including necessary clearing, filling, or dressing out of washes, smoothness and uniformity of surfaces, and time of year.

(2) Fertilizing

Quality of materials. Areas fertilized quantity applied, and method of application.

(3) Seeding

Quality and type of seed, area covered, rate of application, quantity of seed used, and method of distribution.

(4) Maintenance and Repair

Location and type of maintenance problems and remedial treatment performed.

(5) Watering

Quality of water, area watered, quantity applied, and method of application.

1.4.2 Reporting

The original and two copies of these records of inspections and tests, as well as the records of corrective action taken, shall be furnished the Government daily. Format of the report shall be as prescribed in Section 01451, "CONTRACTOR QUALITY CONTROL".

1.5 AREAS TO BE TREATED

Fertilizing and seeding shall be performed on all disturbed areas within the construction limits.

1.6 COMMENCEMENT, PROSECUTION, AND COMPLETION

1.6.1 General

Preparation of the ground surface, fertilizing, and seeding operations shall be accomplished during the applicable growing season as specified in Table I.

1.6.2 Sequence of Work

The sequence of operations for work prescribed in this section, except mowing, shall be as follows:

(1) Preparation of Ground Surface.

(2) Fertilizing.

(3) Seeding.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Fertilizer

Fertilizer shall be uniform in composition and free flowing. The fertilizer shall meet the requirements for commercial fertilizer and shall contain, per acre, 60 pounds of available nitrogen, 60 pounds of available phosphorous, and 60 pounds of available potash. The fertilizer shall be delivered to the site in bags or other convenient containers or delivered in bulk. If delivered in bags or containers, the fertilizer shall be fully labeled in accordance with the applicable state fertilizer laws and shall bear the name, tradename or trademark, and warranty of the producer. Should the commercial fertilizer be furnished in bulk, the Contractor shall furnish certified weight tickets and a certified quantitative analysis report, in triplicate, from a recognized testing laboratory certifying the nutrient ratio of the materials.

2.1.2 Soil for Repairs

For fill of areas to be repaired, soil shall be of a quality at least equal to that which exists in areas adjacent to the area to be repaired. Soil used shall be relatively free from roots, stones, and other materials that hinder grading, planting, and maintenance operations and shall be free from objectionable weed seeds and toxic substances.

2.1.3 Seed

Seed labeled in accordance with U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act shall be furnished by the Contractor. Seed shall be furnished in sealed, standard containers unless written exception is granted. Seed that is wet or moldy or that has been otherwise damaged in transit or storage will not be acceptable. The specifications for seeds shall conform to, and be seeded in accordance with the following table:

Table I

Seeding Period and Grasses to be Used	Minimum Purity%	Minimum Germination%	Minimum Rate Lbs/Acre
2 March – 14 September Hulled Common Bermuda Grass	95	87	50
15 September - 1 March Unhulled Common Bermuda Grass Ryegrass	95 97	87 82	50 35

2.1.4 Water

Water shall be free from oil, acid, alkali, salt, and other substances harmful to growth of grass.

PART 3 EXECUTION

3.1 PREPARATION OF GROUND SURFACE

3.1.1 General

Equipment, in good condition, shall be provided for the proper preparation of the ground and for handling and placing all materials. Equipment shall be approved by the Contracting Officer before work is started.

3.1.2 Clearing

Prior to grading and tilling, vegetation and debris that may interfere with fertilizing and seeding [[fertilizing, seeding and mulching]] operations shall be mowed, grubbed, and raked; and shall be disposed of satisfactorily.

3.1.3 Grading

Previously established grades and slopes shall be maintained in a true and even condition on the areas to be fertilized and seeded. Necessary repairs to previously graded areas shall be repaired with material as described in paragraph 2.1.2. Where grades have not been established, the areas shall be graded as shown, or as directed by the Contracting Officer, and all surfaces shall be left in a true and even condition.

3.1.4 Tillage

After the areas required to be fertilized and seeded have been brought to the specified grades, the soil shall be tilled to a depth of at least 2-inches by plowing, disking, harrowing, or other approved method until the condition of the soil is

acceptable. The work shall be performed only during periods when, in the opinion of the Contracting Officer, beneficial results are likely to be obtained. When drought, excessive moisture, or other unsatisfactory conditions prevail, the work shall be stopped when directed. Undulations or irregularities in the surface to be fertilized and seeded shall be dressed before the next specified operation.

3.2 APPLICATION OF FERTILIZER

Fertilizer, as specified in paragraph 2.1.1, shall be distributed uniformly over areas to be seeded and shall be incorporated into the soil to a depth of at least 2-inches by disking, harrowing, or other acceptable methods. Incorporation of fertilizer may be part of the operation specified in paragraph 3.1.4.

3.3 SEEDING

3.3.1 General

The applicable seed shall be sown at the rate and time as indicated in Table I, unless otherwise directed in writing. A satisfactory method of sowing shall be employed, using approved mechanical power-drawn seeders, mechanical hand- seeders, broadcast-seeders, or other approved methods. When delays in operations extend the work beyond the most favorable planting season for the species designated, or when conditions are such by reason of drought, high winds, excessive moisture, or other factors that satisfactory results are not likely to be obtained, work shall be halted as directed by the Contracting Officer and resumed only when conditions are favorable or when approved alternative or corrective measures and procedures have been effected. If inspection during or after seeding operations indicates that areas have been left unplanted or other areas have been skipped, additional seed shall be applied if so directed by the Contracting Officer.

3.3.2 Broadcast Seeding

If the broadcast method of seeding is used, seed shall be broadcast with approved sowing equipment and distributed uniformly over designated areas. Seed shall be covered to an average depth of 1/4-inch by brush harrow, spike-tooth harrow, chain harrow, cultipacker, or other approved devices. Seed shall not be broadcast during windy weather.

3.3.3 Damage To Seeding

The Contractor shall be fully responsible for any damage to the seeded areas caused by his operations. Areas that become damaged as a result of poor workmanship or failure to meet the requirements of the specifications may be ordered repaired and reseeded to specification requirements, without additional cost to the Government.

3.4 MOWING

The seeded areas shall be mowed with approved mowing equipment to a height of 3 to 4-inches whenever the height of vegetation becomes 6 to 8-inches. When the amount of cut grass is heavy, it shall be removed to prevent destruction of the underlying turf. The Contractor shall perform periodic and final grass mowing within the limits of work for the duration of this contract.

3.5 WATERING

All areas of seeding shall be thoroughly watered a minimum of twice per week.

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SECTION 03101 - FORMWORK FOR CONCRETE

SECTION 03101 - FORMWORK FOR CONCRETE

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all materials and equipment and performing all labor for the forming of concrete in the structures included in these specifications.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Cast-In-Place Structural Concrete, Section 03301

Reinforcing Steel, Section 03210

Expansion Joints, Section 03150

Contractor Quality Control, Section 01451

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ACI INTERNATIONAL (ACI)

347R	(1994) Guide for Formwork for Concrete

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

C 31	(2000) Standard Specification for Making and Curing Concrete Test Specimens in the Field
C 39	(2001) Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
C 1077	(2002) Standard practice for laboratories testing concrete and concrete aggregates for use in construction and criteria for laboratory evaluation

DEPARTMENT OF COMMERCE (DOC)

PS 1	(1983) Construction and Industrial Plywood

1.4 MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for formwork and all costs in connection therewith shall be included in the contract prices for the items of work to which the work is incidental.

1.5 DESIGN REQUIREMENTS

The design, engineering, and construction of the formwork shall be the responsibility of the Contractor. The formwork shall be designed for anticipated live and dead loads and shall comply with the tolerances specified in Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE, paragraph CONSTRUCTION TOLERANCES. However, for surfaces with an ACI Class A surface designation, the allowable deflection for facing material between studs, for studs between walers and walers between bracing shall be limited to 0.0025 times the span. The formwork shall be designed as a complete system with consideration given to the effects of cementitious materials and mixture additives such as fly ash, cement type, plasticizers, accelerators, retarders, air entrainment, and others. The adequacy of formwork design and construction shall be monitored prior to and during concrete placement as part of the Contractor's approved Quality Control Plan.

1.6 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

1.6.1 Materials; FIO

Manufacturer's literature shall be submitted for plywood, concrete form hard board, form accessories, prefabricated forms, and form coating proposed for use.

1.6.2 Shop Drawings; FIO

Drawings and design computations for all formwork (including prefabricated forms) required shall be submitted at least 30 days before either fabrication or delivery of prefabricated forms. The drawings and data submitted shall include the type, size, quantity and strength of all materials of which the forms are to be made; the plan for jointing of facing panels; details affecting the appearance; type and location of form ties; and the assumed design values and loading conditions. If reshoring is permitted, the method, including location, order and time of erection and removal shall also be submitted.

1.6.3 Inspection Reports; FIO.

The Contractor shall submit field inspection reports for concrete forms and embedded items.

1.6.4 Formwork Not Supporting the Weight of Concrete; GA.

If forms are to be removed in less than 24 hours on formwork not supporting the weight of concrete, the evaluation and results of the control cylinder tests [or maturity instrumentation] shall be submitted to and approved before the forms are removed.

1.7 QUALITY CONTROL

1.7.1 General

Forms, embedded items, ties and other accessories as specified in paragraph 2.2, shall be inspected in sufficient time prior to each concrete placement by the Contractor in order to certify to the Contracting Officer that they are ready to receive concrete. Inspection of forms for concrete shall include a detailed evaluation of leakage control measures, type and application of release agent, and form cleanliness to avoid dirt transfer to the concrete. The results of each inspection shall be reported in writing to the Contracting Officer.

1.7.2 Reporting

The results of each inspection shall be reported in writing and shall include, but not be limited to, the following:

(1) Removal of extraneous material from forms.

(2) Check of joints for mortar tightness.

(3) Type of form material required for the concrete finish.

(4) Falsework and/or bracing.

(5) Alignment, tolerances, and dimensions.

(6) Chamfering.

(7) Form coating.

The original and two copies of these reports, as well as corrective action taken, shall be furnished to the Government daily. The format of these reports shall be as prescribed in Section 01451, "CONTRACTOR QUALITY CONTROL".

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Forms

Forms shall be fabricated with facing materials that will produce a finish meeting the specified construction tolerance requirements and the following surface classifications as defined in ACI 347R.

2.1.1.1 Class "A" Finish

This class of finish shall apply to all exterior formed surfaces not covered by backfill. The form facing material shall be composed of new, well-matched tongue and groove lumber or new plywood panels conforming to DOC PS-1, Grade B-B, Class I. High density overlay may also be used.

2.1.1.4 Class "D" Finish

This class of finish shall apply to all surfaces covered by backfill. The sheathing may be of wood or steel.

2.1.2 Form Coating

Form coating shall be commercial formulation that will not bond with, stain, cause deterioration, or any other damage to concrete surfaces. The coating shall not impair subsequent treatment of concrete surfaces depending upon bond or adhesion nor impede the wetting of surfaces to be cured with water or curing compounds.

2.2 ACCESSORIES

Ties and other similar form accessories to be partially or wholly embedded in the concrete shall be of a commercially manufactured type. After the ends or end fasteners have been removed, the embedded portion of metal ties shall terminate not less than 2 inches from any concrete surface either exposed to view or exposed to water. Plastic snap ties may be used in locations where the surface will not be exposed to view. Form ties shall be constructed so that the ends or end fasteners can be removed without spalling the concrete. Safety factors for form ties, anchors and hangers shall comply with the standards of ACI 347R, Table 2.4. The use of tapered ties is not allowed.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Form Construction

Forms shall be mortar tight, properly aligned and adequately supported to produce concrete surfaces meeting the surface requirements of 2.1.1, and conforming to construction tolerances of 1.5. Where concrete surfaces are to be permanently exposed to view, joints in form panels shall be arranged to provide a pleasing appearance. Where forms for continuous surfaces are placed in successive units, care shall be taken to fit the forms over the completed surface so as to obtain accurate alignment of the surface and to prevent leakage of mortar. All possible efforts shall be made to minimize the occurrence of butt joints in the forms. Forms shall not be reused if there is any evidence of surface wear and tear or defects which would impair the quality of the surface. All surfaces of forms and embedded materials shall be cleaned of any mortar from previous concreting and of all other foreign material before concrete is placed in them. The failure of a form or any system used in conjunction with a form in the placement of a floodwall that in any way affects the integrity of the form or tolerance of the floodwall shall necessitate the immediate removal of the form and any concrete placed prior to the failure. All costs for removal, clean up and salvage of reinforcing shall be borne by the Contractor. Any form material removed shall not be returned to service until it has been satisfactorily shown to the Contracting Officer or his representative, that the cause for the failure has been corrected and proper steps have been added to the Contractor's Quality Control Plan to prevent a recurrence.

3.1.2 Chamfering

All exposed joints, edges and external corners shall be chamfered by molding placed in the forms unless the drawings specifically state that chamfering is to be omitted or as otherwise specified. When wood chamfering strips do not prevent leakage of paste or water, an elastomeric type shall be employed. Chamfered joints shall not be permitted where earth or rockfill is placed in contact with concrete surfaces. Chamfered joints shall be terminated twelve inches outside the limit of the earth or rockfill so that the end of the chamfers will be clearly visible.

3.1.3 Coating

Forms for exposed or painted surfaces shall be coated with form oil or a form-release agent before the form or reinforcement is placed in final position. The use of waste oil or used oil as a form-release agent or form oil is prohibited. The coating shall be used as recommended in the manufacturer's instructions. Forms for unexposed surfaces may be wet with water in lieu of coating immediately before placing concrete, except that, in cold weather when freezing temperatures are anticipated, coating shall be mandatory. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be removed before placing concrete. Coatings that discolor concrete or are incompatible with their concrete materials are prohibited.

3.2 FORM REMOVAL,

Forms shall not be removed without approval. The minimal time required for concrete

to reach a strength adequate for removal of formwork without risking the safety of workers or the quality of the concrete depends on a number of factors including, but not limited to, ambient temperature, concrete lift heights, type and amount of concrete admixture, and type and amount of cementitious material in the concrete. It is the responsibility of the Contractor to consider all applicable factors and leave the forms in place until it is safe to remove them. In any case forms shall not be removed unless the minimum time or minimum compressive strength requirements below are met, except as otherwise directed or specifically authorized. When conditions are such as to justify the requirement, forms will be required to remain in place for a longer period. All removal shall be accomplished in a manner which will prevent damage to the concrete and ensure the complete safety of the structure. Where forms support more than one element, the forms shall not be removed until the form removal criteria are met by all supported elements. Form removal shall be scheduled so that all necessary repairs can be performed as specified in Section 03301 paragraph 3.4.2. Evidence that concrete has gained sufficient strength to permit removal of forms shall be determined by tests on control cylinders. All control cylinders shall be stored in the structure or as near the structure as possible so they receive the same curing conditions and protection methods as given those portions of the structure they represent. Control cylinders shall be removed from the molds at an age of no more than 24 hours. All control cylinders shall be prepared and tested in accordance with ASTM C 31 and ASTM C 39 at the expense of the Contractor by an independent laboratory that complies with ASTM C 1077 and shall be tested within 4 hours after removal from the site

3.2.1 Inspection of Concrete Placement.

The Contractor shall place the first monolith in it's entirety and remove the formwork as indicated in paragraph 3.2 prior to placing concrete in any other monolith. The Contractor shall notify the Contracting Officer's representative immediately after the forms are removed so that an on-site inspection of the concrete work can be made. No patching or repair shall be permitted until after the inspection is made. Curing operations shall not be altered. Recommendations, as a result of the inspection, shall be made part of the Contractor's Quality Control for all future concrete work.

3.2.2 Formwork Not Supporting Weight of Concrete

Formwork for walls, columns, sides of base slabs, and other vertical type formwork not supporting the weight of concrete shall not be removed in less than 24 hours after concrete placement is completed curing which the temperature of the air surrounding the concrete is above 50 degrees F.

3.2.3 Formwork Supporting Weight of Concrete

Formwork supporting weight of concrete and shoring shall not be removed until structural members have acquired sufficient strength to safely support their own weight and any construction or other superimposed loads to which the supported

concrete may be subjected. As a minimum, forms shall be left in place until control concrete test cylinders indicate evidence the concrete has attained at least 75 percent of the compressive strength required for the structure in accordance with the quality and location requirements of Section 03301, paragraph 1.7.1.

3.3 INSPECTION

Forms and embedded items shall be inspected in sufficient time prior to each concrete placement by the Contractor in order to certify to the Contracting Officer that they are ready to receive concrete. The results of each inspection shall be reported in writing.

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SECTION 03150 -
EXPANSION, CONTRACTION AND CONSTRUCTION JOINTS IN CONCRETE

SECTION 03150
EXPANSION, CONTRACTION AND CONSTRUCTION JOINTS IN CONCRETE

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all equipment, materials and labor for forming expansion joints, and providing and installing waterstops in accordance with these specifications and the contract drawings.

1.2. RELATED WORK SPECIFIED ELSEWHERE

Major requirements for concrete work are specified in Section 03301, "CAST-IN-PLACE STRUCTURAL CONCRETE" and in Section 03501, "MODIFY TRASH SCREEN BAY".

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 412	(1998) Standard test methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastometers - Tension
D 792	(2000) Standard test methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
D 1752	(1984) Standard Specifications for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
D 2240	(2002) Standard test methods for Rubber Property-Durometer Hardness

CORPS OF ENGINEERS (COE)

CRD-C 513	(1974) Corps of Engineers Specifications for Rubber Waterstops
CRD-C 572	(1974) Corps of Engineers Specifications for Polyvinylchloride Waterstop

LOUISIANA STANDARD SPECIFICATIONS

Louisiana Standard Specifications for Roads and Bridges, (LSSRB),2000 Edition.

1005	Joint Materials for Pavement and Structures

1.4 MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for the work covered under this section. All costs in connection therewith will be included in the contract unit or lump sum prices for the items of work to which the work is incidental. Price and payment will constitute full compensation for furnishing all plant, labor, material and equipment required to perform the work.

1.5 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 - SUBMITTAL PROCEDURES:

Statements

1.5.1 Splicing Waterstops; GA

Procedures for splicing waterstops shall be submitted.

Reports

1.5.2 Premolded Expansion Joint Filler Strips; FIO

Certified manufacturer's test reports shall be provided for premolded expansion joint filler strips and waterstops to verify compliance with applicable specification.

Samples

1.5.3 Waterstops; FIO

Waterstop materials and splice samples shall be submitted for inspection and testing

and shall be identified to indicate manufacturer, type of material, size and quantity of material and shipment represented. Each material sample shall be a piece not less than 12 inches long cut from each 200 feet of finished waterstop furnished, but not less than a total of four linear feet of each type and size furnished. For spliced segments of waterstops to be installed in the work, one spliced sample of each size and type for every 50 splices made in the factory and every 10 splices made at the job site shall be furnished for inspection and testing. The spliced samples shall be made using straight run pieces with the splice located at the mid-length of the sample and finished as required for the installed waterstop. The total length of each spliced sample shall be not less than 12 inches long. Test samples shall be furnished at least 60 days prior to the installation of waterstops in the work. All samples and splices shall be taken in the presence of the Government Representative.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Preformed Expansion Joint Filler Strips

Preformed expansion joint filler strips shall conform to ASTM D 1752, Type I. Wood, cork, or other cellulose-based material shall not be used.

2.1.2 Joint Seals and Sealants

Joint Sealant

All joint sealant shall be colored to match the adjacent concrete and shall be according to the following:

(1) All sealant used for joints shall be polyurethane sealant conforming to LSSRB 1005.02 (b).

(2) All sealant used for joints with preformed expansion joint filler (bituminous type) shall be silicone sealant conforming to LSSRB 1005.02 (c).

2.1.2.2 Preformed Elastomeric Compression Joint Seals

All preformed elastomeric compression joint seals shall conform to the requirements of Paragraph 1005.03(a)(2) of the LSSRB.

2.1.3 Waterstops

2.1.3.1 Non-Metallic Waterstops

Rubber waterstops shall conform to COE CRD-C 513. Polyvinylchloride waterstops shall conform to COE CRD-C 572.

2.1.3.2 Hydrophilic Rubber Waterstops

All hydrophilic waterstops shall be preformed hydrophilic non-vulcanized rubber strips. Hydrophilic waterstop shall be a bentonite based product which swells in contact with water.

Hydrophilic waterstop shall comply with the minimum standards listed below:

PROPERTY	UNIT	ASTM	VALUE
Hardness	HS	D2240	30 ± 6
Tensile Strength	Lbs./In.²	D412*	100 Min.
Elongation	%	D412*	500 Min.
Specific Gravity	----	D792**	1.18 ± 0.15

* As measured by Dumbbell Die No. 3.
** As measured by a test piece (Thk x Wdth x Lth).

Coefficient of expansion shall be determined using the following test method:

(a) Step 1. Determine the volume of the dry sample (V1).

(b) Step 2. Immerse the sample in water at ambient temperature for ten (10) DAYS.
(c) Step 3. Determine the volume of the sample after immersion (V2).

(d) Step 4. Calculate the coefficient of expansion (V1).

Coefficient of expansion shall be at least 2.

2.2 TESTS, INSPECTIONS, AND VERIFICATIONS

2.2.1 Materials Tests

Samples of materials and splices as required in paragraph 5.2 shall be visually inspected and tested by and at the expense of the Government for compliance with CRD-C 513 or CRD-C 572, as applicable. Hydrophilic waterstops shall be visually inspected and tested for compliance with these specifications. If a sample fails to meet the specification requirements, new samples shall be provided and the cost of retesting will be deducted from payments due the Contractor at the rate of $920.00 for materials complying with CRD-C 513 per material sample retested, $810.00 for materials complying with CRD-C 572 per material sample retested, $1,000.00 for hydrophilic sample retested and $150.00 per splice sample retested.

2.2.1.1 Non-Metallic Waterstops

Samples of materials and splices as required in paragraph WATERSTOPS shall be visually inspected and tested by and at the expense of the Government for compliance with COE CRD-C 513 or COE CRD-C 572 as applicable. If a sample fails to meet the specification requirements, new samples shall be provided and the cost of retesting will be deducted from payments due the Contractor at the rate of $920.00 (for materials complying with CRD-C-513) or $810.00 (for materials complying with CRD-C-572) per material sample retested and $150.00 per splice sample retested.

NOTE: Testing of Non-Metallic Waterstops shall be performed by the Corps of Engineers Waterways Experiment Station.

2.2.2 Splicing Waterstops

2.2.2.1 Procedure and Performance Qualifications

Procedure and performance qualifications for splicing waterstops shall be demonstrated in the presence of the Contracting Officer. All splices shall be performed by qualified personnel in the presence of the quality assurance representative.

2.2.2.2 Non-Metallic Waterstops

Procedure and performance qualifications for splicing non-metallic waterstops shall be demonstrated by the manufacturer at the factory and the Contractor at the job site by each making three spliced samples of each size and type of finished waterstop.

PART 3 EXECUTION

3.1 INSTALLATION

Joint locations and details, including materials and methods of installation of joint fillers and waterstops, shall be as specified, as shown, and as directed. In no case shall any fixed metal be continuous through an expansion joint.

3.1.1 Expansion Joints

Preformed expansion joint filler shall be used in expansion and isolation joints in slabs around columns and between slabs on grade and vertical surfaces where indicated. The filler shall extend the full slab depth, unless otherwise indicated. The edges of the joint shall be neatly finished with an edging tool of 1/8 inch radius. [, except where a resilient floor surface will be applied]. Where the joint is to receive a sealant, the filler strips shall be installed at the proper level below the finished floor with a slightly tapered, dressed and oiled wood strip temporarily secured to the top to form a recess to the size shown on the drawings. The wood strip shall be removed after the concrete

has set. No wood, cork, or other cellulose-based material shall remain in the joints. The Contractor may use a removable expansion filler cap designed and fabricated for this purpose in lieu of the wood strip. The groove shall be thoroughly cleaned of laitance, curing compound, foreign materials, protrusions of hardened concrete, and any dust, which shall be blown out of the groove with oil-free compressed air.

3.1.2 Waterstops

Waterstops shall be installed at the locations shown on the drawings to form a continuous water-tight diaphragm. Waterstops shall be carefully and correctly positioned during installation to eliminate faulty installation that may result in joint leakage. Adequate provision shall be made to support and protect the waterstops during the progress of work. Any waterstop punctured or damaged shall be replaced or repaired at the Contractor's expense. The concrete shall be thoroughly consolidated in the vicinity of the waterstop. Suitable guards shall be provided to protect exposed projecting edges and ends of partially embedded waterstops from damage when concrete placement has been discontinued.

3.1.2.1 Splices

Joints in waterstops shall be spliced together by qualified splicers using the approved splicing procedures to form a continuous watertight diaphragm. All "ELLS", "TEES" and "CROSSES" in PVC waterstop may be field spliced. Straight butt joints will also be allowed to be spliced in the field. Overlapping in lieu of splicing will not be permitted.

a. Non-Metallic Waterstops - Waterstop ends to be joined shall be carefully cut to insure good alignment and contact between joined surfaces. The continuity of the characteristic features of the cross section shall be maintained across the splice.

b. Rubber Waterstops - Splices shall be vulcanized in accordance the manufacturer's recommendations.

c. Polyvinylchloride Waterstops - Splices shall be made by heat sealing the adjacent surfaces in accordance with the approved procedure. A thermostatically controlled electrical heat source shall be used to make all splices. The correct temperature at which splices should be made will differ with the material concerned but the applied heat should be sufficient to melt but not char the plastic. Waterstops shall be reformed at splices with a remolding iron with ribs or corrugations to match the pattern of the waterstop. The spliced area, when cooled and bent by hand in as sharp an angle as possible, shall show no sign of separation.

d. Hydrophilic Waterstop - Hydrophilic waterstop shall be spliced as per the manufacturer's recommendations.

3.1.3 Seals, Sealants and Neoprene Strips

Seals, sealants and Neoprene strips shall be installed at the locations shown on the drawings. They shall be carefully and correctly placed during construction to eliminate faulty installation. The seals, sealants and Neoprene strips shall be installed in concrete joints according to the plans and these specifications.

SECTION TABLE OF CONTENTS

SECTION 03210 – REINFORCING STEEL

SECTION 03210 – REINFORCING STEEL

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all equipment, materials and labor for providing and placing steel bars, steel welded wire fabric, and accessories for concrete reinforcement.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Formwork, Section 03101 "FORMWORK FOR CONCRETE"

Joints, Section 03150 "EXPANSION JOINTS & WATERSTOPS"

Concrete, Section 03301 "CAST-IN-PLACE STRUCTURAL CONCRETE"

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ACI INTERNATIONAL (ACI)

318/318R	(2002) Building Code Requirements for Structural Concrete and Commentary
SP-66	(1994) Detailing Manual

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A 615	(2001b) Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
E 8	(2001e1) Standard Test Methods for Tension Testing of Metallic Materials
A185	(2001) Standard Specifications for Steel Welded Wire Reinforcement, Plain, for Concrete Reinforcement

1.4 MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for reinforcement bars, welded wire fabric or accessories. Payment for furnishing and placing reinforcement bars,

welded wire fabric and accessories shall be included in the contract prices for the items of work to which the reinforcement bars and accessories are incidental.

1.5 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

Drawings

1.5.1 Fabrication and Placement; FIO.

The Contractor shall prepare and submit complete shop drawings to the Contracting Officer for approval in accordance with specified requirements. Shop drawings shall include the details of bar supports including types, sizes, spacing and sequence.

Reports

1.5.2 Materials; FIO. Tests, Inspections, and Verifications; FIO.

Certified test reports of reinforcement steel showing that the steel complies with the applicable specifications shall be submitted to the Contracting Officer. Reports shall be furnished for each steel shipment and shall be identified with specific lots prior to use of the steel in the work. Three copies of the ladle analysis shall be provided for each lot of steel and the Contractor shall certify that the steel furnished conforms to the ladle analysis.

Records

1.5.3 Material; FIO.

A system of identification, which shows the disposition of specific lots of approved materials in the work, shall be established and submitted to the Contracting Officer before completion of the contract.

1.6 QUALITY CONTROL

1.6.1 Materials Tests

The Contractor shall have required material tests performed by an approved laboratory to demonstrate that the materials are in conformance with the specifications. Tension tests shall be performed on full cross section specimens in accordance with ASTM E 8, using a gage length that spans the extremities of specimens with welds or sleeves included. Tests shall be at the Contractor's expense.

1.6.2 General

The Contractor shall establish and maintain quality control for proper installation of all work covered in this section to assure compliance with contract specifications and maintain records of his quality control for all construction operations including but not limited to the following:

(1) Minimum concrete cover of reinforcement steel.

(2) Number, size, and location of placement.

(3) Maintain adequate splicing lengths where required.

1.6.3 Reporting

The original and two copies of these records and tests, as well as the records of corrective action taken, shall be furnished the Government daily. Format of the report shall be as prescribed in Section 01451, "CONTRACTOR QUALITY CONTROL".

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Reinforcing Steel

Billet-steel bars shall conform to ASTM A 615, Grade 60 for bar sizes 3 through 11, including the following requirements:

(1) Tension test specimens shall be bars of full cross section as rolled for all sizes.

(2) The bend test requirements shall be based upon 180 degree bends of full size bars for all grades of steel. The bend diameters for bend tests shall be as indicated in the following table and shall be measured on the inside of bars:

Bar Size	Maximum Diameter
#3, #4 and #5	4 bar diameters
#6, #7 and #8	5 bar diameters
#9, #10 and #11	5 bar diameters

(3) Steel Bars shall conform to the grade, size, and length shown on drawings.

2.1.2 Accessories

2.1.2.1 Bar Supports

Bar supports shall conform to ACI Publication SP-66. Supports for bars in concrete with formed surfaces exposed to view or to be painted shall be plastic-coated wire, stainless steel or precast concrete supports. Precast concrete supports shall be wedged-shaped, not larger than 3-1/2 by 3-1/2 inches, of thickness equal to that indicated for concrete cover and have an embedded hooked tie-wire for anchorage. Bar supports used in precast concrete with formed surfaces exposed to view shall be the same quality, texture and color as the finish surfaces.

2.1.2.2 Wire Ties

Wire ties shall be 16 gage or heavier black annealed wire.

2.1.2.3 Welded Wire Fabric

Reinforcement shall be steel welded wire fabric, plain, for concrete reinforcement conforming to the requirements of ASTM A 185.

PART 3 EXECUTION

3.1 PLACEMENT

Reinforcement steel and accessories shall be placed as specified and shown and approved shop drawings. Holes cut in steel sheet piling for passing reinforcing bars shall not exceed 2 inches in diameter. Where holes fall in the web of the steel sheet pile, the hole shall be slotted 4 inches horizontally to accommodate passing the reinforcing bars. Placement details of steel and accessories not specified or shown shall be in accordance with ACI Publication SP-66 or ACI 315 and ACI 318/318R. Steel reinforcement shall be fabricated to shapes and dimensions shown, placed where indicated within specified tolerances and adequately supported during concrete placement. At the time of concrete placement all steel shall be free from loose, flaky rust, scale (except tight mill scale), mud, oil, grease or any other coating that might reduce the bond with the concrete.

3.1.1 Hooks and Bends

Reinforcement bars shall be mill or field-bent. All steel shall be bent cold unless authorized. No steel bars shall be bent after being partially embedded in concrete unless indicated or authorized. No steel bars partially embedded in concrete shall be field bent unless indicated on the drawings or otherwise authorized. All hooks or bends shall be in accordance with ACI 318.

3.1.2 Placing Tolerances

3.1.2.1 Spacing of Bars

Bars shall be spaced as indicated on the drawings or as otherwise directed. The spacing between adjacent bars and the distance between layers of bars may not vary from the indicated position by more than one bar diameter nor more than 1 inch, whichever is less.

3.1.2.2 Concrete Cover

The minimum and maximum concrete cover of main reinforcement steel shall be as indicated on the drawings. The concrete tolerances allowable variation for minimum cover shall be as follows:

MINIMUM COVER	VARIATION
6 inch	plus 1/2 inch
4 inch	plus 3/8 inch
3 inch	plus 3/8 inch
2 inch	plus 1/4 inch
1-1/2 inch	plus 1/4 inch
1 inch	plus 1/8 inch
3/4 inch	plus 1/8 inch

3.1.3 Splicing

Splices in reinforcement steel shall be as specified, shown on the drawings or as directed by the Contracting Officer. Bars may be spliced at alternate or additional locations at no additional cost to the Government, subject to the approval of the Contracting Officer. Except as provided herein, all splicing shall be in accordance with approved splicing procedures and the requirements of ACI 318. Bars larger than No. 13 shall be spliced with mechanical connectors or butt welded in accordance with ACI 318. The splice shall be submitted to the Contracting Officer for approval.

3.1.3.1 Lap Splices

Lap Splices shall be used only for bars smaller than size #14. Bar laps may be placed in contact and securely tied or spaced transversely apart to permit the embedment of the entire surface of each bar in concrete, but shall not be spaced farther apart than one-fifth the required length of lap nor 6-inches. Lengths of laps for bars shall conform to the requirements of ACI 318, except when otherwise shown on the drawings.

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SECTION 03301 - CAST-IN-PLACE STRUCTURAL CONCRETE

SECTION 03301 - CAST-IN-PLACE STRUCTURAL CONCRETE

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all plant, labor, materials, and performing all operation in connection with furnishing and placing cast-in-place concrete as indicated on drawings and specified herein.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Expansion Joints and Waterstops, Section 03150

Reinforcing Steel and Accessories, Section 03210

Formwork for Concrete, Section 03101

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ACI INTERNATIONAL (ACI)

117/117R	(1990) Standard Tolerances for Concrete Construction and Materials
211.1	(1991) Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
214.3R	(1988) Simplified Version of the Recommended Practice for Evaluation of Strength Test Results of Concrete
305R	(1999) Hot Weather Concreting
318/318R	(2002) Building Code Requirements for Structural Concrete and Commentary

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

C 29	(1997) Standard test method for bulk density ("Unit Weight") and Voids in Aggregate
C 31	(2000e1) Standard Practice for Making and Curing Concrete Test Specimens in the Field

C 33	(2002) Standard Specification for Concrete Aggregates
C 39	(2001) Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
C 42	(1999) Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beam of Concrete
C 94	(2000e2) Standard Specification for Ready-Mixed Concrete
C 123	(1998) Standard Test Method for Lightweight Particles In Aggregate
C 127	(2002) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
C 128	(2001) Standard Test Method for Density (Specific Gravity) and Absorption of Fine Aggregate
C 136	(2001) Standard Test Method For Sieve Analysis of Fine and Coarse Aggregates
C 143	(2000) Standard Test for Slump of Hydraulic Cement Concrete
C 150	(2002) Standard Specification for Portland Cement
C 171	(1997a) Standard Specification for Sheet Materials for Curing Concrete
C 172	(1999) Standard Practice for Sampling Freshly Mixed Concrete
C 192	(2000) Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
C 231	(1997e1) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
C 260	(2001) Standard Specification for Air-Entraining Admixtures for Concrete
C 309	(1998a) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

C 494	(1999ae1) Standard Specification for Chemical Admixtures for Concrete
C 566	(1997) Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
C 595	(2002) Standard Specification for Blended Hydraulic Cement
C 597	(1997) Standard Test Method for Pulse Velocity Through Concrete
C 618	(2001) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
C 803	(1997e1) Standard Test Method for Penetration Resistance of Hardened Concrete
C 805	(1997) Standard Test Method for Rebound Number of Hardened Concrete
C 1059	(1999) Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete
C 1064	(2001) Standard Test Method for Temperature of Freshly Mixed Portland Cement Concrete
C 1077	(2002) Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
C 1107	(2002) Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
D 75	(1997) Standard Practice for Sampling Aggregates

CORPS OF ENGINEERS (COE)

CRD-C 94	(1995) COE Specification for Surface Retarders
CRD-C 100	(1975) Method for Sampling Concrete Aggregate and Aggregate Sources, and Selection of Material for Testing
CRD-C 104	(1980) Method of Calculation of the Fineness Modulus of Aggregate

CRD-C 143	(1962) Specification for Meters for Automatic Indication of Moisture in Fine Aggregates
CRD-C 400	(1963) Requirements for Water for Use in Mixing or Curing Concrete
CRD-C 521	(1981) Standard Test Method for Frequency and Amplitude of Vibrators for Concrete

COMMERCIAL ITEM DESCRIPTION (CID)

A-A-1555	Water Paint, Powder (Cementious, White and Colors)

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST HB 44	(2000) Specifications, Tolerances, and other Technical Requirements for Weighing and Measuring Devices

NATIONAL READY-MIXED CONCRETE ASSOCIATION (NRMCA)

NRMCA CPMB 100-990	(1990) Concrete Plant Standards

LOUISIANA STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES (LSSRB) 2000 EDITION, STATE OF LOUISIANA, DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT (LDOTD)

1003.02	Aggregates for Portland Cement Concrete and Mortar

US GENERAL SERVICES ADMINISTRATION (GSA)

CCC-C-467C	(Feb. 8, 1972) Cloth, Burlap, Jute (or Kenaf)

1.4 MEASUREMENT AND PAYMENT

No measurement will be made for concrete.

1.4.1 Payment for cast-in-place concrete required to replace the suction basin deck will be made at the contract lump sum price for "REPLACE SUCTION BASIN DECK".

1.4.2 Payment for all other concrete required to complete this item will be made at the contract lump sum price for "CAST-IN-PLACE STRUCTURAL CONCRETE".

1.4.3 Cast-in-Place Structural Concrete consists of base slabs, stabilization slabs, 6" thick concrete pavement, retaining walls, structural concrete, dowel

placement, epoxy grout, reinforcing steel, formwork, waterstops, expansion joint filler, and other components required to yield cast-in-place concrete structures according to the plan and specifications.

1.5 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES.

1.5.1 Concrete Mixture Proportioning; GA.

Concrete mixture proportions shall be determined by the Contractor, in accordance with the requirements in paragraph 2.2, and submitted for approval. The concrete mixture quantities of all ingredients per cubic yard and nominal maximum coarse aggregate size that will be used in the manufacture of each quality of concrete shall be stated. Proportions shall indicate the mass of cement, pozzolan (if used), and water; the mass of aggregates in a saturated surface-dry condition; and the quantities of admixtures. The submission shall be accompanied by test reports from a laboratory complying with ASTM C 1077, which show that proportions thus selected will produce concrete of the qualities indicated. The submission shall provide information specified in paragraph 2.2.8, and if applicable, paragraph 2.2.6. Test reports shall be from tests performed on concrete produced from the submitted mixture proportions. No substitution shall be made in the source or type of materials used in the work without additional tests to show that the quality of the new materials and concrete are satisfactory.

1.5.2 Batch Plant; FIO.

The Contractor shall submit batch plant data to the Contracting Officer for review for conformance with paragraphs 3.1.1 and 3.1.2.

1.5.3 Concrete Mixers; FIO.

The Contractor shall submit concrete mixer data, which includes the make, type, and capacity of concrete mixers for review of conformance with paragraphs 3.1.1 and 3.1.3.

1.5.4 Conveying Equipment and Methods; FIO.

The conveying equipment and methods for transporting, handling, and depositing the concrete shall be submitted for review for conformance with paragraphs 3.1.1 and 3.1.4.

1.5.5 Placing Equipment and Methods; FIO.

All placing equipment and methods for transporting, handling, and depositing the concrete shall be submitted for review for conformance with paragraph 3.1.1 and 3.3.

1.5.6 Testing Technicians; FIO. Concrete Construction Inspector; FIO.

The Contractor shall submit statements that the concrete testing technicians and the concrete inspectors meet the requirements of paragraph 3.7.

1.5.7 Construction Joint Treatment; GA.

The method and equipment proposed for joint cleanup and waste disposal shall be submitted for review for conformance with paragraph 3.2.3.

1.5.8 Curing and Protection; GA.

The curing medium, equipment and methods to be used shall be submitted for review for conformance with paragraph 3.5.

1.5.9 Cold-Weather Placing; GA.

If concrete is to be placed under cold-weather conditions, the proposed materials, methods, and protection meeting the requirements of paragraph 3.3.4 shall be submitted for review.

1.5.10 Hot-Weather Placing; GA.

If concrete is to be placed under hot-weather conditions, the proposed materials and methods, meeting the requirements of paragraph 3.3.5 and paragraph 3.4, shall be submitted for review.

1.5.11 Aggregate ; GA.

Information identifying the aggregate source to be used along with gradation tests for fine and coarse aggregates shall be submitted for approval. The gradation test for fine aggregate shall include the No. 8 and No. 30 sieve sizes. Specific gravity and absorption of fine and coarse aggregates determined by ASTM C 128 and ASTM C 127, respectively shall also be submitted.

Samples of materials for Government testing and approval shall be submitted as required in paragraph 1.6.

1.5.12 Uniformity of Concrete Mixing; FIO.

The results of the initial mixer uniformity tests as required in paragraph 3.7.2.13 shall be submitted at least 5 days prior to the initiation of placing.

1.5.13 Tests and Inspections; FIO.

Test results and inspection reports shall be submitted daily and weekly as required in paragraph 3.7.3.

1.5.14 Cementitious Materials; GA.

Cementitious Materials, including Cement and Pozzolan, will be accepted on the basis of the manufacturer's certification of compliance, accompanied by mill test reports stating that materials meet the requirements of the specification under which they are furnished. Certification and mill test reports shall be from samples taken from the particular lot furnished . No cementitious materials shall be used until notice of acceptance has been given by the Contracting Officer. Cementitious materials will be subject to check testing from samples obtained at the source, at transfer points, or at the project site, as scheduled by the Contracting Officer, and such sampling will be by or under the supervision of the Government at its expense. Material not meeting specifications shall be promptly removed from the site of work.

1.5.15 Impervious-Sheet Curing Materials; FIO.

Impervious-Sheet Curing Materials shall be certified for compliance with all specification requirements.

1.5.16 Air-Entraining Admixture; FIO.

Air-Entraining Admixture shall be certified for compliance with all specification requirements.

1.5.17 Other Chemical Admixtures; FIO.

Other Chemical Admixtures shall be certified for compliance with all specification requirements.

1.5.18 Membrane-Forming Curing Compound; FIO.

Membrane-Forming Curing Compound shall be certified for compliance with all specification requirements.

1.5.19 Nonshrink Grout; FIO.

Descriptive literature of the Nonshrink Grout proposed for use shall be furnished together with a certificate from the manufacturer stating that it is suitable for the application or exposure for which it is being considered. In addition, a detailed plan shall be submitted for approval, showing equipment and procedures proposed for use in mixing and placing the grout.

1.5.19.1 Prepackaged Material

Prepackaged material requiring only the addition of water will be accepted on the basis of certified laboratory test results showing that the material meets the requirements of ASTM C 1107. When fine aggregate is to be added, the Contractor shall also furnish for approval the mixture proportions together with certified copies of laboratory test results indicating that the mixture is in conformance with the requirements of ASTM C 1107.

1.5.19.2 Mixture Proportions

Mixture proportions using a volume-change controlling ingredient shall be submitted for approval. The submittal shall include the mixture proportions of all ingredients and certified copies of laboratory test results indicating that the materials and the mixture is in conformance with the requirements of ASTM C 1107.

1.5.20 Water

The name of the source of mixing and curing water (and documentation that mixing water meets CRD-C 400, if undrinkable) shall be submitted for conformance with paragraph 2.1.5.

1.5.21 Latex Bonding Compound; FIO

Latex Bonding Compound shall be certified for compliance with all specification requirements.

1.6 GOVERNMENT TESTING AND SAMPLING

The Contractor shall provide facilities and labor as may be necessary for procurement of representative test samples of aggregates and concrete. Concrete and aggregate requirements in this paragraph and its subparagraphs do not relieve the Contractor of the requirements outlined in paragraph 3.7.

1.6.1 Aggregates

The aggregate sources listed in 01100-12 have been tested and at the time testing was performed, these sources were capable of producing materials of a quality acceptable for this project provided suitable processing was performed. If the Contractor proposes to furnish aggregates from a source not listed in 01100-12, samples consisting of not less than 500 pounds of each size coarse aggregate and 300 pounds of fine aggregate taken under the supervision of the Contracting Officer in accordance with CRD-C 100 shall be delivered to the Waterways Experiment Station (3909 Halls Ferry Road) in Vicksburg, MS within 15 days after notice to proceed. Sampling and shipment of samples shall be at the Contractor's expense. The cost of

testing one source for each size aggregate will be borne by the Government. If the Contractor selects more than one source for each aggregate size or selects a substitute source for any size aggregate after the original source was tested, the cost of that additional testing will be borne by the Contractor. From 90 to 120 days will be required to complete evaluation of the aggregates. Testing will be in accordance with applicable CRD or ASTM test methods. Tests to which aggregate may be subjected are specific gravity, absorption, cycles of freezing and thawing in concrete, alkali-aggregate reaction, organic impurities, and any other test necessary to demonstrate that the aggregate is of a quality that is at least equivalent to those sources listed in 001100-12. 13

1.6.2 Concrete

The Government will determine when concrete shall be sampled. The Contractor shall cast, protect and deliver concrete cylinders and determine slump and air content. The person conducting the tests shall meet the Concrete Field Testing Technician requirements contained in paragraph 3.7.1. Concrete shall be sampled in accordance with ASTM C 172. When cylinders are molded, slump and air content shall be determined in accordance with ASTM C143 and ASTM C 231, respectively. Test samples for each class of concrete shall be taken at least once every 8-hour shift or for every 150 cubic yards placed, whichever requires more samples. From each sample, three 6-inch by 12-inch compression test specimens shall be made in accordance with ASTM C 31. If cylinders are not delivered to the testing laboratory within 24 to 48 hours after molding, they shall be submerged in a water tank provided by the Contractor, where the surrounding water temperature is maintained by the Contractor at 73.4 plus or minus 3 degrees F. Cylinders shall be transported in accordance with ASTM C 31 (with cushioning material) and unloaded in the Government designated location. Compression testing will be performed by the Government in accordance with ASTM C 39. One cylinder will be tested at 7 days for information and two cylinders will be tested at 28 days (90 if pozzolan or slag is used) for acceptance.

1.6.2.1 Government Designated Location

The Government designated location for delivery of the test cylinders is:

The New Orleans District Soils and Materials Processing Unit
New Orleans, Louisiana
At the foot of Prytania Street
Between the hours of 8:00 AM & 3:00 PM

1.6.2.2 Cementitious Materials, Admixtures, Curing Compound

At least 60 days in advance of concrete placement, the Contractor shall notify the Contracting Officer of the source of materials, along with sampling location, brand name, type, and quantity to be used in the manufacture and/or curing of the concrete.

1.6.2.3 Air-Entraining Admixture

Air-entraining admixtures or other chemical admixtures that have been in storage at the project site for longer that 6 months or that have been subjected to freezing will be retested at the expense of the Contractor when directed by the Contracting Officer and will be rejected if test results are not satisfactory or indicate non-compliance with paragraph 2.1.3.

1.6.3 Concrete Strength

Compressive strength test specimens required in paragraph 1.6.2 will be used to determine compliance. The strength of the concrete will be considered satisfactory so long as the average of all sets of three consecutive test results equals or exceeds the specified compressive strength f'c and no individual test result falls below the specified strength f'c by more than 500 psi. A "test" is defined as the average of two companion cylinders, or if only one cylinder is tested, the results of the single cylinder test. Additional analysis or testing, including nondestructive testing, taking cores and/or load tests may be required at the Contractor's expense when the strength of the concrete in the structure is considered potentially deficient.

1.6.3.1 Investigation of Low-Strength Test Results

When any strength test of standard-cured test companion cylinders falls below the specified strength requirement by more than 500 psi or if tests of field-cured cylinders indicate deficiencies in protection and curing, steps shall be taken to assure that the load-carrying capacity of the structure is not jeopardized. Nondestructive testing in accordance with ASTM C 597, ASTM C 803, or ASTM C 805 may be permitted by the Contracting Officer to estimate the relative strengths at various locations in the structure as an aid in evaluating concrete strength in place or for selecting areas to be cored. Such tests shall not be used as a basis for acceptance or rejection.

1.6.3.2 Testing of Cores

When the strength of concrete in place is considered potentially deficient, cores shall be obtained and tested in accordance with ASTM C 42. At least three representative cores shall be taken from each member or area of concrete in place that is considered potentially deficient. The location of cores will be determined by the Contracting Officer to least impair the performance of the structure. Concrete in the area represented by the core testing will be considered adequate if the average strength of the cores is equal to at least 85 percent of the specified strength requirement and if no single core is less than 75 percent of the specified strength requirement.

1.6.3.3 Load Tests

If the core tests are inconclusive or impractical to obtain or if structural analysis does not confirm the safety of the structure, load tests may be directed by the Contracting Officer in accordance with the requirements of ACI 318/318R. Concrete work evaluated by structural analysis or by results of a load test shall be corrected in a manner satisfactory to the Contracting Officer. All investigations, testing, load tests, and correction of deficiencies will be performed and approved by the Contracting Officer at the expense of the Contractor, except that if all concrete is in compliance with the plans and specifications, the cost of investigations, testing, and load tests will be at the expense of the Government.

1.7 DESIGN REQUIREMENTS

1.7.1 Concrete Strength

Specified compressive strength f'c shall be as follows:

Compressive Strength (PSI)	Structure Or Portion Of Structure
4,000 @ 28 * days	All other concrete
3,000 @ 28 * days	6" Thick Concrete Paving
2,500 @ 28 * days	Stabilization Slab

* 90 days if pozzolan is used.

1.7.2 Maximum Water-Cementitious Materials (W/CM) Ratio

Maximum W/CM shall be as follows:

W/CM, By Mass	Structure Or Portion Of Structure
0.44	All other concrete
0.55	6" Thick Concrete Paving
0.64	Stabilization Slab

1.8 CONSTRUCTION TOLERANCES

1.8.1 General

The definitions of the terms used in the following tables shall be as defined in ACI 117/117R. Level and grade tolerance measurements of slabs shall be made as soon as possible after finishing. When forms or shoring are used, the measurements shall be made prior to removal. Tolerances are not cumulative. The most restrictive tolerance controls. Tolerances shall not extend the structure beyond legal boundaries. Except as specified otherwise, plus tolerance increases the amount or dimension to which it applies, or raises a level alignment, and minus tolerance decreases the amount or dimension to which it applied, or lowers a level alignment. A

tolerance without sign means plus or minus. Where only one signed tolerance is specified, there is no limit in the other direction.

TABLE 1

CONSTRUCTION TOLERANCES FOR
REINFORCED CONCRETE CONSTRUCTION

1.	Footings:		
	(a)	Variation from plans (sizes)	Plus 2 in.**
	(b)	Variation in thickness	Plus 10%** Minus 5%
	(c)	Variation from plans (location)	2% of footing width in the direction of misplacement but not more than 2 in.
2.	Horizontal surfaces: decks, beams, soffits, caps, floors, slabs, ceilings:		
	(a)	Variation from grade or level	1/4 in. in 20 ft. 3/8 in. in any bay or 20 ft. maximum. 1/2 in. in 40 ft.
	(b)	Variation from level (exposed conspicuous lines)	1/4 in. in any bay or 20 ft. maximum. 1/2 in. in 40 ft. or more
	(c)	Variation of the surface from plane	1/4 in. in 10 ft. for* any line intended to lie on the plane.
3.	Variation in thickness of slabs and walls		1/4 in. minus, 1/2 in. plus.**

* 1/8 in. in 10 ft. where electrical switchgear will be installed.

** Tolerance is allowable only if there is no interference with other construction elements.

1.8.2 Level and Grade Tolerance Measurements for Slabs

Level and grade tolerance measurements for slabs shall be made as soon as possible after finishing. When forms or shoring are used, the measurements shall be made prior to removal.

1.8.3 Appearances

Permanently exposed surfaces shall be cleaned, if stained or otherwise discolored, by a method that does not harm the concrete and that is approved by the Contracting Officer.

1.8.4 Surface Requirements

The surface requirements for the classes of finish required by paragraph 03101-2.1, shall be as hereinafter specified. Allowable irregularities are designated "abrupt" or "gradual" for purposes of providing for surface variations. Offsets resulting from displaced, misplaced, or mismatched forms, or sheathing, or by loose knots in sheathing, or other similar form defects, shall be considered "abrupt" irregularities. Irregularities resulting from warping, unplaneness, or similar uniform variations from planeness, or true curvature, shall be considered "gradual" irregularities. "Gradual" irregularities will be checked for compliance with the prescribed limits with a 5-ft template, consisting of a straightedge for plane surfaces and a shaped template for curved or warped surfaces. In measuring irregularities, the straightedge or template may be placed anywhere on the surface in any direction, with the testing edge held parallel to the intended surface.

Class of Finish	Irregularities (Maximum Allowed) Abrupt, inches	Gradual, inches
A	1/8	1/4
D	1	1

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Cementitious Materials

Cementitious materials shall be portland cement, portland-pozzolan cement, or portland cement in combination with pozzolan and shall conform to appropriate

specifications listed below. Use of cementitious materials in architectural concrete shall be restricted to one color, one source, and one type.

2.1.1.1 Portland Cement

ASTM C 150, Type I or II, low alkali, except that the maximum amount of C_3A in Type I cement shall be 10 percent and cement with a Blaine Fineness of 400 square meters per kilogram shall be considered Type III cement.

2.1.1.2 High-Early-Strength Portland Cement

ASTM C 150, Type III, low alkali, shall not be used.

2.1.1.3 Pozzolan

Pozzolan shall conform to ASTM C 618, Class C, or F, with the alkali requirement of Table 2 and with the requirements for multiple factor of Table 4.

2.1.1.4 Portland-Pozzolan Cement

ASTM C 595, Type IP with Table 2 mortar expansion limits.

2.1.2 Aggregates

Concrete aggregate shall be produced from the sources and under the conditions described in 01100-12. Fine and coarse aggregates shall conform to the grading requirements of ASTM C 33 or LSSRB 1003.02. The quality of all aggregates shall conform to ASTM C 33. The nominal maximum size shall be as listed in paragraph 2.2.2.

2.1.3 Chemical Admixtures

Chemical admixtures to be used, when required or permitted, shall conform to the appropriate specification listed.

2.1.3.1 Air-Entraining Admixture

The air-entraining admixture shall conform to ASTM C 260 and shall consistently cause the concrete to have an air content in the specified ranges under field conditions.

2.1.3.2 Water-Reducing or Retarding Admixture

a. Water-Reducing or Retarding Admixtures: ASTM C 494, Type A, B, or D, except that the 6-month and 1-year compressive strength tests are waived.

b. High-Range Water Reducing Admixture: ASTM C 494, Type F or G, except that the 6-month and 1-year strength requirements shall be waived. The admixture may be used only when approved by the Contracting Officer, such approval being contingent upon particular mixture control as described in the Contractor's Quality Control Plan.

2.1.4 Curing Materials

2.1.4.1 Impervious-Sheet Curing Materials

Impervious-sheet curing materials shall conform to ASTM C 171, type optional, except polyethylene film shall not be used.

2.1.4.2 Membrane-Forming Curing Compound

The membrane-forming curing compound shall conform to ASTM C 309, Type 1-D or 2, Class B.

2.1.4.3 Burlap

Burlap used for curing shall conform to GSA CCC-C-467C .

2.1.5 Water

Water for mixing and curing shall be fresh, clean, potable, and free of injurious amounts of oil, acid, salt, sugar, or alkali, except that nonpotable water may be used if it meets the requirements of COE CRD-C 400.

2.1.6 Nonshrink Grout

Nonshrink grout shall conform to ASTM C 1107 and shall be a commercial formulation suitable for the application proposed.

2.1.7 Cementitious Paint

All cementitious paint shall conform to CID A-A-1555. Color shall be Pearl Gray.

2.1.8 Latex Bonding Compound

Latex Bonding Compound agents for bonding fresh to hardened concrete should conform to ASTMC 1059.

2.2 CONCRETE MIXTURE PROPORTIONING

2.2.1 Quality of Mixture

For each portion of the structure, mixture proportions shall be selected so that the strength and W/CM requirements listed in paragraph 1.7 are met.

2.2.2 Nominal Maximum-Size Coarse Aggregate

Nominal maximum-size coarse aggregate shall be1-1/2 inches or 1 inch except 3/4 inch nominal maximum-size coarse aggregate shall be used when any of the following conditions exist: the narrowest dimension between sides of forms is less than 7-1/2 inches; the depth of the slab is less than 4 inches; the minimum clear spacing between reinforcing and sheet piling is less than 2 ¼ inches; or the minimum clear spacing between reinforcing is less than 2 ¼ inches.

2.2.3 Air Content

Air content as delivered to the forms and as determined by ASTM C 231 shall be between 4 and 7 percent except that when the nominal maximum-size coarse aggregate is 3/4 inch, it shall be between 4 ½ and 7 ½ percent.

2.2.4 Slump

The slump shall be determined in accordance with ASTM C 143 and shall be within the range of 1 to 4 inches. Where placement by pump is approved, the slump shall not exceed 6 inches and shall remain within a 3-inch band.

2.2.5 Pozzolan Content

If pozzolan is used, it shall range from 15 to 35 percent by weight of the total cementitious materials.

2.2.6 Determining Standard Deviation

Where a concrete production facility has test records, a standard deviation shall be established in accordance with the applicable provisions of ACI 214. Test records from which a standard deviation is calculated shall:

(1) represent materials, quality control procedures, and conditions similar to those expected at the proposed work;

(2) not be from a project where the allowable changes in materials and/or proportions were more restricted than for the proposed work;

(3) represent concrete produced to meet a specified strength or strengths, f'_c, within 1000 psi of that specified for the proposed work;

(4) be from consecutive tests;

(5) be from different batches;

(6) be the average of strengths from two cylinders made from the same sample of concrete and tested at the age indicated in paragraph 1.7.1; and

(7) be from concrete that was produced within one year of the time when concrete placement is expected to begin for the proposed work.

2.2.6.1 For 30 or More Test Records

Use an unmodified standard deviation and calculate f_{cr} as specified in paragraph 2.2.7.1.

2.2.6.2 For 15 to 29 Test Records

Where a concrete production facility does not have 30 test records, but does have a record based on 15 to 29 consecutive tests, a modified standard deviation may be established as the product of the standard deviation based on 15 to 29 tests and modification factor from the following table. Calculate f_{cr} as specified in paragraph 2.2.7.1.

Number of Records *	Modification Factor for Standard Deviation
15	1.16
20	1.08
25	1.03
30 or more	1.00

*Interpolate for intermediate numbers of records.

2.2.6.3 For Less Than 15 Test Records

No standard deviation is needed. Calculation of f_{cr} shall be as specified in paragraph 2.2.7.2.

2.2.7 Required Average Compressive Strength, f_{cr}.

In meeting the strength requirements specified in paragraph 1.7.1, the selected mixture shall have proportions so as to produce an f_{cr} exceeding f'_c as indicated in paragraph 2.2.7.1 or 2.2.7.2.

2.2.7.1 For 15 or More Test Records

If a standard deviation is calculated as specified in paragraph 2.2.6, f_{cr} shall be determined based on the value of f'_c and the standard deviation, S, as follows:

Standard Deviation, S	Required Average Compressive Strength, f_{cr} (psi)
Less than or equal to 505	$f'_c + 1.34\ S$
Greater than 505	$f'_c + 2.33\ S-500$

2.2.7.2 For less than 15 Test Records

When a concrete production facility does not have field strength test records for calculation of standard deviation, f_{cr} shall be determined based on the value of f'_c as follows:

Specified Compressive Strength, f'_c (psi)	Required Average Compressive Strength, f_{cr} (psi)
Less than 3000	$f'_c + 1000$
3000-5000	$f'_c + 1200$
Greater than 5000	$f'_c + 1400$

2.2.8 Documenting Average Strength

Documentation that proposed concrete proportions produce the required average strength, f_{cr}, determined in paragraph 2.2.7 shall be based on previous field experience (paragraph 2.2.8.1) or laboratory trial batches (paragraph 2.2.8.2).

2.2.8.1 Field Experience

Required average strength can be documented by field experience if compressive strength test records consisting of not less than 10 consecutive tests and encompassing a period of not less than 60 days are used. Test records shall represent similar materials to those proposed and similar conditions to those expected. Changes in materials, conditions, and proportions within the test record shall not have been more closely restricted than those for the proposed work.

2.2.8.2 Laboratory Trial Batches

The laboratory used to develop information required by this section shall comply with ASTM C 1077.

2.2.8.2.1 Delivery of Samples

Representative samples for all concrete materials proposed for this project and a copy of this section of the contract specifications entitled "CAST-IN-PLACE STRUCTURAL CONCRETE" shall be delivered to the laboratory that performs the concrete proportioning at least 60 days (120 when pozzolan [or slag] is used) before

concrete placement is expected to begin. Samples of approved aggregates shall be obtained in accordance with the requirements of ASTM D 75. Samples of materials other than aggregate shall be representative of those proposed for the project and shall be accompanied by manufacturer's test reports indicating compliance with applicable specification requirements. When all of these materials have been delivered, the name, address, and phone number of this laboratory and a list of the sources and types of all concrete materials shall be submitted to the Contracting Officer.

2.2.8.2.2 Trial Mixtures

Trial mixtures having proportions, consistencies, maximum slump and maximum air content suitable for the work shall be made based on ACI 211.1, using at least three different water- cementitious materials ratios which will produce a range of strengths encompassing those required for the work. The target water- cementitious materials ratios required in paragraph 1.7.2 include the total weight of cement plus pozzolan, converted from absolute volume as described in ACI 211.1. Trial mixtures shall be designed in accordance with the procedure in ACI 211.1, Chapter 6, using the absolute volume basis for determining the required amount of fine aggregate. The dry rodded weight per cubic foot of the coarse aggregate determined according to ASTM C 29; the fineness modulus of the fine aggregate determined according to CRD-C 104; and the yield, slump and air content shall be reported. For each water-cementitious materials ratio at least three test cylinders for each test age shall be made and cured in accordance with ASTM C 192. They shall be tested in accordance with ASTM C 39 at 7 and 28 days (also 90 if pozzolan is used). From these test results a curve shall be plotted and submitted showing the relationship between water-cementitious materials ratio and strength at design age.

PART 3 EXECUTION

3.1 EQUIPMENT

3.1.1 Capacity

The batching, mixing, conveying, and placing equipment shall have a capacity of at least 30 cubic yards per hour.

3.1.2 Batch Plant

Batch plant shall conform to the requirements of NRMCA CPMB 100 and as specified; however, rating plates attached to batch plant equipment are not required.

3.1.2.1 Batching Equipment

The batching controls shall be semiautomatic or automatic. The semiautomatic batching system shall be provided with interlocks such that the discharge device

cannot be actuated until the indicated material is within the applicable tolerance. The batching system shall be equipped with an accurate recorder or recorders that meet the requirements of NRMCA CPMB 100. Separate bins or compartments shall be provided for each size group of aggregate and cement, and pozzolan. Aggregates shall be weighed either in separate weigh batchers with individual scales or cumulatively in one weigh batcher on one scale. Aggregate shall not be weighed in the same batcher with cement or pozzolan. If both cement and pozzolan are used, they may be batched cumulatively provided that the portland cement is batched first. If measured by mass, the mass of the water shall not be weighed cumulatively with another ingredient. Water batcher filling and discharging valves shall be so interlocked that the discharge valve cannot be opened before the filling valve is fully closed. An accurate mechanical device for measuring and dispensing each admixture shall be provided. Each dispenser shall be interlocked with the batching and discharging operation of the water so that each admixture is separately batched and discharged automatically in a manner to obtain uniform distribution throughout the batch in the specified mixing period. Admixtures shall not be combined prior to introduction in water. The plant shall be arranged so as to facilitate the inspection of all operations at all times. Suitable facilities shall be provided for obtaining representative samples of aggregates from each bin or compartment. All filling ports for cementitious materials bins or silos shall be clearly marked with a permanent sign stating the contents.

3.1.2.2 Scales

The equipment for batching by mass shall conform to the applicable requirements of NIST HB 44, except that the accuracy shall be plus or minus 0.2 percent of scale capacity. The Contractor shall provide standard test weights and any other auxiliary equipment required for checking the operating performance of each scale or other measuring devices. Tests shall be made at the frequency required in paragraph 3.7, and in the presence of a government inspector.

3.1.2.3 Batching Tolerances

a. Weighing Tolerances

MATERIAL	PERCENT OF REQUIRED MASS
Cementitious materials	0 to plus 2
Aggregate	plus or minus 2
Water	plus or minus 1
Chemical admixture	0 to plus 6

b. Volumetric Tolerances - For volumetric batching equipment, the following tolerances shall apply to the required volume of material being batched:

Water: ..... Plus or minus 1 percent.
Chemical admixtures: .....Zero to plus 6 percent.

3.1.2.4 Moisture Control

The plant shall be capable of ready adjustment to compensate for the varying moisture content of the aggregates and to change the masses of the materials being batched. An electric moisture meter complying with the provisions of COE CRD-C 143 shall be provided for measuring moisture in the fine aggregate. The sensing element shall be arranged so that the measurement is made near the batcher charging gate of the sand bin or in the sand batcher.

3.1.3 Concrete Mixers

The concrete mixers shall not be charged in excess of the capacity recommended by the manufacturer. The mixers shall be operated at the drum or mixing blade speed designated by the manufacturer. The mixers shall be maintained in satisfactory operating condition, and the mixer drums shall be kept free of hardened concrete. Should any mixer at any time produce unsatisfactory results, its use shall be promptly discontinued until it is repaired.

3.1.3.1 Stationary Mixers

Concrete plant mixers shall be tilting, nontilting, horizontal-shaft, vertical-shaft, or pugmill and shall be provided with an acceptable device to lock the discharge mechanism until the required mixing time has elapsed. The mixing time and uniformity shall conform to all the requirements in ASTM C 94 applicable to central-mixed concrete.

3.1.3.2 Truck Mixers

Truck mixers, the mixing of concrete therein, and concrete uniformity shall conform to the requirements of ASTM C 94. A truck mixer may be used either for complete mixing (transit-mixed) or to finish the partial mixing done in a stationary mixer (shrink-mixed). Each truck shall be equipped with two counters from which it will be possible to determine the number of revolutions at mixing speed and the number of revolutions at agitating speed.

3.1.4 Conveying Equipment

The conveying equipment shall have a capacity of at least 30 cubic yards per hour. Concrete shall be conveyed from mixer to forms as rapidly as practicable and within the time interval in paragraph 3.3.3 by methods that will prevent segregation or loss of ingredients. Any concrete transferred from one conveying device to another shall be passed through a hopper that is conical in shape and shall not be dropped vertically more than 5 feet, except where suitable equipment is provided to prevent segregation

and where specifically authorized.

3.1.4.1 Buckets

The interior hopper slope shall be not less than 58 degrees from the horizontal, the minimum dimension of the clear gate opening shall be at least five times the nominal maximum-size aggregate, and the area of the gate opening shall not be less than 2 square feet. The maximum dimension of the gate opening shall not be greater than twice the minimum dimension. The bucket gates shall be essentially grout tight when closed and may be manually, pneumatically, or hydraulically operated except that buckets larger than 2 cubic yards shall not be manually operated. The design of the bucket shall provide means for positive regulation of the amount and rate of deposit of concrete in each dumping position.

3.1.4.2 Transfer Hoppers

Concrete may be charged into nonagitating hoppers for transfer to other conveying devices. Transfer hoppers shall be capable of receiving concrete directly from delivery vehicles and have conical-shaped discharge features. The transfer hopper shall be equipped with a hydraulically operated gate and with a means of external vibration to effect complete discharge. Concrete shall not be held in nonagitating transfer hoppers more than 30 minutes.

3.1.4.3 Trucks

Truck mixers operating at agitating speed or truck agitators used for transporting plant-mixed concrete shall conform to the requirements of ASTM C 94. Nonagitating equipment may be used for transporting plant-mixed concrete over a smooth road when the hauling time is less than 15 minutes. Bodies of nonagitating equipment shall be smooth, watertight, metal containers specifically designed to transport concrete, shaped with rounded corners to minimize segregation, and equipped with gates that will permit positive control of the discharge of the concrete.

3.1.4.4 Chutes

When concrete can be placed directly from a truck mixer, agitator, or nonagitating equipment, the chutes attached to this equipment by the manufacturer may be used. A discharge deflector shall be used when required by the Contracting Officer. Separate chutes and other similar equipment will not be permitted for conveying concrete except when specifically approved.

3.1.4.5 Belt Conveyors

Belt conveyors may be used when approved. Such conveyors shall be designed and operated to assure a uniform flow of concrete from mixer to final place of deposit without segregation of ingredients or loss of mortar and shall be provided with positive

means for preventing segregation of the concrete at the transfer points and the point of placing. Belt conveyors shall be constructed such that the idler spacing shall not exceed 36 inches. The belt speed shall be a minimum of 300 feet per minute and a maximum of 750 feet per minute. If concrete is to be placed through installed horizontal or sloping reinforcing bars, the conveyor shall discharge concrete into a pipe or elephant trunk that is long enough to extend through the reinforcing bars. In no case shall concrete be discharged to free-fall through the reinforcing bars.

3.1.4.6 Concrete Pumps

Concrete may be conveyed by positive displacement pump when approved. The pumping equipment shall be piston or squeeze pressure type. The pipeline shall be rigid steel pipe or heavy-duty flexible hose. The inside diameter of the pipe shall be at least three times the nominal maximum-size coarse aggregate in the concrete mixture to be pumped but not less than 4 inches. Aluminum pipe shall not be used.

3.1.5 Vibrators

Vibrators of the proper size, frequency, and amplitude shall be used for the type of work being performed in conformance with the following requirements:

Application	Head Diameter	Frequency	Amplitude
	Inches	VPM	Inches
Thin walls, beams, etc.	1-1/4 to 2-1/2	9,000 to 13,500	0.02 to 0.04
General construction	2 to 3-1/2	8,000 to 12,000	0.025 to 0.05

The frequency and amplitude shall be determined in accordance with COE CRD-C 521.

3.2 PREPARATION FOR PLACING

3.2.1 Embedded Items

Before placement of concrete, care shall be taken to determine that all embedded items are firmly and securely fastened in place as indicated on the drawings, or required. Embedded items shall be free of oil and other foreign matter such as loose coatings or rust, paint, and scale. The embedding of wood in concrete will be permitted only when specifically authorized or directed. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable materials to prevent the entry of concrete into voids. Welding, including tack welding, will not be permitted on embedded metals within 2 feet of the surface of the concrete.

3.2.2 Concrete on Earth Foundations

Earth surfaces upon which concrete is to be placed shall be clean, damp, and free from debris, frost, ice, and standing or running water. Prior to placement of concrete, the earth foundation shall have been satisfactorily compacted in accordance with Section 02320-2.1.1.1.

3.2.3 Construction Joint Treatment

Construction joint treatment shall conform to the following requirements.

3.2.3.1 Joint Preparation

Concrete surfaces to which additional concrete is to be bonded shall be prepared for receiving the next lift or adjacent concrete by cleaning with either air-water cutting, sandblasting, high-pressure water jet, or other approved method. Air-water cutting will not be permitted on formed surfaces or surfaces congested with reinforcing steel. Regardless of the method used, the resulting surfaces shall be free from all laitance and inferior concrete so that clean, well bonded coarse aggregate is exposed uniformly throughout the lift surface. The edges of the coarse aggregate shall not be undercut. The surface shall be washed clean again as the last operation prior to placing the next lift. There shall be no standing water on the surface upon which concrete is placed.

3.2.3.2 Air-Water Cutting

Air-water cutting of a construction joint shall be performed at the proper time and only on horizontal construction joints. The air pressure used in the jet shall be 90 to 110 psi, and the water pressure shall be just sufficient to bring the water into effective influence of the air pressure. When approved by the Contracting Officer, a retarder complying with the requirements of COE CRD-C 94 may be applied to the surface of the lift to prolong the period of time during which air-water cutting is effective. Prior to receiving approval, the Contractor shall furnish samples of the material to be used and shall demonstrate the method to be used in applications. After cutting, the surface shall be washed and rinsed as long as there is any trace of cloudiness of the wash water. Where necessary to remove accumulated laitance, coatings, stains, debris, and other foreign material, high-pressure water jet or sandblasting will be required as the last operation before placing the next lift.

3.2.3.3 High-Pressure Water Jet

A stream of water under a pressure of not less than 3,000 psi may be used for cleaning. Its use shall be delayed until the concrete is sufficiently hard so that only the surface skin of mortar is removed and there is no undercutting of coarse-aggregate particles. If the water jet is incapable of a satisfactory cleaning, the surface shall be cleaned by sandblasting.

3.2.3.4 Wet Sandblasting

This method may be used when the concrete has reached sufficient strength to prevent undercutting of the coarse aggregate particles. The surface of the concrete shall then be washed thoroughly to remove all loose materials.

3.2.3.5 Waste Disposal

The method used in disposing of waste water employed in cutting, washing, and rinsing of concrete surfaces shall be such that the waste water does not stain, discolor, or affect exposed surfaces of the structures, or damage the environment of the project area. The method of disposal shall be subject to approval.

3.2.3.6 Surface Condition

The surface of the lift shall be damp at the time of placement of the next lift and shall be free of standing water.

3.3 PLACING

3.3.1 Placing Procedures

The surfaces of horizontal construction joints shall be kept continuously wet for the first 12 hours during the 24-hour period prior to placing concrete. Surfaces may be dampened immediately before placement if necessary. Concrete placement will not be permitted when, in the opinion of the Contracting Officer, weather conditions prevent proper placement and consolidation. Concrete shall be deposited as close as possible to its final position in the forms and, in so depositing, there shall be no vertical drop greater than 5 feet except where suitable equipment is provided to prevent segregation and where specifically authorized. Depositing of the concrete shall be so regulated that it may be effectively consolidated in horizontal layers 2 feet or less in thickness with a minimum of lateral movement. The amount deposited in each location shall be that which can be readily and thoroughly consolidated. Sufficient placing capacity shall be provided so that concrete placement can be kept plastic and free of cold joints while concrete is being placed. Concrete shall be placed by methods that will prevent segregation or loss of ingredients. Any concrete transferred from one conveying device to another shall be passed through a hopper that is conical in shape. The concrete shall not be dropped vertically more than 5 feet, except where a properly designed and sized elephant truck with rigid drop chute bottom section is provided to prevent segregation and where specifically authorized. In no case will concrete be discharged to free-fall through reinforcing bars.

3.3.2 Placement by Pump

When concrete is to be placed by pump, the nominal maximum-size coarse aggregate shall not be reduced to accommodate the pumps. The distance to be pumped shall not exceed limits recommended by the pump manufacturer. The

concrete shall be supplied to the concrete pump continuously. When pumping is completed, concrete remaining in the pipeline shall be ejected without contamination of concrete in place. After each operation, equipment shall be thoroughly cleaned, and flushing water shall be wasted outside of the forms. Grout used to lubricate the pumping equipment at the beginning of the placement will not be incorporated into the placement.

3.3.3 Time Interval Between Mixing and Placing

Concrete shall be placed within 30 minutes after discharge into nonagitating equipment. When concrete is truck-mixed or when a truck mixer or agitator is used for transporting concrete mixed by a concrete plant mixer, the concrete shall be delivered to the site of the work, and discharge shall be completed within 1-1/2 hours after introduction of the cement to the aggregates. When the length of haul makes it impossible to deliver truck-mixed concrete within these time limits, batching of cement and a portion of the mixing water shall be delayed until the truck mixer is at or near the construction site.

3.3.4 Cold-Weather Placing

When cold-weather placing of concrete is likely to be subjected to freezing temperatures before the expiration of the curing period, it shall be placed in accordance with procedures previously submitted in accordance with paragraph 1.5. The ambient temperature of the space adjacent to the concrete placement and surfaces to receive concrete shall be above 32 degrees F. The placing temperature of the concrete having a minimum dimension less than 12 inches shall be between 55 and 75 degrees F when measured in accordance with ASTM C 1064. The placing temperature of the concrete having a minimum dimension greater than 12 inches shall be between 50 and 70 degrees F. Heating of the mixing water or aggregates will be required to regulate the concrete-placing temperatures. Materials entering the mixer shall be free from ice, snow, or frozen lumps. Salt, chemicals, or other materials shall not be mixed with the concrete to prevent freezing.

3.3.5 Hot-Weather Placing

Concrete shall be properly placed and finished with procedures previously submitted in accordance with paragraph 1.5. The concrete-placing temperature shall not exceed 90 degrees F when measured in accordance with ASTM C 1064. Cooling of the mixing water and aggregates, or both, may be required to obtain an adequate placing temperature. A retarder shall be used to facilitate placing and finishing when concrete temperatures exceed 85 degrees F. Steel forms and reinforcement shall be cooled prior to concrete placement when steel temperatures are greater than 120 degrees F. Conveying and placing equipment shall be cooled if necessary to maintain proper concrete-placing temperature.

3.3.6 Consolidation

Immediately after placement, each layer of concrete, including flowing concrete, shall be consolidated by internal vibrating equipment. Vibrators shall not be used to transport concrete within the forms. Hand spading may be required, if necessary, with internal vibrating along formed surfaces permanently exposed to view. Vibrating equipment shall at all times be adequate in number of units and power to properly consolidate the concrete. A spare vibrator shall be kept on the job site during all concrete placing operations. Form or surface vibrators shall not be used unless specifically approved. The vibrator shall be inserted vertically at uniform spacing over the entire area of placement. The distance between insertions shall be approximately 1-1/2 times the radius of action of the vibrator. The vibrator shall penetrate rapidly to the bottom of the layer and at least 6 inches into the preceding unhardened layer if such exists. It shall be held stationary until there is a general cessation in escape of large bubbles of entrapped air at the surface of the concrete (generally 5 to 15 seconds) then withdrawn slowly at about 3 inches per second.

3.4 FINISHING

The ambient temperature of spaces adjacent to surfaces being finished shall be not less than 40 degrees F. In hot weather when the rate of evaporation of surface moisture, as determined by use of Figure 2.1.5 of ACI 305R, may reasonably be expected to exceed 0.2 pounds per square foot per hour, provisions for windbreaks, shading, fog spraying, or wet covering with a light-colored material shall be made in advance of placement, and such protective measures shall be taken as quickly as finishing operations will allow. All unformed surfaces that are not to be covered by additional concrete or backfill shall have a float finish, unless a trowel finish is specified. Additional finishing shall be as specified below and shall be true to the elevation shown in the drawings. Surfaces to receive additional concrete or backfill shall be brought to the elevation shown on the drawings and left true and regular. Exterior surfaces shall be sloped for drainage unless otherwise shown in the drawing or as directed. Joints shall be carefully made with a jointing or edging tool. The finished surfaces shall be protected from stains or abrasions. Grate tampers or jitterbugs shall not be used.

3.4.1 Unformed Surfaces

3.4.1.1 Float Finish

Surfaces shall be screeded and darbied or bullfloated to bring the surface to the required finish level with no coarse aggregate visible. No water, cement, or mortar shall be added to the surface during the finishing operation. The concrete, while still green but sufficiently hardened to bear a man's weight without more than about a ¼ inch indentation, shall be floated to a true and even plane. Floating may be performed by use of suitable hand floats or power-driven equipment. Hand floats shall be made of magnesium or aluminum. Tolerance for a floated finish shall be true

plane within 5/16 inch in 10 feet as determined by a 10-foot straightedge placed anywhere on the slab in any direction.

3.4.1.2 Trowel Finish

A trowel finish shall be applied to the top surfaces of all walls and columns. Concrete surfaces shall be finished with a float finish, and after surface moisture has disappeared, the surface shall be troweled to a smooth, even, dense finish free from blemishes including trowel marks. Tolerance shall be true planes within 5/16 inch in 10 feet as determined by a 10-foot straightedge placed anywhere on the slab in any direction.

3.4.2 Formed Surfaces

Unless another finish is specified, surfaces shall be left with the texture imparted by the forms except that defective surfaces shall be repaired as described in paragraph 3.4.3. Other finishes shall be applied to the following structures or portions of structures:

TYPES OF FINISH	STRUCTURE OR PORTION OF STRUCTURE
Cementitious Paint Finish	All exposed vertical walls and top surfaces of gate monoliths above Elevation (+/-)1.5; all exposed concrete vertical sides and tops of the east and west side canal walls above Elevation (+/-) 1.5; and all side faces of the force main support caps

Unless painting of surfaces is required, uniform color of the concrete shall be maintained by use of only one mixture without changes in materials or proportions for any structure or portion of structure that is exposed to view or on which a special finish is required. The form panels used to produce the finish shall be orderly in arrangement, with joints between panels planned in approved relation to openings, corners, and other architectural features. Forms shall not be reused if there is any evidence of surface wear or defects that would impair the quality of the surface.

3.4.2.1 Cementitious Paint Finish

As approved by the Contracting Officer and after all required patching, cleaning, and correction of major imperfections have been completed, the concrete surfaces identified above shall be given a cementitious paint finish as hereinafter described. The finish shall not be applied before the initial 7 day moist curing period is complete. The temperature of the air adjacent to the surface shall not be less than 50 degrees F

for 24 hours prior to and following the application of the finish. If the temperature of the air adjacent to the surface is above 90 degrees F, the surface shall be cooled prior to the application of the finish by hosing with clean water until it reaches a temperature of 85 degrees F. The finish for any area shall be completed in the same day and the limits of the finished area shall be made at corners or monolith joints. The surfaces to be finished must be structurally sound, clean and free from dirt, form marks, loose mortar particles, paint, films, protective coatings, efflorescence, laitance, etc. The cementitious paint finish shall consist of dampening the surface ahead of the cementitious paint application with clean water. As a base coat, cementitious paint shall be applied according to the manufacturer's recommendations. The coating shall be uniform, completely filling all pits, air bubbles, and surface voids. Cementitious paint shall be prepared and applied in accordance with the manufacturer's written recommendations. The mixing liquid for cementitious paint shall contain one part "Acryl 60" or equal, to three parts clean water. Two coats of acrylic emulsion paint shall then be applied over the base coat. The cementitious base coat and the acrylic emulsion paint shall both be pearl grey in color. Uniform color shall be maintained by use of only one mixture without any changes in materials or proportions for nay structure or portion of structure which is exposed to view or on which a special finish is required.

3.4.3 Formed Surface Repair

After removal of forms, all ridges, lips, and bulges on surfaces permanently exposed shall be removed. All repairs shall be completed within 48 hours after form removal.

3.4.3.1 Classes A Finish

Surfaces listed in Section 03101 FORMWORK FOR CONCRETE and as shown to have classes A finish shall have surface defects repaired as follows: defective areas, voids, and honeycombs smaller than 16 square inches in area and less than 1/2 inch deep and bug holes exceeding 1/2 inch in diameter shall be chipped and filled with dry-packed mortar. Holes left by removal of tie rods shall be reamed and filled with dry-packed mortar as specified in paragraph 3.4.3.4. Defective and unsound concrete areas larger than described shall be defined by 1/2 inch deep dovetailed saw cuts in a rectangular pattern with lines parallel to the formwork, the defective concrete removed by chipping, and the void repaired with replacement concrete. The prepared area shall be brush-coated with a latex bonding agent meeting the requirements of paragraph 2.1.8, or a neat cement grout after dampening the area with water. The void shall be filled with replacement concrete in accordance with paragraph 3.4.3.3.

3.4.3.2 Class D Finish

Surfaces listed in Section 03101 FORMWORK FOR CONCRETE and as shown to have class D finish shall have surface defects repaired as follows: defective areas, voids, and honeycombs greater than 48 square inches in area or more than 2 inches

deep shall be defined by 1/2 inch deep dovetailed saw cuts in a rectangular pattern, the defective concrete removed by chipping and the void repaired with replacement concrete. The prepared area shall be brush-coated with a latex bonding agent meeting the requirements of paragraph 2.1.8, or a neat cement grout after dampening the area with water. The void shall be filled with replacement concrete in accordance with paragraph 3.4.3.4.

3.4.3.3 Material and Procedure for Repairs

The cement used in the dry-packed mortar or replacement concrete shall be a blend of the cement used for production of project concrete and white portland cement properly proportioned so that the final color of the mortar or concrete will match adjacent concrete. Trial batches shall be used to determine the proportions required to match colors. Dry-packed mortar shall consist of one part cement to two and one-half parts fine aggregate. The fine aggregate shall be that used for production of project concrete. The mortar shall be remixed over a period of at least 30 minutes without addition of water until it obtains the stiffest consistency that will permit placing. Mortar shall be thoroughly compacted into the prepared void by tamping, rodding, ramming, etc. and struck off to match adjacent concrete. Replacement concrete shall be produced using project materials and shall be proportioned by the Contracting Officer. It shall be thoroughly compacted into the prepared void by internal vibration, tamping, rodding, ramming, etc. and shall be struck off and finished to match adjacent concrete. Forms shall be used to confine the concrete. If an expanding agent is used in the repair concrete, the repair shall be thoroughly confined on all sides including the top surface. Metal tools shall not be used to finish permanently exposed surfaces. The repaired areas shall be cured for 7 days. The temperature of the in situ concrete, adjacent air, and replacement mortar or concrete shall be above 40 degrees F during placement, finishing, and curing. Other methods and materials for repair may be used only when approved in writing by the Contracting Officer. Repairs of the so called "plaster-type" will not be permitted.

3.5 CURING AND PROTECTION

3.5.1 Duration

The length of the curing period shall be determined by the type of cementitious material, as specified below. Concrete shall be cured by an approved method.

Type I portland cement	7 days
Type IP cement	7 days
Type II portland cement	14 days
Portland cement blended with	
25 percent or less pozzolan or GGBF slag	14 days
Portland cement blended with more than	

25 percent pozzolan _____ 21 days

Immediately after placement, concrete shall be protected from premature drying, extremes in temperature, rapid temperature change, and mechanical damage. All materials and equipment needed for adequate curing and protection shall be available and at the placement site prior to the start of concrete placement. Concrete shall be protected from the damaging effects of rain for 12 hours and from flowing water for 14 days (7 days with Type III cement). No fire or excessive heat including welding shall be permitted near or in direct contact with concrete or concrete embedments at any time.

3.5.2 Moist Curing

Moist-cured concrete shall be maintained continuously, not periodically, wet for the entire curing period. Vertical surfaces shall be cured using soaker hoses, fog sprayers or sprinklers. Burlap may be used to assist moist curing provided that the wall and burlap are kept continuously saturated, including nights and weekends, and the burlap is kept in contact with the concrete being cured. If water or curing materials stain or discolor concrete surfaces that are to be permanently exposed, they shall be cleaned as required in paragraph 1.8.3. Where wooden form sheathing is left in place during curing, the sheathing shall be kept wet at all times. Where steel forms are left in place during curing, the forms shall be carefully broken loose from the hardened concrete and curing water continuously applied into the void so as to continuously saturate the entire concrete surface. Horizontal surfaces may be moist cured by ponding, by covering with a minimum uniform thickness of 2 inches of continuously saturated sand, or by covering with saturated nonstaining burlap or cotton mats. Horizontal construction joints may be allowed to dry for 12 hours immediately prior to the placing of the following lift.

3.5.3 Membrane-Forming Curing Compound

Concrete may be cured with an approved membrane-forming curing compound in lieu of moist curing except that membrane curing will not be permitted on any surface on which a cementitious paint finish is to be applied or other concrete is to be bonded, on any surface containing protruding steel reinforcement, or any surface maintained at curing temperature by use of free steam. A pigmented-type curing compound shall not be used on surfaces that will be exposed to view when the project is complete. Concrete cured with nonpigmented curing compound must be shaded from the sun for the first 3 days when the ambient temperature is 90 degrees F or higher.

3.5.3.1 Application

The curing compound shall be applied to formed surfaces immediately after the forms are removed and prior to any patching or other surface treatment except the cleaning of loose sand, mortar, and debris from the surface. The surfaces shall be thoroughly moistened with water, and the curing compound applied as soon as free water disappears. The curing compound shall be applied to unformed surfaces as soon as

free water has disappeared and bleeding has stopped. The curing compound shall be applied in a two-coat continuous operation by approved motorized power-spraying equipment operating at a minimum pressure of 75 psi, at a uniform coverage of not more than 400 square feet per gallon for each coat, and the second coat shall be applied perpendicular to the first coat. Concrete surfaces that have been subjected to rainfall within 3 hours after curing compound has been applied shall be resprayed by the method and at the coverage specified. All concrete surfaces on which the curing compound has been applied shall be adequately protected for the duration of the entire curing period from pedestrian and vehicular traffic and from any other cause that will disrupt the continuity of the curing membrane.

3.5.4 Evaporation Retardant

The following concrete surfaces may be cured using sheet material:

Horizontal Surfaces Only

Sheet curing shall not be used on vertical or near-vertical surfaces. All surfaces shall be thoroughly wetted and be completely covered with waterproof paper, polyethylene film or polyethylene-coated burlap having the burlap thoroughly water-saturated before placing. Covering shall be laid with light-colored side up. Covering shall be lapped not less than 12 inches and securely weighted down or shall be lapped not less than 4 inches and taped to form a continuous cover with completely closed joints. The sheet shall be weighted to prevent displacement so that it remains in contact with the concrete during the specified length of curing. Coverings shall be folded down over exposed edges of slabs and secured by approved means. Sheets shall be immediately repaired or replaced if tears or holes appear during the curing period.

3.5.5 Cold-Weather Curing and Protection

When the daily outdoor low temperature is less than 32 degrees F, the temperature of the concrete shall be maintained above 40 degrees F for the first 7 days after placing. In addition, during the period of protection removal, the air temperature adjacent to the concrete surfaces shall be controlled so that concrete near the surface will not be subjected to a temperature differential of more than 25 degrees F as determined by observation of ambient and concrete temperatures indicated by suitable temperature measuring devices furnished by the Government as required and installed adjacent to the concrete surface and 2 inches inside the surface of the concrete. The installation of the thermometers shall be made by the Contractor at such locations as may be directed. Curing compounds shall not be used on concrete surfaces that are maintained at curing temperature by use of free steam.

3.6 SETTING OF BASE PLATES AND BEARING PLATES

3.6.1 Setting of Plates

After being plumbed and properly positioned, base plates, bearing plates and similar structural members, and machinery and equipment base plates shall be provided with full bearing with dry-pack bedding mortar except where nonshrink grout is approved or required. The space between the top of concrete or masonry-bearing surface and the bottom of the plate shall be approximately 1/24 of the width of the plate, but not less than 1/2 inch for plates less than 12 inches wide. Concrete surfaces shall be rough, clean, and free of oil, grease, and laitance, and they shall be damp. Metal surfaces shall be clean and free of oil, grease, and rust.

3.6.2 Nonshrink Grout Application

Nonshrink grout shall conform to the requirements of paragraph 2.1.6. Unless recommended otherwise by the grout manufacturer, the mixture shall include by weight 1-1/2 parts of sound, clean, uncrushed gravel conforming to the size No. 8, Table 2, ASTM C-33 in combination with fine aggregate conforming to ASTM C-33, to 1 part portland cement except that no coarse aggregate shall be used when grout is placed in areas with a clearance of less than 2 inches. Water content shall be the minimum that will provide a flowable mixture and fill the space to be grouted without segregation, bleeding, or reduction of strength.

3.6.2.1 Mixing and Placing of Nonshrink Grout

Mixing and placing shall be in conformance with the material manufacturer's instructions and as specified. Ingredients shall be thoroughly dry-mixed before adding water. After adding water, the batch shall be mixed for 3 minutes. Batches shall be of size to allow continuous placement of freshly mixed grout. Grout not used within 30 minutes after mixing shall be discarded. The space between the top of the concrete or masonry-bearing surface and the plate shall be filled solid with the grout. Forms shall be of wood or other equally suitable material for retaining the grout and shall be removed after the grout has set. If grade "A" grout as specified in ASTM C 1107 is used, all surfaces shall be formed to provide restraint. The placed grout shall be worked to eliminate voids; however, overworking and breakdown of the initial set shall be avoided. Grout shall not be retempered or subjected to vibration from any source. Where clearances are unusually small, placement shall be under pressure with a grout pump. Temperature of the grout, and of surfaces receiving the grout, shall be maintained at 65 to 85 degrees F until after setting.

3.6.2.2 Treatment of Exposed Surfaces

After the grout has set, those types containing metallic aggregate shall have the exposed surfaces cut back 1 inch and immediately covered with a parge coat of mortar proportioned by mass of one part portland cement, two parts sand, and sufficient water to make the mixture placeable. The parge coat shall have a smooth, dense finish. The exposed surface of other types of nonshrink grout shall have a smooth, dense finish.

3.6.2.3 Curing

Grout and parge coats shall be cured in conformance with paragraph 3.5.

3.6.3 Mortar

Mortar shall consist of 1 part Type 1 portland cement and 2-1/2 parts of fine aggregate conforming to ASTM C 33, proportioned by weight, and not more than 4-1/2 gallons of water per bag of cement. The space between the top of the concrete or masonry-bearing surface and the bottom of the plate shall be packed with the bedding mortar by tamping or ramming with a bar or rod until the voids are completely filled.

3.7 TESTS AND INSPECTIONS

Tests and inspections shall conform to the following requirements.

3.7.1 General

The Contractor shall perform the inspections and tests described below, and, based upon the results of these inspections and tests, he shall take the action required and submit reports as required. When, in the opinion of the Contracting Officer, the concreting operation is out of control, concrete placement shall cease. The laboratory performing the tests shall conform with ASTM C 1077. The individuals who sample and test concrete or the constituents of concrete as required in this specification shall have demonstrated a knowledge and ability to perform the necessary test procedures equivalent to the ACI minimum guidelines for certification of Concrete Field Testing Technician, Grade I. The individuals who perform the inspection of concrete construction shall have demonstrated a knowledge and ability equivalent to the ACI minimum guidelines for certification of Concrete Construction Inspector, Level II. The Government will inspect the laboratory, equipment, and test procedures prior to start of concreting operations and at least once per year thereafter for conformance with ASTM C 1077.

3.7.2 Testing and Inspection Requirements

3.7.2.1 Fine Aggregate

a. Grading - At least once during each shift when the concrete plant is operating, there shall be one sieve analysis and fineness modulus determination in accordance with ASTM C 136 and COE CRD-C 104 for the fine aggregate or for each size range of fine aggregate if it is batched in more than one size or classification. The location at which samples are taken may be selected by the Contractor as the most advantageous for control. However, the Contractor is responsible for delivering fine aggregate to the mixer within specification limits. Results of tests shall be reported in writing.

b. Corrective Action for Fine Aggregate Grading - When the amount passing on any sieve is outside the specification limits, the fine aggregate shall be immediately resampled and retested. If there is another failure on any sieve, the fact shall immediately be reported to the Contracting Officer and immediate steps shall be taken to rectify the situation.

c. Moisture Content Testing - When in the opinion of the Contracting Officer the electric moisture meter is not operating satisfactorily, there shall be at least four tests for moisture content in accordance with ASTM C 566 during each 8-hour period of mixing plant operation. The times for the tests shall be selected randomly within the 8-hour period. An additional test shall be made whenever the slump is shown to be out of control or excessive variation in workability is reported by the placing foreman. When the electric moisture meter is operating satisfactorily, at least two direct measurements of moisture content shall be made per week to check the calibration of the meter. The results of tests for moisture content shall be used to adjust the added water in the control of the batch plant.

d. Moisture Content Corrective Action - Whenever the moisture content of the fine aggregate changes by 0.5 percent or more, the scale settings for the fine-aggregate batcher and water batcher shall be adjusted (directly or by means of a moisture compensation device) if necessary to maintain the specified slump.

3.7.2.2 Coarse Aggregate

a. Grading - At least once during each shift in which the concrete plant is operating, there shall be a sieve analysis in accordance with ASTM C 136 for each size of coarse aggregate. The location at which samples are taken may be selected by the Contractor as the most advantageous for production control. However, the Contractor shall be responsible for delivering the aggregate to the mixer within specification limits. A test record of samples of aggregate taken at the same locations shall show the results of the current test as well as the average results of the five most recent tests including the current test. The Contractor may adopt limits for control which are coarser than the specification limits for samples taken at locations other than as delivered to the mixer to allow for degradation during handling. Results of tests shall be reported in writing.

b. Corrective Action for Grading - When the amount passing any sieve is outside the specification limits, the coarse aggregate shall be immediately resampled and retested. If the second sample fails on any sieve, that fact shall be reported to the Contracting Officer. Where two consecutive averages of five tests are outside specification limits, the operation shall be considered out of control and shall be reported to the Contracting Officer. Concreting shall be stopped and immediate steps shall be taken to correct the grading.

c. Coarse Aggregate Moisture Content - A test for moisture content of each size group of coarse aggregate shall be made at least twice per week. When two consecutive readings for smallest size coarse aggregate differ by more than 1.0 percent, frequency of testing shall be increased to that specified above for fine aggregate, until the difference falls below 1.0 percent. These results should be used to adjust the added water in the control of the batch

d. Coarse Aggregate Moisture Corrective Action - Whenever the moisture content of any size of coarse aggregate changes by 0.5 percent or more, the scale setting for the coarse aggregate batcher and the water batcher shall be adjusted if necessary to maintain the specified slump.

3.7.2.3 Deleterious Substances

a. When in the opinion of the Contracting Officer a problem exists in connection with deleterious substances in fine or coarse aggregates, test shall be made in accordance with ASTM C 33 at a frequency not less than one per week. Results of tests shall be reported in writing.

b. Corrective Action for Deleterious Substances - When the results for a deleterious substance are outside the specification limit, the aggregate shall be resampled and retested for the deleterious substance that failed. If the second sample fails, that fact shall be reported to the Contracting Officer. When material finer than No. 200 sieve for coarse aggregate exceeds the specification limit, immediate steps, such as washing or other corrective actions, shall be initiated.

3.7.2.4 Scales

a. Weighing Accuracy - The accuracy of the scales shall be checked by test weights prior to start of concrete operations and at least once every 3 months for conformance with the applicable requirements of paragraph 3.1.2. Such tests shall also be made as directed whenever there are variations in properties of the fresh concrete that could result from batching errors. Results of the tests shall be reported in writing.

b. Batching and Recording Accuracy - Once a week the accuracy of each batching and recording device shall be checked during a weighing operation by noting and recording the required weight, recorded weight, and the actual weight batched. The Contractor shall provide the necessary calibration devices and confirm that the calibration devices described in paragraph 3.1.2 for checking the accuracy of dispensed admixtures are operating properly. Results of the tests shall be reported in writing.

c. Scales Corrective Action - When either the weighing accuracy or batching accuracy does not comply with specification requirements, the plant shall not be

operated until necessary adjustments or repairs have been made. Discrepancies in recording accuracies shall be corrected immediately.

3.7.2.5 Batch-Plant Control

The measurement of all constituent materials including cementitious materials, each size of aggregate, water, and admixtures shall be continuously controlled. The aggregate weights and amount of added water shall be adjusted as necessary to compensate for free moisture in the aggregates. The amount of air-entraining agent shall be adjusted to control air content within specified limits. A report shall be prepared indicating type and source of cement used, type and source of pozzolan or slag used, amount and source of admixtures used, aggregate source, the required aggregate and water weights per cubic yard, amount of water as free moisture in each size of aggregate, and the batch aggregate and water weights per cubic yard for each class of concrete batched during plant operation. The batch report shall be furnished to the Contracting Officer upon delivery of each batch of concrete.

3.7.2.6 Concrete Mixture

a. Air Content Testing - Air content tests shall be made when test specimens are fabricated. In addition, at least two tests for air content shall be made on randomly selected batches of each separate concrete mixture produced during each 8-hour period of concrete production. Additional tests shall be made when excessive variation in workability is reported by the placing foreman or Government quality assurance representative. Tests shall be made in accordance with ASTM C 231. Test results shall be plotted on control charts, which shall at all times be readily available to the Government. Copies of the current control charts shall be kept in the field by the Contractor's quality control representatives and results plotted as tests are made. When a single test result reaches either the upper or lower action limit a second test shall immediately be made. The results of the two tests shall be averaged and this average used as the air content of the batch to plot on both the control chart for air content and the control chart for range, and for determining the need for any remedial action. The result of each test, or average as noted in the previous sentence, shall be plotted on a separate chart for each mixture on which an "average line" is set at the midpoint of the specified air content range from paragraph 2.2.3. An upper warning limit and a lower warning limit line shall be set 1.0 percentage point above and below the average line. An upper action limit and a lower action limit line shall be set 1.5 percentage points above and below the average line, respectively. The range between each two consecutive tests shall be plotted on a control chart for range where an upper warning limit is set at 2.0 percentage points and an upper action limit is set at 3.0 percentage points. Samples for air content may be taken at the mixer, however, the Contractor is responsible for delivering the concrete to the placement site at the stipulated air content. If the Contractor's materials or transportation methods cause air content loss between the mixer and the placement, correlation samples shall be taken at the placement

site as required by the Contracting Officer and the air content at the mixer controlled as directed.

b. Air Content Corrective Action - Whenever points on the control chart for percent air reach either warning limit, an adjustment shall immediately be made in the amount of air-entraining admixture batched. As soon as is practical after each adjustment, another test shall be made to verify the result of the adjustment. Whenever a point on the control chart range reaches the warning limit, the admixture dispenser shall be recalibrated to ensure that it is operating accurately and with good reproducibility. Whenever a point on either control chart reaches an action limit line, the air content shall be considered out of control and the concreting operation shall immediately be halted until the air content is under control. Additional air content tests shall be made when concreting is restarted. All this shall be at no extra cost to the Government.

c. Slump Testing - In addition to slump tests which shall be made when test specimens are fabricated, at least four slump tests shall be made on randomly selected batches in accordance with ASTM C 143 for each separate concrete mixture produced during each 8-hour or less period of concrete production each day. Also, additional tests shall be made when excessive variation in workability is reported by the placing foreman or Government's quality assurance representative. Test results shall be plotted on control charts which shall at all times be readily available to the Government. Copies of the current control charts shall be kept in the field by the Contractor's quality control representatives and results plotted as tests are made. When a single slump test reaches or goes beyond either the upper or lower action limit, a second test shall immediately be made on the same batch of concrete. The results of the two tests shall be averaged and this average used as the slump of the batch to plot on both the control chart for percent air and the chart for range, and for determining the need for any remedial action. An upper warning limit shall be set at 1/2 inch below the maximum allowable slump on separate control charts for percent air used for each type of mixture as specified in paragraph 2.2.4, and an upper action limit line and lower action limit line shall be set at the maximum and minimum allowable slumps, respectively, as specified in the same paragraph. The range between each consecutive slump test for each type of mixture shall be plotted on a single control chart for range on which an upper action limit is set at 2 inches. Samples for slump shall be taken at the mixer, however, the Contractor is responsible for delivering the concrete to the placement site at the stipulated slump. If the Contractor's materials or transportation methods cause slump loss between mixer and the placement, correlation samples shall be taken at the placement site as required by the Contracting Officer and the slump at the mixer controlled as directed.

d. Slump Corrective Action - Whenever points on the control chart for slump reach the upper warning limit, an adjustment shall be immediately made in the batch weights of water and fine aggregate. The adjustments are to be made so

that the total water content does not exceed that amount allowed by the maximum W/CM specified, based upon aggregates which are in a saturated surface-dry condition. When a single slump reaches the upper or lower action limit, no further concrete shall be delivered to the placing site until proper adjustments have been made. Immediately after each adjustment, another test shall be made to verify the correctness of the adjustment. Whenever two consecutive slump tests, made during a period when there was no adjustment of batch weights, produce a point on the control chart for range at or above the upper action limit, the concreting operation shall immediately be halted and the Contractor shall take appropriate steps to bring the slump under control. Also, additional slump tests shall be made as directed. All this shall be at no additional cost to the Government.

e. Temperature - The temperature of the concrete shall be measured when compressive strength specimens are fabricated. Measurement shall be in accordance with ASTM C 1064. The temperature shall be reported along with the compressive strength data.

f. Compressive-Strength Specimens - At least one set of test specimens shall be made each day on each different concrete mixture placed during the day. Additional sets of test cylinders shall be made, as directed by the Contracting Officer, when the mixture proportions are changed or when low strengths have been detected. A random sampling plan shall be developed by the Contractor and approved by the Contracting Officer prior to the start of construction. The plan shall assure that sampling is done in a completely random and unbiased manner. A set of test specimens for concrete with a 28-day specified strength per paragraph 1.7 shall consist of four cylinders, two to be tested at 7 days and two at 28 days. A set of test specimens for concrete with a 90-day strength per specified paragraph 1.7 shall consist of six cylinders, two tested at 7 days, two at 28 days, and two at 90 days. Test specimens shall be molded and cured in accordance with ASTM C 31 and tested in accordance with ASTM C 39. All compressive-strength tests shall be reported immediately to the Contracting Officer. Quality control charts shall be kept for individual strength tests, moving average for strength, and moving average for range for each mixture. The charts shall be similar to those found in ACI 214.

3.7.2.7 Inspection Before Placing

Foundation or construction joints, forms, and embedded items shall be inspected for quality by the Contractor in sufficient time prior to each concrete placement to certify to the Contracting Officer that they are ready to receive concrete. The results of each inspection shall be reported in writing.

3.7.2.8 Placing

a. Placing Inspection - The placing foreman shall supervise all placing operations, shall determine that the correct quality of concrete or grout is placed in each location as directed and shall be responsible for measuring and recording concrete temperatures and ambient temperature hourly during placing operations, weather conditions, time of placement, yardage placed, and method of placement.

b. Placing Corrective Action - The placing foreman shall not permit batching and placing to begin until he has verified that an adequate number of vibrators in working order and with competent operators are available. Placing shall not be continued if any pile of concrete is inadequately consolidated. If any batch of concrete fails to meet the temperature requirements, immediate steps shall be taken to improve temperature controls.

3.7.2.9 Vibrators

a. Vibrator Testing and Use - The frequency and amplitude of each vibrator shall be determined in accordance with COE CRD-C 521 prior to initial use and at least once a month when concrete is being placed. Additional tests shall be made as directed when a vibrator does not appear to be adequately consolidating the concrete. The frequency shall be determined at the same time the vibrator is operating in concrete with the tachometer held against the upper end of the vibrator head while almost submerged and just before the vibrator is withdrawn from the concrete. The amplitude shall be determined with the head vibrating in air. Two measurements shall be taken, one near the tip and another near the upper end of the vibrator head and these results averaged. The make, model, type, and size of the vibrator and frequency and amplitude results shall be reported in writing.

b. Vibrator Corrective Action - Any vibrator not meeting the requirements of paragraph 3.1.5 shall be immediately removed from service and repaired or replaced.

3.7.2.10 Curing

a. Moist-Curing Inspections - At least once each shift, and once per day on non-work days an inspection shall be made of all areas subject to moist curing. The surface moisture condition shall be noted and recorded.

b. Moist-Curing Corrective Action - When a daily inspection report lists an area of inadequate curing, immediate corrective action shall be taken, and the required curing period for such areas shall be extended by one (1) day.

c. Membrane-Curing Inspection - No curing compound shall be applied until the Contractor's authorized representative has verified that the compound is properly mixed and ready for spraying. At the end of each operation, he shall estimate

the quantity of compound used by measurement of the container and the area of concrete surface covered and compute the rate of coverage in square feet per gallon. He shall note whether or not coverage is uniform.

d. Membrane-Curing Corrective Action - When the coverage rate of the curing compound is less than that specified or when the coverage is not uniform, the entire surface shall be sprayed again.

e. Sheet-Curing Inspection - At least once each shift and once per day on nonwork days, an inspection shall be made of all areas being cured using material sheets. The condition of the covering and the tightness of the laps and tapes shall be noted and recorded.

f. Sheet-Curing Corrective Action - When a daily inspection report lists any tears, holes, or laps or joints that are not completely closed, the tears and holes shall promptly be repaired or the sheets replaced, the joints closed, and the required curing period for those areas shall be extended by one (1) day.

3.7.2.11 Cold-Weather Protection and Sealed Insulation Curing

At least once each shift and once per day on non-work days, an inspection shall be made of all areas subject to cold-weather protection. The protection system shall be inspected for holes, tears, unsealed joints, or other deficiencies that could result in damage to the concrete. Special attention shall be taken at edges, corners, and thin sections. Any deficiencies shall be noted, corrected, and reported.

3.7.2.12 Cold-Weather Protection Corrective Action

When a daily inspection report lists any holes, tears, unsealed joints, or other deficiencies, the deficiency shall be corrected immediately and the period of protection extended 1 day.

3.7.2.13 Mixer Uniformity

a. Stationary Mixers - Prior to the start of concrete placing and once every 6 months when concrete is being placed, or once for every 75,000 cubic yards of concrete placed, whichever results in the longest time interval, uniformity of concrete mixing shall be determined in accordance with ASTM C 94. Whenever adjustments in mixer or increased mixing times are necessary because of failure of any mixer to comply, the mixer shall be retested after adjustment. Results of tests shall be reported in writing.

b. Truck Mixers - Prior to the start of concrete placing and at least once every 6 months when concrete is being placed, uniformity of concrete shall be determined in accordance with ASTM C 94. The truck mixers shall be selected randomly for testing. When satisfactory performance is found in one truck mixer,

the performance of mixers of substantially the same design and condition of the blades may be regarded as satisfactory. Results of tests shall be reported in writing.

3.7.2.14 Mixer Uniformity Corrective Action

When a mixer fails to meet mixer uniformity requirements, either the mixer shall be removed from service on the work, the mixing time shall be increased, batching sequence changed, batch size reduced, or adjustments shall be made to the mixer until compliance is achieved.

3.7.3 Reports

All results of tests or inspections conducted shall be reported informally as they are completed and in writing daily. A weekly report shall be prepared for the updating of control charts covering the entire period from the start of the construction season through the current week. During periods of cold-weather protection, reports of pertinent temperatures shall be made daily. These requirements do not relieve the Contractor of the obligation to report certain failures immediately as required in preceding paragraphs. Such reports of failures and the action taken shall be confirmed in writing in the routine reports. The Contracting Officer has the right to examine all test and inspection records.

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SECTION 03305 – TEMPORARY CONCRETE DAMS

SECTION 03305 – TEMPORARY CONCRETE DAMS

PART 1 GENERAL

1.1 SCOPE

This work shall consist of designing, installing, maintaining and finally removing two (2) reinforced concrete dams in the locations and to the configurations shown in the plans. The Contractor shall be solely responsible for the design, layout, removal and disposal of all elements of each temporary reinforced concrete dam.

1.2 MEASUREMENT AND PAYMENT

There will be no measurement made for installation and removal of two (2) temporary reinforced concrete dams. Payment will be made at the contract lump sum price for "TEMPORARY CONCRETE DAMS". Price and Payment shall include the furnishing of all plant, equipment, labor and materials necessary to install, maintain and finally remove the temporary reinforced concrete dams.

1.3 SUBMITTALS

Within thirty (30) consecutive calendar days after receipt of the Notice to Proceed, the Contractor shall submit, for review by the Contracting Officer, six (6) copies of the following in bound form:

1.3.1 Professional Engineer's Design Calculations

The Calculations shall be on 8 ½" x 11" sheets or shall be in the form of computer analysis and design and shall bear the professional engineers stamp and signature.

1.3.2 Layout

The Contractor shall furnish a detailed layout of each temporary dam on standard (24" x 36") sheets.

(1) The drawings shall show all pertinent dimensions and locations of these structures with reference to the P&A baseline.

(2) The drawings shall also show the construction sequence in which the installation of these dams will occur. Submittal of the items listed above shall be in accordance with Section 01330, "SUBMITTAL PROCEDURES". No work shall proceed until the submittals are approved by the Contracting Officer (CO). Revision as required by the CO shall be implemented by the Contractor at no additional cost to the Government.

1.4 DESIGN CALCULATIONS

The temporary reinforced concrete dam shall be designed using accepted professional

engineering methods of design consistent with current design practice. The design calculations shall be performed by a Registered Professional Civil Engineer licensed to practice in the State of Louisiana. The designer may at his option, use information contained in the plans; however, the government is not responsible for any assumptions that the Contractor makes from this data.

PART 2 PRODUCTS

2.1 Concrete

Concrete shall conform to the requirements of Section 03301 "CAST-IN-PLACE STRUCTURAL CONCRETE" with f'c = 4000 psi in 28 days. (90 days if Pozzolan is used)

2.2 Reinforcement

Reinforcement shall conform to the requirements of Section 03210 "REINFORCING STEEL AND ACCESSORIES". Reinforcement shall be Grade 60.

PART 3 EXECUTION

3.1 REMOVAL AND DISPOSAL

The temporary dams shall be removed in a manner not injurious to the adjacent property or structures. All removed items shall become the property of the Contractor and disposed of according to the requirements of Section 02221, "SELECTIVE DEMOLITION".

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SECTION 03410 – PRECAST CONCRETE SLAB PANELS

SECTION 03410 – PRECAST CONCRETE SLAB PANELS

PART 1 GENERAL

1.1 SCOPE

The work covered required by this Section consists of furnishing all materials and equipment required to furnish and install pre-cast reinforced concrete slab panels for the modification to the trash screen bay in accordance with the contract plans and specifications.

1.2 MEASUREMENT AND PAYMENT

There will be no measurement or payment made for "Precast Concrete Slab Panels" as required by this Section. Payment shall be included in the Lump Sum Price for "MODIFY TRASH SCREEN BAY". Price and payment shall include the furnishing of all plant, equipment, labor and materials necessary to complete this item.

1.3 RELATED WORK SPECIFIED ELSEWHERE

Section 03501, "MODIFY TRASH SCREEN BAY"

1.4 APPLICABLE PUBLICATIONS

The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

LOUISIANA STANDARD SPECIFICATIONS

Louisiana Standard Specifications for Roads and Bridges, (LSSRB), 2000 Edition.

1005 Joint Materials for Pavements & Structures

1018 Miscellaneous Materials

1.5 SUBMITTALS

The Contractor shall submit four (4) copies of Drawings and Design Calculations according to the following:

1.5.1 Professional Engineer's Design Calculations

The Contractor shall submit design calculations to the Contracting Officer for approval. The slab panels shall be designed using accepted professional engineering methods of design consistent with current design practice. The design calculations shall be performed by a Registered Professional Engineer licensed to practice in the State of Louisiana. The

designer shall use design criteria and loading information contained in the contract drawings when designing the slab panels.

1.5.2 Design Drawings

The Contractor shall also furnish a detailed drawing of the slab panels on standard (24" x 36") sheets.

1.6 QUALITY CONTROL

Quality Control for material tests, workmanship and installation shall be according to the requirements in Section 03501, "MODIFY TRASH SCREEN BAY".

PART 2 PRODUCTS

2.1 PORTLAND CEMENT CONCRETE

Portland Cement Concrete shall conform to the requirements of Section 03301, "CAST-IN-PLACE STRUCTRUAL CONCRETE" with f'c = 4000 psi in 28 days. (90 days if Pozzolan is used.)

2.2 REINFORCEMENT

Reinforcement shall conform to the requirements of Section 03210, "REINFORCING STEEL AND ACCESSORIES".

2.3 JOINTING MATERIAL

Joint Material between slab panels shall be the expansion joint type conforming to Section 1005 of the LSSRB.

2.4 GROUT

2.4.1 Grout

Grout shall be non-shrink type placed around the tie down anchors and shall conform to the requirements of Section 1018.27 of the LSSRB.

PART 3 EXECUTION

3.1 CONCRETE SLABS

Concrete slabs shall be the interlocking type. Contractor shall align the slabs to accurately fit the anchor bolt pattern. Jointing materials and epoxies shall be applied according to the manufacturer's recommendations.

Section Table Of Contents

SECTION 03500 - REPLACE SUCTION BASIN DECK

SECTION 03500 - REPLACE SUCTION BASIN DECK

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all labor, materials and equipment and performing all work required to remove the top of the existing suction basin and replace it with a new grid reinforced concrete deck. Included in this work is the removal of the existing wood decking, timbers, steel support beams and the existing concrete and brick work as required and the installation of a new steel beam supported grid reinforced concrete deck, along with all utility adjustments and other miscellaneous work required to complete this section.

1.2 MEASUREMENT AND PAYMENT

No measurement will be made for replacement of the suction basin top. Payment will be made at the contract lump sum price for "REPLACE SUCTION BASIN DECK". Price and payment will include the cost of all labor, materials, and the use of all equipment and tools, including chain link fence, cast-in-place structural, demolition, structural steel, grid reinforced decking and miscellaneous metal, as specified elsewhere, required to complete the work required by this section. All work required by this section is outlined in the appropriate section above.

1.3 RELATED WORK SPECIFIED ELSEWHERE

Demolition - Section 02221 "SELECTIVE DEMOLITION".

Fencing - Section 02831 "CHAIN LINK FENCING AND GATES".

Formwork - Section 03101 "FORMWORK FOR CONCRETE".

Expansion Joints - Section 03150 "EXPANSION JOINTS AND WATERSTOPS".

Reinforcing Steel and Accessories - Section 03210 "REINFORCING STEEL AND ACCESSORIES".

Concrete - Section 03301 "CAST-IN-PLACE STRUCTURAL CONCRETE".

Steel I-Beams and Attaching Hardware - Section 05501 "METALWORK FABRICATION , MACHINE WORK AND MISCELLANEOUS PROVISIONS".

Coatings - Section 09940 "PAINTING".

Electrical Work - Section 16001 "ELECTRICAL WORK".

1.4 SUBMITTALS

The Contractor shall submit shop drawings, test procedures, records for approval as required in the appropriate section. All submittals shall be according to Section 01330 "SUBMITTAL PROCEDURES".

1.5 QUALITY CONTROL

Requirements for material tests, workmanship and other requirements shall be according to the appropriate section outlined in paragraph 1.3 above. All reinforced concrete shall have a minimum strength of 4000 PSI in 28 days or 90 days if Pozzolan is used.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

Section Table Of Contents

SECTION 03501 - MODIFY TRASH SCREEN BAY

SECTION 03501 - MODIFY TRASH SCREEN BAY

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all labor, materials and equipment and performing all work required to rework the existing trash screen bay into a closed subsurface structure according to the plans and these specifications. Included in this work is the removal of the existing chain link fence, removal of the existing trash screen, preparation of the existing bay for installation of a reinforced concrete top and finally backfilling the resulting installation.

1.2 MEASUREMENT AND PAYMENT

No measurement will be made for modification of the trash screen bay. Payment will be made at the contract lump sum price for "MODIFY TRASH SCREEN BAY". Price and payment will include the cost of all labor, materials, and the use of all equipment and tools, required to remove the existing chain link fence, remove the existing trash screen, preparation of the bay for installation of a concrete top and finally the backfilling of the resulting installation. All work required in this section is outlined in the appropriate section listed above.

1.3 RELATED WORK SPECIFIED ELSEWHERE

Demolition - Section 02221 "SELECTIVE DEMOLITION".

Excavation and Backfill - Section 02201 "STRUCTURAL EXCAVATION AND BACKFILL".

Formwork - Section 03101 "FORMWORK FOR CONCRETE".

Reinforcing Steel - Section 03210 "REINFORCING STEEL AND ACCESSORIES".

Concrete - Section 03301 "CAST-IN-PLACE STRUCTURAL CONCRETE".

Precast Concrete Slab Panels - Section 03410 "PRECAST CONCRETE SLAB PANELS".

1.4 SUBMITTALS

The Contractor shall submit mix designs, test procedures, records for approval as required in the appropriate section. All submittals shall be according to Section 01330 "SUBMITTAL PROCEDURES".

1.5 QUALITY CONTROL

Requirements for material tests, workmanship and other requirements shall be according to the appropriate section outline in paragraph 1.3 above. All reinforced concrete shall have a minimum strength of 4000 PSI in 28 days or 90 days if Pozzolan is used.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

Section Table Of Contents

SECTION 04051 - MASONRY

SECTION 04051 - MASONRY

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all plant, equipment, labor and materials and performing all operations required to reconstruct those areas of brick masonry removed during this project.

1.2 MEASUREMENT AND PAYMENT

No measurement or payment will be made for masonry work. Payment shall be distributed among the appropriate bid items.

1.3 APPLICABLE PUBLICATIONS

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

C62	(2001) Standard Specification for Building Brick (Solid Masonry Units made from Clay or Shale)
C91	(2001) Standard Specification for Masonry Cement
C143	(2000) Standard Test Method for Slump of Hydraulic Cement Concrete
C144	(1999) Standard Specification for Aggregate for Masonry Mortar
C150	(2002) Standard Specification for Portland Cement
C207	(1991) Standard Specification for Hydrated Lime for Masonry Purposes
C216	(2001a) Standard Specification for Facing Brick (Solid Masonry Units made from Clay or Shale)
C270	(2001a)Standard Specification for Mortar for Unit Masonry

C404	(1997) Standard Specification for Aggregate for Masonry Grout
C476	(2001) Standard Specification for Grout for Masonry

1.4 QUALITY CONTROL

The contractor shall provide continuous inspection of all operations for quality control and record the results for submittal to the Contracting Officer in order to show compliance with the provisions of the contract. Affidavits from the manufacturer shall be furnished to the Contracting Officer certifying that the materials or products delivered to the job site meet the requirements of these specifications.

PART 2 PRODUCTS

2.1 FACING BRICK

Facing brick shall match the existing bricks and shall have the nominal dimensions of 4-1/8" x 2-5/16" x 8-1/4". The Contractor shall visually and physically check dimensions and color of the existing bricks before ordering. The Contractor shall be responsible for installing brick which conforms to the dimensions which yield smooth tie-ins, have similar texture and dimensions and are of similar color as the existing bricks. Brick shall conform to the requirements of ASTM C216, Grade SW, Type FBS quality, with maximum core diameter of 1/2". Facing brick shall be as selected from samples submitted to the Contracting Officer for approval before shipment.

2.2 GLAZED BRICK

Glazed brick shall match the existing glazed bricks and have the nominal dimensions of 4-1/8" x 2-5/16" x 8-1/4". Shade shall be as selected from samples submitted to the Contracting Officer for approval. Shade shall be similar in color and texture to that of the existing glazed brick on the existing drainage pumping station.

2.3 BUILDING BRICK

Building brick shall have the same dimensions and color as face brick and shall conform to the requirements of ASTM C62, Grade MW.

2.4 MORTAR AND GROUT

Mortar and grout materials shall comply with the following:

2.4.1 Portland Cement

Portland Cement shall be Type I, meeting the requirements of ASTM C91.

2.4.2 Masonry Cement

Masonry Cement shall be according to the requirements of ASTM C91.

2.4.3 Hydrated Lime

Hydrated Lime shall be Type S according to ASTM C207.

2.4.4 Fine Aggregate

Fine Aggregate shall be according to ASTM C144.

2.4.5 Coarse Aggregate

Coarse Aggregate shall be according to ASTM C404.

2.4.6 Water

Water shall be clean and potable.

2.4.7 Mortar

Mortar shall conform to the provisions of ASTM C 270, Type M. Color shall match existing mortar.

2.4.8 Fine Grout

Fine grout for use in spaces less than 2 inches in width shall conform to ASTM C476.

2.4.9 Coarse Grout

Coarse Grout for use in space 2 inches to 4 inches in width shall conform to ASTM C476.

PART 3 EXECUTION

3.1 MIXING MORTAR AND GROUT

All cementitious materials and aggregate shall be mixed for a minimum of 5 min. in a mechanical batch mixer. The consistency of mortar shall be adjusted to the satisfaction of the mason, but as much water shall be added as is compatible with convenience in using the mortar. If the mortar begins to stiffen from evaporation or absorption of a part of the mixing water, the mortar shall be retempered by adding water and remixed. The consistency of the grout shall be such that, at time of placement, it has a slump of 10-

1/2 to 11 in. as determined according to ASTM C143. All grout shall be used within 2-1/2 hr. of initial mixing and no mortar nor grout shall be used after it has begun to set.

3.2 WORKMANSHIP

3.2.1 Wetting Masonry Units

(1) All bricks shall be dampened prior to use and be wet or damp when laid.

(2) The method of wetting masonry units shall be such as to insure that each unit is nearly saturated. During freezing weather, units that require wetting shall be sprinkled with warm water just before laying.

3.2.2 Protection of Work

During erection, all work shall be kept dry by covering at the end of each work day or shutdown period with a strong, waterproof covering.

3.2.3 Freezing Weather

No masonry shall be laid when the temperature of the outside air is below 40 deg. Fahr., unless means are provided to heat and maintain the temperature of the masonry materials and protect the completed work from freezing. Protection shall consist of heating and maintaining the temperature of the masonry materials to at least 40 deg. Fahr., but not more than 160 deg. Fahr., and maintaining an air temperature above 40 deg. Fahr. on both sides of the masonry for a period of at least 48 hrs. These periods may be reduced to 24 hrs., if high-early-strength cement is used.

3.2.4 Pattern Bond

All brick shall be laid in a bond matching the existing.

3.2.5 Joining of Work

Where fresh masonry joins masonry that is partially set or totally set, the exposed surface of the set masonry shall be cleaned and lightly wetted so as to obtain the best possible bond with the new work. All loose brick and mortar shall be removed.

3.2.6 Joints

Head and bed joints shall be nominally 1/4" raked and tooled.

3.2.7 Laying and Grouting

All grouted brick masonry shall be laid plumb and true to line with full head and bed joints. The ends of brick shall be buttered with sufficient mortar to fill the head joints and furrowing of bed joints will not be permitted. The top of the bed joint mortar may be sloped toward the center of the wall to minimize the amount of mortar forced into the grout space when the brick are shoved into line.

When the least clear dimension of the longitudinal vertical joint is less than 2 in., the maximum height of grout pour shall be limited to 12 in. When the least clear dimension of the longitudinal vertical joint is 2 in. or more, the maximum height of grout pour shall not exceed 48 times the least clear dimension of the longitudinal vertical joint for coarse grout nor 64 for fine grout but not to exceed a height of 12 ft. Grout shall be agitated or puddled during placement to insure complete filling of the grout space. When grouting is stopped for 1 hour or longer the grout pour shall be stopped 1-1/2 in. below the top of a masonry unit.

In masonry more than two brick in thickness, the inner wythes shall be placed or floated in grout poured between the two outer wythes.

Whenever possible, grouting shall be done from the inside face of the masonry. Extreme care shall be used to prevent any grout or mortar from staining the face of masonry to be left exposed or painted. If any grout or mortar does contact the face of such masonry, it shall be immediately removed.

Section Table of Contents

SECTION 05501 - METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS

SECTION 05501 - METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS

PART 1 GENERAL

1.1 SCOPE

This section specifies general workmanship requirements, applicable to the fabrication, assembly and testing of various items of metalwork and machine work to insure conformance with the specifications. These requirements are in addition to those contained in the specification sections covering the specific items of work or indicated on the drawings.

1.2 MEASUREMENT AND PAYMENT

No separate measurement and payment will be made for the material and work covered under this section and all costs in connection therewith shall be included in the applicable contract price for the items to which the work pertains.

1.2.1 Payment for all structural steel, grid reinforced decking and miscellaneous metalwork required to replace the suction basin deck will be made at the contract lump sum price for "REPLACE SUCTION BASIN DECK".

1.2.2 Payment for all other structural steel and miscellaneous metalwork required to complete this item not expressly paid for under any other item will be made at the contract lump sum price for "STRUCTURAL STEEL AND MISCELLANEOUS METALWORK".

1.2.3 Payment for fabricating and installing the aluminum stop logs shall be made at the contract lump sum price for "ALUMINUM STOP LOGS."

1.2.4 Price and payment shall constitute full compensation for furnishing all plant, labor, materials and equipment, and tools required for the fabrication and installation of all structural steel and miscellaneous metalwork as specified herein.

1.3 REFERENCES

The following publications of the issues listed below but referred to thereafter by basic designation only form a part of this specification to the extent indicated by the references thereto or as required.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A 36	(2001) Standard Specification for Carbon Structural Steel

A123	(2001a) Standard Specification for Zinc (hot-dip galvanized) coatings on iron and Steel products
A 193	(2001b) Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
A269	(2001) Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
A276	(2002) Standard Specification for Stainless Steel Bars and Shapes
A325	(2002) Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105Ksi Minimum Tensile Strength
A380	(1999e1) Standard Practice for Cleaning and Descaling and Passivation of Stainless Steel Parts, Equipment, and Systems
A490	(2002) Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150KSI Minimum Tensile Strength
A514	(2000a) Standard Specification for High-Yield Strength, Quenched-and-Tempered Alloy Steel Plate, Suitable for Welding
A709	(2001 be2) Standard Specification for Carbon and High Strength Low-Alloy Structural Steel Shapes, Plates, and Bars and Quenched-and-Tempered Alloy Structural Steel Plates for Bridges
B209	(2001) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
B308	(2000) Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles
B429	(2000) Standard Specification for Aluminum-

Alloy Extruded Structural Pipe and Tube

AMERICAN WELDING SOCIETY, INC. (AWS) CODE

D 1.1 (2002) Structural Welding Code, Steel

D 1.2(1997) Structural Welding Code, Aluminum

LOUISIANA STANDARD SPECIFICATIONS

Louisiana Standard Specifications for Roads and Bridges, 2000 Edition (LSSRB)

1.4 SUBMITTALS

Contractor submittals shall be in accordance with the specifications and as herein specified.

1.4.1 Shop Drawings

Shop drawings shall be submitted for approval in accordance with the Contract Clauses. Drawings shall include catalog cuts, templates, fabrication and assembly details and type, grade and class of materials as appropriate. Elements of fabricated items inadvertently omitted on contract drawings shall be detailed by the fabricator and indicated on the shop drawings.

1.4.2 Lists of Materials

The Contractor shall furnish the Contracting Officer 8 copies of all purchase and mill orders, shop orders for materials and work orders, including all new orders placed by Contractors and old orders extended by each supplier. The Contractor, at the time of submittal of shop drawings, shall furnish a list designating the material to be used for each item. Where mill tests are required, purchase orders shall contain the test site address and the name of the testing agency. The Contractor shall also furnish a shipping bill or memorandum of each shipment of finished pieces or members to the project site, giving the designation mark and weight of each piece, the number of pieces, the total weight, and if shipped by rail in carload lots, the car initial and number. Copies of certified shipping bills, in duplicate, shall be mailed promptly to District Engineer, U.S. Army Corps of Engineers, New Orleans, Louisiana 70160-0267.

1.4.3 Schedule of Welding Procedures

A complete schedule of welding procedures as described in paragraph 3.3.1.3 shall be submitted to the Contracting Officer and approved before fabrication commences.

1.4.4 Certificates

Certificates for material tests, examinations, and welding procedure and operator qualifications shall be submitted for approval as specified.

1.4.5 Welding Procedure Specifications (WPS)

A Welding Procedure Specification for each weld, including prequalified welds, shall be submitted to the Government Representative and approved before fabrication is commenced. The WPS shall be submitted with the shop drawings.

1.4.6 Welder, Welding Operator and Tacker Qualification Certification

Welder, welding operator and tacker qualification certification for each welder, welding operator or tack welder shall be submitted to the Government Representative and approved before fabrication is commenced.

1.4.7 Procedure Qualification Report (PQR)

Procedure Qualification Reports (PQR's), if needed, shall be submitted to the Government Representative for approval before fabrication is commenced.

1.4.8 Inspector Qualification Certification

The Certified Welding Inspectors (CWI) shall meet the requirements of AWS D1.1, Paragraph 6.1 and/or AWS D1.5, Paragraph 6.1. NDT Technicians shall meet the requirements of AWS D1.1, Paragraph 6.1 and/or AWS D1.5, Paragraph 6.1. Copies of the certifications, including the Level III NDT Technician that certified the Level I and Level II Technicians shall be included in the submittal.

1.4.9 Nondestructive Testing Procedure

A copy of the weld testing firm's nondestructive testing procedures for each procedure used for weld testing shall be submitted to the Government Representative for approval prior to commencement of fabrication.

1.5 QUALITY CONTROL

1.5.1 Tests of Materials

The Contractor shall, at his expense, perform analyses and tests to demonstrate that all materials are in conformity with the specifications. Should the Contractor desire to use stock materials not manufactured specifically for the work covered by these specifications, he shall submit evidence, satisfactory to the Contracting Officer, that such material conforms to the requirements of the specifications. Detailed tests of these materials will then not be required, if so approved by the Contracting Officer. Tests, except where modified, shall be made as indicated in the respective detailed

specifications or on the drawings and, unless otherwise authorized, in the presence of the Contracting Officer. The Contractor shall furnish specimens and samples for additional independent tests and analyses upon request by the Contracting Officer. Specimens and samples shall be properly labeled and prepared for shipment.

1.5.2 Special Test Requirements

1.5.2.1 Nondestructive Testing

When doubt exists as to the soundness of any material part such part may be subjected to any form of nondestructive testing determined by the Contracting Officer. This may include ultrasonic, magnaflux, dye penetrant, x-ray, gamma ray or any other test that will thoroughly investigate the part in question. The cost of such investigation will be borne by the Government. Any defects will be cause for rejection and rejected parts shall be replaced and retested at the Contractor's expense.

1.5.2.2 Tests of Machinery and Structural Units

Each complete machinery and structural unit, as required by other sections of these specifications, shall be erected and tested in the shop in the presence of the Contracting Officer, unless otherwise directed by the Contracting Officer. Waiving of tests, however, will not relieve the Contractor of responsibility for any fault in operation, workmanship or material that occurs before the completion of the contract or guarantee. After being installed at the site each complete machinery or structural unit shall be operated through a sufficient number of complete cycles to demonstrate to the satisfaction of the Contracting Officer that it meets the specified operational requirements in all respects. The details for tests on the various machinery and structural units shall conform to the requirements of the applicable sections of these specifications.

1.5.3 Workmanship

Workmanship shall be of the highest grade and in accordance with the best modern practices to conform with the specifications for the item of work being furnished.

1.5.4 Quality Control

The Contractor shall establish and maintain a quality control system to assure compliance with the contract requirements and shall maintain records of all quality control operations covered by these specifications.

1.5.4.1 Equipment

Type, size and suitability for construction of the prescribed work.

1.5.4.2 Fabrication

Verify shop drawings.

1.5.4.3 Welding

Verify welding is performed by certified welders and approved WPS's and welds are completed appropriately.

1.5.4.4 Tolerances

Verify dimensional tolerances are within those specified and shown on the drawings.

1.5.4.5 Records

The Contractor performing welding shall maintain records of the test results obtained in welding procedures and performance qualifications. The Contractor shall also maintain a list of defects and the method of repair.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 General

All nuts shall be equipped with washers where indicated on the drawings. Beveled washers shall be used where bearing faces have a slope of more than 1:20 with respect to a plane normal to the bolt axis.

2.1.2 Bolts, Nuts, Screws, And Washers

The finished shank of each bolt shall be long enough to provide full bearing and washers shall be used to provide full grip when the nut is tightened.

2.1.2.1 Bolts

Bolts, including anchor bolts and fitted bolts, shall conform to the applicable provisions of Federal Specifications FF-B-575, Type 4, standard thread, size as noted, and carbon steel unless indicated otherwise on the drawings or in other sections of the specifications.

2.1.2.2 Nuts

Nuts shall conform to the applicable provisions of Federal Specifications FF-N-836 Type II, Style II, standard thread, size as noted, and carbon steel unless indicated otherwise on the drawings or in other sections of the specifications.

2.1.2.3 Washers

Washers shall conform to the applicable provisions of Federal Specification FF-W-92 Type A, Grade I, Class A unless indicated otherwise on the drawings or in other sections of the specifications.

2.1.3 Structural and Miscellaneous Steel

Structural and miscellaneous steel shall conform to the requirements of ASTM A-36.

2.1.4 Horizontal Discharge Tubes

Steel for the horizontal discharge tubes and fabricated flanges shall conform to the requirements ASTM A36.

2.1.5 Suction Basin Grid Decking

Steel for the suction basin grid decking shall conform to the requirements of ASTM A-709.

2.1.6 Stainless Steel Tubing

Stainless steel tubing shall be AISI Type 316 and shall conform to ASTM A269 for stainless tubing.

2.1.7 Aluminum

All aluminum shall be 6061-T6 aluminum alloy suitable to aluminum plate and extruded shapes.

2.1.8 Bearing Pads

Bearing Pads shall be laminated conforming to the requirements of LSSRB Paragraph 1018.14.

2.1.9 Settlement Reference Bolts

Settlement reference bolts and identification tags shall be corrosion resistant steel conforming to ASTM A-276, Type 304.

2.1.10 Seal Retaining Bars

Seal retaining bars shall be fabricated from steel conforming to ASTM A-276, type 304.

2.1.11 High Strength Bolts

High strength bolts shall conform to ASTM A-325 with two (2) plain hardened washers. Beveled washers shall be used where bearing faces have a slope of more than 1:20 with respect to a plane normal to the bolt axis.

2.1.12 Horizontal Discharge Tube Bolts

Bolts for attachment of horizontal discharge tubes shall conform to the requirements of ASTM A-193, Grade B6.

2.1.13 Electrodes

All electrodes for welding carbon steel shall be AWS E70XX electrodes.

PART 3 EXECUTION

3.1 STRUCTURAL FABRICATION

Fabrication shall be in accordance with the current edition of American Institute of Steel Construction "Code of Standard Practice and Specifications, for Design, Fabrication and Erection of Structural Steel for Buildings" unless otherwise shown or as specified herein.

3.1.1 Material

Material must be straight before being laid off or worked. If straightening is necessary it shall be done by methods that will not impair the metal. Sharp kinks or bends shall be cause for rejection of the material. Material with welds will not be accepted except, where welding is definitely specified, indicated on the drawings, or otherwise approved. Bends, except for minor details, shall be made by approved dies, press brakes or bending rolls. Where heating is required precautions shall be taken to avoid overheating the metal and it shall be allowed to cool in a manner as not to destroy the original properties of the metal. Flame cutting of material other than structural steel shall be subject to approval and, where proposed, shall be indicated on shop drawings submitted to the Contracting Officer. Shearing shall be accurately done and all portions of the work shall be neatly finished. Corners shall be square and true unless otherwise shown on the drawings. Re-entrant cuts shall be filleted to a minimum radius of 3/4-inch unless otherwise approved. Finished members shall be free from twists, bends and open joints. Bolts, nuts and screws shall be tight.

3.1.2 Dimensional Tolerances for Structural Work

Dimensions shall be measured by means of an approved calibrated steel tape of approximately the same temperature as the material being measured at the time of measurement. The overall dimensions of an assembled structural unit shall be within the tolerances indicated on the drawings. Except as required to meet the requirements above, an allowable variation of 1/32-inch is permissible in the overall

length of component members with both ends milled; individual component members without milled ends shall not deviate from the dimensions shown on the drawings by more than 1/16-inch for members 30-feet or less in length and by more than 1/8-inch for members over 30-feet in length.

3.1.3 Structural Steel Fabrication

Structural steel may be cut by mechanically guided or hand guided torches provided an accurate profile with a smooth surface which is free from cracks and notches is obtained. Surfaces and edges to be welded shall be prepared in accordance with AWS D1.1, Subsection 3.2 and approved WPS for Non-Fracture Critical Member Welds or in accordance with AWS D1.5, Subsection 12.10 and approved WPS for Fracture Critical Members. Where structural steel is not to be welded, chipping or grinding will not be required except as necessary to remove slag and sharp edges of mechanically guided or hand guided cuts not exposed to view. Hand guided cuts which are to be exposed or visible shall be chipped, ground or machined to sound metal.

3.1.4 Aluminum Fabrication

Laying out and cutting of aluminum shall be in accordance with the AA Specifications for Aluminum Structures.

3.2 Reserved

3.3 WELDING

3.3.1 Structural Steel

3.3.1.1 General

Unless otherwise authorized or specified, welding of structural steel shall be by an electric arc welding process using a method which excludes the atmosphere from the molten metal. Welding, unless otherwise specified or authorized shall conform to the applicable provisions of AWS D1.1, Sections 1 thru 7, 9, 10 and 11.

3.3.1.2 Welding Equipment

All items of welding equipment shall conform to the requirements of AWS D1.1.

3.3.1.3 Welding Procedures

The Contractor shall prepare for submission to the Contracting Officer a complete schedule of welding procedures which shall consist of detailed procedure specifications for each structure to be welded and tables or diagrams showing the procedure to be used for each required joint. The schedule shall conform to the

provisions of AWS D1.1, Sections 2, 3, 4, 7 and 9 and applicable provisions of Section 10, include filler metal requirements, preheat and interpass temperature requirements and any stress relief heat treatment, and show types and locations of welds designated on the drawings and/or in the specifications to receive nondestructive examination. The procedures shall be such as to minimize residual stresses and distortion of the completed weldment. Procedures shall be qualified by tests as prescribed in AWS D1.1, Section 5 except for prequalified procedures described in AWS D1.1, Subsection 5.1. Properly documented evidence of compliance with all requirements of these specifications for previous qualification tests shall establish the joint welding procedure as prequalified. Each procedure shall be clearly identified as being either prequalified or qualified by tests. The test welding and specimen testing must be witnessed and the test report document signed by a representative of the Contracting Officer. The Contractor will be directed or authorized to make any changes in previously approved welding procedures that are deemed necessary or desirable by the Contracting Officer. Approval of any procedure, however, will not relieve the Contractor of the responsibility for producing a finished structure meeting all requirements of these specifications.

3.3.1.4 Qualification of Welders and Welding Operators

Welding operators, welders, and tack welders shall be qualified and requalified if necessary for the particular type of work to be done. Qualification shall be in accordance with AWS D1.1, Section 5 or the ASME BPVC, Section IX.

The Contractor shall certify by name to the Contracting Officer the welders and welding operators so qualified, including the date of qualification and code and procedures under which qualified. Prior qualification may be accepted if welders have performed satisfactory work under the code for which qualified within the preceding three months. The Contractor shall require the welder and welding operators to repeat the qualifying tests when, in the opinion of the Contracting Officer, his work indicates a reasonable doubt as to proficiency. In such cases, he shall be recertified, as above, if he successfully passes the retest; otherwise, he shall be disqualified until he has successfully passed a retest. All expenses in connection with qualification and requalification shall be borne by the Contractor.

3.3.1.5 Technique

3.3.1.5.1 Filler Metal

The electrode, electrode-flux combination and grade of weld metal shall conform to the appropriate AWS specification for the base metal and welding process being used. Only low hydrogen electrodes shall be used for manual shielded metal-arc welding regardless of the thickness of the steel. The AWS designation of the electrodes to be used shall be included in the schedule of welding procedures to be furnished by the Contractor. To maintain low moisture of low hydrogen electrodes, a

controlled temperature storage oven shall be used at the job site as prescribed by AWS D1.1, Subsection 4.5.

3.3.1.5.2 Preheat and Interpass Temperature

Preheating shall be performed as required by AWS D1.1, Subsection 4.2 and 4.3 or as otherwise specified except that the temperature of the base metal shall be at least 70 degrees F. The weldments to be preheated shall be slowly and uniformly heated by approved means to the prescribed temperature, held at that temperature until the welding is completed and then permitted to cool slowly in still air.

3.3.1.5.3 Stress-Relief Heat Treatment

Where stress relief heat treatment is specified or shown on the drawings, it shall be in accordance with the requirements of AWS D1.1, Subsection 4.4, unless otherwise authorized or directed by the Contracting Officer.

3.3.1.6 Workmanship

Workmanship for welding shall be in accordance with AWS D1.1, Section 3 and other applicable requirements of these specifications.

3.3.1.6.1 Preparation of Base Metal

Prior to welding, the Contractor shall inspect surfaces to be welded to assure compliance with AWS D1.1, Subsection 3.2.

3.3.1.6.2 Temporary Welds

Temporary welds required for fabrication and erection shall be made under the controlled conditions prescribed herein for permanent work. All temporary welds shall be made using low-hydrogen welding electrodes and by welders qualified for permanent work as specified elsewhere in these specifications. Preheat furnished for temporary welds shall be as required by AWS D1.1 for permanent welds except that the minimum temperature shall be 120 degrees F in any case. In making temporary welds, arcs shall not be struck in other than weld locations. Each temporary weld shall be removed after serving its purpose and ground flush with adjacent surfaces.

3.3.1.6.3 Tack Welds

Tacks welds that are to be incorporated into the permanent work shall be subject to the same quality requirements as the permanent welds. Preheating shall be performed as specified above for temporary welds. Such tack welds shall be cleaned and fused thoroughly with the permanent welds. Multiple-pass tack welds shall have cascaded ends. Defective tack welds shall be removed before permanent welding.

3.3.1.7 Inspection

Welding shall be subject to inspection by the Contracting Officer to determine conformance with the requirements of AWS D1.1, and the approved welding procedures and provisions stated elsewhere in these specifications. The Contracting Officer will require nondestructive examination of designated welds and may require supplemental examination of any joint or coupon cut from any location in any joint. The Contractor shall maintain an approved inspection system and perform required inspections in accordance with the Contract Clause entitled "CONTRACTOR INSPECTION SYSTEM".

3.3.1.7.1 Visual Examination

Prior to any welding, the Contractor shall visually inspect the preparation of material for welding to assure compliance with Section 3 of AWS D1.1. All completed welds shall be cleaned and carefully examined for insufficient throat or leg sizes, cracks, undercutting, overlap, excessive convexity or reinforcement, and other surface defects to insure compliance with the requirements of AWS D1.1, Section 3 and Section 9, Part D. Defects shall be corrected as provided in paragraph 3.3.1.7.4.

3.3.1.7.2 Supplemental Examination

The Government reserves the right to perform supplemental nondestruction examinations as deemed necessary when the soundness of any weld is in doubt and to detect cracking or similar defects that might occur during shipment or erection and before final acceptance by the Government. The cost of such inspection will be borne by the Government. The repairs and the reexamination of repairs will be performed by the Contractor at no additional cost to the Government.

3.3.1.7.3 Repairs

Defective weld metal shall be removed by air carbon-arc or oxygen gouging to sound metal. Oxygen gouging shall not be used on ASTM A 514 steel. The surfaces shall be thoroughly cleaned before welding. The resulting cavities shall be rewelded in compliance with Article 6.6 of AWS D1.1. When deemed necessary by the Contracting Officer, the Contractor shall submit a welding repair plan for approval before repairs are made. Welds that have been repaired shall be retested by the same methods used in the original inspection. All costs of repairs and testing shall be borne by the Contractor, except for repair of members cut to remove test coupons which were found to contain acceptable welds.

3.3.1.7.4 Oxygen Cutting

In all oxygen cutting, flame shall be so adjusted and manipulated as to avoid cutting beyond the prescribed lines. Cut surfaces and edges shall be left free of slag.

3.4 Reserved

3.5 BOLTED CONNECTIONS

3.5.1 Structural Steel Connections

Bolts, nuts and washers shall be of the type specified or indicated on the drawings. All nuts shall be equipped with washers except for high strength bolts. Beveled washers shall be used where bearing faces have a slope of more than 1:20 with respect to a plane normal to the bolt axis. Where the use of high strength bolts is specified or indicated on the drawings, the materials, workmanship and installation shall conform to the applicable provisions of the RCRBSJ Specification for Structural Joints Using ASTM A 325 or A 490 Bolts.

3.5.1.1 Bolt Holes

Bolt holes shall be accurately located, smooth, perpendicular to the member and cylindrical.

3.5.1.1.1 Regular Bolt Holes

Holes for regular bolts shall be drilled or subdrilled and reamed in the shop and shall not be more than 1/16- inch larger than the diameter of the bolt.

3.5.1.1.2 Fitted Bolt Holes

Holes for fitted bolts shall be match-reamed or drilled in the shop. Burrs resulting from reaming shall be removed. The threads of bolts shall be entirely outside of the holes. The body diameter of bolts shall have tolerances as recommended by ANSI B4.1 for the class of fit specified. Fitted bolts shall be fitted in reamed holes by selective assembly to provide an LN-2 fit.

3.5.1.1.3 High Strength Bolt Holes

Holes for high strength bolts shall have diameters of not more than 1/16-inch larger than the bolt diameters. If the thickness of the material is not greater than the diameter of the bolts the holes may be punched. If the thickness of the material is greater than the diameter of the bolt, the holes may be drilled full size or subpunched or subdrilled at least 1/8-inch smaller than the diameter of the bolts and then reamed to full size. Poor matching of holes will be cause for rejection. Drifting done during assembly shall not distort the metal or enlarge the holes. For slight mismatching, reaming to a larger diameter of the next standard size bolt will be allowed.

5.5.2 Aluminum Connections

Punching, drilling, ramming, and bolting of aluminum connections shall conform to the requirements of the AA Specifications for Aluminum Structures, Section 6. Aluminum bolts, nuts and washer shall be of the type specified or indicated on the drawings.

3.6 SHOP ASSEMBLY

Unless otherwise specified, each machinery and structural unit furnished shall be assembled in the shop to determine the correctness of the fabrication and matching of the component parts. The tolerances shall not exceed those shown on the drawings and each unit assembled shall be closely checked to insure that all necessary clearances have been provided and that binding does not occur in any moving part. Assembly in the shop shall be in the same position as final installation (closed position) in the field unless otherwise specified. Assembly and disassembly work shall be performed in the presence of the Government Inspector, unless waived in writing by the Contracting Officer. Errors or defects disclosed shall be immediately remedied by the Contractor without cost to the Government. Before disassembly for shipment, each piece of a machine or structure shall be match-marked to facilitate erection in the field. The location of match-marks shall be indicated by circling with a ring of white paint after the shop coat of paint has been applied, or as otherwise directed.

3.7 Reserved

3.8 MISCELLANEOUS PROVISIONS

3.8.1 Metallic Coatings

3.8.1.1 Zinc Coatings

Zinc coatings shall be applied in a manner and of a thickness and quality conforming to ASTM A 123. In all cases where zinc coatings are destroyed by cutting, welding or other causes, the affected areas shall be regalvanized by the following methods. Coatings 2 ounces or heavier shall be regalvanized with a suitable low-melting zinc base alloy similar to the recommendations of the American Hot-Dip Galvanizers Association to the thickness and quality specified for the original zinc coating. Coatings less than 2 ounces shall be regalvanized.

3.8.2 Cleaning of Corrosion-Resisting Steel

After fabrication, oil, paint and other foreign substances shall be removed from corrosion-resisting steel surfaces. Cleaning shall be done by vapor degreasing or by the use of cleaners of the alkaline, emulsion or solvent type. After the surfaces have been cleaned, they shall be given a final rinsing with clean water followed by a 24-hour period during which the surfaces are intermittently wet with clean water and then allowed to dry for the purpose of inspecting the clean surfaces. The surfaces shall be visually inspected for evidence of paint, oil, grease, welding slag, heat treatment

scale, iron rust or other forms of contamination. If evidence of foreign substance exist, the surface shall be cleaned in accordance with the applicable provisions of Section 6 of ASTM A 380. The proposed method of treatment shall be furnished for approval. After treatment the surfaces shall be visually reinspected. Brushes used to remove foreign substances shall utilize only stainless steel or nonmetallic bristles. Any contamination occurring subsequent to the initial cleaning shall be removed by one or more of the methods indicated above.

3.8.3 Protection of Finished Work

3.8.3.1 Machined Surfaces

Machined Surfaces shall be thoroughly cleaned of foreign matter. All finished surfaces shall be protected by suitable means. Unassembled pins and bolts shall be oiled and wrapped with moisture resistant paper or protected by other approved means. Finished surfaces of ferrous metals to be in bolted contact shall be washed with a rust inhibitor and coated with an approved rust resisting compound for temporary protection during fabrication, shipping and storage periods. Finished surfaces of metals which will be exposed after installation shall be painted as specified in Section 09900, "PAINTING", except that painting of corrosion resisting steel or nonferrous metals will not be permitted unless specifically authorized or specified.

3.8.3.2 Lubrication

The arrangement and details for lubrication shall be as shown on the drawings. Before erection or assembly, all bearing surfaces shall be thoroughly cleaned and lubricated with an approved lubricant. After assembly, all lubricating systems shall be filled with the lubricant specified and, additional lubricant shall be applied at regular intervals to maintain the equipment in satisfactory condition until acceptance of the work by the Contracting Officer.

3.8.3.2.1 Thread Lubrication

Threads on screw jacks and gate latches, shall be lubricated as specified above and maintained in satisfactory condition until acceptance of the work by the Government.

3.9 INSTALLATION

3.9.1 General

All parts to be installed shall be thoroughly cleaned. Packing compounds, rust, dirt, grit and other foreign matter shall be removed. Holes and grooves for lubrication shall be cleaned. Enclosed chambers or passages shall be examined to make sure that they are free from damaging materials. Where units or items are shipped as assemblies they will be inspected by a representative of the Contracting Officer prior

to installation. Disassembly, cleaning and lubrication will not be required except where there is indication that such work is necessary to place the assembly in a clean and properly lubricated condition. Pipe wrenches, cold chisels, or other tools likely to cause damage to the surfaces of rods, nuts or other parts shall not be used for assembling and tightening parts. Bolts and screws shall be tightened firmly and uniformly, but care shall be taken not to over stress the threads. When a half nut is used for the purpose of locking a full nut, the half nut shall be placed first and followed by the full nut. Threads of all bolts, except high strength bolts, nuts and screws shall be lubricated by graphite and oil before assembly. Threads of corrosion-resisting steel bolts and nuts shall be coated with an approved anti-galling compound. Driving and drifting bolts or keys will not be permitted.

3.9.2 Alignment and Setting

Each machinery or structural unit shall be accurately aligned by the use of steel shims or other approved methods so that no binding in any moving parts or distortion of any member occurs before it is fastened in place. The alignment of all parts with respect to each other shall be true within the respective tolerances required. Machines shall be set true to the elevations shown on the drawings.

3.9.3 Blocking and Wedges

All blocking and wedges used during installation for the support of parts to be grouted in foundations shall be removed before final grouting unless otherwise directed by the Contracting Officer. Blocking and wedges left in the foundations with the approval of the Contracting Officer shall be of steel or iron.

3.9.4 Foundations and Grouting

Concreting of sub-bases and frames and the final grouting under parts of machines shall be in accordance with good construction procedures.

3.9.5 Expansion Joint Covers

Expansion joint covers shall be set in formwork before pouring concrete and protected from damage and soil.

3.9.6 Pipe Sleeves

Pipe sleeves shall be set in formwork before pouring concrete. Align and space as indicated on the drawings.

3.9.7 Erection

Erection shall be in accordance with the current edition of the American Institute of Steel Construction "Code of Standard Practice and Specifications for Design,

Fabrication and Erection of Structural Steel for Buildings", except as otherwise shown or specified.

3.9.8 Tolerance

The erection of structural steel frames shall be considered plumb and aligned if the error does not exceed 1:1000.

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SECTION 09940 - PAINTING

SECTION 09940 – PAINTING

PART 1 GENERAL

1.1 SCOPE

The work covered by this section of the specifications consists of furnishing all plant, labor, equipment, appliances, and materials and performing all operations in connection with preparation of surfaces and application of paint and other specified materials. This work shall be accomplished in complete and strict accordance with the specifications and the applicable drawings and shall be subject to the terms and conditions of the contract.

1.1.1 Work Performance

Work shall be performed in accordance with the requirements of 29 CFR 1910, 29 CFR 1926, EM 385-1-1, and other references as listed herein. Matters of interpretation of the standards shall be submitted to the Contracting Officer for resolution before starting work. Where the regulations conflict, the most stringent requirements shall apply.

1.2 MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for painting as required by this Section. Payment will be included in the items for which the work is incidental thereto.

1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN COFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH) PUBLICATIONS

ACGIH-02	Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environmental and Biological Exposure Indices.
ACGIH-03	Guidelines to the Selection of Chemical Protective Clothing, Volumes I and II.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI-A13.1	(1996) Schemes for Identification of Piping Systems.
ANSI Z87.1a	(1997) Occupational and Educational Eye and Face Protection
ANSI Z358.1-81	Emergency Eyewash and Shower Equipment

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 1186	(2001) Standard Test Methods for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base
ASTM D 4417	(1993) Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction

ENGINEERING MANUAL (EM)

EM 385-1-1	(1996)U.S. Army Corps of Engineers Safety and Health Requirements Manual(3 Sep 96 Edition)

FEDERAL STANDARDS (FED-STD)

FED-STD-595	(Rev B, Notice 1) Colors Used in Government Procurement
FED-STD-313	Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH Pub No. 98-119	(1998; 4th Ed., 2nd Supplement) NIOSH Manual of Analytical Methods
NIOSH Pub No. 87-108	Respirator Decision Logic

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SP 5 (2000) White Metal Blast Cleaning

AMERICAN WATER WORKS ASSOCIATION - AWWA

AWWA C205-00 Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 in. and larger – shop applied

LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

LSSRB Louisiana Standard Specification for Roads and Bridges, 2000 Edition

1.4 SUBMITTALS

Government approval is required for all submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330, "SUBMITTAL PROCEDURES":

1.4.1 Statements

1.4.1.1 Qualifications and Experience; GA

The Contractor shall provide certification pursuant to paragraph 1.5 for all job sites. Submittal of the qualifications and experience of any additional qualified and competent persons the CIH, IH, CSP employs to provide on-site safety and health will also be provided. Acceptance of this submission must be obtained prior to the submission of other required safety and health submittal items.

1.4.1.2 Accident Prevention Plan; GA

The Contractor shall submit an Accident Prevention Plan in accordance with the requirements of Section 01 of EM 385-1-1. The plan shall be prepared for all sites and shall include, but is not limited to, each of the topic areas listed in Appendix A therein and the requirements of paragraph 1.7; each topic shall be developed in a concise manner to include management and operational aspects.

1.4.1.3 Confined Space Procedures; GA

The Contractor shall submit detailed written standard operating procedures for confined spaces for all job sites in accordance with 29 CFR 1910.146 and EM 385-1-1 and as further described in this paragraph.

1.4.1.3.1 Certificates of Calibration

The Contractor shall supply certificates of calibration for all testing and monitoring equipment. The certificates of calibration shall include: type of equipment, model number, date of calibration, firm conducting calibration, and signature of individual certifying calibration.

1.4.1.3.2 Methods of Inspection

The procedures shall include methods of inspection of personal protective equipment prior to use.

1.4.1.3.3 Work Practices

The procedures shall include work practices and other engineering controls designed to reduce airborne hazardous chemical exposures to a minimum.

1.4.1.3.4 Specification of the Design

The procedures shall include specification of the design and installation of ventilation systems which shall provide adequate oxygen content and provide for the dilution of paint solvent vapor, lead, and other toxic particulates within the confined space. In addition, the contractor shall include plans to evaluate the adequacy of air flow patterns.

1.4.1.4 Respiratory Protection Program; GA

The Contractor shall submit a comprehensive written respiratory protection program for all job sites in accordance with 29 CFR 1910.134, 29 CFR 1926.62, and Section 05.E of EM 385-1-1.

1.4.1.5 Airborne Sampling Plan; GA

The contractor shall submit an Airborne Sampling Plan for all job sites detailing the NIOSH Pub No. 98-119, Factory Mutual, or Underwriters Laboratories approved equipment, equipment calibration procedures, sampling methods, sampling to be performed, and analytical procedures to be used based on the type of work to be performed and anticipated toxic contaminants to be generated. The contractor shall include the name of the accredited laboratory, listed by the American Industrial Hygiene Association (AIHA), to be used to conduct the analysis of any collected air samples. In addition, the contractor shall provide the Contracting Officer with a copy of the test results from the laboratory within 5 working days of the sampling date and shall provide results from direct-reading instrumentation on the same day the samples are collected.

1.4.1.6 Ventilation Assessment; GA

The contractor shall submit a plan to provide ventilation assessment for all job sites as required by paragraph 1.7.4.1.

1.4.1.7 Medical Surveillance Plan; GA

The Contractor shall submit a plan to provide medical surveillance to the workforce for all job sites as required in paragraph 1.8 and provide a statement from the examining physician indicating the name of each employee evaluated and any limitations which will preclude the employee from performing the work required. The statement shall include the date of the medical evaluation, the physician's name, signature, and telephone number. Medical records shall be maintained as required by 29 CFR 1910.20.

1.4.1.8 Waste Classification, Handling, and Disposal Plan; GA

The Contractor is responsible for assuring the proper disposal of all hazardous and nonhazardous waste generated during the project. Therefore, the contractor shall develop a Waste Classification, Handling, and Disposal Plan for all job sites in accordance with the requirements of 40 CFR 261 and 40 CFR 262 and paragraph 1.10.1.

1.4.2 Samples

1.4.2.1 Paints and Thinners; GA

A 1-quart sample of each batch of Federal and Military Specifications paints and thinners to be used when the required amount of a material of a particular type or color is more than 50 gallons shall be labeled and submitted. Lead based paints are unacceptable. When the required quantity of any type is 50 gallons or less, the Contractor shall supply either of the following:

(1) A certified test report showing the results of required tests made on the material and a statement that it meets all of the specification requirements.

(2) A certified test report showing the results of required tests made on a previous batch of paint produced by the same firm using the same ingredients and formulation except for minor differences necessitated by a color change and a statement that the previous batch met all of the specification requirements.

He shall also apply a report of tests on the proposed batch showing the following properties applicable to the material specifications: color, gloss, drying time, opacity, viscosity, weight per gallon, and fineness of grind.

1.4.2.1.1 Proprietary paints

When the required quantity of a particular type or color of a paint is 10 gallons or less, a proprietary, name-brand, shelf item paint of the same type and with similar properties to the material specified may be proposed without sampling. Proprietary paints are any which do not follow the complete specification requirements of Federal, Military, and The Society For Protective Coatings specifications. To receive consideration, a statement from the supplier that the paint is appropriate as to type, color, and gloss and is a premium grade of paint shall be furnished.

1.4.2.2 Thinners; GA

Samples shall be submitted of the thinners which are those solvents used to reduce the viscosity of the paint.

1.4.3 Records

1.4.3.1 Inspections and Operations; GA

The Contractor shall document and submit records of inspections and operations performed in accordance with paragraph 3.6. Submittals shall be made on a daily basis.

1.4.3.3 Airborne Sampling Report

The Contractor shall submit reports of airborne sampling tests as required by paragraph 1.7.5.1.

1.5 QUALIFICATIONS

Qualifications and experience shall comply with the following.

1.5.1 Certified Professional

The Contractor shall provide a person who is qualified and competent as defined in Section 01 of EM 385-1-1, to develop the required safety and health submittal, and to be responsible for on-site safety and health during the contract period. The person shall be a Certified Industrial Hygienist (CIH), an Industrial Hygienist (IH), or a Certified Safety Professional (CSP) with a minimum of 3 years of demonstrated experience in similar related work. The Contractor shall certify that the Certified Industrial Hygienist (CIH) holds current and valid certification from the American Board of Industrial Hygiene (ABIH), that the IH is considered board eligible by written confirmation from the ABIH, or that the CSP holds current and valid certification from the American Board of Certified Safety Professionals. The CIH, IH, or CSP may

utilize other qualified and competent persons, as defined in EM 385-1-1, to conduct on-site safety and health activities as long as these persons have a minimum of 3 years of demonstrated experience in similar related work and are under the direct supervision of the CIH, IH, or CSP.

1.5.2 Certified Laboratory

The Contractor shall provide documentation which includes the name, address, and telephone number of the laboratories to be providing services.

1.6 SAMPLING AND TESTING

The Contractor shall allow at least 30 days for sampling and testing. Sampling may be at the jobsite or source of supply. The Contractor shall notify the Contracting Officer when the paint and thinner are available for sampling. Sampling of each batch shall be witnessed by the Contracting Officer unless otherwise specified or directed. A 1-quart sample of paint and thinner shall be submitted for each batch proposed for use. The sample shall be labeled to indicate formula or specification number and nomenclature, batch number, batch quantity, color, date made, and applicable project contract number. Testing will be performed by the Government. Costs for retesting rejected material will be deducted from payments to the Contractor at the rate of $300.00 dollars for each sample retested.

1.7 SAFETY AND HEALTH PROVISIONS

Paragraph 1.7 supplements the requirements of EM 385-1-1, paragraph (1). In any conflict between Section 01 of EM 385-1-1 and this paragraph, the provisions herein shall govern.

1.7.1 Abrasive Blasting

The Contractor shall comply with the requirements in Section 06.H of EM 385-1-1.

1.7.1.1 Hoses And Nozzles

In addition to the requirements in Section 20 of EM 385-1-1, hoses and hose connections of a type to prevent shock from static electricity shall be used. Hose lengths shall be joined together by approved couplings of a material and type designed to prevent erosion and weakening of the couplings. The couplings and nozzle attachments shall fit on the outside of the hose and shall be designed to prevent accidental disengagement.

1.7.1.2 Workers Other Than Blasters

Workers other than blasting operators working in close proximity to abrasive blasting operations shall be protected by utilizing MSHA/NIOSH-approved half-face or full-face air purifying respirators equipped with high-efficiency particulate air (HEPA) filters, eye protection meeting or exceeding ANSI Z87.1 and hearing protectors (ear plugs and/or ear muffs) providing at least 20 dBA reduction in noise level, or as needed to provide adequate protection.

1.7.2 Cleaning with Compressed Air

Cleaning with compressed air shall be in accordance with Section 20.B.5 of EM 385-1-1 and personnel shall be protected as specified in 29 CFR 1910.134.

1.7.3 Cleaning with Solvents

1.7.3.1 Ventilation

Ventilation shall be provided where required by 29 CFR 1910.146 or where the concentration of solvent vapors exceeds 10 percent of the Lower Explosive Limit (LEL). Ventilation shall be in accordance with 29 CFR 1910.94, paragraph (c)(5).

1.7.3.2 Personal Protective Equipment

Personal protective equipment shall be provided where required by 29 CFR 1910.146 and in accordance with 29 CFR 1910, Subpart I.

1.7.4 Paint Application

1.7.4.1 Ventilation

When using solvent-based paint in confined spaces, ventilation shall be provided to exchange air in the space at a minimum rate of 5,000 cubic feet per minute per spray gun in operation. It may be necessary to install both a mechanical supply and exhaust ventilation system to effect adequate air changes within the confined space. All air-moving devices shall be located and affixed to an opening of the confined space in a manner that assures that the airflow is not restricted or short circuited and is supplied in the proper direction. Means of egress shall not be blocked. Ventilation shall be continued after completion of painting and through the drying phase of the operation. If the ventilation system fails or the concentration of volatiles exceeds 10 percent of the LEL (except in the zone immediately adjacent to the spray nozzle), painting shall be stopped and spaces evacuated until such time that adequate ventilation is provided. An audible alarm that signals system failure shall be an integral part of the ventilation system. The effectiveness of the ventilation shall be checked by using ventilation smoke tubes and making frequent oxygen and combustible gas readings during painting operations. Exhaust ducts shall discharge clear of the working areas and away from possible sources of ignition.

1.7.4.2 Explosion Proof Equipment

Electrical wiring, lights, and other equipment located in the paint spraying area shall be of the explosion proof type designed for operation in Class I, Division 1, Group D, hazardous locations as required by the NFPA 70. Electrical wiring, motors, and other equipment, outside of but within 20 feet of any spraying area, shall not spark and shall conform to the provisions for Class I, Division 2, Group D, hazardous locations. Electric motors used to drive exhaust fans shall not be placed inside spraying areas or ducts. Fan blades and portable air ducts shall be constructed of nonferrous materials. Motors and associated control equipment shall be properly maintained and grounded. The metallic parts of air-moving devices, spray guns, connecting tubing, and duct work shall be electrically bonded and the bonded assembly shall be grounded.

1.7.4.3 Further Precautions

a. Workers shall wear nonsparking safety shoes.

b. Solvent drums taken into the spraying area shall be placed on nonferrous surfaces and shall be grounded. Metallic bonding shall be maintained between containers and drums when materials are being transferred.

c. Insulation on all power and lighting cables shall be inspected to ensure that the insulation is in excellent working condition and is free of all cracks and worn spots. Cables shall be further inspected to ensure that no connections are within 50 feet of the operation, that lines are not overloaded, and that they are suspended with sufficient slack to prevent undue stress or chafing.

1.7.4.4 Ignition Sources

Ignition sources, such as lighted cigarettes, cigars, pipes, matches, or cigarette lighters shall be prohibited in area of solvent cleaning, paint storage, paint mixing, or paint application.

1.7.5 Health Protection

1.7.5.1 Air Sampling

The Contractor shall perform air sampling and testing as needed to assure that workers are not exposed to contaminants above the permissible exposure limit. In addition, the Contractor shall provide the Contracting Officer with a copy of the test results from the laboratory within five working days of the sampling date and shall provide results from direct-reading instrumentation on the same day the samples are collected.

1.7.5.2 Respirators

During all spray painting operations, spray painters shall use approved SCBA or SAR (air line) respirators, unless valid air sampling has demonstrated contaminant levels to be consistently within concentrations that are compatible with air-purifying respirator Assigned Protection Factor (APF). Persons with facial hair that interferes with the sealing surface of the facepiece to faceseal or interferes with respirator valve function shall not be allowed to perform work requiring respiratory protection. Air-purifying chemical cartridge/canister half- or full-facepiece respirators that have a particulate prefilter and are suitable for the specific type(s) of gas/vapor and particulate contaminant(s) may be used for nonconfined space painting, mixing, and cleaning (using solvents). These respirators may be used provided the measured or anticipated concentration of the contaminant(s) in the breathing zone of the exposed worker does not exceed the APF for the respirator and the gas/vapor has good warning properties or the respirator assembly is equipped with a NIOSH-approved end of service life indicator for the gas(es)/vapor anticipated or encountered. Where paint contains toxic elements such as lead, cadmium, chromium, or other toxic particulates that may become airborne during painting in nonconfined spaces, air-purifying half-and full-facepiece respirators or powered air-purifying respirators equipped with appropriate gas vapor cartridges, in combination with a high-efficiency filter, or an appropriate canister incorporating a high-efficiency filter, shall be used.

1.7.5.3 Protective Clothing and Equipment

All workers shall wear safety shoes or boots, appropriate gloves to protect against the chemical to be encountered, and breathable, protective, full-body covering during spray-painting applications. Where necessary for emergencies, protective equipment such as life lines, body harnesses, or other means of personnel removal shall be used during confined-space work.

1.8 MEDICAL STATUS

Prior to the start of work and annually thereafter, all Contractor employees working with or around paint systems, thinners, blast media, those required to wear respiratory protective equipment, and those who will be exposed to high noise levels shall be medically evaluated for the particular type of exposure they may encounter. The evaluation shall include:

a. Audiometric testing and evaluation of employees who will work in the noise environments.

b. Vision screening (employees who use full-facepiece respirators shall not wear contact lenses).

c. Medical evaluation shall include, but shall not be limited to, the following:

(1) Medical history including, but not limited to, alcohol use, with emphasis on liver, kidney, and pulmonary systems, and sensitivity to chemicals to be used on the job.

(2) General physical examination with emphasis on liver, kidney, and pulmonary system.

(3) Determination of the employee's physical and psychological ability to wear respiratory protective equipment and to perform job-related tasks.

(4) Determination of baseline values of biological indices for later comparison to changes associated with exposure to paint systems and thinners or blast media, which include: liver function tests to include SGOT, SGPT, GGPT, alkaline phosphates, bilirubin, complete urinalysis, EKG (employees over age 40), blood urea nitrogen (bun), serum creatinine, pulmonary function test, FVC, and FEV, chest x-ray (if medically indicated), blood lead (for individuals where it is known there will be an exposure to materials containing lead), other criteria that may be deemed necessary by the Contractor's physician, and Physician's statements for individual employees that medical status would permit specific task performance.

1.9 CHANGE IN MEDICAL STATUS

Any employee whose medical status has changed negatively due to work related chemical and/or physical agent exposure while working with or around paint systems and thinners, blast media, or other chemicals shall be evaluated by a physician, and the Contractor shall obtain a physicians statement as described in paragraph 1.8 prior to allowing the employee to return to those work tasks. The Contractor shall notify the Contracting Officer in writing of any negative changes in employee medical status and the results of the physicians reevaluation statement.

1. 10 ENVIRONMENTAL PROTECTION

In addition to the requirements of section 01352 the Contractor shall comply with the following environmental protection criteria.

1.10.1 Waste Classification, Handling, and Disposal

The Contractor shall be responsible for assuring the proper disposal of all hazardous and nonhazardous waste generated during the project. Waste generated from abrasive blasting lead-containing paints with recyclable steel or iron abrasives shall be disposed of as a hazardous waste or shall be stabilized with proprietary pre-blast additives regardless of the results of 40 CFR 261, App II, Mtd 1311. Where

stabilization is preferred, the contractor shall employ a proprietary blast additive, that has been blended with the blast media prior to use. Hazardous waste shall be placed in properly labeled closed containers and shall be shielded adequately to prevent dispersion of the waste by wind or water. Any evidence of improper storage shall be cause for immediate shutdown of the project until corrective action is taken. Nonhazardous waste shall be stored in closed containers separate from hazardous waste storage areas. All hazardous waste shall be transported by a licensed transporter in accordance with 40 CFR 263 and 49 CFR 171, Subchapter C. All nonhazardous waste shall be transported in accordance with local regulations regarding waste transportation. In addition to the number of manifest copies required by 40 CFR 262.22, one copy of each manifest will be supplied to the Contracting Officer prior to transportation.

1.11 QUALITY CONTROL

1.11.1 General

The Contractor shall establish and maintain quality control for painting operations to assure compliance with contract specifications and maintain records of his quality control for all construction operations including but not limited to the following:

(1) Cleaning and preparation of surfaces.

(2) Paint and formulations.

(3) Number of coats and rates of applications.

(4) Protection of painted surfaces.

(5) Safety and Industrial Hygiene monitoring.

1.11.2 Reporting

The original and two copies of these records and tests, as well as the records of corrective action taken, shall be furnished to the Government daily. Format of this report shall be as prescribed in Section 01451, "Contractor Quality Control".

1.12 PAINT PACKAGING, DELIVERY, AND STORAGE

Paints shall be processed and packaged to ensure that within a period of one year from date of manufacture, they will not gel, liver, or thicken deleteriously, or form gas in the closed container. Paints, unless otherwise specified or permitted, shall be packaged in standard containers not larger than 5 gallons, with removable friction or lug-type covers. Containers for vinyl-type paints shall be lined with a coating resistant to solvents in the formulations and capable of effectively isolating the paint

from contact with the metal container. Each container of paint or separately packaged component thereof shall be labeled to indicate the purchaser's order number, date of manufacture, manufacturer's batch number, quantity, color, component identification and designated name, and formula or specification number of the paint together with special labeling instructions, when specified. Paint shall be delivered to the job in unbroken containers. Paints that can be harmed by exposure to cold weather shall be stored in ventilated, heated shelters. All paints shall be stored under cover from the elements and in locations free from sparks and flames.

PART 2 PRODUCTS

2.1 THREE (3) COAT PRIMER AND TOPCOAT SYSTEM

The steel grid reinforced concrete deck support beams shall receive a three (3) coat zinc primer and topcoat system according to the provision of Section 1008 "PAINTS", paragraph 1008.02, as found in the Louisiana Standard Specifications for Roads and Bridges, 2000 Edition. For surface cleaning requirements see paragraph 3.1 below.

2.2 TWO (2) COAT ZINC RICH URETHANE PRIMER AND COAL TAR EPOXY SYSTEM.

The forty-eight (48") inch, forty-two (42") inch fifty-four (54") inch diameter sewer force main, the forty-eight (48") diameter dry weather flow bypass pipe and the twenty-four (24") diameter fresh water intake pipe shall receive 2.5 to 3.5 mil dry film thickness of urethane prime coat and a 14.0 to 20.0 mil dry film thickness of coal tar epoxy on the interior and exterior surfaces over the entire length of newly installed pipe. For surface cleaning requirements see Paragraph 3.1 below.

2.2.1 Prime Coat

Prime coat shall be two (2) part measured and stored in maximum 5 gallon cans. Upon mixing the Contractor shall use the mixed A and B components within 24 hours of mixing. Primer shall be TNEMEC 90-97 TNEMEC-ZINC COAT or approved equal.

2.2.2 Finish Coat

Finish coat shall be hi-build coal tar epoxy 14.0 to 20.0 mil dry film thickness. Coal tar epoxy shall have a minimum of 80% of solids by volume. Epoxy shall be two (2) component parts A and B packaged and stored in five (5) gallon and one (1) gallon containers respectively. Application over zinc rich primer shall be according to the manufacturer's recommendations.

2.2.3 Exterior Pipe Surfaces

Cement mortar coating shall be applied to the exposed portions of the forty-eight (48") inch and forty-two (42") inch sewer diameter force main and the twenty-four (24") inch diameter dry weather flow bypass pipe according to AWWA C-205. The metal reinforcement for the cement mortar coating shall not come in contact with the coal tar epoxy coating. The reinforcement shall be 2" x 2" x 12 gauge galvanized wire fabric if the coating is applied by the gunite method. If the coating is applied by brush-coat or spinning the mortar on, the reinforcement shall be according to the requirements of AWWA C-205.

2.3 SINGLE (1) COAT COAL TAR EPOXY

All exterior steel pipe pile surfaces shall receive one (1) coat of coal tar epoxy 14.0 to 20.0 mil dry film thickness. Coating shall extend from the top of pile to the discharge canal bottom. For surface cleaning requirements see Paragraph 3.1 below. The coating shall extend for the top twenty-seven (27') feet.

2.4 TWO (2) COAT EPOXY

All non-machined ferrous surfaces of the channels, catwalks, lintels base plates, structural steel stairs and their supports, other supports, the horizontal pump discharge pipes and fabricated flanges, the discharge piping and manufactured flanges for the 800 GPM pumps, vacuum lines, and waterlines shall receive two (2) coats of epoxy conforming to the following:

(1) One (1) prime coat of Tnemec Hi-Build Epoxoline Primer-Red Series 66-1211, 3.0 to 5.0 MDFT or approved equal.

(2) One (1) finish coat of Tnemec Hi-Build Epoxoline Series 66, 4.0 to 6.0 MDFT color cinder gray or approved equal. Color to be approved by the Contracting Officer.

For surface cleaning requirements see Paragraph 3.1 below.

2.5 SINGLE (1) COAT ZINC CHROMATE PRIMER

Aluminum surfaces to be placed in contact with steel shall be given one (1) coat of zinc chromate primer in accordance with United States Military Specification MIL-P-735. The steel surface placed in contact with aluminum shall also be given one (1) coat of zinc chromate primer in accordance with United States Military Specifications MIL-P-735.

2.6 HORIZONTAL PUMP DISCHARGE PIPE FLANGES

All machined ferrous surfaces of the discharge pipes shall be sealed using Permatex or an approved equal. Cleaning shall be according to the requirements of Paragraph 3.1 below.

2.7 COATINGS

All coatings shall be applied within the continental United States.

2.8 PIPE MARKERS

All exposed pipes installed by the Contractor shall have pipe labels at a maximum interval of twenty (20') feet, and in addition at each branch takeoff point where pipe leaves or enters a wall, or takes a major change in direction. The labels shall be acrylic plastic conforming to ANSI A13.1-1981. Labels shall also meet the following requirements:

2.8.1 Flow Arrows

Direction of flow arrows shall be included on the markers.

2.8.2 Marker Style

Provide set mark pipe markers, marker style no. B7 as manufactured by Seton identification Products or an approved equal.

2.8.3 Labels

Labels shall read as follows:

Legend	Color of Field	Color of Letters for Legend
Non-Potable Waterline	Green	White
Vacuum Breaker Lines	Yellow	Black

2.8.4 Letter and Label Size

Letters and labels shall be sized in accordance with the following:

O.D. of Pipe (Inches)	Length of Color Fields	Letter Height
3/4 to 1-1/4	8"	1/2"

1-1/2 to 2	8"	3/4"
2-1/2 to 6	12"	1-1/4"
8 to 10	24"	2-1/2"
Over 10	32"	3-1/2"

PART 3 EXECUTION

3.1 CLEANING AND PREPARATION OF SURFACES TO BE PAINTED

3.1.1 General Requirements

Surfaces to be painted shall be cleaned before applying paint or surface treatments. Deposits of grease or oil shall be removed in accordance with SSPC SP 1, prior to mechanical cleaning. Solvent cleaning shall be accomplished with mineral spirits or other low toxicity solvents having a flashpoint above 100 degrees F. Clean cloths and clean fluids shall be used to avoid leaving a thin film of greasy residue on the surfaces being cleaned. Items not to be prepared or coated shall be protected from damage by the surface preparation methods. Machinery shall be protected against entry of blast abrasive and dust into working parts. Cleaning and painting shall be so programmed that dust or other contaminants from the cleaning process do not fall on wet, newly painted surfaces, and surfaces not intended to be painted shall be suitably protected from the effects of cleaning and painting operations. Welding of, or in the vicinity of, previously painted surfaces shall be conducted in a manner to prevent weld spatter from striking the paint and to otherwise reduce coating damage to a minimum; paint damaged by welding operations shall be restored to original condition. Surfaces to be painted that will be inaccessible after construction, erection, or installation operations are completed shall be painted before they become inaccessible.

3.1.2 Ferrous Surfaces Subject to Severe Exposure

Ferrous surfaces subject to extended periods of immersion or as otherwise required shall be dry blast-cleaned to SSPC SP 5. The blast profile, unless otherwise specified, shall be 1.5 to 2.5 mils as measured by ASTM D 4417, Method C. Appropriate abrasive blast media shall be used to produce the desired surface profile and to give an angular anchor tooth pattern. If recycled blast media is used, an appropriate particle size distribution shall be maintained so that the specified profile is consistently obtained. Steel shot or other abrasives that do not produce an angular profile shall not be used. Weld spatter not dislodged by blasting shall be removed with impact or grinding tools and the areas reblasted prior to painting. Surfaces shall be dry at the time of blasting. Blast cleaning to SSPC SP 5 shall be done in the field

and, unless otherwise specifically authorized, after final erection. Within 8 hours after cleaning, prior to the deposition of any detectable moisture, contaminants, or corrosion, all ferrous surfaces blast cleaned to SSPC SP 5 shall be cleaned of dust and abrasive particles by brush, vacuum cleaner, and/or blown down with clean, dry, compressed air, and given the first coat of paint. All abrasives used in sandblasting operations shall contain less than 1% silica, unless approved in writing by the Contracting Officer. Upon written request by the Contractor, the Contracting Officer may authorize mill or shop cleaning of assembled or partially assembled components specified to receive one of the vinyl-type paint systems. The surfaces, if shop blasted, shall be shop coated with the first and second coats of the specified paint system. The shop coating shall be maintained in good condition by cleaning and touching up of areas damaged during the construction period. If pinpoint or general rusting appears, surfaces shall be reblasted and repainted at no added cost to the Government. Prior to the field application of subsequent coats, soiled areas of the shop coating shall be thoroughly cleaned and all welds or other unpainted or damaged areas shall be cleaned and coated in a manner to make them equivalent to adjacent, undamaged paint surfaces.

3.2 PAINT APPLICATION

3.2.1 General

The finished coating shall be free from holidays, pinholes, bubbles, runs, drops, ridges, waves, laps, excessive or unsightly brush marks, and variations in color, texture, and gloss. Application of initial or subsequent coatings shall not commence until the Contracting Officer has verified that atmospheric conditions and the surfaces to be coated are satisfactory. Each paint coat shall be applied in a manner that will produce an even, continuous film of uniform thickness. Edges, corners, crevices, seams, joints, welds, rivets, corrosion pits, and other surface irregularities shall receive special attention to ensure that they receive an adequate thickness of paint. Spray equipment shall be equipped with traps and separators and where appropriate, mechanical agitators, pressure gauges, pressure regulators, and screens or filters. Air caps, nozzles, and needles shall be as recommended by the spray equipment manufacturer for the material being applied. Airless-type spray equipment may be used only on broad, flat, or otherwise simply configured surfaces, except that it may be employed for general painting if the spray gun is equipped with dual or adjustable tips of proper types and orifice sizes. Airless-type equipment shall not be used for the application of vinyl paints.

3.2.2 Mixing and Thinning

Paints shall be thoroughly mixed, strained where necessary, and kept at a uniform composition and consistency during application. Paste or dry-powder pigments specified to be added at the time of use shall, with the aid of powered stirrers, be incorporated into the vehicle or base paint in a manner that will produce a smooth,

homogeneous mixture free of lumps and dry particles. Where necessary to suit conditions of the surface temperature, weather, and method of application, the paint may be thinned immediately prior to use. Thinning shall generally be limited to the addition of not more than 1 pint per gallon of the proper thinner; this general limitation shall not apply when more specific thinning instructions are provided. Paint that has been stored at low temperature, shall be brought up to at least 70 degrees F before being mixed and thinned, and its temperature in the spray tank or other working container shall not fall below 60 degrees F during the application. Paint that has deteriorated in any manner to a degree that it cannot be restored to essentially its original condition by customary field-mixing methods shall not be used and shall be removed from the project site. Paint and thinner that is more than 1 year old shall be resampled and resubmitted for testing to determine its suitability for application.

3.2.3 Atmospheric and Surface Conditions

Paint shall be applied only to surfaces that are above the dew point temperature and that are completely free of moisture as determined by sight and touch. Paint shall not be applied to surfaces upon which there is detectable frost or ice. Except as otherwise specified, the temperature of the surfaces to be painted and of air in contact therewith shall be not less than 45 degrees F during paint application nor shall paint be applied if the surfaces can be expected to drop to 32 degrees F or lower before the film has dried to a reasonably firm condition. During periods of inclement weather, painting may be continued by enclosing the surfaces and applying artificial heat, provided the minimum temperatures and surface dryness requirements prescribed previously are maintained. Paint shall not be applied to surfaces heated by direct sunlight or other sources to temperatures that will cause detrimental blistering, pinholing, or porosity of the film.

3.2.4 Time Between Surface Preparation and Painting

Surfaces that have been cleaned and/or otherwise prepared for painting shall be primed as soon as practicable after such preparation has been completed but, in any event, prior to any deterioration of the prepared surface.

3.2.5 Method of Paint Application

Unless otherwise specified, paint shall be applied by brush or spray to ferrous and nonferrous metal surfaces. Special attention shall be directed toward ensuring adequate coverage of edges, corners, crevices, pits, rivets, bolts, welds, and similar surface irregularities. Other methods of application to metal surfaces shall be subject to the specific approval of the Contracting Officer.

3.2.6 Measurement on Ferrous Metal

Film thickness or spreading rates shall be as specified hereinafter. Where no spreading rate is specified, the paint shall be applied at a rate normal for the type of material being used. In any event, the combined coats of a specified paint system shall completely hide base surface and the finish coats shall completely hide undercoats of dissimilar color. Where dry film thickness requirements are specified for coatings on ferrous surfaces, measurements shall be made with one of the thickness gages listed below. They shall be calibrated and used in accordance with ASTM D 1186. They shall be calibrated using plastic shims with metal practically identical in composition and surface preparation to that being coated, and of substantially the same thickness (except that for measurements on metal thicker than 1/4 inch, the instrument may be calibrated on metal with a minimum thickness of 1/4 inch). Frequency of measurements shall be as recommended for field measurements by ASTM D 1186 and reported as the mean for each spot determination. The instruments shall be calibrated or calibration verified prior to, during, and after each use. Authorized thickness gages:

a. Mikrotest, Elektro-Physik, Inc.

b. Inspector Gage, Elcometer Instruments, Ltd.

c. Positest, Defelsko Corporation

d. Minitector, Elcometer Instruments, Ltd.

e. Positector 2000, Defelsko Corporation

3.2.7 Progress of Painting Work

Where field painting on any type of surface has commenced, the complete painting operation, including priming and finishing coats, on that portion of the work shall be completed as soon as practicable, without prolonged delays. Sufficient time shall elapse between successive coats to permit them to dry properly for recoating, and this period shall be modified as necessary to suit adverse weather conditions. Paint shall be considered dry for recoating when it feels firm, does not deform or feel sticky under moderate pressure of the finger, and the application of another coat of paint does not cause film irregularities such as lifting or loss of adhesion of the undercoat. All coats of all painted surfaces shall be unscarred and completely integral at the time of application of succeeding coats. At the time of application of each successive coat, undercoats shall be cleaned of dust, grease, overspray, or foreign matter by means of airblast, solvent cleaning, or other suitable means. Cement and mortar deposits on painted steel surfaces, not satisfactorily removed by ordinary cleaning methods, shall be brushoff blast cleaned and completely repainted as required. Undercoats of high gloss shall, if necessary for establishment of good adhesion, be scuff sanded, solvent wiped, or otherwise treated prior to application of a succeeding coat. Field coats on metal shall be applied after erection except as otherwise

specified and except for surfaces to be painted that will become inaccessible after erection.

3.2.8 Contacting Surfaces

When riveted or ordinary bolted contact is to exist between surfaces of ferrous or other metal parts of substantially similar chemical composition, such surfaces will not be required to be painted, but any resulting crevices shall subsequently be filled or sealed with paint. Contacting metal surfaces formed by high-strength bolts in friction-type connections shall not be painted. Where a nonmetal surface is to be in riveted or bolted contact with a metal surface, the contacting surfaces of the metal shall be cleaned and given three coats of the specified primer. Unless otherwise specified, corrosion-resisting metal surfaces, including cladding therewith, shall not be painted.

3.2.9 Drying Time Prior to Immersion

Painted surfaces shall be permitted a final drying time as long as necessary.

3.2.10 Protection of Painted Surfaces

Where shelter and/or heat are provided for painted surfaces during inclement weather, such protective measures shall be maintained until the paint film has dried and discontinuance of the measures is authorized. Items that have been painted shall not be handled, worked on, or otherwise disturbed until the paint coat is fully dry and hard. All metalwork coated in the shop or field prior to final erection shall be stored out of contact with the ground in a manner and location that will minimize the formation of water-holding pockets; soiling, contamination, and deterioration of the paint film, and damaged areas of paint on such metalwork shall be cleaned and touched up without delay. The first field coat of paint shall be applied within a reasonable period of time after the shop coat and in any event before weathering of the shop coat becomes extensive.

3.2.11 Reserved

3.2.12 Coal Tar-Epoxy Paint

3.2.12.1 Mixing

Component B shall be added to previously stirred Component A and thoroughly mixed together with a heavy-duty mechanical stirrer just prior to use. The use of not more than 1 pint of xylene thinner per gallon of paint will be permitted to improve application properties and extend pot life. The pot life of the mixed paint, extended by permissible thinning, may vary from 2 hours in very warm weather to 5 or more hours in cool weather. Pot life in warm weather may be extended by precooling the

components prior to mixing; cooling the mixed material; and/or by slow, continuous stirring during the application period. The mixed material shall be applied before unreasonable increases in viscosity take place.

3.2.12.2 Application

Spray guns shall be of the conventional type equipped with a fluid tip of approximately 0.09 inch in diameter and external atomization, seven-hole air cap. Material shall be supplied to the spray gun from a bottom withdrawal pot or by means of a fluid pump; hose shall be 1/2 inch in diameter. Atomization air pressure shall not be less than 80 psi. High-pressure airless spray equipment may be used only on broad, simply configured surfaces. Brush application shall be with a stiff-bristled tool heavily laden with material and wielded in a manner to spread the coating smoothly and quickly without excessive brushing. The coverage rate of the material is approximately 110 square feet per gallon per coat to obtain 20 mils (dry thickness) in a two-coat system. The paint shall flow together and provide a coherent, pinhole-free film. The direction of the spray passes (or finish strokes if brushed) of the second coat shall be at right angles to those of the first where practicable.

3.2.12.3 Subsequent Coats

Except at the high temperatures discussed later in this paragraph, the drying time between coal tar-epoxy coats shall not be more than 72 hours, and application of a subsequent coat as soon as the undercoat is reasonably firm is strongly encouraged. Where the temperature for substrate or coating surfaces during application or curing exceeds or can be expected to exceed 125 degrees F as the result of direct exposure to sunlight, the surfaces shall be shaded by overhead cover or the interval between coats shall be reduced as may be found necessary to avoid poor intercoat adhesion. Here, poor intercoat adhesion is defined as the inability of two or more dried coats of coal tar-epoxy paint to resist delamination when tested aggressively with a sharp knife. Under the most extreme conditions involving high ambient temperatures and sun-exposed surfaces, the drying time between coats shall not exceed 10 hours, and the reduction of this interval to a few hours or less is strongly encouraged. Where the curing time of a coal tar-epoxy undercoat exceeds 72 hours of curing at normal temperatures, 10 hours at extreme conditions, or where the undercoat develops a heavy blush, it shall be given one of the following treatments before the subsequent coat is applied:

a. Etch the coating surface lightly by brushoff blasting, using fine sand, low air pressure, and a nozzle-to-surface distance of approximately 3 feet.

b. Remove the blush and/or soften the surface of the coating by wiping it with cloths dampened with 1-methyl-2-pyrrolidone solvent or with Bitumastic 2CB solvent marketed by the Kopcoat, Inc or approved equal. The solvents may be applied to the surface by fog spraying followed by wiping, but any puddles of

solvent must be mopped up immediately after they form. The subsequent coat shall be applied in not less than 15 minutes or more than 3 hours after the solvent treatment.

3.2.12.4 Ambient Temperature

Coal tar-epoxy paint shall not be applied when the receiving surface or the ambient air is below 50 degrees F nor unless it can be reasonably anticipated that the average ambient temperature will be 50 degrees F or higher for the 5-day period subsequent to the application of any coat.

3.2.12.5 Safety

In addition to the safety provisions in paragraph 1.7, other workmen as well as painters shall avoid inhaling atomized particles of coal tar-epoxy paint and contact of the paint with the skin.

3.3 PAINT SYSTEMS APPLICATION

The required paint systems and the surfaces to which they shall be applied are shown in this paragraph, Part 2 of these specifications, and/or in the drawings. Supplementary information follows.

3.3.1 Fabricated and Assembled Items

Items that have been fabricated and/or assembled into essentially their final form and that are customarily cleaned and painted in accordance with the manufacturer's standard practice will be exempted from equivalent surface preparation and painting requirements described herein, provided that:

a. Surfaces primed (only) in accordance with such standard practices should be compatible with specified field-applied finish coats.

b. Surfaces that have been primed and finish painted in accordance with the manufacturer's standard practice are of acceptable color and are capable of being satisfactorily touched up in the field.

c. Items expressly designated herein to be cleaned and painted in a specified manner are not coated in accordance with the manufacturer's standard practice if different from that specified herein.

3.3.2 Surface Preparation

Cleaning and pretreatment of surfaces prior to painting shall be accomplished in accordance with detailed requirements previously described.

3.4 PROTECTION OF NON-PAINTED ITEMS AND CLEANUP

Walls, equipment, fixtures and all other items in the vicinity of the surfaces being painted shall be maintained free of damage by paint or painting activities. Prompt cleanup of any paint spillage and prompt repair of any painting activity damage shall be required.

3.5 INSPECTION

The Contractor shall inspect, document, and report all work phases and operations on a daily basis. As a minimum the daily report shall contain the following:

a. Inspections performed, including the area of the structure involved and the results of the inspection.

b. Surface preparation operations performed, including the area of the structure involved, the mode of preparation, the kinds of solvent, abrasive, or power tools employed, and whether contract requirements were met.

c. Thinning operations performed, including thinners used, batch numbers, and thinner/paint volume ratios.

d. Application operations performed, including the area of the structure involved, mode of application employed, ambient temperature, substrate temperature, dew point, relative humidity, type of paint with batch numbers, elapsed time between surface preparation and application, elapsed time for recoat, condition of underlying coat, number of coats applied, and if specified, measured dry film thickness or spreading rate of each new coating.

Section Table Of Contents

SECTION 11285 - SLUICE GATES, BUTTERFLY GATES, OPERATORS AND FLOOR STANDS

SECTION 11285 - SLUICE GATES, BUTTERFLY GATES, OPERATORS AND FLOOR STANDS

PART 1 GENERAL

1.1 SCOPE

The work provided for herein consists of furnishing all plant, labor, equipment, and materials required to manufacture, test, deliver, store and install eleven (11) sluice gates, and four (4) temporary butterfly gates, with floor stands and electric operators, complete with all necessary accessories and appurtenances, all as shown on the contract drawings and according to these specifications.

1.2 MEASUREMENT AND PAYMENT

1.2.1 Sluice Gates

No measurement will be made for sluice gates and associated floor stands and operators. Payment will be made at the contract lump sum price for "SLUICE GATES, OPERATORS AND FLOOR STANDS". Price and payment shall constitute full compensation for furnishing all plant, labor, material and equipment, installation, field test, and all appurtenant work required to complete the work.

1.2.2 Butterfly Gates

No separate measurement or payment will be made for butterfly gates and associated floor stands and operators. Payment will be included in the contract lump sum price for "INSTALL TEMPORARY SHEET PILE DAM" and/or "REMOVE TEMPORARY SHEET PILE DAM".

1.3 REFERENCES

The following publications of the issues listed below, but referred to hereafter by basic designation only, form a part of this specification to the extent indicated by references thereto.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A 36	(2001) Standard Specification for Carbon Structural Steel
A 48	(2000) Standard Specification for Gray Iron Castings
A 123	(2001A)Standard Specification for Zinc (Hot Dip Galvanized) Coatings on iron and steel products

A 153	(2001a) Standard Specification for Zinc Coatings (Hot Dip) on Iron and Steel Hardware
A 193	(2001b) Standard Specification for Alloy Steel and Stainless Steel Bolting Materials for High-Temperature Service
A 194	(2001a) Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service, or both
A 276	(2002)Standard Specification for Stainless Bars and Shapes
A 320	(2002) Standard Specification for Alloy/ Steel Bolting Materials for Low-Temperature Service
A 582	(1995b) Standard Specification for Free-Machining Stainless and Heat-Resisting Steel Bars
B 21	(2001) Standard Specification for Naval Brass Rod, Bar, and Shapes
B 584	(2000) Standard Specification for Copper Alloy Sand Castings for General Applications
D 2000	(2001) Standard Classification system for Rubber Products in Automotive Applications

AMERICAN GEAR MANUFACTURE'S ASSOCIATION (AGMA)

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440/6034

1.4 SUBMITTALS

Prior to installation of all gate assemblies, frames, floor stands, actuators, motors, wiring and other miscellaneous items required by this section, the Contractor shall submit shop drawings to the CO for approval. Shop drawings shall be submitted in accordance with the requirements of Section 01300 "SUBMITTAL PROCEDURES". Shop drawings shall show size, location, materials, coating, connections, etc., that are required to install the

assemblies required by this section. For those items which are standard manufactured items or for which sufficient descriptive data and/or other information is contained in catalog cuts may be submitted to substantiate the acceptability of the items proposed, and their compliance with the plans and specifications. All embedded items, structural openings, clearances and other appurtances require for installation shall also be included.

1.5 QUALITY CONTROL

1.5.1 General

The Contractor shall establish and maintain quality control for sluice gates operations to assure compliance with contract requirements and maintain records of his quality control for all construction operations, including but not limited to the following:

(1) Machine work.

(2) Shop painting.

(3) Galvanizing.

(4) Use of specified materials and equipment.

(5) Shop assembly and tests.

(6) Preparation for shipment and storage.

(7) Inspection at the worksite for damage to and defects in all material and equipment.

(8) Storage.

(9) Field painting.

(10) Installation and tests.

(11) Operation and maintenance after installation.

1.5.2 Reporting

The original and four copies of these records of inspection and tests, as well as the corrective action taken, shall be furnished to the Government daily. Format of the report shall be as specified in Section 01451, "CONTRACTOR QUALITY CONTROL".

1.6 EQUIPMENT TO BE INSTALLED AND/OR FURNISHED

The following equipment, together with all necessary accessories and appurtenances,

shall be installed or furnished for a complete operational system with all other items required for a complete in place operational system.

1.6.1 Gate Assemblies

Eleven (11) sluice gate assemblies including rubber seal, bronze seal bars, wedges, filler blocks and shims, and gate structure.

1.6.2 Gate Frames

Eleven (11) sluice gate frames, including steel angles, bars and plates, bronze seal bars and bearing bars.

1.6.3 Sill Beams

Eleven (11) sluice gate sill beams, including support angles and adjustable tees.

1.6.4 Shafts and Couplings

Eleven (11) interconnected shafts and flexible couplings.

1.6.5 Lift Nuts

Eleven (11) lift nuts.

1.6.6 Gate Stems

Eleven (11) gate stems.

1.6.7 Stem Guides

Eleven (11) stem guides.

1.6.8 Thrust Nuts

Eleven (11) thrust nuts.

1.6.9 Floor Stand Pedestals

Eleven (11) floor stand pedestals.

1.6.10 Operating System

Actuators, motors, gears, control panels, wiring and all appurtenant items required for complete operating in place system.

1.6.11 Temporary Butterfly Gates

Four (4) government furnished temporary butterfly gates and assemblies (frames, shaft, seal, actuator, motor only) See paragraph 01100-11 for more information.

1.6.12 Additional Items

All control panels, wiring, switches and all other appurtenant items required to remotely control permanent and temporary gates at the locations shown.

The following paragraphs may at times describe or refer to only one item, assembly or arrangement, but these requirements shall apply to all such items, assemblies or arrangements furnished under these specifications.

1.7 DESIGN

The interconnected electrically operated sluice gate floor stands with motors shall be products of a manufacturer who has been regularly engaged during the past five years in the production of similar-sized gate equipment and hoists for the design heads specified herein. Working stresses shall not exceed the lower value of either one-third of the yield strength or one-fifth of the ultimate strength of the material. The floor stand accessories and appurtenances shall be designed for installation as shown on the contract drawings. The pedestal and operators shall be manufactured by the same manufacturer.

1.8 WORKMANSHIP

All workmanship, whether in the factory or the field, shall be performed in a skillful and workmanlike manner by qualified mechanics under competent supervision and direction and in accordance with the best modern practice for the various trades involved and for the manufacture of high-grade machinery.

All parts shall have accurately machined mounting and bearing surfaces so that they can be assembled without fitting, chipping or remachining. All parts shall conform to the design dimensions and shall be free of all defects in either workmanship or material that will impair their service. All attaching bolt holes shall be accurately drilled to the layout indicated on the shop drawings.

PART 2 PRODUCTS

2.1 MATERIALS

All materials shall be free from defects and imperfections, of recent manufacture and unused, and of the classifications and grades specified herein unless otherwise

approved by the Contracting Officer. Material not specifically described shall, as far as practical, conform to the latest specifications of the American Society for Testing and Materials. All materials, supplies and articles not manufactured by the Contractor shall be the products of recognized reputable manufacturers. Equipment, materials and articles installed, furnished, or used without such approval shall be at the risk of subsequent rejection.

2.1.1 Iron Castings

Material for iron castings shall meet the applicable requirements of either ASTM A 48 for "Class Nos. 30A, 30B or 30C" for the sluice gates.

2.1.2 Bronze

Bronze castings for such items as wedges, thrust nuts, lift nuts, and couplings shall meet the applicable requirements of ASTM B 584 "Copper Alloy No. 865". Bronze extrusions for seat facings in the frame and slide shall meet the applicable requirements of ASTM B 21 for "Copper Alloy No. 482".

2.1.3 Corrosion-resistant Steel

Corrosion-resisting steel rods for stems shall meet the applicable requirements of either ASTM A 276 for "Type 302 or 304" or ASTM A 582 for "Type 303". Corrosion-resisting steel for fasteners shall meet either the above-mentioned specification or ASTM A 320 for "Grades B8, B8F or B8M" or ASTM A 193 for "Identification Symbols B8, B8A, B8M" and ASTM A 194 for "Grades 8, 8F or 8M".

2.1.4 Structural Steel

Structural steel for the gate, frames, and sill beams shall meet the applicable requirements of ASTM A 36.

2.1.5 Rubber

Rubber for seals shall meet the applicable requirements of ASTM D 2000 for "Grade R 625".

2.2 FLOOR STANDS, ACCESSORIES AND APPURTENANCES

2.2.1 Sluice Gates

2.2.1.1 Description

Floor stands, associated lifting machinery and accessories shall be designed for gates with the opening as shown and maximum heads of 19.37 feet seating and 11.79 feet

unseating when measured from the horizontal centerline of the gate. The maximum design conditions shall be established within these heads.

2.2.1.2 Stem, Couplings and Stem Guides

The stem shall be made of corrosion-resisting steel. Stem threads shall be either machine-cut or rolled and of the ACME type. The stem and nut threads shall have sufficient contact area so that the contact pressure will not exceed 5,000 psi when the maximum stem thrust is exerted. The stem thread surfaces in contact with the lift nut shall have not rougher than a 63 micro-inch finish if machine cut or not rougher than a 32 micro-inch finish if roll-formed. The exterior corners of the threads, either during or after machining, shall be given a slight radius of approximately 0.015-inch in order to prevent them from acting as cutting edges as the stem passes through the lift nut. The stem shall be fitted with a tapped hole in the top end for handling. The tapped hole shall be of sufficient diameter and depth for the insertion of an eyebolt of sufficient strength to pick up the entire stem from a horizontal position. The stem shall be provided at its lower end with a threaded 6-inch cube bronze thrust nut which will fit into the pocket provided therefore on the gate. The thrust nut and stem shall be drilled through and one side of the thrust nut threaded so as to be jointed by a corrosion-resistant steel bolt. Stem guides shall be of cast-iron, bronze bushed and mounted on cast-iron brackets. They shall be drilled and slotted so as to be adjustable in two directions and shall be spaced as shown on the drawings. The bronze bushing shall be machine-bored 1/16-inch to 1/8-inch larger than the stem diameter. The stem guide, including the bronze bushing, shall be the two-piece collar type which can be installed and removed with the stem in place. Stem guides shall be attached with C.R.S. anchor bolts. Upper and lower stop nuts shall be installed on the threaded portion of the stem. They shall be placed such that the gate has full range of opening and closing with protection against damage to the stem and operator.

2.2.1.3 Fasteners

All fasteners used for fastening the floor stands and the stem guides shall be of either silicon bronze or corrosion-resisting steel. The quantity and size of fasteners shall be as recommended by the floor stand manufacturer.

2.2.1.4 Stem Cover

A stem cover of schedule 20 steel pipe shall be provided. The cover shall be hot-dip galvanized and be provided with a threaded cap. Galvanized fasteners shall be provided to attach the cover to the top of the floor stand. The cover shall be provided with an opening through which the stem may be inspected and lubricated, and a gasketed cover with wing nuts shall be furnished to seal this opening. It shall also be provided with clearly legible and permanent markings to show the slide position.

2.2.1.5 Lube Reservoir

A manual lube reservoir shall be installed on each floor stand to feed oil to the lift nut

during operation.

2.2.2 Temporary Butterfly Gates

The temporary butterfly gate shall be furnished by the government according to Section 01100 paragraph 11.

2.3 GATE OPERATORS

2.3.1 Sluice Gates

2.3.1.1 Basic Actuator

The electric valve actuator shall include the motor, actuator unit gearing, limit switch gearing, position limit switches, torque switches, stem nut, declutch lever, and handwheel as a self-contained unit.

The valve actuator motor and all electrical enclosures shall be NEMA 4 (watertight).

External gearing (side mounting) such as bevel or spur gearing between the gate stem and the electric actuator is not acceptable. The actuator shall be direct mounted to the gate stem.

The units shall be of a standard current model with a basic design that has been in active production for at least the past five (5) years by a manufacturer regularly engaged in the production of this type of device. The manufacturer shall provide a statement that the units have been designed based on methods and practices of the American Gear Manufacturers Association-AGMA218/2001 for Helical and Spur Gears and AGMA 440/6034 for worm gearing. The units shall be delivered completely wired, assembled and ready for installation. The units shall be limitorque or an approved equal.

Each unit shall have a dial type indicator housed in a water tight enclosure in the operator to show gate position during both manual and motor operation. The indicator shall be graduated in percentages from full open to full closed. The gate travel speed shall be 12 inches per minute in both directions without exceeding the full load ampere reading.

2.3.1.2 Motor

The motor shall be specifically designed for valve actuator service and shall be of high starting torque, totally enclosed, non-ventilated construction. Motor insulation shall be a minimum NEMA Class F, with a minimum continuous temperature rating of 155 degrees C (rise plus ambient) for the duty cycle specified. Optional insulation classes shall be purchased where service conditions warrant.

The motor shall be designed for use on a 240V, 3 phase 25 hz system.

The motor shall be supplied with a NEMA rated FVR starter sized based on the horsepower of the motor. A operator push button station (open/stop/close) with red (open) and green (close) indicating lights shall be supplied. Also supply a control power transformer and all control wiring. The control power transformer shall be sized to supply 120V power to the motor heaters and 120V control power.

The motor shall be of sufficient size to open or close the gate at the maximum stated torque. The motor shall be capable of operating at plus or minus 10% of specified voltage. The motor duty rating shall be sufficient for one complete cycle (open-close-open, or reverse) without exceeding its temperature rating. Motor bearings shall be of the anti-friction type, and permanently lubricated.

The motor shall be an independent sub-assembly such that the power gearing shall not be an integral part of the motor assembly, to allow for motor or gear changes dictated by system operation requirements.

The motor shall be equipped with internal contacts, to protect against motor overload, and 120 volt heaters.

The Contractor will be allowed to purchase a 60 Hz motor and have it rewound for 25 Hz as long as all other requirements of the plans and specifications are met.

2.3.1.3 Power Gearing

The actuator shall be a multiple reduction unit with power gearing consisting of spur, helical, or bevel gearing and worm shall be of hardened alloy steel, and the worm gear shall be alloy bronze. All gearing shall be accurately cut. Non-metallic, aluminum or cast gearing shall not be allowed. Anti-friction bearings shall be used throughout.

2.3.1.4 Lubrication

All rotating power train components shall be immersed in grease with provisions for inspection and re-lubrication without disassembly. Lubricants shall be suitable for ambient conditions of minus 20 degrees F to 150 degrees F. Adequate seals shall be provided on all shafting.

2.3.1.5 Self-Locking Feature

Actuator gearing and/or stem threading shall be self-locking when required by the application.

2.3.1.6 Lost Motion Device

The actuator shall have a built in device, incorporated in the power train and located between the worm gear and actuator drive sleeve, to permit load impact under dynamic

efficiency conditions, with a hammer blow effect, to allow the motor to reach full speed before engaging the gate load.

2.3.1.7 Manual Operation

A metallic handwheel shall be provided for manual operation with an arrow to indicate "open" rotation. The handwheel shall not rotate during motor operation. A fused motor shall not prevent manual operation. When in the manual operating mode, the actuator will remain in this mode until the motor is energized, at which time the actuator will automatically return to electric operation. Movement from motor operation to handwheel operation shall be accomplished by a positive padlockable declutch lever which mechanically disengages the motor and related gearing. It shall be impossible for simultaneous manual and motor operation to occur. Friction type declutch mechanism is not acceptable.

The maximum effort required at the hand wheel rim to open and close the gate in the manual mode shall be 25 pounds. The actuator shall have a two (2") inch square not welded to the operators central axis suitable for operation with an air wrench.

2.3.1.8 Stem Nut

The valve actuator shall have a removable stem nut (or drive bushing) of high tensile bronze or other material compatible with the valve stem material.

2.3.1.9 Position Limit Switches

Position limit switches and the associated gearing shall be an integral part of the valve actuator. Limit switch gearing shall be of the intermittent type, made of bronze or stainless steel, grease lubricated, and totally enclosed to prevent dirt and foreign matter from entering the gear train. Switches shall be adjustable, allowing for trip points from fully open to fully closed positions of valve travel. They shall not be subject to breakage or slippage due to over-travel. Limit switch contacts shall be heavy duty, silver plated with wiping action. The actuators shall have 16 contacts, 4 contacts/4 rotor type, all of the same basic design. Contacts shall be convertible from N/O to N/C or reverse.

Switch design shall permit visual verification of switch position without disassembly.

2.3.1.10 Torque Switch

Each actuator shall be equipped with a switch, that will interrupt the control circuit in both the opening and closing directions when torque overload occurs or when gates require torque seating in the closed or open position. Contacts shall be silver plated. The torque switch shall have graduated dials for both open and close directions of travel and each shall be independently adjustable, with a positive means to limit the adjustability so as not to exceed the actuator output torque capability.

Switch design shall permit visible verification or switch position without disassembly.

2.3.1.11 Switch Contact Ratings

The position limit switch and torque switch shall be rated 600 volts per NEMA standard ICS 2-125, heavy duty.

2.3.1.12 Control Compartment Heater

The control compartment shall be provided with a 120 volt space heater.

2.3.2 Temporary Butterfly Gates

The government will furnish four (4) 60" X 72" butterfly gates for use on this project. Also furnished are the actuators, motors, operating shaft, bonnet (operating shaft cover), and handwheel.

The contractor will be required to rework each operating shaft in order to shorten each to conform to the length requirements of this project.

The operating shaft shall be shortened and the actuator end re-machined and keyed to confrom to the actuator receiver.

All work necessary to load, haul, unload, rework the shaft, install and finally remove the butterfly gates shall be included in the lump sum price for "INSTALL TEMPORARY SHEET PILE DAM" or "REMOVE TEMPORARY SHEET PILE DAM".

See paragraph 01100-11 for more information.

PART 3 EXECUTION

3.1 PAINTING

The floor stand shall be painted with a complete coating system in accordance with the manufacturer's standard practice provided the coating system is approved by the Contracting Officer, is of acceptable color and is touched up as necessary prior to shipment. A complete description of the manufacturer's standard coating system, including the surface preparation, type of primer and finish coat or coats, dry film thickness and whether baked-on or air-dried shall be submitted for approval.

3.2 GALVANIZING

The gate frame and sill beam shall be cleaned and hot-dip galvanized in accordance with the applicable requirements of either ASTM A 123 or ASTM A 153. All items shall be galvanized before attachment of seals and bronze accessories. The average minimum weight of the coating shall be 2 ounces per square foot.

3.3 LUBRICATION AND LUBRICANTS

The floor stand shall be lubricated prior to any use or operation, either in the shop or in the field. Each bearing shall be lubricated through its associated lubrication fitting, and the gears shall be packed with lubricant at assembly. After shop testing, and prior to shipment, the bearings shall be relubricated. Prior to testing in the shop, and to initial operation in the field, the gate seat facings and wedging devices shall be cleaned of all foreign material and lubricated thoroughly with a light grease. Just prior to field assembly, the lift nut and stem threads shall be lubricated. All lubricants shall be as recommended by the floor stand manufacturer and shall be submitted by manufacturer's name and number as part of the shop drawings. At no additional expense to the Government, the Contractor shall furnish an additional 20 pounds of each different floor stand lubricant.

3.4 SHOP ASSEMBLY AND TESTS

After completion of initial machining, the gate shall be completely assembled, in the vertical position, and the wedging devices adjusted to exclude a 0.004-inch thickness gage between the frame and slide seating surfaces. Any additional machining needed to achieve this condition shall be performed, any discrepancies or deficiencies discovered as a result of this procedure shall be corrected, and a retest conducted. The slide shall be completely opened and closed in the guides several times to ensure that it operates freely. The gate shall then be disassembled to the extent necessary for shipment. The Contractor shall notify the Contracting Officer sufficiently in advance so that a representative of the Contracting Officer may witness the assembly, testing and disassembly work, unless this requirement is waived in writing by the Contracting Officer. The portable operator floor stand assembly shall be given the standard shop test. The floor stand shall be operated a sufficient length of time to ensure proper assembly and operation. Any malfunctions or discrepancies disclosed as a result of these tests shall be promptly remedied by the Contractor at no additional expense to the Government, and retests conducted.

3.5 PREPARATION FOR SHIPMENT AND STORAGE

3.5.1 Preparation for Shipment

Prior to shipment from the manufacturer's plant, the Contractor shall prepare the gate and floor stand for shipment as described herein. All large, bulky and/or heavy elements shall be mounted on skids or pallets of ample size and strength to facilitate loading and unloading. All small parts shall be boxed in sturdy wood or heavy corrugated paperboard boxes. A packing list, indicating the contents of each such box and enclosed in a moisture-proof envelope, shall be securely fastened to the outside of the box. The skid and/or pallet mounting and the boxing shall be done in a manner which will prevent damage to the gate and floor stand during loading, shipment, unloading, storage and any associated and/or subsequent handling. Weatherproof covers shall be provided during shipment to protect all items. All attachments or other devices used in loading the equipment at the manufacturers' and/or fabricators' plants shall be furnished for unloading and handling at the destination and shall become the property of the Government.

3.5.2 Preparation for Storage

At the conclusion of all shop tests, the gate and floor stand shall be protectively processed for not less than 24-month storage either outdoors or indoors as the case may be, at the destination. Bulky Parts of the gate not particularly susceptible to damage from exposure, such as the frame, slide, etc., may be stored outdoors. Other parts, such as fasteners, stem, and the complete floor stand, shall be stored indoors. The Contractor shall furnish for approval, a complete description of the processing method or methods he intends to use, including complete instructions for maintaining the protection during the storage period. Surfaces of items or of portions of items which are to be embedded in or rest on concrete, shall be cleaned of all dirt, rust, and other foreign coatings, not including closely-adhering mill scale, and then coated with a rust preventative meeting the applicable requirements of Mil. Spec. MIL-C-16173 for "Grade 2". This coating shall be removed before the item is installed on or embedded in concrete.

3.6 STORAGE

Upon delivery at the worksite, bulky parts of the gates, such as the frames, slides and wall thimbles, which have been coated with a complete paint system in the manufacturer's plant, may be stored outdoors provided these parts are stored on wood blocking not less than 8 inches above a base of washed gravel or crushed stone not less than 2 inches thick. The alinement of the wood blocks must be checked at least weekly by the Contractor to correct any settlement that would effect the part's ability to function. All other elements of the gates, and the floor stands, shall be stored in a weathertight building. A framework covered with a plastic film, or any other such expedient or makeshift arrangement, will not be acceptable. The Contractor shall inspect the storage site at least once per day. The Contractor shall submit a detailed description of the proposed storage facilities, and a plan for storage, maintenance and inspection, before any storage actually begins.

3.7 ERECTING ENGINEER

The Contractor shall furnish the services of a competent erecting engineer to supervise and direct the installation and testing of the gates and floor stands furnished under this section. The erecting engineer shall be a full-time employee of, and designated as such by, the gate and floor stand manufacturer, shall have had at least five years of experience installing and designing the type of gate and floor stand furnished under these specifications and shall be subject to the approval of the Contracting Officer. The services of the engineer shall be furnished at no extra cost to the Government. The installation and testing of the thrust nut and the stem into the gate, and the testing of the gate travel and floor stands under the direction and supervision of the erecting engineer shall in no way relieve the Contractor of sole responsibility for the gates and floor stands meeting all requirements of the specifications and fulfilling all the Contractor's guarantees.

3.8 FIELD INSTALLATION AND TESTS

3.8.1 Installation

All installation of the gates, floor stand and appurtenances shall be in accordance with the manufacturer's installation instructions and under the supervision and direction of the erecting engineer specified in paragraph 3.7 above. The floor stands and all elements of the gates shall be cleaned of all protective coating used thereon during shipment and storage, and all rust, dirt, grit and other foreign matter shall be removed. The gates shall then be "touched up" painted with the standard paint provided by the gate manufacturer. The floor stands and each element of the gates shall be carefully and accurately aligned so that after it is fastened in place there will be no binding or excessive pressure or wear in any moving part and no distortion of any member. The wall thimble shall be internally braced during concrete placement. Fasteners shall be tightened uniformly and firmly, but care shall be taken not to overstress either the fastener or the member with which it is associated. Where specified torque values or ranges are cited in the installation instructions, an accurately calibrated torque wrench, having the proper capacity range, shall be used. Stilson wrenches, cold chisels or other tools, likely to cause injury to the surface of any part, shall not be used in the work of assembly or tightening. All fasteners shall be installed with an anaerobic locking compound similar or equal to that of the LOCTITE Corporation. Cleaning prior to application of the locking compound and adjustment of the torque valves shall follow the manufacturer's recommendations. All shims shall be of either bronze or corrosion resistant steel. Where grouting is required, either an epoxy grout or a ready-to-use, non-shrinking grouting material, requiring only mixing with water at the worksite, shall be used, and use of any grouting material shall be as recommended by the manufacturer. All blocking and wedges used for support during initial grouting shall be removed prior to final grouting.

3.8.2 Tests

Each gate and floor stand shall be operated and tested by and at the expense of the Contractor and under the supervision and direction of the erecting engineer specified in paragraph 3.4 to determine if they have been properly manufactured, assembled and installed and if they meet the requirements of the specifications. The Contractor shall notify the Contracting Officer at least 5 days prior to commencing the testing. Check the motor rotation to ensure that the slide moves in the "OPEN" position on control mechanism and correct if necessary. The slide shall be raised manually about three inches prior to initial hydraulic operator operation. The "OPEN" control mechanism switch shall be adjusted so the opening cycle does not permit the end of the stem thread to enter the lift nut. In addition, the slide shall be blocked in both directions and the relief value settings checked. After all adjustments have been properly made, the slide shall be raised and lowered with the use of the hydraulic operator not less than three times. Any malfunctions or discrepancies disclosed as a result of these tests shall be promptly remedied by the Contractor at no additional expense to the Government, and retests conducted.

3.9 NAME PLATES

Each gate floor stand shall be identified by means of a name plate permanently affixed in a conspicuous location. The plate shall bear the manufacturer's name, model designation,

serial number, if applicable, and any other pertinent information such as speed, capacity, type, etc.. Plates shall be made of corrosion-resisting metal with raised or depressed lettering and contrasting background.

3.10 INSTRUCTION PLATES

As necessary, each floor stand shall be equipped with suitably located instruction plates, including any warnings and cautions describing any special and important procedures to be followed in starting, operating and servicing the equipment. Plates shall be made of corrosion-resisting metal with raised or depressed lettering and contrasting background.

3.11 OPERATION AND MAINTENANCE MANUAL AND PARTS LISTS

3.11.1 Manual

The Contractor shall furnish 5 copies of manual containing complete detailed information in connection with the operation, lubrication (includes specific name of lubricant) adjustment, routine and/or special maintenance, disassembly, repair and reassembly of all mechanical, and control components of the gate floor stands furnished under this section.

3.11.2 Parts Lists

The Contractor shall furnish 5 copies of the manufacturer's spare parts lists and/or bulletins for each item of mechanical equipment furnished under this section. These lists and/or bulletins shall clearly show all details and parts, and all parts shall be adequately described and/or have proper identification marks.

3.11.3 General

The operation manual, the maintenance manual, and the parts lists shall be bound separately, shall be approximately 8-1/2 inches by 11 inches, printed on good quality paper and bound between flexible, durable covers. Drawings incorporated in the manual and/or parts lists may be reduced to page size provided they are clear and easily legible, or may be folded into the manual to page size. Photographs and/or catalog cuts of components may be included for identification.

3.12 MAINTENANCE

After completion of the installation, the Contractor shall continue to maintain and protect the gates and floor stands and shall keep them ready for operation at any time until final acceptance.

3.13 WARRANTY

The Contractor warrants that the gates, floor stands and operators will be free from defects

in design, materials and workmanship for a period of one year from the date of acceptance thereof, either for beneficial use or final acceptance, whichever is later. Upon receipt of notice from the Government of failure of any part of the gates, floor stands or hydraulic operator during the warranty period, due to the above-stated caused, new replacement parts shall be furnished and installed promptly by the Contractor at no additional cost to the Government.

Section Table Of Contents

SECTION 15002 - INSTALLATION OF WELDED STEEL PIPE

SECTION 15002 - INSTALLATION OF WELDED STEEL PIPE

PART 1 GENERAL

1.1 SCOPE

The work required by this section shall consist of furnishing all materials, labor, tools, equipment and incidentals required to install the following:

(1) A forty-eight (48") inch diameter dry weather flow pipe including fabricated fitting, elbows and specials, resting on cast-in-place pile supported concrete caps according to the plans and these specifications.

(2) A twenty-four (24") inch diameter fresh water intake pipe including fabricated fitting, elbows and specials, valves and other incidentals installed in compacted fill according to the plans and these specifications. The valve required shall be according to the Sewerage and Water Board's standard drawing 5730-B-6.

(3) A forty-eight (48") inch, a forty-two (42") inch and a fifty-four (54") inch diameter sewer force main including fabricated and manufactured fittings, fabricated elbows, specials and all incidentals required to install the sewer force main according to the plans and these specifications.

1.2 MEASUREMENT

There will be no measurement for installation of the twenty-four (24") inch diameter fresh water intake pipe, the forty-eight (48") inch diameter dry weather flow pipe or the forty-eight (48") inch, forty-two (42") inch, and the fifty-four (54") inch diameter sewer force main.

1.3 PAYMENT

Payment for the respective item of work will be made at the applicable contract lump sum price for "42" DIAMETER SEWER FORCE MAIN", "48" DIAMETER SEWER FORCE MAIN", "54" DIAMETER SEWER FORCE MAIN, "48" DIAMETER DRY WEATHER FLOW PIPE, AND THE "24" DIAMETER FRESH WATER INTAKE PIPE". Price and payment shall constitute full compensation for furnishing all plant, labor, materials and equipment to coat and install these steel pipes as specified herein. Payment for incidental items necessary to complete this work such as installation of steel manholes, concrete caps, support piles, backfill, and reinforcement should be included in the applicable bid item for the respective work.

1.4 REFERENCES

The publications listed below form a part of this specification to the extent specified herein. The publications are referred to in the text by the basic designation only.

AMERICAN WATERWORKS ASSOCIATION (AWWA)

B-30	(2000) Standard Specifications for Copper Alloys in Ingot Form
C-200	(1997) Standard Specifications for Steel Water Pipe 6 Inches and Larger
C-203	(1997) Coal Tar Protective Coatings and Lining for Steel Water Pipelines - Enamel and Tape - Hot Applied
C-205	(2000) Cement Mortar Protective Lining and Coating for Steel Water Pipe - 4 Inches and Larger - Shop Applied
C-206	(1997) Field Welding of Steel Water Pipe
C-207	(2001) Steel Pipe Flanges for Waterworks Service -- Sizes 4" through 144"
C-208	(2001) Dimensions for Steel Water Fittings.
C-504	(2000) Rubber-Seated Butterfly Valves

AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)

A-126	(2001) Standard Specifications for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
A-240	(2002) Standard Specifications for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
A-283	(2000) Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
A-536	(1999) Standard Specifications for Ductile Iron Castings

1.5 SUBMITTALS

The Contractor shall submit the following for approval by the Contracting Officer. Submittals shall be according to Section 01330 "SUBMITTAL PROCEDURES":

(1) Mill Certificates.

1.5 QUALITY CONTROL

1.5.1 General

The Contractor shall establish and maintain quality control for work under this section in order to assure compliance with contract requirements and maintain records of his quality control for materials and equipment supplied.

1.5.2 Reporting

The original and two copies of these records, as well as the records of corrective action taken, shall be furnished the Government daily. Format of this report shall be as prescribed in Section 01451, "CONTRACTOR QUALITY CONTROL".

1.6 RELATED WORK SPECIFIED ELSEWHERE

Additional work required to complete this section may be found in the following:

(a)	Section 03301	CAST-IN-PLACE STRUCTURAL CONCRETE
(b)	Section 02315	STEEL "H" PILING
(c)	Section 02451	STEEL PIPE PILES
(d)	Section 03210	REINFORCING STEEL AND ACCESSORIES

PART 2 PRODUCTS

2.1 MATERIALS

All welded steel pipe, fittings and specials furnished under this item shall be lined and coated as specified.

The steel pipe to be furnished under this contract shall be as follows:

SIZE	INSIDE DIAMETER	WALL THICKNESS	STAND. PIPE LENGTH MIN.	STAND. PIPE LENGTH MAX.
24"	24"	0.375"	40	50
42"*	42"	0.500"	40	50
48"	48"	0.375"	40	50

48"*	48"	0.500"	40	50
54"*	54"	0.500"	40	50

*For Sewer Force Main.

2.1.1 Steel Pipe

All steel pipe shall be fabricated in accordance with AWWA C200.

2.1.2 Supplementary Details

The following is the supplementary details required under A.W.W.A. C200, Section IIID:

(1) Standard Used: AWWA C200

(2) See the drawings for the total length of each pipe

(3) Internal Design Pressure: All sizes, 100 PSI

(4) Design stress as a percentage of minimum yield strength.

24" I.D. x 0.375" W.T.: 15%

42" I.D. x 0.500" W.T.: 22% (Sewer Force Main)

48" I.D. x 0.375" W.T.: 22%

48" I.D. x 0.500" W.T.: 22% (Sewer Force Main)

54" I.D. x 0.500" W.T.: 22% (Sewer Force Main)

(5) Minimum wall thickness given in (4) above

(6) No butt straps required

(7) No calculations or drawings by the manufacturer

(8) See applicable provisions of these specifications.

(9) See applicable provisions of these specifications.

(10) See applicable provisions of these specifications.

(11) An affidavit of compliance with the material requirements is required from the manufacturer

(12) ASTM Designation:

24" I.D.: A283 Grade "C"

42" I.D.: A283 Grade "C"

48" I.D.: A283 Grade "C" (All Pipe)

54" I.D.: A283 Grade "C"

(13) The manufacturer at his option may order to chemistry.

(14) As per Section 3.4.4 of AWWA C200.

(15) As per Section 3.4.4.1 of AWWA C200.

(16) Each straight section of pipe shall be tested to a hydrostatic pressure of 150 psi.

(17) As shown in Table above.

(18) All pipe shall have beveled ends according to the drawings.

(19) Not required.

(20) Fittings and specials shall be hydrostatically tested to 150 psi. In lieu of hydrostatically testing fittings and specials, the manufacturer may be allowed to use another form of testing such as dye-check, magnetic-particle, radiograph, ultrasonic or equivalent. The Government reserves the right , however, to required a minimum of ten percent (10%) of welds of fittings and specials to be radiographed. If this ten percent shows any failure, then all of that manual welded seam of that special or fittings shall be radiographed. The cost of all testings shall be borne by the manufacturer with the exception of the initial ten percent radiographic testing, if performed.

(21) The full length straight pipes may have one (1) longitudinal seam. All longitudinal seams shall be butt welded.

2.2 FITTINGS AND SPECIALS

All fittings and specials shall be in accordance with the contract drawings and AWWA C-208, unless a detail for fittings other than C-208 is specifically shown. Where shown on the contract drawings, flanges are to be in accordance with AWWA C-207, Class "D".

2.3 PLUG VALVE

Plug valve shall be of the non-lubricated eccentric type with resilient faced plug. Valve to be rectangular port type, ¼ turn, non-lubricated, and serviceable (able to be repacked without removing the operator) under full line pressure and capable of sealing in both directions at the rated pressure. Flanged valve shall be faced and drilled to ANSI 125/150# standard. Plug valve specified herein shall be by DeZurik or approved equal. Manufacturer shall have at least (10) years experience in the manufacture of eccentric plug valves 24" and larger and shall provide references and a list of installations upon request. Valve shall be flanged and have a minimum 100 percent open port area regardless of published Cv factors. Valve shall be rated at minimum 150-psi W.O.G. (Water, Oil, and Gas) working pressure. Plug valve shall be performance, leakage and hydrostatically tested in accordance with AWWA C504, except as herein modified.

At the above rated minimum working pressures, the valves shall be certified by the manufacturer as permitting zero leakage for a period of at least five minutes with pressure applied in either direction.

Valve body shall be cast iron, 30,000 psi tensile strength, ASTM A126, Grade B, or of ductile iron, ASTM A536 and of the top entry, bolted bonnet design, cast with integral flanges conforming to the connecting piping. Buried service valve shall have Type 316 stainless steel hardware. Body shall be furnished with 1/8" welded overlay seat of not less than 90% pure nickel. Screwed in seats shall not be acceptable.

The upper and lower plug journals shall be fitted with ASTM A-240 type 316 stainless sleeves with bearings of ASTM B30, Alloy C5400 aluminum bronze. Non-metallic bearings shall not be acceptable. Shaft seals shall be of the multiple V-ring type and shall be externally adjustable and repackable without removing the actuator or bonnet from the valve under pressure. Discs shall have full resilient facing of Chloroprene (CR) or resilient facing suitable for application.

Valve and gear actuator shall have a metal enclosed spring-loaded seal on shaft and gasket on the valve and actuator cover to prevent the entry of water. The seals on the actuator covers shall be metal enclosed spring-loaded rubber seals to insure no leaking. Actuator mounting brackets shall be totally enclosed and shall have gasket seals. Actuator shall clearly indicate valve position and an adjustable stop shall be provided.

Plug valve shall be installed so that the direction of flow through the valve and the shaft orientation is in accordance with the manufacturer's recommendations. Shaft shall be horizontal, with plug opening up.

Flange insulated joints shall be installed at both ends of the plug valve where they connect to the new force main. Joint construction shall conform to the details of Sewerage and Water Board drawing No. 1815-P1. Joint insulation shall consist of micarta tubes and washers, reinforced insulated gaskets etc., as shown in the Sewerage and Water Board's drawing. Insulated joint kits utilizing plastic sleeves, in lieu of micarta tubes will not be accepted.

The insulated joint connection shall be inspected by personnel of the Sewerage and Water Board prior to acceptance. Each joint shall be tested for continuity. Acceptable continuity shall be a reading of "infinity" on a VOM scale.

The Contractor shall furnish a sample of the Micarta dielectric to the CO for approval prior to its use or installation.

2.4 COATINGS

All coatings shall be according to Section 09940 "PAINTING" as contained in these specifications.

PART 3 EXECUTION

3.1 INSPECTION AND TESTING OF PIPE, LININGS AND COATINGS

The testing of the pipe by the laboratory selected by the Government does not relieve the Contractor of his obligation in conforming to specifications. The pipe can be rejected by the Government at the installation site if it deviates from the allowable tolerances of the specifications.

3.1.1 Inspection and Testing

The inspection and testing of the pipe and the lining and coating shall be in accordance with the requirements of AWWA Specifications C-200 and AWWA Specifications C-205 applicable thereto.

3.1.2 Tolerances

The tolerances set forth in Section 3.5 and 3.6 of AWWA C-200 Specifications dealing with the fabrication of pipe will be enforced.

3.1.3 Test

The test specified in Section 3.3 of AWWA C-200 Specifications shall be performed.

3.1.4 Defective Pipe

Any pipe or special that is found to be defective or fails to meet all specifications, as to materials, fabrication welds, lining and coating shall be replaced or repaired by an improved method by and at the expense of the Contractor. The reconditioned pipe will then be re-tested and inspected by the designated laboratory. The expense of retesting and inspecting all rejected materials, welds, lining and coating shall be borne by the Contractor.

3.1.5 Notification

The Contractor shall notify the Government, in writing, at least two (2) weeks prior to the fabrication or the manufacture of any pipe or fittings. The notifications shall state the names and locations of all sub-contractors involved in the fabrication of the pipe, fittings and specials, and in the lining and coating operations of the pipe.

3.2 HANDLING

All steel pipe shall be handled and transported with equipment provided with stout wide canvas or rubber-nylon fiber slings and wide padded skids or cradles, designed, constructed and arranged to prevent damage to the pipe coating. Bare cables, chains, hooks, metal bars, or narrow skids or cradles will not be permitted to come in contact with the coating or lining. All pipe handling or transportation equipment shall be approved by the Contracting Officer prior to their use and the CO reserves the right to discontinue any handling equipment that he considers damaging to the coating or lining.

3.2.1 Hauling

During hauling, all pipe shall be supported in wide cradles or suitably padded timbers that are formed to fit the curvature of the pipe, and all chains, cables or other equipment used to fasten down the pipe shall be carefully and well padded.

3.2.2 Storing

Pipe stored at the job site or at a storage site shall be supported on wooden skids, not smaller than 3" x 4" in size, placed under the uncoated ends of the pipe with intermediate padded supports as required. Pipe shall not be permitted to be rolled, skidded or otherwise moved when in contact with the ground.

3.2.3 Hoisting

Pipe shall be hoisted by means of wide slings of canvas, leather, or other similar material approved by the CO. The use of cables, chains, hooks, covered or uncovered or other devices which may cause damage to the coating or lining will not be permitted. The Contractor shall allow for inspection of the bottom side of the pipe for damage to the

coating prior to hoisting the pipe. If the coating is damaged, the coating shall be repaired before lowering the pipe into the final position.

3.2.4 Installation

At all times during the pipe installation, the Contractor shall use every precaution against damage to the coating. Workmen shall not be permitted to walk on the coating or lining except when necessary, and then only if such workmen are wearing shoes of rubber or composition soles and heels.

3.2.5 Defects

Any pipe section or special section that shows dents, kinks, abrupt changes or curvature other than specified, or any other defects at the site will be rejected. The Contractor shall replace, at his own expense, such rejected section or he may recondition the rejected section as stated in Section 1.4.3 of AWWA C-200.

3.3 WELDED STEEL MANHOLE

At the locations shown on the plan and profile, the Contractor shall furnish and install a welded steel access manhole of the size indicated. Welded Steel Manhole shall be according to Sewerage and Water Board Drawing No. 6220-B-6, included at the end of this Section.

3.3.1 Payment

The Contractor shall receive no additional payment for the furnishing and installing of these manholes. The Contractor shall be permitted for his convenience, to furnish and install additional manholes also at no additional cost to the Government. On the required manholes, the Contractor shall install an air-vent cock. On the required saddles and cover plates, the Contractor shall install an air-vent cock. All cast steel saddles and cover plates shall be coated and lined as stated in Section 09940 "PAINTING".

3.4 MANHOLE OVER WELDED STEEL ACCESS OPENING

The Contractor shall construct an access manhole over each saddle and cover plate. He shall not be required to construct a manhole over any saddles that he installs for his own convenience.

3.5 TAPPED PLATES FOR AIR-VENT COCKS

At various locations in the line, as shown on the Contract Drawings, the Contractor shall drill a 2 1/2" diameter hole and furnish and install a tapped plate over this hole for the installation of air-vent cocks as shown.

3.6 DISHED HEADS

All dished heads for testing purposes will be furnished and installed by the Contractor. After the test has been completed, the dished heads shall be removed by the Contractor and shall become his property.

3.7 IDENTIFICATION MARKING

All straight lengths, fittings and specials furnished by the Contractor shall be clearly marked on the inside for identification purposes near one end of the pipe. The identifying mark or marks shall give the length of pipe for all straight lengths, angle for all bends, type of special and wall thickness for all fittings and specials. These marks shall be the same as those shown on all shop drawings submitted by the Contractor for the Government's approval.

3.8 SPECIFICATIONS FOR FIELD WELDING

In order that longitudinal seams may be accessible after the installation, where practical, pipes must be set with the longitudinal weld within the uppermost quarter of the pipe but not at the extreme top where the seam could interfere with the installation of air-vents, etc. The field welding of the circumferential joints shall be in accordance with the following specifications and as shown on the Contract Drawings: Field welding shall be according to AWWA C-206.

3.8.1 Protection

The Contractor must carefully protect the lining in the pipes and specials during installation. The invert must be covered so that the passage of the welders and their equipment shall not do damage to the lining. Any damage done to the lining by any operation of the Contractor shall be repaired before the next succeeding pipe is welded into place.

3.8.2 Procedures

Welding procedures shall be qualified in accordance with the latest rules of the AWS Standard Qualification Procedure as defined in Section 3.1 of AWWA C-206 Specifications. Also all welding operators performing work on the contract shall have been tested under the AWS Standard Qualification Procedure, as specified in Section 3.2 of AWWA C-206 Specifications and certified copies of these tests submitted to the Contracting Officer.

3.8.3 Testing

The Government's appointed Inspection Laboratory will perform testing of welded pipe joints as specified in Section 6 of AWWA C-206 Specifications at not cost to the Contractor. All welds that are defective shall be repaired by the Contractor as specified in Section 7 of AWWA C-206 Specifications at no cost to the Government.

3.9 FIELD COATING

After installation, all joints shall be primed with a 2.5 to 3.5 Mil Dry Film Thickness of TNEMEC 90-97 TNEMEC-ZINC Coating OR APPROVED EQUAL. Upon completion, each joint shall receive a 14.0 to 20.0 Mil Dry Film Thickness of Coal Tar Epoxy according to AWWA C-203. Preparation shall be according to the paint Manufacturer's recommendations.

3.10 FIELD CEMENT MORTAR COATING

After welding and coal-tar coating, joints on steel pipe having cement-mortar coating shall be field coated according to Section A-3 of Appendix to AWWA C-205 Specifications.

3.11 CATHODIC PROTECTION

The fresh water intake steel pipe and the underground portion of the new sewer force main shall be additionally protected from corrosion during and after installation by a cathodic protection system as described below.

(1) All work shall conform to the requirements of the latest National Electrical Code and all amendments in effect at the time bids are accepted, and of the Department of Regulatory Inspection. A certificate of inspection shall be furnished to the Contracting Officer prior to final acceptance of the contract.

(2) The completed installation and operations during installation shall comply with the Occupational Safety and Health Act (OSHA) and all changes in effect at the time proposals are submitted.

(3) All work shall be carefully and neatly done by firms and persons regularly engaged in the electrical and cathodic protection industries. Poorly bent conduit or conduit runs that are not truly horizontal or vertical will not be accepted. All locknuts are to be driven up tightly. All conductor connections are to be made up securely and thoroughly insulated for the working voltage. Conduit shall be squarely cut and reamed.

(4) Cathodic protection shall be according to the provisions of Section 16640 "Cathodic Protection".

(5) Backfill for all anodes and lead installations shall be clean, select river sand free of roots, shells, concrete, tin cans and other debris. Fill shall extend a minimum of two feet from all anodes or leads.

(6) Test posts shall be installed as shown on the drawings. Posts shall be set in excavated holes, plumbed and the backfill tamped in place.

3.12 HYDROSTATIC TESTING

When the entire dry weather flow bypass, fresh water intake pipe or sewer force main, or a portion thereof, has been installed, and all apparent defects in the coating, joints, etc., have been repaired, the Contractor shall make a hydrostatic test of the pipe. The Contractor shall provide all the equipment and labor necessary for filling and emptying the pipe and measuring the pressure and leakage. The Sewerage and water Board will provide the water free of charge.

(1) Each pipe will be filled from adjacent hydrants or from other sources of supply where hydrants are not available. The Contractor shall provide connections necessary to fill and vent line; as well as connection for test gauges. When the pipe is completely filled with water, the Contractor shall close the air cocks. He shall apply a hydrostatic pressure of one hundred and fifty (150) p.s.i., and shall maintain this pressure for a period of twenty-four (24) continuous hours. During this period, the total leakage shall not exceed fifty (50) gallons per inch of internal diameter for each mile of pipe.

(2) If greater leakage than the said quantity is developed the Contractor shall locate the leaks and repair them, working only from outside the bypass pipe and using only such methods as shall have been approved in advance by the Contracting Officer.

(3) It is the intent of these specifications and of the contract based thereon that all pipe joints be watertight under all service conditions and, even though the total leakage of any test is within permissible limits as stated herein any and all leaks which are discovered during the leakage test or tests, or at any time prior to the elapse of forty-five (45) days following the final acceptance of the Government of the entire work, shall be repaired by and at the expense of the Contractor.

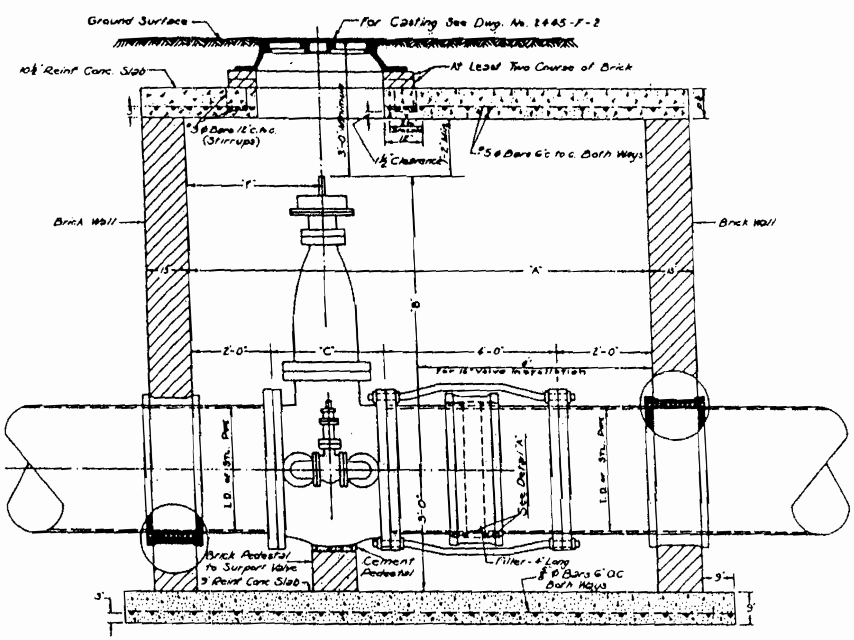
(4) No welding on any steel pipe shall be done at any time after the ends of the pipe have been closed for the hydrostatic test, except when it is completely filled with water to absorb the heat, to prevent melting of the coal-tar lining, unless specified otherwise. The consent of the CO must be secured before any welding is done.

3.13 BACKFILL REQUIREMENTS

All excavations shall be backfilled with granular material meeting the requirements of Section 02320.

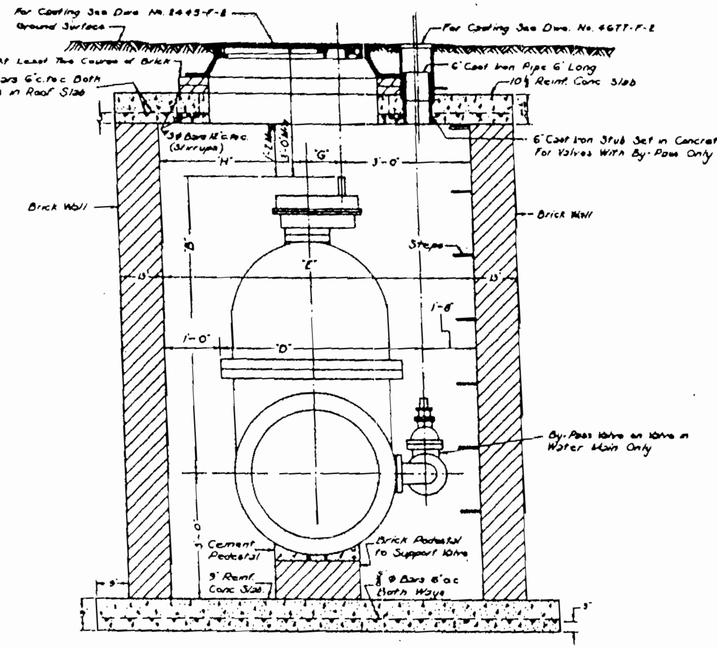
3.14 PAVEMENT REPAIR

All repairs made to existing street areas which are removed in order to install the sewer force main shall be according to Section 01501 "ROAD CONSTRUCTION" and the details shown in the plans.



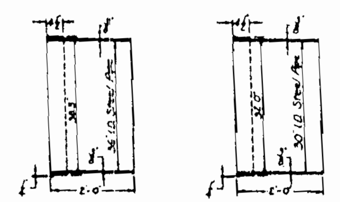
SECTION THRU A-A

NOTE:
Δ Sleeve & Tie Rod Not Required Unless Otherwise Specified.

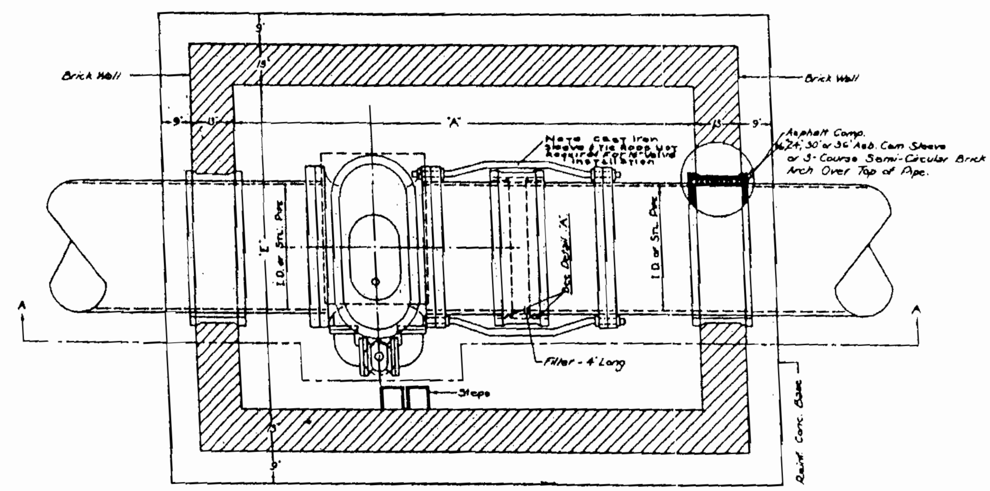


SECTION THRU B-B

DETAIL "A"



Band And Bead to be Placed on Short Steel Pipes Under Cast Iron Sleeves in Valve Manholes
Scale ¾" = 1'-0"



PLAN WITH ROOF REMOVED

Pipe Dia	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'
36"	10'-9"	7'-1"	2'-9"	4'-6"	7'-4"	3'-4½"	10"	3'-6"
30"	10'-4"	6'-2½"	2'-4"	4'-0"	6'-8"	3'-2"	10"	2'-10"
24"	9'-8"	5'-1½"	1'-8"	3'-8"	6'-1"	2'-10"	8"	2'-5"
16"	8'-4"	4'-1½"	1'-6"	—	6'-0"	—	—	—

REV.	DATE	DESCRIPTION	BY
Δ	7-8-63	ADDED NOTE	P.C.B.

SEWERAGE AND WATER BOARD OF NEW ORLEANS

DETAIL OF MANHOLE FOR 36" & 30" VALVES IN STEEL PIPE LINE

DWG. NO. 8730-B-6

Retraced 7-13-61 By R.J. Wallace

Section Table Of Contents

SECTION 15003 - INSTALLATION OF DUAL 800 GPM DRY PIT SUBMERSIBLE PUMPS

SECTION 15003 - INSTALLATION OF DUAL 800 GPM DRY PIT SUBMERSIBLE PUMPS

PART 1 GENERAL

1.1 SCOPE

The Contractor shall furnish all plant, equipment, material and labor required to furnish, install, test and place in operation two (2) self-supporting electric dry pit submersible pumping units, submersible power cables, and discharge piping as shown on the drawings.

1.2 MEASUREMENT AND PAYMENT

There will be no measurement for installation of dual 800 GPM submersible pumps. Payment will be made at the contract lump sum price for "INSTALL DUAL SUBMERSIBLE PUMPS" Price and payment will include the furnishing of all plant, equipment, labor and materials required to furnish, test and install two (2) submersible pumps, including discharge piping, coating, insulation, etc.

1.3 REFERENCES

The following publications of the issues listed below, but referred to hereafter by basic designation only, form a part of this specification to the extent indicated by references thereto.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM):

A48	(2000) Standard Specification for Gray Iron Castings
A53	(2001) Standard Specification for pipe, steel, black and hot-dipped, zinc-coated, welded and seamless
A105	(2001) Standard Specification for Carbon Steel forgings for piping applications
A181	(2001) Standard Specification for Carbon Steel Forgings for General Purpose Piping
A234	(2001a) Standard Specifications for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature service
C303	(2002) Standard Test Method for Dimensions and Density of Preformed block-type thermal insulation

1.4 SUBMITTALS

The following shall be submitted in accordance with Section 01330, SUBMITTAL PROCEDURES.

1.4.1 Pump Performance Curves

Three (3) copies of the pump performance curves showing pump capacity in gpm on the abscissa versus the total head in feet; net positive suction head required (NPSHR) in feet; efficiency; and bhp on the ordinate.

1.4.2 Pump outline Drawings

Three (3) copies of the outline drawing of the pump showing dimensions and location of pertinent items.

1.4.3 Pump Cross-Sectional Drawings

Three (3) copies of cross-sectional drawings of the pump and motor assembly showing each component. Indicate on each drawing an itemized list of components showing type, grade, and class of material used and make and model number of standard component used.

1.4.4 Electrical Drawings

Three (3) copies of one line power and control schematics.

1.4.5 Operation and Maintenance Manual

Six (6) copies of the manual containing complete information in connection with the operation, lubrication, adjustment, routine and/or special maintenance, disassembly, repair and reassembly of the pump. The manual shall be printed on good quality paper measuring approximately 8-1/2 x 11 inches and bound between flexible durable covers.

1.4.6 Parts List

Three (3) copies of the manufacturer's parts list separately bound from the O&M manuals above shall also be furnished. The list shall clearly show all details and parts, and all parts shall be adequately described and/or have proper identification marks. The list shall be printed on good quality paper measuring approximately 8-1/2 x 11 inches and bound between flexible durable covers.

1.4.7 Motor Performance Curve

Three (3) copies of performance charts showing curves for torque, current, power factor, input/output KW and efficiency. The chart shall also include data on starting and no load characteristics.

1.5 QUALITY CONTROL

1.5.1 General

The Contractor shall establish and maintain quality control for all manufacturing, fabrication and installation operations to assure compliance with contract requirements and maintain records of his quality control for all construction operations, including, but not limited to, the following:

(1) Shop welding, machine work, fabrication, and assembly.

(2) Preparation for shipment and storage.

(3) Factory tests.

(4) Inspection at the worksite for damage to and defects in material and equipment.

(5) Field installation and tests.

1.5.2 Reporting

Two copies of the records of inspection and tests, as well as the corrective action taken, shall be furnished daily to the Government.

PART 2 PRODUCTS

2.1 PUMP UNITS

The dry pit submersible pumping units shall be self contained, integral pump/motor units designed to operate at continuous full load in an air or completely submerged condition without the need for any external cooling devices such as water jackets. The pump shall be capable of running dry without damage to its internal components. Motors shall be cooled by an internal closed loop cooling system which shall conform to the latest applicable requirements of NEMA, IEEE, UL, ANSI and NECE standards and shall meet the latest design standards of a Totally Enclosed Non-Ventilated, Explosion-proof design NEMA frame motor. Designs which incorporate cooling jackets and in particular, designs which rely on circulation of the pumped drainage water for cooling, are not considered equal to the equipment described in this specification and shall not be acceptable.

The nameplate ratings of the motor shall be based on 40 degrees C ambient environment. The pump motors shall be designed to withstand a minimum of 200 PSI differential water pressure at all seal locations. The motor, Closed-Loop-Cooled type will be cooled by an internal closed loop cooling system which shall conform to the

latest applicable requirements of NEMA, IEEE, ANSI AND NEC standards. Motor heat dissipation shall be accomplished by circulating a high coefficient heat transfer fluid from an integral reservoir through channels which are internally cast into the motor stator housing. The bottom of the reservoir shall be designed to provide adequate retention time of the heat transfer fluid to ensure positive heat transfer. The heat transfer fluid shall be environmentally safe and shall not require hazardous material disposal. Heat transfer fluid shall be accomplished by convection through the reservoir wall to the pumped fluid. Motors without an internal closed loop cooling system will not be acceptable; however, motors designed to dissipate the stator heat through the use of a larger stator housing will be acceptable if the motor frame is a minimum of two sizes larger than a standard submersible motor to assure adequate heat dissipation.

Pumps shall be Model 6154 as manufactured by Yeomans Pump Company, Melrose Park, Illinois or an approved equal.

2.1.1 Bearings and Lubrication

Bearings shall be specifically selected to carry all radial and axial loads imposed by the pump and motor. All bearings shall have a Class 3 internal fit conforming to AFBMA Standard 20.

Bearings shall be rated to provide a minimum L_{10} Bearing Life of 50,000 hours at any design operating point within plus or minus 40% of flow at the best efficiency point (BEP) of the pumps performance curve. The bearing selection shall limit the bearing temperature rise to a maximum of 60 degrees C under full load operation.

All bearings shall be permanently lubricated with a premium moisture resistant grease containing rust inhibitors and shall be suitable for operation over a temperature range of –25 degrees C to + 120 degrees C. The bearings shall not require any additional or periodic lubrication. All bearings may be commercially available from third party sources other than the pump/motor manufacturer.

2.1.2 Shaft Seals

Two independent, tandem mounted, mechanical seals shall be provided in the heat transfer pumped fluid reservoir to isolate and protect the air-filled motor from the pumped media. The heat transfer fluid level shall not require constant monitoring and shall be suitable for a minimum of two (2) years service under the specified operating conditions before requiring replacement for normal maintenance. The reservoir shall act as a barrier to trap moisture and provide sufficient time for a planned shutdown. The inner and outer mechanical seals shall be constructed with solid block tungsten carbide stationary and rotating faces. All other seal components of both inner and outer seals shall be AISI 316 stainless steel. Mechanical seals which employ sprayed or laminated seal faces shall not be considered equal, or acceptable.

Mechanical seals shall be readily and commercially available from third party sources

other than the pump and motor manufacturer, their agents, dealers and/or distributors. Mechanical Seals shall be John Crane Type 21 or an approved equal.

2.1.3 Moisture Detection System

A dual moisture sensing probe system shall detect the entrance of moisture and provide an alarm. The moisture detection system shall be designed to detect the entrance of moisture in both the lower heat transfer fluid reservoir and the air-filled motor stator housing. The use of single probe or float switch type senor systems shall not be acceptable. The sensing relay shall either be provided or approved by the pump/motor manufacturer.

2.1.4 Cable Entry System

The power and control cable entry system shall be designed to provide a positive, leak-free seal to prevent liquid from entering the air filled motor housing. The design shall incorporate provisions which prevent moisture from wicking through the cable assembly even in the event the cable jacket has been punctured. All cable shall be Type SEOW-A and U.L. listed for the intended submersible service.

The power and control cable entry into the lead connection chamber shall be epoxy encapsulated for positive moisture sealing. A Buna-N cable grommet shall be provided in addition to the epoxy sealed leads. Separate power and control cables shall be provided to prevent false sensor warnings.

2.1.5 Materials of Construction

The pump casing, impeller, motor housing and stationary base elbow shall be manufactured of close grained cast iron, ASTM A48, Class 30. All casing surfaces coming into contact with the pumped liquid shall have a surface cleanliness equal to that of a SSPC-SP6 process prior to being factory protected by one (1) coat, 3 mils DFT, of an environmentally-safe protective bituminous asphalt based coating with a minimum 50% solids content.

The pump and motor shaft shall be a single unit fabricated from Series 416 stainless steel or better. the pump end connection shall be flanged, compatible with the discharge piping. All fasteners shall be series 300 stainless steel or better.

The pump casing shall be constructed of close grained cast iron, conforming to ASTM A48, Class 30 and shall be of sufficient thickness to withstand all operating pressures and mechanical stresses. The casing shall be suitably ribbed, have tangential discharge, and be reinforced to support the weight of the motor assembly. Centerline discharge pump casings are not acceptable. The pump casing shall have an integrally cast hand hole supplied with a hand hole cover. The hand hole cover shall be constructed of the same material as the pump casing and shall have surfaces which match the internal casing contours to minimize turbulence and localized wear. The casing shall also be provided with a 3/8" NPT tapped pressure gauge connection of the

discharge nozzle. A support pedestal for mounting the completed pump/motor assembly shall be provided and shall be constructed of fabricated steel. The support pedestal shall be designed for anchor bolting to a concrete base slab and shall be of adequate strength and mass to support the combined weight of the pump/motor assembly and withstand all forces imposed by the pump unit during operation.

The impeller shall be of a multi-vaned, fully shrouded enclosed design and shall have large passages to provide smooth flow transition and unimpeded passage of large spherical solids. All impellers shall be statically and dynamically balanced. Repelling vanes shall be provided on the rear shroud to expel solids and reduce axial thrust and pressure at the seal area. Replaceable suction and impeller hardened 420 stainless steel wear rings shall be provided. Solids passing capability of the impeller offered shall be clearly indicated on the manufacturer's performance curve. Single vane impellers shall not be acceptable.

2.1.6 Level Control

Each submersible pump shall be furnished with one (1)-two (2)-pole float switch assembly consisting of a stand complete with copper float rod, wrought steel float rod guide pipe, and float rod stuffing box. A level control shall automatically start and stop the pump.

2.1.7 Control Panel

Furnish one (1) NEMA 4x Stainless Steel Control Panel, complete with Combination Fused Switch, 240 V, 3 Phase, 25 hz, Magnetic Starter, rated for Pump Horse Power. Control Power shall be 24DC. Control Panel shall include a self-contained 24V DC power supply. Provide interior electric space heater. Provide "Hand-Off-Auto" Selector Switch "On Green Indicator Light" and "Off Red Indicator Light". "Auto" mode operation will be controlled by a float switch. Provide one (1) control panel for each pump (total of two (2)). Provide a reversible lead/lag switch to provide equal operating time for the two (2) pumps.

2.2 MOTOR REQUIREMENTS

The submersible motors shall successfully operate under power supply variations per NEMA, MGI-14.30. Motors shall be NEMA Design B with torque and starting current in accordance with NEMA-MG-12.

The submersible motors shall be of an air-filled, high efficiency design and shall be rated for continuous full load operation. Oil filled motors will not be acceptable. Motors shall be capable of withstanding up to 15 starts per hour and shall have a minimum 1.15 Service Factor. Maximum motor speed shall be 705 r.p.m. Higher speeds will not be acceptable.

Stators shall be solid copper wound and shall be press fitted into the stator housing for true positive alignment and efficient heat transfer. The motor insulation system shall be

Class F minimum, utilizing materials and insulation systems evaluated and certified with IEEE 117 classification tests. The entire wound stator assembly shall receive a minimum of two (2) coats of insulating varnish utilizing a dip and bake process.

Three (3) normally closed, automatic reset, thermostats connected in series shall be embedded in adjoining phases of the stator windings. The thermostats shall be connected to safely shut down the motor upon opening.

Motor shall be provided with a minimum of 30 feet power/control cable, factory terminated and sealed at the motor ready for connection to control panel during field installation.

Motors shall be 25 HZ. The Contractor will be allowed to purchase a 60 HZ motor and have it rewound for 25 HZ as long as all other requirements of the plans and specifications are met.

2.3 VALVES

All valves required for this dual submersible pump installation shall be as follows:

2.3.1 Gate Valves

Iron body bronze trim, OS&Y bolted bonnet, flanged, F.F., 125 lb., Stockham G623, or an approved equal.

2.3.2 Check Valves

Iron body bronze trim, swing check valve, flanged 125 lb. Stockham G-923B, or an approved equal.

2.4 DISCHARGE PIPING AND FITTINGS

2.4.1 Discharge Piping

Discharge piping shall conform to ASTM A53, Type E, Grade B, galvanized, Schedule 40, welded flange.

2.4.2 Fittings

Fittings shall conform to ASTM A234, forged carbon steel, galvanized, flanged, Schedule 40.

2.4.3 Joints

Joints shall conform to ASTM A105/A 181 forged carbon steel, galvanized, welded flange, 150 lb.

2.5 INSULATION REQUIREMENTS

All discharge piping, valves, fitting, joints, etc., shall be insulated for their entire length. Insulation shall be one and one half (1-1/2") inch thick cellular glass insulation conforming to the following requirements:

Average Density	7.5 lb./Cu.Ft.	ASTM C303
Combustibility	Will Not Burn	N/A
Composition	Pure Glass, Inorganic contains No Binder	N/A
Specific Heat	0.19 BTU/Lb. Degrees F	N/A

All insulation shall be protected from the elements by an aluminum jacket attached to the insulation according to the manufacturer's recommendations. Insulation shall be Foamglas Super K as manufactured by Pittsburgh Corning or an approved equal.

PART 3 EXECUTION

3.1 TESTING

Each completed and assembled pump shall receive a routine factory test in accordance with NEMA methods and IEEE standards.

The pumps shall be performance tested at the manufacturer's plant prior to shipment. The performance shall be within the limits set forth by the Hydraulic Institute. Certified curves shall be submitted to the Contracting Officer.

As a minimum, each finished pump shall be performance tested for total dynamic head, capacity, efficiency and power requirements at five (5) operating points plus shut-off head for the selected impeller diameter, of which, the design capacity operating point shall be one point. Tests shall be certified by a professional Engineer who may be an employee of the pump manufacturer.

The Government and Sewerage and Water Board reserve the right to witness any and all factory testing at their own expense.

Upon request, a written quality assurance record confirming the above testing/inspections shall be supplied by the Contractor with the pump at the time of shipment. All testing shall be done in accordance with the latest test code of the Hydraulic Institute.

The Contractor shall provide a wet test after installation. The wet test shall demonstrate the manual and automatic operation of the installation. The test shall demonstrate to the satisfaction of the Government that the equipment meets all

specified performance criteria, is properly installed and anchored, and operates smoothly without exceeding the full load amperage rating of the motor or exhibits excessive motor heating. The Contractor shall give the Government a minimum of five (5) days notice before the wet test begins.

3.2 FIELD SERVICE REQUIREMENTS

The Contractor shall furnish the services of an authorized, factory trained representative for a period not to exceed 16 hours who will inspect the completed installation in order to insure that it has been installed properly and in accordance with the Manufacturer's recommendations.

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SECTION 15004 -NEW VACUUM PUMPS AND ACCESSORIES

SECTION 15004 – NEW VACUUM PUMPS AND ACCESSORIES

PART 1 GENERAL

1.1 SCOPE

The work covered by this section generally consists of performing all operations in connection with the removal and transportation of two (2) existing vacuum pumps, electric motors, and associated piping and valves as shown in the plans and the installation of two (2) skid mounted vacuum pump assemblies, each consisting of a vacuum pump, speed reducer, couplings, coupling guards and electric motor mounted on a common base with necessary accessories along with associated vacuum piping and valves.

1.2 MEASUREMENT AND PAYMENT

1.2.1 MEASUREMENT. There will be no separate measurement made for removal of two (2) existing vacuum pumps and accessories or the installation of two (2) new vacuum pumps and accessories as required by the plans and specifications.

1.2.2 PAYMENT. Payments shall be made under the contract lump sum price for "REMOVE EXISTING VACUUM PUMPS AND ACCESSORIES" or "INSTALL NEW VACUUM PUMPS AND ACCESSORIES." Price and payment will include the furnishing of all plant, equipment, labor and materials required to remove two (2) existing vacuum pumps, electric motors, electrical circuits, piping, valves, etc.; palletizing and shipment to the Sewerage and Water Board facility and in their place installing two (2) vacuum pumps, electric motors, piping, valves, etc.

1.3 REFERENCES

The following publications of the issues listed below, but referred to hereafter by basic designation only, form a part of this specification to the extent indicated by references therein:

AMERICAN SOCIETY OF TESTING

A48	(2000) Standard Specification for Gray Iron Castings
A53	(2001) Standard Specification for Pipe, Steel, Black and Hot-dipped, Zinc Coated, Welded and Seamless
A234	(2001a) Standard Specification for Piping, fittings of wrought carbon steel and alloy steel for moderate and high temperature service

A307 (2000) Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength

A536 (1999e1) Standard Specification for Ductile Iron Castings

A563 (2000) Standard Specification for Carbon and Alloy Steel Nuts

1.4 SUBMITTALS

The Contractor shall submit shop and data to the Contracting Officer for approval. The submittals shall contain the following information and shall be according to Section 01300 "SUBMITTAL PROCEDURES":

(a) Dimensioned outlined drawing of the pump assembly, giving foundation bolt sizes and locations. Make and model number of the pumps.

(b) Operating weight of pump assembly.

(c) Size and location of all customer connections.

(d) Seal water schematic drawings including line sizes and all recommended appurtenances.

(e) Minimum seal water pressure and volume required.

(f) Performance curve of pump to be furnished.

(g) Any other pertinent information or data required to assist in the approval process.

1.5 QUALITY CONTROL

1.5.1 General

The Contractor shall establish and maintain quality control for vacuum pumps and accessories operations in order to assure compliance with contract requirements and maintain records of his quality control for all construction operations, including but not limited to:

(1) Machine work.

(2) Shop Painting.

(3) Use of specified materials and equipment.

(4) Shop assembly and testing.

(5) Preparation for shipment and storage.

(6) Inspection at the work site for damage to and defects in all materials and equipment.

(7) Installation and tests.

(8) Operation and maintenance after installation.

PART 2 PRODUCTS

2.1 VACUUM PUMP CONSTRUCTION

The Contractor shall provide two (2) skid mounted vacuum pump assemblies consisting of a vacuum pump, reduction gear, coupling, coupling guard and electric motor.

(a) The vacuum pump shall be rated for 2200 CFM at 640 RPM at 20.0" Hg vacuum and 1900 CFM at 24.5" Hg vacuum. The pump shall be able to pump 2000 CFM of air at 5 PSI for air suppression system. The pump shall be Nash 2002 Type CL or an approved equal.

(b) The vacuum pump shall be the rotary type, non-pulsating, single stage, oil free, water sealed type. The vacuum pump shall be rugged heavy duty cast iron construction which will operate at 640 RPM.

(c) The vacuum pump shall be equipped with a cast iron body of one piece construction, cast iron heads, grease lubricated anti-friction bearings, stainless steel shrouded rotor and stainless steel shaft with stainless steel surface in the pacing areas.

(d) The vacuum pump shall be of the conical design with large inlet and discharge ports located in the cones. The pump casing shall have discharge connections in the bottom with left hand or right hand outlets and be self-draining of entrained water. The vacuum pump shall be capable of handling heavy slugs of water without damaging the pump. The vacuum pump shall require no internal lubrication.

(e) The vacuum pump shall be furnished with the following accessories:

(1) Cast Iron Inlet Manifold.

(2) Cast Iron Discharge Manifold.

(3) Seal Water Orifice Union and Adjusting Valve.

(4) Seal Water Solenoid Valve in water tight enclosure.

(5) Base Plate for Vacuum Pump and Motor shall be structural steel. The pads for mounting the vacuum pump and motor shall have machined surfaces. The pump, motor, gear, couplings, and coupling guards shall be furnished as a complete assembled unit, aligned at the purnp factory prior to shipment and shall be suitable for checking and realignment in the field as necessary.

(6) Coupling guards for the low and high speed couplings shall be OSHA approved.

(7) Flow Switch.

2.1.1 Seal Water

Seal water will be from City mains at approximately 30 psig and 80□ F maximum.

2.1.2 Demonstration

The Contractor shall conduct a demonstration operation of the vacuum pumps in order to show that they meet all requirements of the plans and specifications.

2.2 GEAR REDUCER

The gear reducer shall be designed and built in accordance with applicable standards for the American Gear Manufacturer's Association with a service factor of 1.75. Gears shall be single helical type with accurately generated tooth shapes hardened and ground throughout. Bearings shall be anti-friction type with a B-10 life of 50,000 hours. Shafts shall be alloy steel. Provide cooling fans where required. Service factor shall be 1.75. Gear reducer shall have an oil reservoir with dip stick or other level indicator and a dial type temperature indicator. Gear Ratio shall be 1500/640. Gears shall be Falk Model 305A1 or an approved equal.

2.3 COUPLINGS

Flexible couplings of suitable type and size shall be furnished between the pump, speed reducer and motor. Service factor shall be 1.75. Expanded metal guards shall be furnished at all couplings for personnel protection. Coupling shall be Falk Steelflex or an approved equal.

2.4 ACCESSORIES

The necessary accessories for the vacuum pump water seal, i.e., direct operating solenoid valve, by-pass ball valve, adjusting cock, orifice union, strainer, etc. 120 volt,

25 Hz, A.C. rated shall be included. A relief valve shall be provided and set pressure shall be as recommended by manufacturer to protect pump against long periods of operation when pulling from a closed system. A water pressure switch and stainless steel dial pressure gauge shall be provided. Inlet and discharge manifolds shall be provided. Anchor bolts for the vacuum pumps will be furnished by the Contractor. Design of anchor bolts shall be the responsibility of the vacuum pump manufacturer.

2.5 VACUUM PUMP COATING REQUIREMENTS

The coating system furnished on the vacuum pump assemblies shall be the manufacturer's standard for indoor installation in a damp, semi-tropical environment with sustained exposure to 100% relative humidity. Finish coat shall be gray in color.

2.6 ELECTRIC MOTOR

The vacuum pump motor shall be 150 horsepower, 240 volt, 3-phase, 25 Hertz, 1,500 RPM, open drip-proof type, conforming to NEMA B standards with grease lubricated anti-friction bearing having a minimum life of 50,000 hours. A 125 horsepower motor may be supplied provided that the manufacturer will guarantee the motor will not be overloaded and its service factor will not be reduced at any point on the vacuum pump operations curve. Alemite fittings shall be installed to allow periodic greasing. Insulation shall be Class F. Motor temperature rise shall be Class B based on 40 degrees C ambient, as measured by thermometer. Service factor shall be 1.15. Winding insulation shall be impervious to mineral oil lubricants, lubricant detergents, as well as tropical conditions including fungus, salt laden air, etc. It shall be equipped with 120 volt, single phase, 25 Hertz space heaters with terminals brought out to the motor junction box.

2.7 VACUUM PIPING

All vacuum piping shall be fabricated and installed using good construction practice, the New Orleans Building Code and related regulations, Sewerage and Water Board of New Orleans Applicable Codes for work required. The Contractor shall furnish all piping, valves, fittings, sealants, hangers and other accessories required to complete this installation.

The vacuum pumps shall be piped as shown on the drawings. Contractor shall use welded carbon steel pipe, minimum schedule 40 and keep the number of field welds to a minimum. Start up screens and expansion joint shall be provided for the inlet and outlet of the vacuum pumps.

(a) Material specifications:

Pipes and Fittings

Pipe	ASTM A53, Type E, Grade B, Schedule 40, Butt Weld
Fittings	ASTM A234, Forged Carbon steel, Butt Weld, Schedule 40

Gaskets	1/8" Thick, Full Face Nitrile Rubber
Gate Valves	Iron Body Bronze Trim, OS&Y Bolted Bonnet, Flanged, Flat Faced, 125 Lb., Stockham G932B, or an approved equal.
Check Valves	Iron Body, Swing Check, Bronze Trim, Flanged, 125 Lb., Stockman G-923B, or an approved equal.
Bolting	ASTM A307 Studs and ASTM A563 Nuts

PART 3 EXECUTION

3.1 FACTORY TESTS

In addition to standard factor tests the vacuum pump manufacturer shall conduct a test on each unit furnished to verify that the capacity is within 5% of the capacities specified in paragraph 5 and that required motor horsepower shall not exceed the rated HP of the motor. Eight (8) copies of this certified test shall be submitted to the Contracting Officer for approval prior to shipment of the equipment.

3.2 SHIPMENT

The pump unit and accessories shall be protectively processed for not less than 12 months indoor storage after complete delivery. Manufacturer shall furnish instructions for maintaining protective storage during the 12 month period.

3.3 DRAWINGS AND EQUIPMENT MANUALS

The pump manufacturer shall furnish drawings, data sheets, parts lists, pump curves, etc. for approval.

3.3.1 Six (6) complete, hard cover, bound sets of operation and maintenance manuals printed on durable and permanent material shall be furnished upon completion and acceptance of all work. The O & M manuals shall contain complete information regarding assembly, disassembly, lubrication, operation, calibration, adjustment, periodic maintenance, materials breakdown, performance data, etc. The front cover of each manual shall be properly marked, titled and printed in a format acceptable to the CO. Xerox reproduction of photographs will not be allowed.

3.4 DISPOSITION OF EXISTING EQUIPMENT

The existing equipment removed under the requirements of this section shall be dispositioned according to the following:

(1) The existing vacuum pumps, electric motors, starters, valves, couplings, chains

and drives, etc. shall be removed, palletized and shipped to the Sewerage and Water Board's storage facility at 8800 South Claiborne Avenue. The Contractor shall call Mr. Glen Semel at 865 - 0514 at least twenty-four (24) hours prior to delivery. This equipment shall become the property of the Sewerage and Water Board.

(2) All other miscellaneous equipment such as piping, anchor bolts, electrical wiring shall become the property of the Contractor and shall be removed from the site and disposed of in a manner acceptable to the Contracting Officer.

Section Table Of Contents

SECTION 15005 – TEMPORARY DRY WEATHER FLOW PIPE

SECTION 15005 – TEMPORARY DRY WEATHER FLOW PIPE

PART 1 GENERAL

1.1 SCOPE

This work consists of designing, furnishing, installing, maintaining and finally removing all elements of the temporary dry weather flow pipe required to complete this project. The contractor will be solely responsible for the design, construction, maintenance and finally the removal of all elements of the temporary dry weather flow pipe.

1.2 MEASUREMENT AND PAYMENT

There will be no measurement for "TEMPORARY DRY WEATHER FLOW PIPE". Payment will be made at the contract lump sum price for "TEMPORARY DRY WEATHER FLOW PIPE" and shall include the furnishing of all plant, equipment, materials, including pipe, piles, fittings, tie down straps, etc., required to complete this item of work.

1.3 DURATION

The contractor will be required to maintain an operating temporary dry weather flow pipe from that time when the existing dry weather flow pipe is removed and the new dry weather flow pipe is operating.

1.4 DESIGN CALCULATIONS

The temporary dry weather flow pipe, pile support, caps, tie-down straps, etc., shall be designed using accepted professional methods of engineering design consistent with current design practice. The design calculations shall be performed by a registered professional engineer licensed to practice in the State of Louisiana. The contractor may, at his option, use the soil borings and profile data contained in the plans. The government is not responsible for any assumptions that the contractor may make from this data.

1.5 CONSIDERATIONS

The contractor shall make the appropriate provisions in the design and installation of the temporary dry weather flow pipe, in planning the sequence of construction, and in the placement of the temporary earth retaining structures such that the temporary system is fully operational and does not interfere with the contractor's work.

1.6 SUBMITTALS

The contractor shall submit, for review by the contracting officer, six (6) copies of the following. Submittals shall be according to Section 01330 "SUBMITTAL PROCEDURES".

1.6.1 Professional Engineer's Design Calculation

The calculations shall be on 8 1/2" x 11" sheets or shall be in the form of computer analysis and design and shall bear the stamp of the professional engineer.

1.6.2 Additional Information

The submittal shall contain all pertinent dimensions, location of supports, tie down straps, general alignment of the pipe and any other information which the contracting officer requires to review and comment on this item.

1.7 ALIGNMENT

The temporary dry weather flow pipe shall generally conform to the alignment shown in the plans. The contractor may vary the alignment of the temporary pipe, with the approval of the contracting officer in order to more adequately accommodate the construction if all other requirements of the specifications are satisfied.

1.8 TIME CONSTRAINTS

The Sewerage and Water Board will cease pumping dry weather flow for a maximum of eight (8) continuous hours. The contractor will be required to make any change over connections according to the following:

(a) From the existing dry weather flow to the temporary dry weather flow within eight (8) consecutive hours.

(b) From the temporary dry weather flow back to the permanent dry weather flow within eight (8) consecutive hours.

(c) The contractor shall coordinate these changeover operations with the contracting officer a minimum of thirty-six (36) hours prior to start.

1.9 PHYSICAL CRITERIA

For design and installation, the contractor will be required to follow the listed minimum criteria:

(a) The minimal diameter of the temporary pipe shall be forty-eight (48") inches.

(b) The elevation of the top of the temporary pipe shall be no higher than (+)1.0 NGVD.

(c) All dry weather flow pipe shall be held in place by steel straps attached at each support.

(d) The discharge end shall be submerged below the top of water elevation in

the by-pass canal. Discharge elevation shall be no higher than two (2') feet above the canal bottom.

(e) The alignment of the temporary pipe shall generally conform to that shown in the plans.

1.10 COATING REQUIREMENTS

There are no requirements for coating this pipe.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 HYDROSTATIC TESTING

When the entire temporary dry weather flow pipe, or a portion thereof, has been installed, and all apparent defects, leaks, etc., have been repaired, the contractor will make a hydrostatic test of the pipe. He shall provide all of the equipment and labor required for filling and emptying the pipe, measuring the pressure and leakage, the government will furnish the water free of charge.

(1) The pipe will be filled from nearby hydrants or from other sources of supply. The contractor shall provide all connections necessary to fill and vent the line, as well as the test gauge connections. When the pipe is completely filled with water to the satisfaction of the contracting officer, the contractor shall close the air cocks. He shall apply a hydrostatic pressure of one hundred and fifty (150) P.S.I., and shall maintain this pressure for twenty-four (24) continuous hours. During this period, the total leakage shall not exceed fifty (50) gallons per inch of internal diameter for each mile of pipe.

(2) If greater leakage is developed, the contractor shall locate the leaks and repair same. When the leakage is stopped then the hydrostatic test shall be rerun.

3.2 DISPOSITION OF MATERIALS

All materials required to complete this item shall become the property of contractor at the end of this project to be disposed of off of the project site at a location acceptable to the Contracting Officer.

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SECTION 16001 – ELECTRICAL WORK

SECTION 16001 – ELECTRICAL WORK

PART 1 GENERAL

1.1 SCOPE

The work to be done under this section of the specifications includes the furnishing of all labor, materials, and equipment required to construct a complete and operative electrical system in accordance with these specifications and accompanying electrical drawings. The materials and workmanship shall conform to the best practice and the equipment and accessories shall be complete and properly operating.

In general, this work will include, but not be necessarily limited to, the following:

(1) Change Transformer T3, Primary Continuous Overload trip setting to 40 amp.

(2) Remove existing transformer T3 and replace with 300 KVA 6600-120/240 V, 3 Phase dry type. Deliver existing transformer to the Sewerage and Water Board's Electrical Maintenance Facility at 8800 South Claiborne Avenue. Call 865-0500 to arrange for delivery with 24 hour minimum advanced notice.

(3) Connect new 300 KVA transformer to existing transfer switch and to new contractor furnished 600 Amp fused disconnect.

(4) Remove existing Vacuum Pump Motors #1 and #2, complete with wiring, conduits, and starters. Return vacuum pump motor starters to the Sewerage and Water Board's electrical maintenance facility at 8800 South Claiborne Avenue. Call 865-0500 to arrange delivery with a minimum of 24 hours advanced notice.

(5) Install new Vacuum Pump Motors #1 and #2, complete with new wiring, conduits, and reduced voltage starters.

(6) Install ten (10) new motorized valves complete with disconnect switches, control wiring and power wiring.

(7) Modify control consoles.

(8) Provide lighting.

(9) Provide receptacles.

(10) Provide grounding.

(11) Provide necessary and related demolition and re-arrangement of existing equipment, feeders, vacuum pumps, and wiring.

(12) Replace existing 400 Amp fused disconnect switch with 600 Amp fused disconnect switch part of "T1" power panel.

(13) Furnishing and installing all required sleeves, thimbles, anchors, hangers, bolts, etc.

(14) Performing all necessary cutting and coordinating with general contractor for patching.

(15) Testing electrical systems, equipment and wiring.

(16) Pay any and all fees necessary to furnish, install and maintain all of the contractor's temporary power requirements and to supply the permanent power to the Norfolk Southern Railroad Service Pole.

(17) Furnishing and installing two (2) new electrical manholes.

(18) Temporarily relocate Feeders 340 and 508 conflicting with construction, restoring to the permanent location after construction is completed.

(19) Temporarily relocate North Broad U/P Station Feeders in conflict with construction and restoring same to permanent location after construction is completed.

(20) Relocate Feeders 400 and 432.

(21) Feeders 170, 408, and 90 shall remain in place. No work required.

1.1.1 Layout

The drawings which constitute a part of this contract indicate the general layout of the electrical system required. Items not specifically mentioned, but obviously necessary to make a complete installation, shall be included. The drawings shall be used for general guidance only. Contractor shall verify all dimensions, sizes, location, etc., in the field; do not scale.

1.1.2 Routing

The drawings showing the layout of the electrical work indicate the general arrangement of outlets, switches, receptacles, switchgear, mechanical and other equipment. The runs of feeders and branches are intended to show the preferred routing of conduits. The Contractor shall obtain the approval of the Contracting Officer before changing the routing of raceways indicated on the plans. The Contractor shall consult all drawings, which may affect the location of any outlet, apparatus or equipment, and shall adjust his work to avoid interference. Any reasonable change in the location of an outlet, apparatus or equipment, up to the time of roughing-in, is reserved by the Contracting Officer, and any minor

deviations shall be made without additional cost.

1.1.3 Maintenance

It shall be the Contractor's responsibility to see that all equipment, such as junction boxes, pull boxes, switchgear, conduits, disconnect switches and other apparatus, as may require maintenance from time to time, is made easily and readily accessible. Although the location of the equipment may be shown on the drawings, the construction may disclose the fact that such location does not make its position readily accessible, in which case the Contractor shall call the Contracting Officer's attention to the conditions before advancing the construction to a point where a change in location would require additional cost.

1.1.4 Materials

All materials shall be new and shall conform with the standards of Underwriter's Laboratories in every case where such a standard has been established for the particular type of materials in question.

1.1.5 Installation

All equipment shall be installed in accordance with the manufacturer's recommendation and any conflicting data shall be verified before bids are submitted.

1.1.6 General

It is the Contractor's responsibility to satisfy himself as to the nature and location of the work, the general conditions, availability of labor, water, electric power, roads, physical conditions at the site, the existing equipment to remain, existing equipment to be modified or to be removed, and all other matters which can in any way affect the work or the cost thereof under this contract. Any failure by the Contractor to acquaint himself with all available information will not relieve him of responsibility of successfully performing the work.

1.1.7 Load Requirements

The Contractor shall be responsible to coordinate with the equipment suppliers for determination of the exact service points for the equipment shown on the drawings and shall verify the load requirements. Any discrepancies between the actual load requirements and those shown on the drawings shall be brought to the attention of the Contracting Officer for resolution prior to accomplishment of the associated work.

1.2 MEASUREMENT AND PAYMENT

There will be no separate measurement or payment made for completion of all items of work specified in this section. Payment for all costs associated with the completion of this section shall be included in the contract lump sum price for "ELECTRICAL WORK".

1.3 APPLICABLE PUBLICATIONS

The following standards of the issues listed below and referred to thereafter by basic designation only from a part of this specification to the extent indicated by the references thereto:

AMERICAN SOCIETY FOR TESTING AND MATERIALS

B1 (2001) Standard specification for hard drawn wire

B8 (1999) Standard specification for concentric-lay-stranded copper conductors, hard, medium hard or soft

C144 (1999) Standard specification for aggregate for masonry mortar

C150 (2002) Standard specification for portland cement

C270 (2001a) Standard specification for mortar for unit masonry

D709 (2001) Standard specification for laminated thermosetting materials

INSITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

STD 100 Dictionary of electrical and electronics terms

STD 383 Tray cable

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ICS 1 (2001) Industrial control and systems; general requirements

ICS 2 (2000) Industrial and systems; Instructions for the handling, installation, operation, and maintenance of motor control centers rated not more than 600 volts.

ICS 6 (1993, R2001) Industrial control and systems: Enclosures

TC 2 (1998) Electrical polyvinyl chloride(PVC)conduit and tubing

TC 3 (1999)PVC fittings for use with rigid PVC conduit and tubing

MG 1 (1998)Motors and generators

C80.1 (1994) Specification for rigid steel conduit, zinc coated

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

70	(2002) National electrical code

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

C80.5	Aluminum rigid conduit
C82.4	Ballast for high intensity discharge and low pressure sodium lamps
C57.96	Standard for loading dry type distribution and power transformers

UNDERWRITERS LABORATORY (U.L.)

1	(2000) Flexible Metal Conduit
6	(2000) Electrical rigid metal conduit-steel
6A	(2000)Electrical rigid metal conduit-aluminum, bronze, and stainless steel
44	(1999) Thermoset-insulated wires and cables
50	(1995) Enclosures for electrical equipment
67	(1993) Panelboards
360	(1996) Liquid-tight flexible steel conduit
467	(1993) Grounding and bonding equipment
489	(2001) Molded-case circuit breakers, molded case switches and circuit breaker enclosures
506	(2000) Specialty transformers
1072	(2001) Medium voltage power cables
1277	(2001) Electrical power and control tray cables with optional optical fiber members

ASSOCIATION OF EDISON ILLUMINATING COMPANY (AEIC)

CS6	(1996) Specification for ethylene propylene rubber insulated shielded power cables rated 69 KV

INSULATED CABLE ENGINEERS ASSOCIATION (ICEA)

ICEA-S-95-516 Non shielded 0-2KV cables

1.4 CODES, PERMIT AND INSPECTIONS

The installation shall comply with all laws applying to electrical installation in effect and in accordance with the last edition of the National Electrical Code, the requirements of the City of New Orleans Regulatory Department, and the Fire Marshal of the State of Louisiana. Electrical Contractor shall be licensed in the State of Louisiana. The Contractor shall obtain an electrical permit from the City of New Orleans and after completion of the work, shall furnish a Certificate of Inspection and Completion from the City of New Orleans, and shall obtain all other permits required from any other affected agency.

1.5 INCIDENTAL COST OF FEES AND UTILITY CO. CHARGES

The Contractor shall include, as part of this Contract, all fees and costs incidental to the electrical work, including inspection certificates.

1.6 SUBSTITUTION OF EQUIPMENT

Where plans and/or specifications mention the name of a manufacturer or the products of specific manufacturers, the phrase "or an approved equal" is implied. The Contractor shall furnish the specified item, or similar items of other manufacturers if approved by the Contracting Officer, as equal in quality and utility to the specified item or items. It shall be the Contractor's responsibility to furnish the information and data sufficient to establish the equality and utility of the items in question. No substitutions will be permitted without the written approval of the Contracting Officer.

1.7 SUBMITTALS

Shop drawings shall be submitted to the Contracting Officer for approval and shall consist of a complete list of equipment and materials, including manufacturer's descriptive and technical data, catalog cuts; and any special installation instructions that may be required. The label or listing of the Underwriter's Laboratories, Inc. will be accepted as evidence that the materials or equipment conform to the applicable standards of the agency. All lists of equipment and materials for which submittals are required are listed below. Additional information or equipment and material submittals may be required.

(1) High voltage cable.

(2) Low voltage cable.

(3) Transformers.

(4) Lighting fixtures.

(5) Convenience outlets and switches.

(6) Motor starters and disconnect switches.

(7) Splices, terminations, splice and cable support racks and hardware.

(8) Control and Specialty Cables.

(9) Light Poles, Hardware.

(10) Conduit.

(11) Fabricated Pull Boxes.

(12) Electrical Manholes.

1.8 OPERATING AND MAINTENANCE MANUALS

The Contractor shall furnish to the Contracting Officer, prior to final acceptance, a set of five (5) copies of literature of all component parts installed within the new and existing buildings. This information shall show the model number, individual part numbers, etc. Maintenance brochures with illustrated part diagrams are required for all electrical equipment.

Eight (8) copies of all manuals for the following data must be submitted.

(a) Transformer.

1.9 SAFETY

(1) The Contractor shall take proper precautions to safeguard his safety and security fence and the Board's facility during his work. Personnel or employees shall be equipped with safety devices while working over water. Only approved methods of construction shall be used.

(2) The completed installation and operations during installation shall comply with the occupational Safety and Health Act (OSHA) and all changes in effect at the time proposals are submitted.

1.9.1 Sign-Out Procedure for Feeder Outages

(1) S&WB Feeders outages are required and shall be allowed to complete the work of this contract. The Contractor shall coordinate his work leading up to and during said outages with the S&WB Power Dispatcher at 865-0575 who shall be given 48 hours minimum advanced notice of Contractor's desire to schedule an outage, and shall abide by the particular cautions, requirements, and possible restrictions set by

the S&WB. Special permission must be granted for feeders to be left de-energized for more than an eight hour workday.

(2) The Contractor's representative shall personally appear at Drainage Station No. 3, as early as possible on each day he intends to perform work in close proximity to the feeders and desires clearance for protection of his personnel and equipment. The power dispatcher will either advise the Contractor that prevailing weather conditions prevent clearance of the feeders, or will de-energize the feeders and sign same out in the name of the Contractor's representative. No attempt to restore power can be made unless the name of the Contractor's representative has been personally removed from the feeder through the Power Dispatcher's Office.

(3) At the expiration of each day that the feeders have been cleared, the Contractor's representative shall personally appear at the same Board facility to remove his name from the feeders. Test power will be applied to verify their integrity and service ability.

(4) The Contractor shall maintain a telephone at the job site at which he can be reached during the day should emergency conditions arise which will require re-energization of the feeder.

(5) The Contractor shall furnish, in addition to the job site telephone number, his home number for use by the Power Dispatcher in the event that the feeders are not released at the expiration of each working day.

PART 2 PRODUCTS

2.1 SLEEVES, INSERTS AND THIMBLES

Furnish and install all necessary sleeves, inserts, thimbles, anchor bolts, etc., required for conduit, lighting fixtures or other electrical equipment. The proper location of all inserts, sleeves, thimbles, anchor bolts, etc., is the responsibility of the Electrical Sub-contractor.

2.2 HIGH VOLTAGE CABLE

2.2.1 General Requirements - Medium Voltage Power Cables

(1) All cable furnished shall comply with all applicable paragraphs of the following section for "Detailed Medium Voltage Cable Specifications". Submittal data shall be complete with all necessary data sheets, documentation, specifications, etc., necessary and proper to show complete compliance with the detailed specifications, including compliance with all guaranteed test values.

(2) All cable furnished shall comply with all applicable paragraphs of the following section for "Detailed Medium Voltage Cable Specifications". Submittal data shall be complete with all necessary data sheets, documentation, specifications,

etc., necessary and proper to show complete compliance with the detailed specifications, including compliance with all guaranteed test values.

(3) All cable shall be manufactured in the United States. Foreign manufactured cable will not be accepted. Cables offering insulation material compounded outside the USA will be considered foreign and will not be accepted.

(4) Cable manufacturer shall be responsible for all phases of cable construction from laying of conductors through application of outer jacketing and shall perform the complete manufacturing cycle at one factory location. Cables which are purchased in semi-complete condition and jacketed by manufacturer will not be accepted.

2.2.2 Multi-Conductor (CLX) Medium Voltage Cable

The temporary feeders 340 and 508 shall consist of a 15kv, Type MV-105, Okoguard, 133% insulation level, 500 MCM and 750 MCM respectively, 3/conductor, CLX cable with Okoseal Jacket.

2.2.3 Single Conductor Medium Voltage Cable

(1) Each permanent feeder 340, 432 and 508 shall consist of three (3) single conductors. Cables shall be 15 rated Type MV-105, Okoguard-Okjoseal, 133% insulation level sized as shown on the plans.

(2) Each cable shall consist of uncoated Class B stranded copper conductors, extruded EPR based semiconducting strand screen, extruded thermosetting ethylene propylene based insulating compound, extruded EPR based thermosetting compound insulation screen, uncoated copper tape shield applied with 12-1/2% overlap, and outer jacket of PVC materials.

2.2.4 Detailed Medium Voltage Cable Specifications

2.2.4.1 General Cable Description

Basic cable construction shall consist of stranded copper conductors, extruded semiconducting thermosetting strand screen, extruded ethylene propylene rubber insulation, extruded semiconducting thermosetting insulation screen (strand screen, insulation, and insulation screen) shall be applied by a Single Pass (Triple Tandem Extrusion Process) , copper shielding tape and other jacketing as required above, and as specifically described hereinafter.

2.2.4.2 Cable

Cable shall be three conductor type MV105 or single conductor Type MV-105-CT shielded copper medium voltage (5 KV, 8 KV and 15 KV) at 100% or 133% insulation levels. UL

listed as Type MV-105-CT rated as 90 degrees C normal continuous, 140 decrees C emergency and 250 degrees C short circuit.

2.2.5 Conductors

(1) Conductor shall be uncoated copper, Class B stranded as per ASTM B-8 with the minimum number of wires noted below:

CONDUCTOR SIZE AWG OR KCMIL	NUMBER OF STRANDS
8 - 2	7
1 - 4/0	19
250 - 500	37
501 - 1000	61

(2) Conductor shall comply with requirements of UL1072, ICEA S-68-516 and AEIC CS6.

2.2.6 Insulation System

The conductor insulation system shall be composed of an extruded strand screen, extruded EPR insulation, and extruded thermosetting insulation screen, all applied in a single pass utilizing the triple extrusion process.

2.2.6.1 Strand Screen

The strand screen shall consist of an ethylene propylene rubber based extruded semiconducting thermosetting compound applied over the conductor. The screen shall be clean stripping from the conductor and inseparable bonded to the overlying insulation. The thickness of the conductor screen shall be as specified in Table I with a 80% minimum point.

TABLE I

CONDUCTOR SIZE AWG OR KCMIL	CONDUCTOR SHIELD THICKNESS (MILS) Min. Average	Min. Point
8-4/0	15	12
250-500	20	16
501-1000	25	20

The D-C volume resistivity of the extruded conductor shield shall not exceed 50 meter-ohms at 90 degrees C when tested.

The strand screen shall meet the requirements of ICEA S-68-516, AEIC CS679 and

UL1072.

2.2.6.2 Insulation

The insulation shall be flexible thermosetting high dielectric strength compound based on an ethylenepropylene elastomer. It shall be contrasting in color from the extruded strand and the insulation screens and shall be compliant with the physical and aging requirements specified hereinafter. The ethylene content of the elastomer used in the insulation compound shall not exceed 72% by weight of ethylene to limit the degree of susceptibility to treeing experienced by highly crystalline materials. The minimum average thickness of insulation shall not be less than the value specified in Table II below:

TABLE II

RATED VOLTAGE PHASE TO PHASE KV	CONDUCTOR SIZE AWG/KCMIL	INSULATION THICKNESS-MILS 100% INSUL. LEVEL	133% INSUL. LEVEL
5	8-1000	115	115
8	6-1000	115	140
15	2-1000	175	220

2.2.6.3 Insulation Screen

The insulation screen shall consist of an ethylene propylene rubber based semiconducting thermosetting compound applied over the insulation with a volume resistivity not in excess of 75 ohm-meters at 90 degrees C when tested per AEIC NO. CS-6. The extruded screen shall be clean stripping and shall have a peel strength from the insulation between 6 and 18 lbs./O.5 inch width when tested per AEIC NO. CS-6. The thickness of the extruded screen shall be as specified in Table III.

TABLE III

O.D. OVER INSUL.(INCHES)	INSULATION SHIELD THICKNESS (MILS) MIN. POINT	MAX. POINT
0-1.000	24	70
1.001-1.500	32	70
1.501-2.000	40	85
2.001 & Larger	40	100

The entire thickness of the insulation screen shall be contrasting in color from the insulation.

2.2.6.4 Metallic Shield

The outer insulation screen shall be covered with a 5 mil copper tape shield. It shall be applied helically with 12-1/2% nominal overlap. Standard tape shields shall be uncoated copper. Shielding on cable rated for Tray Service shall be tinned, coated copper tape for Hypalon Jackets, uncoated for PVC jackets approved for CT service.

2.2.6.5 Jacket

The overall jacket shall be polyvinyl chloride (PVC) or chlorosulfonated polyethylene which shall meet requirements specified hereinafter. The jacket thickness shall be as shown in Table IV.

TABLE IV

CABLE CORE DIAMETER(INCHES)	JACKET THICKNESS - MINIMUM AVERAGE STANDARD CABLE(MILS)	TERMITE CABLE(MILS
0-0.425	45	--
0.426-0.700	60	--
0.701-1.500	80	50
1.501-2.500	110	--
2.501 & Larger	140	--

2.2.6.6 Operating Experience

The medium voltage power cable shall have a performance record demonstrating a minimum of fifteen (15) years successful operation experience in utility and industrial power cable applications.

2.2.6.7 Cable Identification

Cable shall be identified in accordance with AEIC-CS6. Cable surface shall be printed with manufacturer's identification, type of insulation, size of conductor, rated voltage, year of manufacture, insulation thickness and UL listing.

2.2.7 Testing

2.2.7.1 Routine Tests of Factory Reel Lengths

Conductor Resistance: Conductor DC resistance shall comply with UL1072, IECA S-68-516, and AEIC CS6 requirements as applicable.

2.2.7.2 Production Tests

(1) Conductors shall meet the electrical requirements of ICEA S-68-516 Section 2.5.

(2) Insulation Resistance test shall be performed in accordance with requirement of ICEA S-68-516, Part 6.28. Each cable shall have an insulation resistance not less than that corresponding to the insulation resistance constant of at least 50,000 megohms-1000 ft. at 15.6 degrees C.

(3) A high voltage AC and CD test shall be performed in accordance with Part 6.27 of ICEA S-68-516 at the AC and DC test voltage given in Table V.

(4) Each reel of completed cable shall withstand, for a period of 5 minutes, the 60 cycle AC test voltage and a period of 15 minutes the D. C. test voltage. The completed cable shall be tested with the voltage applied between conductor and shield with the cable in air in accordance with ICEA, UL and AEIC standard as applicable.

(5) Shield resistance is measured and recorded from end to end on the completed cable.

TABLE V

RATED VOLTAGE KV	INSULATION THICKNESS		5 MIN. A.C. WITHSTAND TEST KV		15 MIN. D.C WITHSTAND TEST KV	
	100% Level	133% Level	100% Level	133% Level	100% Level	133% Level
5	115	115	18	18	45	45
8	115	140	18	22	45	55
15	175	220	27	33	70	80

2.2.7.3 Corona Test

Each reel of completed cable shall be subjected to the partial discharge extension level test performed in accordance with the test procedure described in Section G of AEIC AS6. The partial discharge in picocoulombs shall not exceed the values in the following Table VI.

TABLE VI

Picocoulombs All Voltage	5	5	20	35	50

Rated Cable Voltage (KV)	Corresponding Test Voltage (KV)

5	3.0	4.5	6.0	7.0	9.
8	4.5	7.0	9.0	11.5	14.0
15	8.5	13.0	17.5	21.5	26.0

2.2.7.4 Test Reports

Manufacturer shall furnish one (1) certified copy of test results for all routine and factory production tests, as specified above, for approval of the Contracting Officer prior to shipment. Test results shall clearly indicate compliance with the requirements of these specifications or the cable shall be ejected as unsuitable for use. Any cable shipped and/or installed without acceptance of the Contracting Officer may be rejected and no payment shall be made therefore.

2.2.8 Physical and Electrical Characteristics of Etheylene Propylene Rubber Dielectric

When samples from completed cable are tested in accordance with the ICEA specifications, the vulcanized insulation shall meet the following values:

		ICEA	GUARANTEE
a.	Physical Requirements Unaged		
	Tensile min. psi @ 15.6C	700	1200
	Elongation % min.	250	250
	200%, Modules, psi min. @ 15.6C	N.R.	600
b.	Aging Requirements After Air Oven for 168 hrs. @ 121C		
	Tensile, % of unaged, min.	75	90
	Elongation % of unaged, min.	75	85

		ICEA	GUARANTEED
c.	Ozone Resistance After 24 hrs. @ 0.025 to 0.030%	N.R.	No Cracks
d.	Dielectric Traits @ 15.6C		
	SIC @ 8OV/mil, max.	4	3
	% Power Factor @ 80V/mil max.	2	1
	IR Constant (K) min.	20,000	50,000
e.	Electrical Traits @ 90C After 24 hrs. water		

	immersion @90C	N.R.	
	SIC, 80V/mil max.		3
	% pf		1.5
	After 26 wks. water immersion @ 90C	N.R.	
	SIC, 80V/mil max.		3.1
	% pf		1.5
	Stability Factor (pf @ 80-40 V/mil) max.		0.2
f.	Mechanical Water Absorption 168 hrs. @70C, mg/sq in, max.	N.R.	5
g.	Accelerated Water Absorption EM60-75C		
	SIC after 24 hrs. max.	4	4
	Increase in SIC, % max.		
	1-14 days	3.5	3.5
	7-14 days	1.5	1.5
	Stability Factor after 14 days max.	1.0	1.0
	Alternate to Stability Factor		
	1-14 days max.	0.5	0.5
h.	Degree of Cure		
	Heat distortion, % max.		10
	Hot Creep, % Elongation max.	50	50
	Set, % max.	5	5

2.2.9 Physical Characteristics of Polyvinylchloride Jacket

When tested in accordance with the ICEA specification, the jacket shall meet the following values:

		ICEA	GUARANTEED
a.	Physical Requirements Unaged		
	Tensile min. psi	1500	1500
	Elongation min.	100	100
b.	Aging Requirements After Air Oven for 120 hrs. at 100C		
	Tensile, min. % of unaged	85	85
	Elongation, min. % of unaged	60	60

c.	Oil Immersion Requirements In ASTM #2 Oil for 4 hrs. at 70C		
	Tensile, min. % of unaged	80	80
	Elongation, min. % of unaged	60	60
d.	Heat Distortion Air Oven, 1 hr. at 121C		
	% max.	50	50
e.	Heat Shock Air Oven, 1 hr. at 121C	No Cracks	No Cracks
f.	Cold Bend After 1 hr. at -35C	No Cracks	No Cracks

2.2.10 Medium Voltage Cable Connections and Splices

2.2.10.1 Switch Gear Connection

Medium voltage cable connections to switchgear bus shall be accomplished by crimping lugs to the cables. Lugs shall be bolted to switchgear bus and torqued to manufacturer's recommendation. Insulate cable to bus connection with Raychem HVBC Bus Termination heat shrinkable kits, Insulating Sheets Type HVIS, or manual hand taping with materials as noted above.

2.2.10.2 Trifurcating Splices

Trifurcating Splices for Feeders 340, 432 and 508 new single conductor cables shall be spliced to existing lead covered three conductor cable by means of trifurcating splices. Said splices consist of crimping properly prepared conductor ends in proper phase sequence, taping necessary and proper for the working voltage and application of overall lead splice sleeve. The lead sleeve shall be wiped directly to the three conductor cable jacket. A three phase crotch piece shall be furnished for installation within the overall sleeve to separate the single conductor cables. Lead wipe three individual lead tubes to crotch piece to encase the single conductor cables and wipe the overall lead sleeve completely and properly around the three tubes. Seal cable and tube juncture with heat shrink tubing containing internal sealant. Completely and properly fill the interior of the splicing sleeve with NO VOID - "C" splicing compound and solder close the fill and vent holes. The lead wipe shall be accomplished using the hand wipe Solder Method. Sealing of splice sleeve to lead jacketing by use of bar or string solder applied with a torch will not be permitted. Trifurcating splice kits as available from MAC Products, Dwg. S-2597, Straight Splice Kit for 3/C RILC Shielded Cable to 3-1C Polymeric Shielded Cable.

2.2.10.3 Conventional Splicing

Single Conductor Medium Voltage 15 KV Cables shall be spliced using standard splice kits, Raychem Type HVS, or as recommended by the cable manufacturer. Provide custom crimp sleeves, 600 to 750 MCM and 400 to 500 MCM.

2.2.10.4 Three Phase Splices

Three phase splices made in cable trays shall be staggered to use minimum tray cross sectional area.

2.3 MOTORS

(1) Motors which form an integral part of a driven machine will be properly connected by this Contractor.

(2) Motors which are not an integral part of equipment shall be properly handled, set aligned and connected by this Contractor, to the satisfaction of the Contracting Officer.

(3) Final connection to motors shall be through "liquid tight" flexible metal conduit sealtight or equal (18" maximum length). Insert ground within the conduit. No rigid connection shall be made to any portion of the motor or its base beyond its isolation mountings.

2.4 CONTROL SYSTEMS

(1) Control wiring shall be multi-colored throughout the installation in order to separate the various circuits and equipment. Furnish and install correspondingly numbered vinyl wire markers at each termination.

(2) All wiring for interlocking and sequencing devices shall be furnished as work of this section. All interlocking wiring between starters and control devices and control wiring, solenoid valves, water pressure switches, etc., for the mechanical equipment shall be furnished and installed as work of this section.

2.5 SAFETY SWITCHES

(1) All safety switches shall be unfused, 250 volt, UL listed, and shall meet or exceed Federal specifications W-S-865C for Type HD enclosed heavy duty switches, and NEMA Enclosed Switch Standard KS1-1983 for Type HD switches. Fusible switches shall be listed for 200,000 RMS Symmetrical Amperes Interrupting Capacity when used with Class J or R fuses.

(2) Safety Switches shall be premium Construction Specifications Grade, heavy duty type, visible blade with quickmake, quick-break mechanism, rated 600 volts, three pole ampere ratings shall be as indicated on the plans, either fusible or non-

fusible as shown on the plans.

(3) Safety switch enclosures shall be NEMA 1 for indoor mounted switches and NEMA 4X stainless steel for outdoor mounted switches, with full cover interlock and defeater mechanism.

(4) Double throw safety switches shall be 250 volt, unfused, with quick-make, quick-break mechanism through 200 ampere rating and shall conform to the standards listed above in paragraph (2.3(1)).

2.6 FUSES

(1) All 250 volt fusible equipment shall be equipped with Buss dual element Fusetron Type R rejection fuses. Contractor shall furnish fuses as shown on the plans.

(2) Furnish 10% spare fuses, but no less than three (3) of each rating and voltage level used.

(3) Control fuses shall be furnished as required by the particular control device. Provide spares as outlined above.

(4) Switchgear control fuses shall be furnished as recommended by the manufacturer. Provide spares as outlined above.

2.7 NOISE AND VIBRATION CONTROLS

Where transformers, starters or other vibration and hum producing devices are mounted, vibration damping or isolating supports shall be used to mount such equipment. Liquid tight flexible metal conduit, Sealtight or equal (18" maximum length) shall be used to feed this equipment.

2.8 GROUNDING

(1) The grounding system shall be in accordance with the National Electrical Code, Article 250 and local codes.

(2) All grounding connections shall be made with approved type copper grounding lugs or clamps and shall be in accessible locations. All ground wires within equipment or conduit and where extending free from conduit systems shall have green THWN insulation for ease of identification. Green taping or painting of conductors is forbidden.

(3) Only green or bare grounds shall be used. A separate ground conductor, Type THHN/THWN, sized in accordance with Table 250-95 of the N.E.C., shall be run in all conduits and bonded to the raceway system. Painted or taped insulation will

not be accepted as a substitute for green insulation.

(4) All metallic conduit, transformers, supports, switchgear enclosures, cabinets, boxes and other equipment enclosures shall be grounded in accordance with the N.E.C.

(5) Motor frames shall be grounded through a separate grounding conductor included in the conduit.

(6) Provide insulated throat grounding bushings on all conduits entering switchgear, MCC's enclosures, boxes, panels, etc. Internal ground wires from conduit shall be bound to bushings and to enclosures, ground buses, etc.

2.9 LIGHTING FIXTURES

(1) Contractor shall furnish and install all lighting fixtures and associated equipment for all lighting outlets as shown on the plans and listed in the schedule of fixtures, including the connection of the fixtures and equipment to the electrical wiring of the building.

(2) Contractor shall supply necessary brackets, and all necessary hardware to properly install fixtures.

(3) Fixtures shall be designed, built, tested and provided with U.L. labels.

(4) All lamps shall be Sylvania or G.E.

(5) Ballasts: HID shall be ANSI C82.4, select exterior ballast for reliable starting to -20 degrees fahrenheit.

(6) Lighting Poles shall be as shown on drawings.

(7) Relamp all fixtures which have failed lamps at completion of work.

(8) Extra Stock: Provide 20 percent (minimum one) of each lamp size and type. Provide 3 percent (minimum one) of each type and size of lens. Provide 10 percent (minimum one) of each type and size of ballast.

2.10 MOTOR STARTERS

2.10.1 General

(1) The intent of these specifications is to outline the minimum requirements to be met by full voltage, nonreversing, combination type switch and fuse motor controllers to be used for the vacuum pumps.

(2) Motor controllers shall be free standing, three phase, 25 HZ, 240 volts service, with corrosion resistant enclosures. Controllers shall be known to function properly in potentially destructive atmospheres, and shall have a proven record of service and relatively maintenance free operation in said environments.

(3) Each motor controller shall be reduced voltage auto transformer type, non-reversing and shall be complete with cover mounted overload reset button, "Hand-Off-Auto" control switch, "LED" Type Red pilot light, three (3) normally open auxiliary contacts, fused control power transformer, and 120 volt AC operating coil.

(4) Motor controllers furnished shall be Allen Bradley Bulletin 512 as specified hereinafter, or an approved equal.

2.10.2 Enclosure

(1) Each enclosure shall be heavy duty, NEMA 1A Gasketed. Conduit entry shall be bottom, same as existing.

(2) Enclosure door shall be factory drilled to accept and shall be fitted with the following heavy duty, oil tight pilot devices:

One (1) "Hand-Off-Auto" three position selector switch with nameplate.

One (1) transformer type "LED" pilot indicating light with red color cap and nameplate reading "RUN".

One (1) overload reset push-button.

(3) Doors shall be interlocked to disconnect switch mechanism to prevent opening with switch in the "ON" position. An interlock defeat mechanism shall be provided for maintenance access by trained personnel.

(4) Doors shall be fitted with padlocking provisions to prevent unauthorized entry.

2.10.3 Disconnect Switch

(1) Each combination motor controller shall have a flange mounted visible blade, heavy duty, quick make, quick break, three pole, gang operated disconnect switch for safety of operating and maintenance personnel.

(2) Switch handle shall be Red/Green color coded to indicate its position and shall bear clearly printed "ON" and "OFF" labeling in contrasting colors. The switch handle shall be capable of receiving up to three (3) 3/8" diameter shackle padlocks for positive "Lock-Out" safety protection.

(3) The switch handle shall be in control of the three blades and disconnecting mechanism at all times, independent of door position. An interlock and defeater shall be furnished to prevent normal door entry with the switch in the "ON" position.

(4) Visible blades shall be provided to insure that maintenance and operations personnel can determine, at a glance, the position of the disconnect blades. Line side terminal guards shall be provided on the switch mechanism to lessen danger of shock hazard with the door opened.

2.10.4 Contactors

(1) Each contactor shall be NEMA rated constructed to operate with electrically actuated and held-in vertical "closure" and gravity "dropout" design to effectively "fail safe".

(2) Magnet and armature laminations shall be phosphorized, prior to assembly, to resist corrosion. Shading coils shall be pressed into place in the laminations and the entire assembly shall be epoxy dipped. The intent is to secure the shading coils for longer life and more effective operations and to draw epoxy between the laminations to prevent laminations shift or movement. Such construction shall effectively eliminate chatter and hum commonly encountered in contactors applied in harsh service. The pole faces shall then be ground and the entire assembly re-phosphorized to prevent corrosion at the pole faces. The magnet assembly shall have a permanent non-wearing air gap to limit residual magnetism which may prevent a clean release.

(3) The contactor base and movable contact carrier shall be constructed of fiber reinforced polyester for strength, long life, and resistance to carbon tracking. The contact carrier shall be fitted into the base utilizing a positive alignment tongue and groove guidance system to provide accurate alignment. Magnet and coil shall be keyed to fit only one way to prevent improper field assembly.

(4) The contactor and overload relay assembly (specified hereinafter) shall be mounted on a substantial steel baseplate, as tabulated below, with zinc chromate finish for 3-slot mounting to enclosure. The contactors shall be tested and certified capable of the number of mechanical operations as tabulated below:

Nema Sizes	Min. # of Mech. Operations	Min. Baseplate Thickness
0 - 2	10 million	0.065"
3 - 5	5 million	0.109"

(5) Contactors shall have been Life Load Tested per the requirements defined in IBC Standard 947-4 for Utilization Category AC3, the starting of

squirrel cage motors and switching with motor up to operating speed, and Category AC4, the starting of squirrel cage motors with inching and plugging duty. Provide life load curves as part of data to be submitted with bids as specified hereinafter.

(6) Each contactor shall be designed for the addition of up to eight (8) bifurcated, isolated auxiliary contacts. All control terminals shall have retractable wire clamps with clamp conductor strands between two (2) non-rotating surfaces. The contactors shall have straight through wiring design with clearly marked terminals, prominent "On-Off" indication, and total front accessibility. All terminals shall be identifiable and accessible for wiring or maintenance without disturbing other components. All terminals shall be clearly identified with print of contrasting color to general background.

Each contactor shall have a durable product nameplate, of print contrasting with background, which shall be visible from the front, and legible in substandard lighting conditions. The following information shall be provided on the nameplate, as a minimum:

Catalog Number
Series Number or Letter
Continuous Ampere Rating, Voltage Rating
UL Label or Mark
Manufacturer Name and Location

2.10.5 Starters

(1) Starters shall be of the single-step closed transition autotransformer type and shall have an adjustable tune interval between application of reduced and full voltages to the motors.

(a) Provide adjustable pneumatic tuners.

(b) Provide three-phase overload protection relays.

(c) Provide terminal strip for control and interlock wiring.

(d) Provide red run pilot light.

(e) Provide ammeter and voltmeter with phase selector switches.

2.10.6 Operating Coils

(1) Operating coils furnished under this contract shall be 120 volt, 25 Hz and shall be fabricated of hot pressure molded thermoset epoxy to protect the windings from moisture and vibrational damage and to dissipate heat. Coil design shall include a shunt plate to assure "seal-in" voltage is reached before pickup occurs. A thermal cutout shall be imbedded in the coil to interrupt the coil circuit under extreme high

temperature to prevent damage to other motor starter components.

(2) All coils shall be color coded for their operating voltage levels and shall have catalog number, voltage and frequency clearly printed on the front, in contrasting color, to allow clear and precise identification in substandard lighting.

(3) Specially manufactured coils shall be available from the manufacturer with 25 Hertz rated windings to allow application to the Sewerage and Water Board generated power system. In addition, coils shall be suitable for application to the 25 Hertz system without causing hum and chatter, when applied at double the voltage rating of the control circuit (i.e. 220 volt, 60 Hz coil on 110 volt, 25 Hertz circuit).

(4) Standard encapsulated coils shall have Lifetime Replacement Warranty.

2.10.7 Overload Relays

(1) Overload relays shall be eutectic (melting alloy) Type, "trip free", with tamper-proof, non-convertible, construction. Overload relay shall have manual reset from interior or exterior of enclosure and shall provide optical trip indicator, test module, and provisions for alarm contact addition.

(2) Thermal (Heater) units shall be one piece, factory calibrated, to provide NEMA Class 20 protection. The overload relays shall also accept Class 10 and Class 30 Thermal Units without modification.

(3) Power contacts shall be double-break with silver cadmium oxide finish and shall be field replaceable without removing power wiring.

2.10.8 Control Power Transformer

(1) Control Power shall be from self-contained, individual 120 volt power transformer, with two fused primaries and fused/grounded secondary.

(2) Control Power Transformer shall be sized so as to be capable of providing power to motor space heaters.

2.10.9 Auto Transformer

(1) Auto Transformer shall be provided with 80% and 65% available taps.

2.10.10 Testing and Certification

(1) The complete motor controller device, consisting of enclosure switch, contactor and overload relay, shall be UL listed for applications at up to 100,000

amperes RMS symmetrical at up to 600 volts AC.

(2) The controller shall have UL Certified Type 2 coordination allowing its use with any brand of UL listed or CSA Certified RK1 or Type J fuse to provide up to 100,000 amp RMS Symmetrical withstand at up to 600 volts AC with Type 2 coordination. After withstanding fault conditions as described above, the controller shall be suitable for further use.

(3) Contactors shall have been tested for Mechanical Operations and shall have been load/life tested as previously specified.

2.11 DRY TYPE TRANSFORMERS

(1) The transformers and all components shall be designed, manufactured and tested in accordance with the latest applicable standards of ANSI and NEMA. Transformers shall be UL-listed and bear the UL label.

(2) Transformers shall be 25 Hz, 100 KVA, 6600-240/120 volts. Contractor shall supply three transformers wired Delta-Delta. The phase "AB" transformer center tap shall be grounded and the "C" phase shall be labeled "stinger leg" (conductor shall be colored orange).

(3) Transformers windings shall be copper. The insulation shall be based on 220 degrees C insulating materials providing a transformer temperature rating of 150 degrees C rise above 40 degrees C maximum ambient, when operating 15% continuous overload. All insulation materials shall be flame-retardant and shall not support combustion as defined in ASTM Standard Test Method D635.

(4) Transformers shall be designed for continuous operation at rated KVA, for 24 hours a day, 365 days a year operation, with normal life expectancy as defined in ANSI C57.96.

(5) Transformer sound levels shall not exceed 50 db based on ANSI and NEMA standards. Transformer core shall be constructed with high-grade, non-aging, grain-oriented silicon steel with high magnetic permeability, and low hysteresis and eddy current losses. Maximum magnetic flux densities shall be substantially below the saturation point. The transformer core volume shall allow efficient transformer operation at 10% above the highest tap voltage. The core laminations shall be tightly clamped and compressed. Coils shall be wound of electrical grade aluminum with continuous wound construction.

(6) The core and coil assembly shall be impregnated with non-hydroscopic, thermosetting varnish and cured to reduce hot spots and seal out moisture. The assembly shall be installed on vibration-absorbing pads. Taps shall be two steps above and 4 steps below nominal voltage in 2.5% increments.

(7) The enclosure shall be made of heavy-gauge steel. All transformers shall be equipped with a wiring compartment suitable for conduit entry and large enough to allow convenient wiring. The maximum temperature of the enclosure shall not exceed 90 degrees C. The core of the transformer shall be grounded to the enclosure.

(8) The enclosure construction shall be ventilated, NEMA 2, drip-proof, with lifting holes. All ventilation openings shall be protected against falling dirt.

(9) Enclosures shall be finished with ANSI 61 color weather-resistant enamel.

(10) The following standard factory tests shall be performed on the transformers. All tests shall be in accordance with the latest version of ANSI and NEMA standards.

(a) Ratio tests at the rated voltage connection and at all tap connections.

(b) Polarity and phase relation tests on the rated voltage connection.

(c) Applied potential tests.

(d) Induced potential test.

(e) No-load and excitation current at the rated voltage connection.

(f) The contractors shall install transformers per the manufacturer's recommendations and the contract drawings. Adjust taps to deliver appropriate voltage. Measure primary and secondary voltages for proper tap settings.

2.12 REMOTE CONTROL CONSOLE

2.12.1 Intent of Plans and Specifications

The intent of these specifications and accompanying drawings is to define the minimum requirements to be met by the Contractor in modification and wiring of Remote Control Console as specified hereinafter.

2.12.2 Drawings

The drawings are intended to depict the actual details of control console, device placement, and required point-to-point wiring. Contractor shall not deviate from methods of wiring required on the drawings. Report any wiring discrepancies to the Contracting Officer for clarification prior to performance.

2.12.3 General

Console is existing. Console shall be modified in place. Contractor shall clean and re-paint console affected area to match existing. All control switchtest pilot devices, terminal strips, nameplates, lugs, fuse blocks, etc., shall be furnished, installed, and wired in the manner called for herein and indicated on the plans.

2.12.4 Wiring

(1) All wiring shall be #14 AWG, stranded, tinned copper type SIS Switchboard wire. Insulation shall be gray Vulkene, 600 volt rated.

(2) All devices shall be terminated on terminal strips located near bottom of console. All wiring termination shall be fitted with AMP insulated shank crimp-on ring tongue terminals. Terminations to box type connections on terminal strips shall be made directly with no additional hardware required.

(3) All wiring shall be labeled with AMP vinyl cloth wire markers, or equal numbering method. Jumpers which are not coded on the drawings shall be identified with wire markers in a manner similar to that used elsewhere on the plans. All individual conductors shall be labeled on each end.

(4) Wiring shall be bundled in a neat competent workmanlike manner. Conductors shall be run straight and parallel within each bundle without twisting. Bundles shall be routed in a manner similar to that shown on the plans with all bundles run parallel and perpendicular to sides and rear of the consoles.

(5) Bundles shall be secured each three-fourths (3/4") inch of length with nylon self-clinching cable ties. Size of cable ties shall be graduated throughout each bundle with smaller ties used as a number of bundles wires decreases.

(6) Panduit or enclosed type bundling systems will not be accepted. Spiral wire wrapping will not be accepted.

2.12.5 Control Compartments

Devices to be installed in the Control Consoles shall be as shown on the drawings and as specified herein. Manufacturer shall submit full catalog data on any components he may wish to substitute, for approval by the Contracting Officer. The decision of the Contracting Officer shall be final and binding with regard to the equality and suitability of requested substitution. No substitution shall be allowed without the expressed written approval of the Contracting Officer.

2.12.6 Nameplates

(1) All control switches, pushbuttons, pilot lights, and terminal strips shall have nameplates.

(2) Nameplates for all control switches, terminal block identification, fuse blocks, and console zone function identifying nametags shall be engraved laminated phenolic with beveled edges, white letters on black background. Inscriptions shall be as specified hereinafter or as shown on the plans.

(3) All phenolic nameplates shall be attached to the consoles with drive screws or self-tapping screws. Adhesive backed or glued nameplates will not be accepted.

(4) Engraved phenolic nameplate sizes shall be as shown on drawings.

2.12.7 Layout of Devices

Manufacturer shall layout all consoles into equal quarters, as indicated on the plans, and mount control devices around and on the center line of each quarter panel. Knockout and drilling plan shall be as shown on the drawings. Pilot and switch placement shall be made to the same basic vertical dimension on all consoles. Consoles shall be ganged in installation and all pilots, switches, etc. shall fall in straight, even horizontal rows and present neat uniform appearance.

PART 3 EXECUTION

3.1 CUTTING AND REPAIRING

All conduit runs, when installed in or under concrete floors, foundations, and bases, shall be laid before pouring. No cutting into a structural member shall be done without the approval of the Contracting Officer. Core and grout all wall and floor penetrations.

3.2 PROTECTION OF FIXTURES, MATERIAL AND EQUIPMENT

The Contractor shall continuously maintain adequate protection of all his work from damage and shall protect the Board's property from injury arising in connection with this contract. He shall make good any such damage, injury or loss. He shall adequately protect adjacent property, as provided by law. Conduit openings shall be capped or plugged during installation. Fixtures and equipment shall be tightly covered and protected against dirt, moisture, chemical and mechanical injury. At the completion of the work all fixtures, material and equipment shall be thoroughly cleaned and left in condition satisfactory to the Contracting Officer.

3.3 CLEANING UP

Remove all debris, surplus and waste materials, oil or stains, resulting from the work performed in the area, building, or on the exterior thereof, prior to final acceptance. The interior and exterior of all electrical equipment shall be thoroughly cleaned of all dust, dirt, debris, oil, etc., prior to final acceptance.

3.4 WORKMANSHIP

All work shall be done in a neat, orderly, workmanlike manner. All conduits shall be properly installed, perfectly parallel and perpendicular to adjoining surfaces. Conduit shall be installed to allow insertion of and withdrawal of wire without damage to the insulation or outer jacket which may occur on wiring during pulling process. Any installation rejected shall be redone at no additional cost to the Government.

3.5 UNDERGROUND AND ENCASED CONDUIT AND MANHOLE INSTALLATION

(1) All conduit installed underground shall be encased in 3/8" aggregate 3000 psi concrete with a 7 to 8 inch slump,4-1/2" rods, 1/4" stirrups, with three inch (3") minimum coverage all around as shown on the drawings. Concrete shall be colored red throughout by addition of 10 pounds red dye per cubic yard of concrete.

(2) The Contractor shall excavate to the depth and section as shown on the plans. Trench shall be dewatered and maintained free of standing or flowing water until concrete has set. Contractor shall be responsible for the water until concrete has set. Contractor shall be responsible for the integrity of the trench and shall provide any necessary sheathing or bracing.

(3) Backfill shall be made in layers not to exceed six inches (6") in depth and shall be firmly tamped between layers. Backfill material shall be suitable granular material conforming to Section 02201 "STRUCTURAL EXCAVATION AND BACKFILL". Density shall be 95% when measured according to ASTM D 2922. Density checks shall be one per lift per 100 linear feet of backfilled trench.

(4) All encased conduits shall be spaced a minimum of 3" apart to allow passage and flow of concrete.

(5) Concrete shall be crowned around conduits emerging from underground ducts to retard collection of water.

(6) Encasement shall extend a minimum of 6" above grade.

(7) Underground duct banks shall be Carlon Schedule 40 PVC, rated for 90 degree C cable or an approved equal. The walls of the trench should act as forms for the concrete encasement where possible. Duct spacing is to be accomplished with the use of Carlon plastic spacers, with plywood support under spacers to keep 3" minimum above trench bottom, approximately 5' apart as shown in drawings. Terminations at manholes shall be reinforced at the ends with malleable iron end bells.

(8) The ducts shall be U.L. listed and shall conform to NEMA standard TCG.

(9) Joints shall be solvent welded in accordance with the recommendations of the manufacturer. Duct, fittings, and cement shall be the product of the same manufacturer.

(10) Duct transition before riser shall utilize rigid heavy wall hot dipped galvanized conduit in lieu of PVC as shown on drawings.

(11) Provide OZ seal fittings on all conduits which emerge from underground and may conduct water into buildings or equipment.

(12) All conduit duct banks shall be pinned to building slab or other terminating structure.

3.6 MANHOLES

(1) Contractor shall construct new manholes in the areas indicated on the plans. Manholes shall be constructed as detailed on Drawing No. 126 of 137. Interior dimensions shall be adjusted from standard required size as indicated on the plans for each manhole.

(2) Manholes shall be constructed of standard modularcommon brick (3-5/8" x 2-1/4" x 7-5/8") with 3/8" mortar joints. All joints shall be completely filled with mortar. Mortar for brick masonry shall meet the requirements for Type N mortar of ASTM C270. Cement shall be Portland Cement Type II, of ASTM C150. Lime shall conform to ASTM C207. Sand Aggregate shall conform to ASTM C144-81.

(3) Each wall shall be leveled and plumbed. A 3/4" thick moistureproof sand-cement mortar coating shall be applied on each interior wall to prevent water seepage.

(4) Provide cable racks, grounding, malleable iron conduit endbell fittings with plugs/caps, deadman screw anchors, eyebolts, marker tape and manhole cover lifting bars as shown on the plans.

(5) Perform all excavation, sheeting and bracing, and furnish all materials except covers and castings. Covers and castings will be furnished by the Sewerage and Water Board at its Central Yard, 2900 Peoples Avenue, New Orleans, Louisiana. Contractor shall pick up castings and covers, when required, from the Central Yard.

(6) Clean out new manholes including removal of all broken concrete, abandoned cable, mud, dirt, debris, etc. Demonstrate compliance to the Contracting Officer

at completion of the work.

3.7 METHODS OF WIRING

(1) Aluminum Rigid Metal Conduit shall be used for all exposed raceways. Conduit couplings and fittings for rigid conduit shall be aluminum with conventional dimensions and tapered thread at each end to fit the thread on each conduit.

(2) All raceways run in concrete slabs shall be rigid, hot dipped galvanized, heavy wall conduit.

(3) The use of EMT, BX or Greenfield is prohibited. Sealtight flexible conduit is acceptable for motor connections, maximum 18" in length.

(4) All raceways in office control room shall be concealed. No surface mounting will be allowed. Conduits to equipment on drainage station shall be run surface mounted, as noted. Run concealed raceways as direct and with as long bends as possible. Run exposed raceways parallel or perpendicular to walls and ceilings. Clear hot objects by a minimum of 6". Make turns with symmetrical bends in lieu of outlet or junction boxes. Where a symbol on the drawings indicates raceway to be run exposed overhead, install vertical portions of run concealed in walls, except for raceway runs to surface wall mounted boxes or cabinets. Make bends and offsets without kinking or destroying the cross sectional contour of the raceway. Use pipe straps or other approved supporting devices at minimum 5' intervals. Fasten support for raceways as follows:

(a) To wood by means of screws.

(b) To masonry by means of threaded metal inserts, metal expansion screws, or toggle bolts.

(c) To steel by means of machine screws or bolts.

(5) For supports in exterior and wet locations, use brass screws, bolts, etc. Use supports which will allow 1/4" air space between raceway and wall. Use only malleable iron body beam clamps with clamp backs. Stamped steel straps or stamped steel body beam clamps are not acceptable.

(6) All conduits shall be reamed after cutting. Field threads shall be painted with cold-galvanized paint (galvax or duncan 05030) for galvanized steel conduit.

(7) All spare or unused conduit shall be capped to prevent entry of debris. All encased conduits shall be swabbed out and full size mandrel pulled in the presence of the Contracting Officer.

(8) For supports for multiple parallel runs, use galvanized Powerstrut, Unistrut or equal, attached to wall or hung from ceiling or roof construction. Size of

supporting strut to be capable of adequately carrying load of strut, plus raceways and conductors with minimum safety factor of 2. Use conduit straps designed for use with strut. Threaded rod, hangers, etc., shall be hot dipped galvanized steel. All unistrut shall be fitted with end caps and shall be neatly and straight cut. All cuts and drilled holes shall be treated with cold-galvanized paint (galvax or duncan 05030)

(9) For exposed raceways, bank parallel runs of raceways together. Install raceway so that offsets, bends, etc. occur at same points. Make symmetrical offsets and bends. Run shall present neat appearance.

(10) At each point of entry of conduit to wiring devices, cabinets, pull boxes, and all other equipment items, furnish and install two galvanized steel locknuts and one insulated grounding type bushing. Ground wires shall be bound to all bushings to effectively ground entire conduit system.

(11) Conduit shall be 3/4" minimum trade size, unless noted otherwise.

(12) Where wiring or conduit sizes have been omitted on the drawings, they shall be sized in accordance with the requirements of Table No. 1, Chapter 9, and Table 310-12 of the N.E.C.

(13) An insulated throat grounding bushing connected to a green insulated ground wire shall be run in all conduits and bonded to metal enclosures at both ends. The use of green tape or green paint on ground conductors is prohibited.

(14) Highest degree of workmanship shall be followed throughout in conduit and wiring installation. The opinion of the Contracting Officer shall be final with regard to workmanship. Work judged as "below Par" shall be redone at no additional cost.

(15) Install expansion and expansion-deflection joints where conduit crosses building expansion joints.

(16) Use field bends for direction changes in conduits. Condulets shall only be used where shown on the plans or as specifically approved in the field by the Contracting Officer. Condulets shall be chosen (T, TB, LL, LB, LR, etc.) to provide direct front-of-work access to covers. Provide gaskets on all covers.

3.8 OUTLET BOXES

(1) Ceiling or fixture outlet boxes shall have fixture studs in the center of the box and strongly secured. These boxes shall be a minimum of 4" x 1-1/2" deep, octagon galvanized steel.

(2) Outlet boxes for wall switches and duplex receptacles shall be standard galvanized steel 4" square x 1-1/2", deep with square type "Tile" raised device covers.

(3) Use cast type FS or FD boxes for all exposed work.

3.9 WIRING DEVICES

Receptacles, GFCI Type, weatherproof cover, duplex, specifications grade, brown nylon, rated 20 amps at 120 volts, 3 wire with grounding terminal. Receptacles shall be designed to accept standard 2 wire parallel blade caps or 3 wire grounding caps.

3.10 JUNCTION AND PULL BOXES

(1) Pull boxes shall be constructed of welded aluminum with screw-on, neoprene gasketed covers. Box construction shall be in accordance with NEC requirements.

(2) Junction or pull boxes over 150 cubic inches in size shall be substituted by large special boxes appropriately sized. Covers may be of same thickness as boxes and be secured by brass screws or bolts. All junction boxes shall be galvanized coated inside and out cast aluminum, if aluminum conduit is used or PVC coated inside and out to prevent oxidation. Junction or pull boxes of sizes proportionate to the sizes of conduit or conductors served shall be installed where shown or where necessary or convenient for installing the wire. For unusual locations and very large boxes, submit shop drawings to the Contracting Officer for approval. The large special boxes, wiring troughs, etc., shall be fabricated from 1/8" aluminum, fully welded, with gasketed covers and stainless steel or brass hardware.

3.11 FEEDERS AND BRANCH CIRCUIT - 600 VOLTS AND BELOW

(1) The type of insulation and size of conductors shall comply with the National Electrical Code. All conductors shall be stranded copper. No conductors smaller than No. 12 shall be used, except for control and signal wiring which may be #14 AWG. All conductors shall be Type THWN/THHN with 600 volt insulation rated 75 degrees C for wet locations and 90 degrees C for dry locations.

(2) Multi-conductor control wiring shall be used and shall be small diameter, (600 volt) No. 14 minimum stranded copper, type THHN/THWN insulation (900° C temperature rating) with overall jacket, type TC Control Cable, dual color coded per Method 1A and Method 4 with No Repeat of Colors in any cable assembly. No control cable shall have more than the number of conductors that can be individually colored.

(3) Branch circuit runs over 60 feet from the branch panel to the first outlet, shall have conductors no smaller than No. 10 between panel and first outlet. From thereon, #12 conductors may be used. Where raceways contain more than 3 current carrying conductors, wiring shall be derated in accordance with the N.E.C. It is the Contractor's responsibility to increase wire sizes to provide proper ampacity to service these loads.

(4) All wires and conduits shall be continuous from outlet to outlet; no splices shall be made, except in outlets or junction boxes. Wires shall not be pulled in until the entire conduit run has been roughed-in.

(5) In cases where it is necessary to splice wires and cables in normally dry locations, solderless connectors may be used. Connectors in wire sizes up to and including No. 6 shall be 3M Scotchlok, and Kearney connectites on wire sizes above No. 6. Wire nuts are not acceptable.

(6) All feeders and control conductors shall be properly identified with E-Z code vinyl wire markers in all panels, junction and pull boxes and manholes.

(7) Cable shall be installed in accordance with manufacturer's recommendation. Splicing and termination shall be made by qualified technicians, using materials designed for use with the particular cable being used.

(8) All conductors 600 volts and below shall be manufactured by Anaconda, Okonite, General Cable, G.E., Triangle or Plastic Wire & Cable Corporation.

(9) All power and control wires in floor troughs shall be multi-conductor type (#12, #10, #8, etc.), THWN/THHN, with 600 volt insulation, with an outer jacket type TC per UL1277, IEEE 383.

3.12 TESTING OF SECONDARY SYSTEM - 240 VOLTS AND BELOW

(1) Upon completion of the work, test the individual systems, including all feeders, service, branches, outlets, lighting, motors, apparatus and appliances, with a 500 volt DC insulation tester (with a 0-200 megohm full scale) . All conductors shall have insulation tested when wiring system is complete and a log kept of the circuit name, date, and megger readings. 600 volt rated power cable shall be given a megger test with a 1000 volt meter and held for one minute or until reading reaches a constant value for 15 seconds. Minimum acceptable reading is five (5) megohms. Cable shall be unconnected when tested. Test each receptacle with a Woodhead Company "Ground Loop Independence Tester" and record circuit name, reading in ohms and submit report. All test reports shall be typed.

(2) Provide all instruments, labor and materials required by the Contracting Officer for any essential intermediate and final tests designated.

(3) Test shall indicate full compliance with specifications, drawings and applicable codes. All tests shall be observed by the Contracting Officer.

3.13 WIRE AND CABLE INSTALLATION AND TERMINATION

(1) Each conduit shall be continuous, open and clear of debris and

obstructions before contractor installs wire or cable. The conductors shall be installed in such a manner and by such methods as to insure against damage to the insulation, damage to the outer jacket, or stretching of the conductor.

(2) Wires and cables shall be pulled in their conduits with the application of a suitable lubricant, such as Ideal Yellow 77, or equal, that will have no injurious effect on the covering of the conductor. No oil or grease shall be used.

(3) Cables shall be pulled into PVC Ducts with natural or synthetic fiber ropes - wire rope or steel cable will not be allowed.

(4) All wiring installed in manholes and cable vaults shall be racked along the sides of the structure to allow clear access entry for inspection and maintenance. Every effort shall be made to rack Medium Voltage Power Cable on walls with separation from low voltage power and control cables.

(5) Control wiring in consoles, switchgear, and terminal boxes shall be neatly shaped, formed, and bundled. Spare conductors shall be left with sufficient length to replace any conductor in cable assembly. Self -clinching nylon cable ties spaced on three (3") inch maximum centers shall be applied to ensure shape and integrity of the bundle. A cable tie shall be applied at each conductor which branches from the main bundle for termination.

(6) Cable terminations at motors rated 240 volts and below shall be made with tinned copper compression lugs on both incoming cables and on motor leads bolted together with bolts, nuts, washers and lock washers, all of silicon bronze. Each bolted connection shall be insulated with a heat shrink motor connection kit, Raychem Type MCK, or approved equal, of the proper type for the size of cable terminated.

(7) Terminations in all control wiring shall be made with insulated, tinned copper, crimp-on, ring terminals.

(8) Terminations for high voltage equipment shall be heat shrinkable high voltage type terminations; Raychem, 3M or equal, which will effectively insulate the bolted connection of shielded MV-105 power cable to unshielded machine leads.

(9) Multi-conductor control cable shall be spliced, where specifically required, with 3M Manufacturing Company, Scotchcast Splicing Kits.

(10) All open wiring connections shall be effectively taped and insulated for the working voltage, including connections to switchgear bus.

(11) All new conductors for High and Low Voltage Power, Control, Instrumentation, etc. shall be installed in continuous runs without splices.

(12) Low Voltage Electrical Tape shall be scotch 33+ vinyl plastic. High Voltage Tape shall be Scotch 130C linerless tave. Irregular surfaces of bolts, connectors, etc. shall be filled with Scotch "Scotchfil" insulating putty prior to taping.

3.14 TESTING OF WIRE AND CABLE

(1) When wire and cable installation is complete and not more than 72 hours before energization of the system the wire and cable shall be tested. Testing shall consist of a megohmeter or high potential test for all insulated wire and cable. Contractor shall test only new wiring installed under this contract.

(2) The 600 volt rated power cable shall be given a meter test with a 1000 volt meter and held for one minute or until reading reaches a constant value for 15 seconds. Minimum acceptable reading is 100 megohms. Cable shall be unconnected when tested.

(3) Control cables shall be tested with the 500 volt meter. Minimum acceptable reading is 1.0 megohm.

(4) The 15 KV rated cable shall have a D.C. high potential test and the maximum test voltage reached shall be 55 KV to be held for ten (10) minutes. Each conductor shall be individually tested with all other conductors and all shields grounded. All 15 KV cables shall be given a dielectric absorption test before and after the application of the D.C. high potential test, using a 2500 volt motor driven meter. Ambient temperature and humidity during test shall be recorded. All wiring to be checked for continuity and proper phase sequence. All wiring connections must pass a visual inspection for workmanship and conformance with standard practice.

(5) Certified copies of all test results, which clearly identify the particular wire or cable tested, shall be submitted to the Contracting Officer prior to energizing any system.

(6) The Contractor shall perform DC high potential field acceptance testing of the new high voltage cable after it is in place with terminations at the switchgear but prior to tie-in to the existing distribution system.

(7) Test instruments are to be furnished by the Contractor and are to be in good working condition and calibration. Testing is to be performed only by qualified personnel thoroughly familiar and experienced in use of the test equipment. The DC high potential test set must be equipped with fault finder. Instruments must have been calibrated within one year preceding test.

(8) The contractor will promptly replace any of the installation which proves faulty by test.

(9) Following satisfactory testing, the contractor shall splice the

new cable into the existing distribution system. It is not required to test entire distribution system following the tie-in.

(10) Feeders must be restored in equal phase relationship as found prior to disturbance. Contractor shall ringout existing feeder at manhole prior to cutting the cable or removing the terminations. Clearly mark phases on switchgear terminals and existing feeder. After installation of the permanent feeder, Contractor shall maintain phase relationship, phase testing by the Sewerage and Water Board.

(11) Eight hours maximum are allowed per feeder changeover. Contractor shall use numerous splice crews, overtime, etc., as required, to re-establish the feeder in one day. Phase testing may be conducted on the following day. Forty-eight hour advance notice is required of desire to remove feeder from service. Permission to proceed with this work is dependent upon weather, system conditions, etc. Unforeseen problems may require cancellation of splices even after permission had been previously granted, with no additional cost to the Government.

(12) Splicing on any feeder until preceding feeder is finished, tested, and verified to be "in phase" will not be permitted. Work feeders sequentially.

Section Table Of Contents

SECTION 16002 – MULTIPATH ACOUSTIC TRANSIT-TIME SYSTEM

SECTIONN 16002 – MULTIPATH ACOUSTIC TRANSIT-TIME SYSTEM

PART 1 GENERAL

1.1 SCOPE

The contractor shall furnish and install an ultrasonic flowmeter in a forty-eight (48") inch diameter sewer force main, at the location shown on the drawings, complete and in accordance with these specifications. The flowmeter shall measure flow in the pipe and shall display an output flowrate. The method used for velocity measurement shall be the acoustic transit-time method which measures velocity by transmitting acoustic pulses between pairs of transducers mounted on the pipe walls. There shall be one plane of four parallel acoustic paths used for velocity measurement in the pipe. The velocity data from these paths shall be integrated according to the Gauss-Chebyshev integration method to determine flowrate through the pipe. Transducer placement shall be consistent with the requirements of the Gauss-Chebyshev integration method.

1.2 MEASUREMENT AND PAYMENT

There will be no measurement for furnishing and installing a multipath acoustic transit-time system according to the plans and these specifications. Payment will be made at the contract lump sum price for "ULTRASONIC FLOWMETER". Price and payment shall constitute full compensation for all work required by this section and shall include the furnishing of all plant, equipment, labor and materials necessary to complete this item.

1.3 RELATED WORK SPECIFIED ELSWHERE

Section 15002 "INSTALLATION OF WELDED STEEL PIPE"

1.4 SUBMITTALS

A minimum of 30 days prior to work the contractor shall submit for approval the material and equipment required to complete this item.

1.5 GENERAL REQUIREMENTS

1.5.1 Equipment to be furnished

Equipment to be furnished shall include the following:

1.5.1.1 One 8-path flowmeter console in NEMA 4X wall-mount enclosure

1.5.1.2 One hand-held keypad/display

1.5.1.3 Eight velocity transducer assemblies and cable. The approximate distance between the flowmeter console and the transducers is 250

+/- feet.

1.5.1.4 One transducer insertion/removal tool (suitable for removal with 36" clearance

1.5.2 Required Equipment Functions

The ultrasonic flowmeter will be required to perform the following:

1.5.2.1 Indicate and totalize flow through the pipe.

1.5.2.2 Provide analog 4-20mA output of flowrate for the pipe

1.5.3 Operating Conditions

The ultrasonic flowmeter will be used for measuring the flow of sewage in one sewer force main as shown on the drawings. The system shall be capable of being powered by a 90 to 120 volts, 60 Hz source.

The flowmeter console shall be suitable for operation in an environment with temperature ranging from 0 degrees C to 50 degrees C and relative humidity ranging from 0% to 95% (non-condensing).

The sewage flowing in the pipe will be free of entrained air.

1.5.4 Experience and Qualifications

The flowmeter manufacturer shall have a minimum of ten years experience manufacturing and installing flowmeters of the multiple-parallel-path type specified.

The flowmeter system shall be the Accusonic Series 7510 Electronics Model 7601/7641 Transducers as manufactured by Accusonic Technologies, Inc., 25 Bernard St. Jean Drive, East Falmouth, MA 02536-4420. Tel. (508) 495-6600. Fax (508) 495-6699, or an approved equal.

PART 2 PRODUCTS

2.1 GENERAL

All of the equipment described below shall be furnished by one supplier. Component devices which perform similar functions in each system shall be purchased from the same manufacturer.

2.2 TRANSDUCER ASSEMBLIES

Each transducer assembly shall be watertight and shall consist of a wettable transducer which may be removed through a ball-type valve to allow removal/replacement of the transducer without dewatering the pipeline. The operating frequency of the transducers shall be 1 MHz. The transducer shaft and transducer feedthrough assembly shall be constructed of type 316 stainless steel with PVC face. The transducer feedthrough assemblies shall utilize O-ring and/or packing seals and shall not require welding to be installed on the pipe. No welding on the pipeline will be allowed.

2.3 FLOWMETER CONSOLE

The flowmeter console shall be a multi-path acoustic transit time type system. The flowmeter console shall measure discrete acoustic travel times to arrive at an average velocity for each of the acoustic paths. These velocity data points shall be integrated over the cross-sectional area of flow to determine the flowrate through the pipe. The method of measuring and computing water velocity shall be independent of the speed of sound in water. The flowmeter shall be capable of operating up to 8 acoustic paths. The system shall be capable of bi-directional flow measurement.

The console shall evaluate each acoustic signal received and shall reject those which are distorted by reflections or reverberations or whose amplitude is below a minimum value. Velocity and rate-of-change-of-velocity limits shall be user-selectable and adjustable on-site.

The flowmeter console shall be equipped with an Automatic Gain Control (AGC) feature to ensure that all received acoustic signals are continuously amplified to usable levels.

The flowmeter shall have a hand-held keypad/display for user interface with the flowmeter. The user shall be able to enter all site-specific and operational parameters via the keypad. The keypad/display module shall be removable to prevent unauthorized access to the flowmeter. The system shall also be capable of communication via a PC through a Windows 95® or higher-based user interface.

The console shall be installed in a NEMA 4X enclosure suitable for wall mounting at a location in the control room 5' (+/-) from the floor. The keypad/display shall be mounted inside the enclosure.

The system shall have the capability to display pipe flowrate and totalized flow. At the user's option the system shall display a message that indicates the type and path location of a signal interruption or transducer failure.

When configured as a full-pipe meter, the flowmeter shall be equipped with an automatic path substitution feature to allow the flowmeter to continue to calculate and output flow with one or more failed paths. The flowmeter will generate a substitute velocity for the failed path or paths from the velocities of the remaining good paths, weighted by the historic flow contribution ratios for all acoustic paths. The flowmeter

console shall be capable of automatically "learning" the relative ratios of velocities on each path so that substitution coefficients will be appropriate for specific site conditions.

Analog Outputs – 4-20 mA output of flowrate in the pipe shall be provided.

The flowmeter shall be designed to return to full operation following a short-term power interruption, with all stored values retained.

2.4 Transducer Cable

The contractor shall follow the routing shown on the plans and furnish all cable between the transducers and the electronic console. The cable shall be of the type specified by the flowmeter manufacturer. Any connectors to the transducers that may be required shall also be supplied by the flowmeter manufacturer.

PART 3 EXECUTION

3.1 INSTALLATION

The Contractor shall have the flowmeter manufacturer provide a qualified Field Engineer to supervise installation of the transducer assemblies, placement and connection of the flowmeter console, and commissioning of the system.

3.2 WARRANTY

The Contractor shall repair or replace any part which fails due to defects in materials or workmanship for one (1) year following installation and acceptance. Failed parts shall be returned to the manufacturer's factory for repair or replacement at no expense to the government.

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SECTION 16640 - CATHODIC PROTECTION

SECTION 16640 - CATHODIC PROTECTION

PART 1 GENERAL

1.1 SCOPE

The work covered by this section consists of furnishing all plant, labor, material, and equipment required to install anodes for cathodic protection of the sewer force main and the fresh water intake pipe, and electrically bond the steel piling as shown on the drawings and as specified herein to permit installation of a permanent cathodic protection system.

1.2 MEASUREMENT AND PAYMENT

Measurement will not be made for cathodic protection. Payment for furnishing and installing cathodic protection will be included in the contract price for which the work is incidental.

1.3 APPLICABLE PUBLICATIONS

The following publication of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARDS

B 3	(2001) Standard Specification for Soft or Annealed Cooper Wire
B 8	(1999) Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

1.4 QUALITY CONTROL

1.4.1 General

The Contractor shall establish and maintain quality control for bonding operations to assure compliance with contract specifications and maintain records of his quality control for all construction operations including, but not limited to the installation of bond cables.

1.4.2 Reporting

The original and two copies of these records and tests, as well as the records of corrective action taken, shall be furnished to the Government daily. The format of the report shall be as prescribed in Section 01451, "CONTRACTOR QUALITY CONTROL".

PART 2 PRODUCTS

2.1 BONDING

2.1.1 Reinforcing Bar

A No. 6 reinforcing bar shall be used for electrically bonding sheet piles.

2.1.2 Bond Cables

Bond cables shall be cathodic protection, type CPS cables, 7-strand, #4 AWG, Class B, uncoated annealed copper conforming to ASTM B 3 and B 8. Insulation shall be black, high molecular weight polyethylene. Insulation wall thickness shell be a minimum of 110 mils.

2.2 MAGNESIUM ANODES

Install 50 pound magnesium anodes in locations as shown on the drawings. Minimum separation from the pipe shall be 24 inches. Anode shall be packaged, low output, approximately 8 inch round or square by 18 inches long, with 10 ft. long #6 THW stranded copper wire attached.

The magnesium anode shall be of 50 pound nominal weight and with the following alloy specifications:

Aluminum 5-7%	Copper 0.1% Max.
Zinc 2-4%	Iron 0.003% Max.
Silicon 0.3% Max.	Nickel 0.003% Max.
Manganese 0.15% Min.	Others 0.3% Max.

Magnesium - Balance

Installation of Anodes shall be in accordance with the Sewerage and Water Board drawing 1815-P1.

PART 3 EXECUTION

3.1 BONDING

The sheet piles shall be electrically bonded together with a No. 6 reinforcing bar as shown on the drawings and bond cables as indicated below.

3.2 BOND CABLES

Bond cables shall be welded to the piling using an exothermic type process. Welded joints shall be coated with Scotchcast Electrical Insulating Resin, or approved equal splicing epoxy to obtain a moisture proof joint. The welding process shall be such that the heat of welding will not damage the insulation on the wire. The welding process shall be the Cadweld process of Erico Products, Inc., or an approved equal. Epoxy shall completely cover welded joints and extend 2 inches over cable insulation.

3.3 CADWELD CONNECTIONS

All cathodic protection anode leads shall be connected to pipes by using Cadweld process. Cadweld connection is a fusion weld of conductor to the pipe surface which shall be performed in the presence of the Board's Cathodic Protection Technician.

An area four (4") inch square on the pipe shall be cleaned and pitted for connection to #6 Awg, THW wires. The insulation on the wire shall be removed approximately 1-1/4" and copper sleeve inserted. The end of the wire shall extend 1/4 inch beyond the sleeve. The sleeve shall be crimped to the wire.

3.3.1 Process

Wires shall be cadwelded parallel to the pipe, with the following process:

(1) Prepare pipe surface by removing all coatings to bare metal and chipping to provide a clean, dry, distressed surface for maximum penetration and bonding.

(2) Strip bond wires and install copper crimp sleeve.

(3) Place the metal charge disc provided with each powder charge in the Cadweld Mold.

(4) Fill mold with entire contents one (1) Cadweld #CA-15 Powder Charge - Close Lid.

(5) Place prepared wire on prepared pipe surface. Hold fast to pipe with pressure from mold over wire end and pipe surface.

(6) Hold mold firmly and ignite charge with flint gun.

(7) Wait 60 seconds for cooling and remove mold.

(8) Clean slag from weld area.

(9) Recoat pipe to match existing coating (coal tar epoxy, tape wrap, gunnite, etc.)