PROPOSAL NO. DACW33-79-R-0002

WATER RESOURCES DEVELOPMENT PROJECT

NORTH NASHUA RIVER

FITCHBURG, MASSACHUSETTS

SPECIFICATIONS

FOR THE

CONSTRUCTION OF

CHANNEL REHABILITATION PROJECT
LOCAL PROTECTION

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

FEBRUARY 1979

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NEW ENGLAND DIVISION

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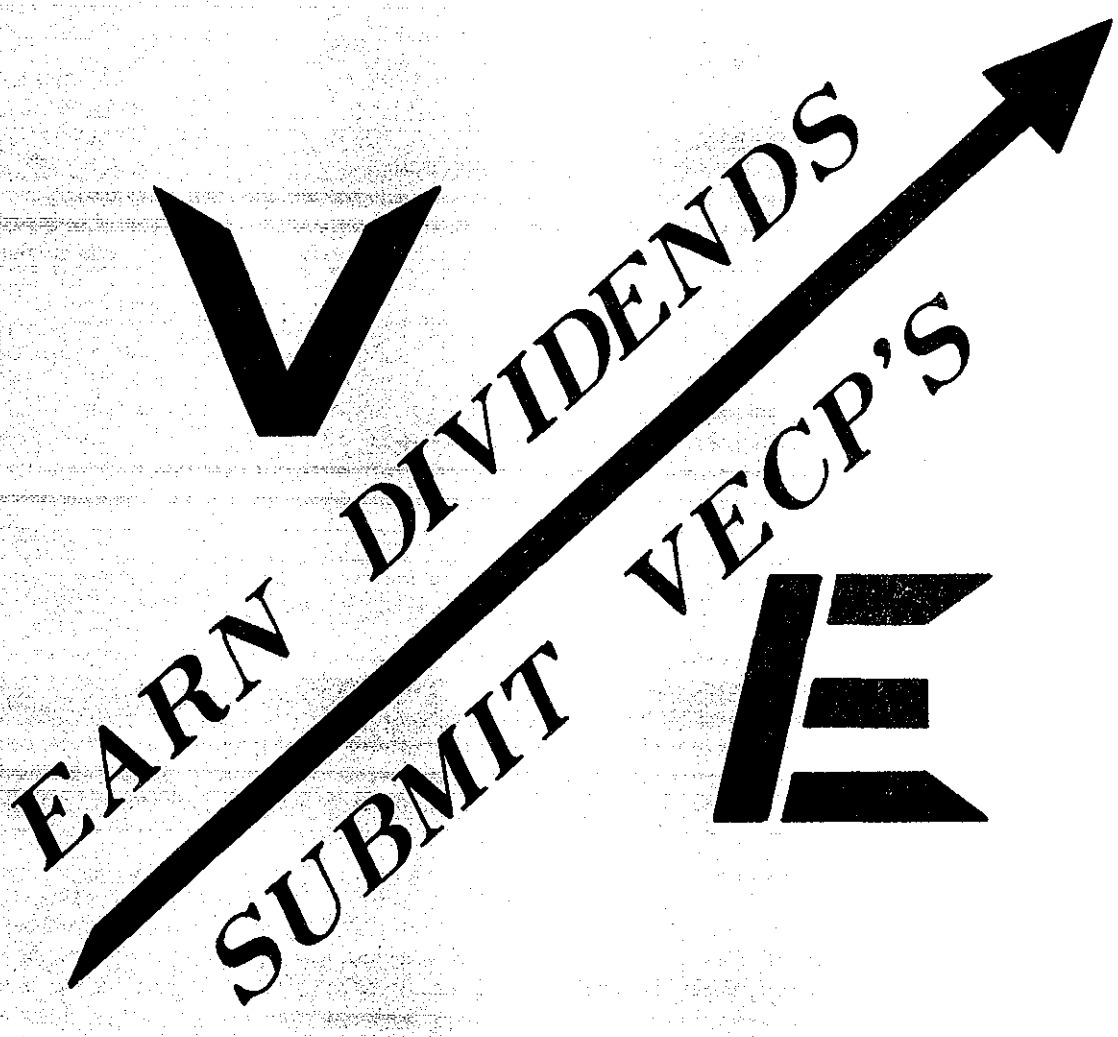

U.S. ARMY CORPS OF ENGINEERS

NED NEW ENGLAND DIVISION

Wear Your HARD HAT

"a little care makes mishaps rare"

The Head You Save WILL BE YOUR OWN

U.S. ARMY CORPS OF ENGINEERS

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DIVISION 1 - GENERAL REQUIREMENTS

SECTION 1A - SPECIAL PROVISIONS

SP-1. COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK. a. The Contractor will be required to commence work under this contract within 15 calendar days after the date of receipt by him of notice to proceed, to prosecute said work diligently, and to complete the entire work ready for use not later than 550 calendar days after date of receipt by him of notice to proceed. The time stated for completion shall include final cleanup of premises.

b. Time Extension for Topsoiling and Seeding. In the event the contract completion date, as established in Subparagraph "a" above, is thirty (30) days or more after the limiting date established for seeding in the TECHNICAL PROVISIONS herein, the contract completion date for topsoiling and seeding will be the last date of the next succeeding period specified as acceptable for seeding.

c. Time Extension for Planting. In the event the contract completion date, as established in Subparagraph "a" above, is thirty (30) days or more after the date established for planting in the Technical Provisions herein, the contract completion date for planting will be the last date of the next succeeding period specified as acceptable for planting.

SP-2. LIQUIDATED DAMAGES. In case of failure on the part of the Contractor to complete the work within the time fixed in the contract or any extensions thereof, the Contractor shall pay to the Government as liquidated damages, pursuant to Clause 5 of the GENERAL PROVISIONS of this contract entitled "Termination for Default-Damages for Delay-Time Extensions", the amount(s) specified below.

a. Entire Work. For failure to complete the entire work, except topsoiling and seeding and planting the sum of $430.00 dollars for each calendar day of delay.

b. Topsoiling and Seeding. For failure to complete the topsoiling and seeding by the date established in SP-1b, the sum of $180.00 dollars for each calendar day of delay beyond the established date until the topsoiling and seeding work is completed and accepted.

c. Planting. For failure to complete the planting by the date established in SP-1c the sum of $180.00 dollars for each calendar day of delay beyond the established date until the planting is done.

SP-3. CONTRACT DRAWINGS AND SPECIFICATIONS. a. Five (5) sets of half-size prints and one (1) set of full-size prints together with specifications will be furnished the Contractor without charge except applicable publications incorporated into the TECHNICAL PROVISIONS by reference. Additional sets will be furnished on request at the cost of reproduction. The work shall conform to the following contract drawings and maps, all of which form a part of these specifications and are available in the office of the U.S. Army Engineer Division, New England, 424 Trapelo Road, Waltham, Massachusetts 02154.

Drawing No.	Sheet No.	Title
MER-34	1	INDEX TO DRAWINGS
MER-34	2	GENERAL PLAN NO. 1
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MER-34	13	AREA P AND Q PLANS, SECTIONS AND ELEVATIONS
MER-34	14	AREA V PLAN AND PROFILE
MER-34	15	AREA V SECTIONS
MER-34	16	PLANTING PLAN NO. 1
MER-34	17	PLANTING PLAN AND DETAILS NO. 2
MER-34	18	TREE REMOVAL PLAN NO. 1
MER-34	19	TREE REMOVAL PLAN NO. 2
MER-34	20	TREE REMOVAL PLAN NO. 3
MER-34	21	HYDROGRAPH
MER-34	22	MISCELLANEOUS PLANS AND SECTIONS AREAS E, G, H, I, S AND U

b. Omissions from the drawings or specifications or the misdescription of details of work which are manifestly necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work but they shall be performed as if fully and correctly set forth and described in the drawings and specifications.

c. The Contractor shall check all drawings furnished him immediately upon their receipt and shall promptly notify the Contracting Officer of any discrepancies. Figures marked on drawings shall in general be followed in preference to scale measurements. Large scale drawings shall in general govern small scale drawings. The Contractor shall compare all drawings and verify the figures before laying out the work and will be responsible for any errors which might have been avoided thereby.

SP-4. CONTRACTOR SUBMITTAL PROCEDURES (SHOPS DRAWINGS AND MATERIALS). a. The term "shop drawings" includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, certificates, performance and test data; and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the contract.

b. The Contractor shall submit to the Contracting Officer for approval six (6) copies.

c. Each copy of each submittal made by the Contractor shall be accompanied by a separate copy of transmittal ENG Form 4025. In addition to the above, and commensurate with the submittal review process, as indicated below, separate information copies of ENG Form 4025, only, (i.e., without inclosures) shall be forwarded by the Contractor directly to each of the following, as applicable:

(1) Submittals reviewed by Engineering Division, NED: One copy, each, to the Area Engineer, the Resident Engineer and the Construction Division, NED.

(2) Submittals reviewed by Resident Engineer: One copy, each, to the Area Engineer, the Construction Division and the Engineering Division, NED.

(3) Submittals reviewed by Area Engineer: One copy, each, to the Resident Engineer, the Construction Division and the Engineering Division, NED.

Blank copies of ENG Form 4025 will be furnished to the Contractor by the Contracting Officer.

d. It shall be the Contractor's responsibility to review all shop drawing submittals for completeness, accuracy, compliance with specifications and insure coordination of same with associated items of construction and all trades involved prior to submission to Contracting Officer for approval. These drawings shall be complete and detailed. The Contractor shall certify on the face of each ENG Form 4025, that each submittal transmitted therewith is correct and in strict conformance with the contract drawings and specifications. All proposed deviations requested by the Contractor shall be noted by him on the transmittal ENG Form 4025. The Contractor shall set forth in writing the reason for any deviations requested and shall annotate such deviations on the shop drawing. In the event the above requirements are not met, the submittal will be returned to the Contractor for corrective action. If approved by the Contracting Officer, each copy of the drawings will be identified as having received such approval by being so stamped and dated. The Contractor shall make any corrections required by the Contracting Officer. If the Contractor considers any correction indicated on the drawings to constitute a change to the contract drawings or specifications, notice as required under the Clause 3 of the GENERAL PROVISIONS entitled "Changes" will be given to the Contracting Officer. Two sets of all shop drawings will be returned to the Contractor and the remaining sets will be retained by the Contracting Officer. The approval of the drawings by the Contracting Officer shall not be construed as a complete check, but will indicate only that the general method of construction and detailing satisfactory. Approval of such drawings will not relieve the Contractor of the responsibility for any error which may exist as the Contractor shall be responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work. (See Par. SP-30, DEVIATIONS FROM CONTRACT REQUIREMENTS).

e. It shall be the Contractor's responsibility to insure that all samples required to be submitted for approval are inspected to assure compliance with contract requirements before being submitted to the Contracting Officer. All samples shall be completely labeled to include product name, manufacturing source, name of project, transmittal number and shall also indicate the specification Section and paragraph for which the sample is being submitted.

f. Payment for materials incorporated into the work will not be allowed if required approvals have not been obtained.

SP-5. PHYSICAL DATA. Information and data furnished or referred to below are furnished for Contractor's information. However, it is expressly understood that the Government will not be responsible for any interpretation or conclusion drawn therefrom by the Contractor.

a. The physical conditions indicated on the drawings and in the specifications are the result of site investigations by surveys, and core borings. Materials obtained from the subsurface explorations together with the field logs are available for examination at the Foundations and Materials Branch, U.S. Army Engineer Division, New England, 424 Trapelo Road, Waltham, Mass., 02154, telephone 617-894-2400, Ext. 367. Two days advance notice is required by F&M Branch in order that samples can be removed from storage and set up for examination.

b. Weather Conditions. Meteorological data as tabulated from the records of climatological data are as follows:

(1) Temperature. The mean annual temperature in the North Nashua River watershed is about 48°F. Freezing temperatures may be expected from late September to late April. The following table lists the mean, maximum and minimum monthly and annual temperatures at Fitchburg for 89 years of record through 1975.

TABLE 1
MONTHLY TEMPERATURES AT
FITCHBURG, MASSACHUSETTS
(Degrees Fahrenheit)

Month	Average	Maximum	Minimum
January	24.8	68	-21
February	25.0	68	-21
March	34.5	86	-8
April	46.0	92	6
May	57.7	97	26
June	66.4	100	35
July	71.6	103	40
August	69.3	105	35
September	62.1	101	27
October	51.3	91	16
November	39.9	81	-2
December	28.6	71	-16
Annual	48.1		

(2) Precipitation. The average annual precipitation over the North Nashua River basin is approximately 43 inches, uniformly distributed throughout the year. The maximum and minimum annual precipitation at Fitchburg is 60.23 (1954) and 27.45 (1883) inches, respectively. Table 2 shows the mean, maximum and minimum monthly and annual precipitation at Fitchburg for 111 years of record through 1975.

TABLE 2

MONTHLY PRECIPITATION AT FITCHBURG, MASSACHUSETTS
(In Inches)

Month	Mean	Maximum	Minimum
January	3.44	7.78	0.84
February	3.28	8.33	0.34
March	3.67	12.15	Trace
April	3.42	9.91	0.57
May	3.57	8.25	0.57
June	3.66	11.56	0.09
July	3.67	12.68	0.46
August	3.66	10.72	0.17
September	3.64	14.04	0.19
October	3.43	13.01	Trace
November	3.84	7.79	0.38
December	3.51	9.33	0.58
Annual	32.77	60.23	27.45

(3) Snowfall. The annual snowfall averages about 60 inches at Fitchburg located at about elevation 400 feet msl. Table 3 shows the mean monthly and annual snowfall at Fitchburg for 90 years of record through 1975.

TABLE 3

SNOWFALL DATA AT
FITCHBURG, MASSACHUSETTS
(Depth in Inches)

Month	Mean
January	15.6
February	17.6
March	11.3
April	2.5
May	Trace
June	-
July	-
August	-
September	-
October	Trace
November	3.5
December	11.7
Annual	62.2

(4) Streamflow data for the North Nashua River is shown on the contract drawings.

c. Transportation Facilities. The Contractor shall make his own investigations on the use of municipal, State and Federal highways, roads, streets and bridges.

SP-6. RATES OF WAGES. The minimum wages, including basic hourly rates of pay and fringe benefits payments, applicable to laborers and mechanics performing work on this project are set forth in Predetermination Decision No. MA 78-2090 dated 22 September 78 issued by the Secretary of Labor in accordance with the Davis-Bacon Act, GENERAL PROVISIONS, Clause 32. A copy of the above decision follows at the end of these SPECIAL PROVISIONS.

SP-7. WORK IN QUARANTINED AREA. The work called for by this contract involves activities in counties quarantined by Department of Agriculture to prevent the spread of certain plant pests which may be present in the soil. The Contractor agrees that all construction equipment and tools to be moved from such counties shall be thoroughly cleaned of all soil residues at the construction site with water under pressure and that hand tools shall be thoroughly cleaned of all soil residues at the construction site with water under pressure and that hand tools shall be thoroughly cleaned by brushing or other means to remove all soil. In addition, if this contract involves the identification, shipping, storage, testing, or disposal of soils from such a quarantined area, the Contractor agrees to comply with the provisions of ER 1110-1-5 and attachments, a copy of which will be made available by the Contracting Officer upon request. The Contractor agrees to assure compliance with this obligation by all subcontractors.

SP-8 thru SP-10. OMITTED.

SP-11. PERFORMANCE OF WORK BY CONTRACTOR. The Contractor shall perform on the site, and with his own organization, work equivalent to at least fifty percent (50%) of the total amount of work to be performed under the contract. If, during the progress of the work hereunder, the Contractor requests a reduction in such percentage; and the Contracting Officer determines that it would be to the Government's advantage, the percentage of the work required to be performed by the Contractor may be reduced; provided, written approval of such reduction is obtained by the Contractor from the Contracting Officer.

SP-12. LAYOUT OF WORK. The Contractor shall lay out his work from Government established base lines and bench marks indicated on the drawings and shall be responsible for all measurements in connection therewith. The Contractor shall furnish, at his own expense, all stakes, templates, platforms, equipment, tools and

materials and labor as may be required in laying out any part of the work from the base lines and bench marks established by the Government. The Contractor will be held responsible for the execution of the work to such lines and grades as may be established or indicated by the Contracting Officer. It shall be the responsibility of the Contractor to maintain and preserve 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 his negligence, prior to their authorized removal, they may be replaced by the Contracting Officer at his discretion. The expense of replacement will be deducted from any amounts due or to become due the Contractor.

SP-13. PERFORMANCE AND PAYMENT BONDS. Within ten (10) days after the prescribed forms are presented to the bidder to whom award is made for signature, a written contract on the form prescribed by the specifications shall be executed and two bonds, each with good and sufficient surety or sureties acceptable to the Government, furnished; namely, a performance bond (Standard Form 25) and a payment bond (Standard Form 25A). Each form shall show the contract number to which the bond applies. The penal sums of such bonds will be as follows:

a. Performance Bond. The penal sum of the performance bond shall equal one hundred percent (100%) of the contract price. In accordance with Federal Tax Lien Act of 1966, the performance bond shall provide coverage for taxes imposed by the United States which are collected, deducted, or withheld from wages paid by the Contractor in carrying out the contract.

b. Payment Bond. (1) When the contract price is $1,000,000 or less, the penal sum will be fifty percent (50%) of the contract price.

(2) When the contract price is in excess of $1,000,000 but not more than $5,000,000, the penal sum shall be forty percent (40%) of the contract price.

(3) When the contract price is more than $5,000,000, the penal sum shall be $2,500,000.

Any bonds furnished will be furnished by the Contractor to the Government prior to commencement of contract performance.

SP-14. CONTINUING CONTRACTS.

(a) This is a continuing contract, as authorized by Section 10 of the River and Harbor Act of September 22, 1922 (33 U.S. Code 621). The payment of some portion of the contract price is dependent upon reservations of funds from future appropriations. The responsibilities of the Government are limited by this clause notwithstanding any contrary provision of the "Payments to Contractor" clause or any other clause of this contract.

(b) (1) The sum of $1,200,000 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 will be reserved for this contract.

(2) 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 (d) and (e) 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 therefor.

(c) (1) 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 in writing of any additional funds reserved for the contract.

(2) 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.

(d) (1) 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 construc-

tively made, and shall be at the rate established by the Secretary of the Treasury pursuant to Public Law 92-41, 85 STAT 97, for the Renegotiation Board, as in effect on the first day of the delay in such payment.

(2) 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.

(3) 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.

(e) If, upon the expiration of sixty (60) 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 this right to proceed with the work as having been terminated. Such a termination shall be considered a termination for the convenience of the Government.

(f) 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.

SP-15. INSURANCE. Because of the complex nature of the work and possibility of property damage or bodily injury in the event of accident, it is advisable for the Contractor to properly protect himself against such an occurrence. Since the Contractor as an independent Contractor is fully responsible for acts of negligence or omission, it is not the policy of the Government to require such insurance in order to protect its interests. The Contractor, however, should consider insurance in appropriate types and amounts to safeguard his interest and those of third parties who may be affected. However, absence of specific requirement for insurance in these specifications is not to be construed as an admission that the Government assumes any risk, liability, claim or damage resulting from the Contractor's want of care or failure to properly perform his work.

SP-16 & SP-17. OMITTED

SP-18. TIME EXTENSIONS. Notwithstanding any other provisions of this contract it is mutually understood that time extensions for changes in the work will depend upon the extent, if any, by which the changes cause delay in the completion of the various elements of construction. The change order granting the time extension may provide that the contract completion date will be extended only for those specific elements so delayed and that the remaining contract completion dates for all other portions of the work will not be altered and may further provide for an equitable readjustment of liquidated damages pursuant to the new completion schedule.

SP-19. CERTIFICATES OF COMPLIANCE. Any certificates required for demonstrating proof of compliance of materials with specification requirements shall be executed in six (6) copies. It shall be Contractor's responsibility to review all certifications before submissions are made to the Contracting Officer to insure compliance with the contract specification requirements and that the affidavit is properly executed prior to submission to the Contracting Officer. Each certificate shall be signed by an official authorized to certify in 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 the specific requirements.

SP-20. OMITTED.

SP-21. APPROVED AGGREGATE SOURCES. a. Concrete aggregates meeting the requirements of these specifications can be produced from the approved sources listed below:

(1) Holden Trap Rock Co., Holden, MA

(2) Mario Pandolph Co., Sterling, MA

(3) Trulson Sand and Gravel Co., Holden, MA

(4) P.J. Keating Co., Lunenburg, MA

(5) San-Vel Corp., Littleton, MA

(6) R.T. Curtis Sand and Gravel Co., Barre, MA

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 sources designated by the Contractor and approved by the Contracting Officer, subject to the conditions hereinafter stated.

c. After the award of the contract, the Contractor shall designate in writing only one source or one combination of sources from which he proposes to furnish aggregates. If the Contractor proposes to furnish aggregates from a source or from sources not listed above, he may designate only a single source or single combination of sources for aggregates. Samples for acceptance testing shall be provided as required by Section, CAST-IN-PLACE STRUCTURAL CONCRETE of the TECHNICAL PROVISIONS. If a source for coarse 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 or fine aggregate, as the case may be, from an approved 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 strata, or channels, when such materials are unsuitable for concete aggregate as determined by the Contracting Officer. Materials produced from an approved source shall meet all the requirements of Section, CAST-IN-PLACE CONCRETE of the TECHNICAL PROVISIONS of these specifications.

SP-22. CONTRACT BID BREAKDOWN. The Contractor shall furnish within 10 days after date of award of contract, a breakdown of each lump sum bid. Partial payments will be based on this breakdown. The Contractor's breakdown will be reviewed by the Contracting Officer to insure that costs are proportioned properly between early and late pay items. Any unbalanced items or other discrepancies will be reviewed by the Contracting Officer and the approved breakdown will be utilized as a basis for progress payments to the Contractor.

SP-23. TEMPORARY HEAT. a. All temporary heat required by the Contractor in connection with his construction operations shall be furnished or provided by or at the expense of the Contractor. Only temporary heating devices having the approval of the Underwriters' Laboratories, Inc., and approved by the Government representative in charge will be used. The Contractor will be required to instruct his personnel in the use and operation of these portable type heaters. Such instructions shall be directed to any and all workmen who will have responsibilities connected with the use of such heaters. Instructions will include proper use, handling, location and placement of such heaters when in operation, fire protection provided, hazards connected with the use of such heaters and actions to be taken in case of fire. Portable oil-fired, or gas heaters will be so placed that the heating end will not be directed at combustible material within 10 feet and the unit, itself, shall be at least 2 feet from combustible material.

b. All materials used as tenting for temporary heated enclosures where oil-fired, or gas temporary heaters are used will be of a fire-resistant material. Clear polyethylene plastic material, or similar products will be permitted.

SP-24. SOILS AND MATERIALS CONTROL AND PAVEMENT EVALUATION. a. Soils and Materials Control. (1) The Contractor shall furnish when requested by the Contracting Officer and depending upon the scheduled and actual work operations in progress one 1/2 ton pickup truck, the maintenance and operation of which shall be the Contractor's responsibility, and shall further provide one laborer depending on the work schedule, approved and qualified as stated below, to aid the Contracting Officer in the sampling and testing of soils, portland cement concrete, bituminous concrete and similar materials. The laborer shall have a high school education or shall have sufficient experience in the sampling and testing of soils and materials so as to attain a reasonable degree of competency in assisting in the performance of field and laboratory tests. Final acceptance by the Contracting Officer will not be made until he has undergone a two week training period at the New England Division Laboratories in

Waltham, Massachusetts. If the laborer furnished is not acceptable, the Contractor shall furnish qualified replacements promptly upon request. The laborer found to be acceptable, if used sporadically, may be requested by name by the Contracting Officer and shall be furnished upon request if still in the employ of the Contractor. The personnel and equipment shall be made available within 30 days after receipt of notice to proceed and shall be assigned when needed until no further sampling and testing is required. The personnel and equipment shall be under the supervision and direction of the Contracting Officer and shall be such as to permit sampling and testing to be maintained concurrent with the progress of construction. Sampling and testing will include that necessary to determine that all construction conforms to contract requirements and such other sampling for the project as directed. No separate payment will be made for the services of the above equipment and personnel, the costs of which will be considered as a subsidiary obligation of the Contractor. In the event that borrow areas outside the project limits are utilized for any necessary borrow materials, personnel and equipment will be provided to take the samples therefrom.

SP-25. CONSTRUCTION SIGN. The Contractor shall furnish, erect, and maintain a construction sign conforming to the requirements of Standard Drawing Number STD-21 4'x8'. The drawing is inserted at the end of the SPECIAL PROVISIONS. The information needed to complete the wording on the sign will be furnisedh by the Contracting Officer and will be essentially as shown on the cover of the specifications. The sign shall be erected not later than 15 calendar days after notice to proceed at a location selected by the Contracting Officer. Upon completion of the work, the sign will remain the property of the Contractor. No separate payment will be made for furnishing, erecting and maintaining the construction sign.

SP-26. SAFETY SIGN. The Contractor shall construct a safety sign at a location directed by the Contracting Officer. The sign shall be 3 feet by 6 feet in size and shall conform to the requirements of Drawing No. STD-36, attached hereto. The sign shall be erected as soon as possible and within 15 calendar days after date of notice to proceed. The data required by the sign shall be corrected as necessary. No separate payment will be made for erecting and maintaining the safety sign and all costs in connection therewith will be considered a subsidiary obligation of the Contractor. The sign will remain the property of the Contractor. Previously used signs may be reused when satisfactorily reconditioned.

SP-27. ACCIDENT PREVENTION. a. Safety Requirements. (1) Corps of Engineers Manual. Clause 55 of the General Provisions incorporates and makes a part of the contract the Corps of Engineers Manual, EM 385-1-1, dated 1 June 1977, entitled "General Safety Requirements", as amended. Such requirements will be strictly enforced and adhered to by the Contractor. An offeror who does not have a copy of this manual, or who is not aware of its contents, should familiarize himself with its provisions by contacting the Resident Engineer at the site or by visiting the Division Office in Waltham, Mass. Copies of this manual will be furnished the Contractor after contract award has been made.

(2) OSHA Safety Standards. It is the Contractor's responsibility to be familiar and comply with the OSHA safety standards. OSHA standards are subject to the change and such changes may well affect the Contractor in his performance under the contract. It is the responsibility of the Contractor to acquaint himself with all such changes and the effective date of such changes.

b. Contractor's Proposals. The Contractor's proposals for effectuating the requirements of Clause 55, "Accident Prevention" of the GENERAL PROVISIONS shall be submitted in quintuplicate to the Resident Engineer as the Contracting Officer's representative.

c. Protective Headgear. All employees of the Contractor and other persons shall wear protective headgear (hard hats) at all times while in the work area(s). These work area(s) shall be all area(s) within the contract work limits.

d. No burning of brush or debris will be permitted in the area.

e. Electric Ground Fault. During execution of this contract, all power tools and temporary wiring connection to 15 and 20-ampere receptacles shall have approved ground fault interrupters protecting personnel. GFCI will operate on fault current of not more than 5 milli-amperes, and will include isolating transformer and test buttons. Tests will be recorded daily and after each change in circuits at any distribution box or panel.

f. Reverse Signal Alarm. (1) All self-propelled construction equipment, except light service trucks, panels, pickups, station wagons, crawler-type cranes, power shovels, and draglines; whether moving alone or in combination, shall be equipped with a reverse signal alarm. The alarm shall be mounted on the rear of the equipment and shall be so protected or constructioned as to with-

stand severe wear and tear, adverse weather and unfavorable environmental working conditions, and shall be certified by the manufacturer as fully meeting the following performance standards.

g. Blasting. (1) All operations involving the transportation, storage and use of explosives shall be conducted in accordance with applicable laws and the Corps of Engineers' "General Safety Requirements Manual" a copy of which is available for inspection in the office of the Division Engineer and the "Manual of Accident Prevention in Construction" published by the Associated General Contractors of America, Inc.

(2) All vehicles assigned to the daily transportation of explosives and other dangerous articles will be inspected not less frequently than once a week. Vehicles which are occasionally used for this purpose shall be inspected within one week prior to such use.

(3) Inspection shall be performed by competent assigned Contractor's personnel other than the operator of the vehicle inspected. Inspection forms will be approved by the Contracting Officer and a completed copy of each inspection will be furnished the Contracting Officer.

(4) Blasting will be permitted only when proper precautions are taken for the protection of all persons, work and property. The Contractor shall be liable for all injuries or deaths of persons and all property damage caused by blasting of explosives. The Contractor shall provide and keep on the project at all times a current copy of the Institute of Makers of Explosives Pamphlet No. 20, entitled "Radio Frequency Energy a Potential Hazard in the Use and Transportation of Electric Blasting Caps". When situations develop which make the application of the tables of safe distances an operational handicap or which are so unusual as not to be covered, competent experts shall be consulted to evaluate the situation. The Contractor or his surety shall, prior to commencement of blasting operations, make all necessary investigations including inspection of structures near the area of blasting and shall provide such vibration monitoring during blasting operations as may be necessary to assure protection of these structures in conformance with regulatory statutes or directives established by State or other authorities to limit the amount of vibration generated by blasting. These investigations shall be conducted by a qualified vibration engineer and copies of the results of such investigations including test data and records shall be furnished to the Contracting Officer.

(5) No shot will be fired without protection of approved blasting mats. All blasting will be done during daylight hours, and under the personal supervision of a Licensed Blaster.

(6) All holes will be full-stemmed.

h. Outlining Loaded Hole Areas. The Contractor shall be required to clearly outline any loaded hole area or areas. This may be accomplished by roping off the entire loaded hole area, or by markers of sufficient height and color spaced so that the entire loaded hole area will be clearly and definitely outlined. The exact method of outlining such areas shall have the prior approval of the Contracting Officer.

SP-28. NOTICE OF TOTAL SMALL BUSINESS SET-ASIDE

a. Restriction. Offers under this procurement are solicited from small business concerns only and this procurement is to be awarded only to a small business concern. This action is based on a determination by the Contracting Officer, alone or in conjunction with a representative of the Small Business Administration, that it is in the interest of maintaining or mobilizing the Nation's full productive capacity, in the interest of war or national defense programs, or in the interest of assuring that a fair proportion of Government procurement is placed with small business concerns. Offers received from firms which are not small business concerns shall be considered nonresponsive and shall be rejected.

b. Definition. A "small business" concern is a concern, including its affiliates, which is independently owned and operated, is not dominant in the field of operation in which it is offering on Government contracts, and can further qualify under the criteria set forth in regulations of the Small Business Administration (Code of Federal Regulations, Title 13, Section 121.3-8 and Revisions). For work under this contract the average annual receipts of the concern and its affiliates for its preceeding three fiscal years must not exceed $12,000,000.

SP-29. PROJECT BULLETIN BOARD. The Contractor shall furnish, install, and maintain during the life of the project, a bulletin board approximately 3 feet high by 5 feet wide. The bulletin board shall be erected as soon as possible and within 15 days after the date of NOTICE TO PROCEED. It shall be mounted in a prominent place accessible to all employees, and as approved by the Contracting Officer. The bulletin board shall remain the property of the Contractor and shall be removed by him upon completion of the contract work. The following information, which will be furnished by the Government to the Contractor, shall be posted on the bulletin board and shall be maintained by the Contractor in easily readable condition at all times for the duration of the contract:

The schedule of minimum wage rates for the contract as required by Clause 32, "Davis-Bacon Act" of the GENERAL PROVISIONS, with the minimum wage rate poster.

SP-30. DEVIATIONS FROM CONTRACT REQUIREMENTS. Deviations from contract requirements will not be permitted, except under unusual circumstances. Submissions of shop drawings and materials will be

assumed to be in conformance with plans and specifications, unless they contain an expressed declaration of a deviation, the reasons for it, and request for waiver.

SP-31. CONTRACTOR'S OPTIONS. The Technical Provisions may, by specific references, permit the Contractor to select optional materials, items, systems, or equipment. The use of options is subject to the following conditions:

a. Once an option has been selected and approved, it shall be used for the entire contract.

b. The Contractor will be required to coordinate his selection with the plans and specifications and to make all necessary adjustments without additional cost to the Government.

SP-32. GOVERNMENT FIELD OFFICE. The Contractor shall provide a trailer for the Government field office similar and approved equal to Crown Model CR-30 (8'x 26'). The trailer shall include as a minimum two (2) overhead shelves, a double desk with pedestal, a 36" x 92" plan table, a plan rack, one moveable office desk, chairs for all desks, an enclosed toilet, a telephone, and one partition. Doors shall be provided with cylinder locks and six (6) keys shall be furnished to the Government. The Contractor shall provide all services and supplies in connection with maintaining the trailer including cleaning, janitorial services, heating, lighting, water supply, sanitary services, and snow removal. The trailer will be located by the Contractor where directed. No separate payment will be made for the trailer and all costs shall be included in the items comprising the bid schedule. The trailer, after completion of the work, will become the property of the Contractor and be removed from the site.

SP-33. OMITTED.

SP-34. PLANT. The Contractor agrees to keep on the job sufficient plant to meet the requirements of the work. The plant shall be in satisfactory operating condition and capable of safely and efficiently performing the work as set forth in the specifications and the plant shall be subject to inspection by the Contracting Officer at all times.

SP-35. DEFINITION OF "SITE OF THE WORK" FOR PURPOSES OF THE PROVISIONS OF THE DAVIS-BACON ACT, 40 U.S.C. 276a. The Comptroller General of the United States, in Decision B-148076 dated 26 July 1963, issued an opinion which conflicts with the long established ruling of the Solicitor of Labor defining the "site of the work".

Pending resolution of this difference the Department of Defense position is to follow the ruling of the Solicitor of Labor that the "site of the work" refers to the site of the contract work and includes not only the limited physical area where the structure or improvement is erected or built but also certain other operations set up exclusively to furnish materials for the construction project. Accordingly, wages paid in connection with such operations shall be not less than the minimum wage rates, with appropriate adjustment for overtime hours, established by the Secretary of Labor and included in the contract. The Contractor must maintain complete payroll records for all employees working at these temporary facilities and must submit to the Contracting Officer weekly payrolls for said employees.

The tests to be used in determining whether such a facility is within the coverage of the Act are basically:

(1) whether the facility is temporary and established virtually exclusively to meet the needs of the contract, or a series of contracts on an integrated project, rather than to serve the public generally; (2) whether the facility is located in the general area of the construction; and (3) whether the facility is integrated with the construction needs.

Any failure of the Contractor to comply with the above may, pursuant to Clauses 37 and 39 of the GENERAL PROVISIONS, result in the Government terminating the contract or withholding from the contract amount funds necessary to assure proper wage payment.

SP-36. BID ITEM REFERENCES ON DRAWINGS. Bid Item references are shown where practicable on the drawings for convenience only. Under no circumstances should these be used without reference to the specifications which describe the work and the bid items. Should there by any descrepancies between the work covered by the bid item numbers as shown on the drawings and in the specifications, the specifications shall govern.

SP-37. OMITTED.

SP-38. CONTRACTOR QUALITY CONTROL. The Contractor shall provide and maintain an effective Quality Control Program that complies with Clause 41 of the GENERAL PROVISIONS entitled "Contractor Inspection System."

a. The Contractor shall establish a quality control system to perform sufficient inspection and tests of all items of work, including that of his subcontractors, to ensure conformance to applicable specifications and drawings with respect to the materials, workmanship, construction, finish, functional performance, and identification. The quality control system shall be adequate to cover all construction operations, shall be keyed to the proposed construction sequence and shall include coordinating the work of the various trades. This control will be established for all construction except where the Technical Provisions of the contract provide for specific Government control by inspections, tests, or other means. The Contractor's quality control system shall provide continuing inspection of all work performed and submission to the Resident Engineer by the Contractor's Quality Control Representative of daily reports of inspection in duplicate signed by the person making the inspection.

b. Typical sample reporting forms for the various required operations, complete with typical types of required entries, are furnished as part of these specifications. The Contractor shall prepare similar forms in comparable detail for these and all other phases of the work as called for in each section of the Technical Provisions. The Contractor's Quality Control Inspection report forms shall be submitted for and receive approval by the Government prior to the start of each phase of the work. Approved Quality Control inspection report forms will be furnished by the Contractor for use by each of the various trade supervisors (foremen), who will submit a completed form for each day's work. The Contractor is responsible for preparing and obtaining Government approval of forms, furnishing blank forms to supervisors and submitting completed forms daily to the Contracting Officer for all phases of work including those phases performed by subcontract.

c. (1) The Contractor's job supervisory staff may be used for quality control. The Contractor shall designate one of his staff as the Quality Control Representative. This man shall be responsible for the administration and performance of the Contractor's Quality Control Program. This responsibility includes the daily collecting of the individual trade supervisor's reports and monitoring these reports by taking appropriate follow-up action when required. The Quality Control Representative's report shall be submitted in a format similar to and with no less detail than that on the sample form which is furnished as part of this specification and is attached at the end of the Special Provisions. The various trade supervisor's reports shall be attached to and submitted with the Quality Control Representative's report. If, in the opinion of the Contracting Officer, work conditions will not permit the designated staff member to perform satisfactorily the quality control function the Contractor shall designate another member of his staff as the Quality Control Representative subject to the approval of the Contracting Officer.

(2) For items of work requiring a highly skilled and experienced type of inspection, the Contractor shall furnish the services of a competent erection and/or testing engineer to supervise and be responsible for the installation and testing of the equipment. These items of work and services of each engineer shall be as specified in the applicable Technical Provisions of the contract and the cost of same shall be included in the applicable contract bid items.

d. (1) Quality Control reports shall include, but not be limited to, information of the following type:

(a) Quality of materials and workmanship

(b) Statements similar to the following on the report for the day each new phase of construction is started:

1. Materials, equipment and shop drawings have been approved.

2. Results of required materials tests have been obtained and are satisfactory.

3. Required certificates of compliance have been obtained.

(c) Indications that the effect one phase of the work will have on another has been considered. For instance: When reporting on formwork being erected, it shall be noted that ironworkers, plumbers, pipe fitters and electricians have been notified and are installing sleeves, pipes, conduits, anchors, etc.

(2) Quality Control requires follow-up inspections daily for the duration of each type of construction. Consequently, daily reports should indicate not only that the work was started properly but that materials and workmanship continue to meet contract requirements.

(3) When trade supervisors (foremen) are capable of accomplishing only a check list type of inspection reporting, their reports must be supplemented by more detail in the Quality Control Representative's report.

e. After the contract is awarded and before constuction operations are started, the Contractor shall meet with the Contracting Officer, or his representative, and discuss quality control requirements. The meeting shall develop mutual understanding relative to details of the system, including the forms to be used for recording the quality control operations inspections, administration of the system, and the interrelationship of Contractor and Government inspection.

f. The Contractor shall furnish to the Government within fifteen (15) days after receipt of the Notice to Proceed a quality control plan which shall include the procedures, instructions, and forms to be used. This document will include as a minimum:

(1) The quality control organization.

(2) Number and qualifications of personnel to be used for this purpose.

(3) Authority and responsibilities of quality control personnel.

(4) Methods of quality control, including that for subcontractor's work.

(5) Test methods including, a specified, name of qualified testing laboratory to be used.

(6) Method of documenting quality control operation, inspection, and testing.

(7) A copy of a letter of direction to the Contractor's Quality Control Representative outlining his duties and responsibilities, and signed by a responsible officer of the firm.

(8) Accident prevention and safety practices.

g. Unless specifically authorized by the Contracting Officer, no construction will be started until the Contractor's quality control plan is approved.

h. If recurring deficiencies in an item or items being inspected indicate that the quality control system is not adequate, such corrective actions will be taken as directed by the Contracting Officer.

SP-39. NONCOMPLIANCE WITH QUALITY CONTROL PROVISIONS. Failure of Contractor to comply with requirements of Paragraph SP-38 shall be grounds for determination by the Contracting Officer that the Contractor is not prosecuting the work as required by the specifications. Approval of progress payment estimates will be withheld until such time as the Contractor complies with the provisions of said paragraph and an amount will be deducted from the contract price equal to the value of the services not furnished.

SP-40. SHOP DRAWINGS AND MATERIALS SUBMITTAL CONTROL DOCUMENT. Within 15 days after receipt of notice to proceed, the Contractor shall submit to the Contracting Officer, in duplicate, submittal control document (ENG Form 4288) listing all submittal items. For example, those items listed will include shop drawings, manufacturer's literature, certificates of compliance, material samples, and guarantees. The scheduled need dates must be recorded on the document for each item for control purposes. In preparing the document adequate time (minimum of 15 days or more) will be allowed for review and approval and possible resubmittal. Scheduling shall be coordinated with the approved progress schedule. The Contracting Officer will supply ENG Forms 4288 to the Contractor to include the above information. The schedule shall not relieve the Contractor of his obligation to comply with all the specification requirements for the items on the schedule. The Contractor's Quality Control representative shall review the listing at least every 30 days and take appropriate action to maintain an effective system. Copies of updated or corrected listing shall be submitted to the Contracting Officer at least every 60 days in the quantity specified. Payment will not be made for any material or equipment which does not comply with contract requirements.

SP-41. OMITTED.

SP-42. DAMAGE TO WORK. The responsibility for damage to any part of permanent work shall be as set forth in Clause 12 of the GENERAL PROVISIONS entitled "Permits and Responsibilities." 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 will make the repairs as ordered by the Contracting Officer and full compensation for such repairs will be made at the applicable contract unit 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 pursuant to GENERAL PROVISIONS, Clause 3, Changes, of the contract, will be made as full compensation for the repairs of that part of the permanent work for which there are no applicable contract unit or lump sum prices. 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.

SP-43. QUANTITY SURVEYS. a. The Contractor shall make original and final surveys and make computuations to determine the quantities of work performed or finally in place.

b. The Contractor shall make such surveys and computations as are necessary to determine the quantities of work performed or placed during each period for which a progress payment is to be made. All original field notes, computations and other records for the purpose of layout and progress surveys shall be recorded in duplicating field books, the original pages of which shall be furnished promptly in ring binders to the representatives of the Contracting Officer to the extent necessary in determining the proper amount of progress payments due the Contractor. Unless waived by the Contracting Officer in each specific case, quantity surveys made by the Contractor shall be made under the direction of a representative of the Contracting Officer.

SP-44 thru SP-46. OMITTED.

SP-47. BRAND NAMES. If items called for by this specification have been identified by a "brand name or equal" description, such identification is intended to be descriptive, but not restrictive, and is to indicate the quality and characteristics of products that will be satisfactory.

SP-48. OMITTED.

SP-49. PROTECTION OF EXISTING STRUCTURES AND UTILITIES. The Contractor shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, water mains, hydrants, sewers, drains, and electric and telephone cables, whether or not they are shown on the contract drawings. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind. Any damage resulting from the Contractor's operations shall be repaired by the Contractor at his own expense.

SP-50. FACTORS AFFECTING THE PROSECUTION OF THE WORK. a. The Contractor shall coordinate his work with private and public business operations in the vicinity so as not to interfere with production, the receipt or shipments of goods or services rendered including necessary relocations of utilities; and construction of work being done or to be done by others. The Contractor shall furnish the Contracting Officer with duplicate copies of all Contractor work coordinating correspondence with private and public business organizations. The Contractor shall also comply with other special requirements as specified in the following subparagraphs as well as in the other parts of these specifications.

b. Traffic Control. The Contractor shall make all arrangements with the State of Massachusetts and the city of Fitchburg relative to detouring and maintenance of traffic and shall be required to secure and pay for all permits, fees, and bond in connection with his operations. The Contractor shall furnish, provide, erect and maintain all signs, necessary barricades, suitable and sufficient red lights, reflectorized signs or signals, danger signals, provide a sufficient number of watchmen and take all necessary precautions for the protection of the work and safety of the public. All applicable requirements of the Massachusetts Standard Specifications shall apply, except the Contractor shall furnish all signs. Commencement of construction shall be contingent upon the prior installation of adequate signs, barricades, warning, etc., in the area concerned. Highways, roads and streets closed to traffic shall be protected by effective barricades on which shall be placed acceptable reflectorized warning

signs, lights, and signals. The Contractor shall provide and maintain throughout the project, acceptable warning, direction and detour signs at all closures, intersections and along the construction and detour routes directing the traffic around the closed portion or portions of the highway so that the temporary detour route or routes shall be indicated clearly throughout its or their entire length. All barricades, obstructions, warning and detour signs shall be either reflectorized or lighted at night. All lights shall be kept burning from sunset to sunrise. When construction is suspended for any reason, the barricades, warning and detour signs shall be established on a semi-permanent basis and shall be reflectorized. Installation and arrangement shall be approved by the Contracting Officer, and shall be designed to provide safe driving conditions on a basis equal to that of the rest of the highway which is not under construction. The Contractor shall not receive additional compensation for the control of traffic, the furnishing, installation, maintenance and removal of lights, barricades, direction signs, warning and detour signs, reflectorization, etc., but the cost thereof shall be included in the applicable lump sum and unit prices for the items involved. In the event that the Contractor neglects to satisfactorily install and maintain barricades, warning and detour signs, the Contracting Officer may proceed to have such installations made, and the cost thereof shall be deducted from the monies due or to become due the Contractor.

SP-51. PLANT AND EQUIPMENT. The offeror shall, upon request of the Contracting Officer, furnish a list of the plant and equipment available to the offeror and proposed for use on the work.

SP-52. CONTINGENT FEE. If the offeror, by checking the appropriate box provided therefor in this offer, has represented that he has employed or retained a company or person (other than a full-time bona fide employee working solely for the offeror) to solicit or secure this contract, or that he has paid or agreed to pay any fee, commission, percentage, or borkerage fee to any company or person contingent upon or resulting from the award of this contract, he shall furnish, in duplicate, a complete Standard Form 119, Contractor's Statement of Contingent or Other Fees. If the offeror has previously furnished a completed Standard Form 119 to the office issuing this proposal, he may accompany his offer with a signed statement, (a) indicating when such completed form was previously furnished, (b) identifying by number the previous invitation for bids or contract, if any, in connection with which such form was submitted, and (c) representing that the statements in such previously furnished form are applicable to this offer.

SP-53. NOTICE REGARDING BUY AMERICAN ACT. The Buy American Act (41 U.S.C. 10a-10d) generally requires that only domestic con-

struction material be used in the performance of this contract. Exception from the Buy American Act shall be permitted only in the case of nonavailability of domestic construction materials. A bid or proposal offering nondomestic construction material will not be accepted unless specifically approved by the Office of the Secretary of Defense. When a bidder or offeror proposes to furnish nondomestic construction material, his bid or proposal must set forth an itemization of the quantity, unit price, and intended use of each item of such nondomestic construction material. When offering nondomestic construction material pursuant to this paragraph, bids or proposals may also offer, at stated prices, any available comparable domestic construction material, so as to avoid the possibility that failure of a nondomestic construction material to be acceptable under this paragraph will cause rejection of the entire bid or proposal.

SP-54. AFFILIATED OFFERORS. a. Business concerns are affiliates of each other when either directly or indirectly (i) one concern controls or has the power to control the other, or (ii) a third party controls or has the power to control both.

b. The offeror shall submit upon request of the Government an affidavit containing information as follows:

(i) whether the offeror has any affiliates;

(ii) the names and addresses of all affiliates of the offeror; and

(iii) the names and addresses of all persons and concerns exercising control or ownership of the offeror and any or all of his affiliates, and whether as common officers, directors, stockholder holding controlling interest, or otherwise.

Failure to furnish such an affidavit promptly upon request may result in rejection of the offer.

SP-55. PARENT COMPANY STATEMENT. The offeror must execute the statement forming a part of Form 19B, REPRESENTATIONS AND CERTIFICATIONS, furnishing information as to Parent Company and Employer Identification Number and submit one executed copy with the offer if the amount of the bid exceeds $10,000. This requirement is an addition to the information required under the provisions of the Affiliated Offerors clause above.

SP-56. AVAILABILITY OF SPECIFICATIONS, STANDARDS AND DESCRIPTIONS. Specifications, standards and descriptions cited in this solicitation are available as indicated below:

(a) Unclassified Federal, Military and Other Specifications and Standards (Excluding Commercial), and Date Item Descriptions. Submit request on DD Form 1425 (Specifications and Standards Requisition) to:

Commanding Officer
U.S. Naval Publications and Forms Center
5801 Tabor Avenue, Philadelphia, PA 19120

The Acquistion Management Systems and Data Requirements Control List, DOD Directive 5000.19-L, Volume II, may be ordered on the DD Form 1425. The Department of Defense Index of Specifications and Standards (DODISS) may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington DC., 20402. When requesting a specification or standard, the request shall indicate the title, number, date and any applicable amendment thereto by number and date. When requesting a data item description, the request shall cite the applicable data item number set forth in the solicitation. When DD Form 1425 is not available, the request may be submitted in letter form, giving the same information as listed above, and the solicitation or contract number involved. Such requests may also be made to the activity by Telex No. 834295, Western Union No. 710-670-1685, or telephone (area code 215-697-3321) in case of urgency.

(b) Commercial Specifications, Standards and Descriptions. These specifications, standards and descriptions are not available from Government sources. They may be obtained from the publishers.

SP-57. PRE-AWARD ON SITE EQUAL OPPORTUNITY COMPLIANCE REVIEW. In accordance with regulations of the Office of Federal Contract Compliance, 41 CFR 60.1, effective 1 July 1968, an award in the amount of $1,000,000 or more will not be made under this solicitation unless the offeror and each of his known first-tier subcontractors (to whom he intends to award a subcontract of $1,000,000 or more) are found, on the basis of a compliance review, to be able to comply with the provisions of Equal Opportunity clause of this solicitation.

SP-58. NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY. To be eligible for award of a contract exceeding $10,000 under the Proposal, the offeror must comply fully with the requirements, terms and conditions of the "Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity" attached at the end of these SPECIAL PROVISIONS.

SP-59. PROGRESS CHARTS. A progress chart shall be provided in accordance with GENERAL PROVISIONS CLAUSE 72.

SP-60. PROJECT DESCRIPTION. The following description is given to indicate the approximate scope of this work. The quantities given are preliminary and approximate and should not be used for bidding purposes.

The channel rehabilitation project extends over an approximate 4.4 mile reach of the North Nashua River and consists of 22 individual work locations involving clearing, reconstruction of deteriorated floodwalls, bank stabilization, stone protection and removal of shoal areas.

SP-61. VISITING THE SITE. The offerer is urged to visit the site of the contract work in order to obtain first hand knowledge of the work to be done and conditions to be encountered. The conditions of surfaces on which repair work is required to be performed should be determined for estimating properly the difficulty, extent and cost of successfully performing the work as specified.

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Timetables	*Goals for minority participation for each trade*	*Goals for female participation in each trade*
From 1 April 1978 until 31 March 1979		3.1%
From 1 April 1979 until 31 March 1980		5.1%
From 1 April 1980 until 31 March 1981		6.9%

NOTE: The goals and timetables for minority utilization, when available, will be provided by amendment to these specifications.

In the event the goals and timetables are not available by bid opening, they will be incorporated by modification to the contract.

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.

4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is Worcester County, Fitchburg, Massachusetts.

(8 May 78)

U.S. DEPARTMENT OF LABOR
OFFICE OF THE SECRETARY
WASHINGTON

DECISION OF THE SECRETARY

This case is before the Department of Labor pursuant to a request for a wage predetermination as required by law applicable to the work described.

A study has been made of wage conditions in the locality and based on information available to the Department of Labor the wage rates and fringe payments listed are hereby determined by the Secretary of Labor as prevailing for the described classes of labor in accordance with applicable law.

This wage determination decision and any modifications thereof during the period prior to the stated expiration date shall be made a part of every contract for performance of the described work as provided by applicable law and regulations of the Secretary of Labor, and the wage rates and fringe payments contained in this decision, including modifications, shall be the minimums to be paid under any such contract by contractors and subcontractors on the work.

The contracting officer shall require that any class of laborers and mechanics which is not listed in the wage determination and which is to be employed under the contract, shall be classified or reclassified conformably to the wage determination, and a report of the action taken shall be sent by the Federal agency to the Secretary of Labor. In the event the interested parties cannot agree on the proper classification or reclassification of a particular class of laborers and mechanics to be used, the question accompanied by the recommendation of the contracting officer shall be referred to the Secretary for determination.

Before using apprentices on the job the contractor shall present to the contracting officer written evidence of registration of such employees in a program of a State apprenticeship and training agency approved and recognized by the U.S. Bureau of Apprenticeship and Training. In the absence of such a State agency, the contractor shall submit evidence of approval and registration by the U.S. Bureau of Apprenticeship and Training.

The contractor shall submit to the contracting officer written evidence of the established apprentice-journeyman ratios and wage rates in the project area, which will be the basis for establishing such ratios and rates for the project under the applicable contract provisions.

Fringe payments include medical and hospital care, compensation for injuries or illness resulting from occupational activity, unemployment benefits, life insurance, disability and sickness insurance, accident insurance (all designated as health and welfare), pensions, vacation and holiday pay, apprenticeship or other similar programs and other bona fide fringe benefits.

NOTE: In addition to the wage rates set forth herein, the complete decision of the Secretary of Labor contains wage rates for other classes of laborers and mechanics. Because it does not appear that the work called for on this project will require the use of such other classes, the wage rates applicable to them have not been reprinted but will be made available upon request to the Contracting Officer.

By direction of the Secretary of Labor,

Alfred L. Ganna

Alfred L. Ganna, Director
Division of Wage Determinations
EMPLOYMENT STANDARDS ADMINISTRATION

DEPARTMENT, AGENCY, OR BUREAU
DEPARTMENT OF THE ARMY, CORPS OF ENGINEERS, NEW ENGLAND DIVISION

LOCATION OF PROJECT (CITY OR OTHER DESCRIPTION)
NORTH NASHUA RIVER — FITCHBURG

STATE: MASSACHUSETTS
COUNTY: WORCESTER

DESCRIPTION OF WORK:
CHANNEL REHABILITATION PROJECT, LOCAL PROTECTION

DECISION NO.: MA78-2090

DATE OF DECISION: 22 SEPT 1978

EXPIRES: CONTINUING AS MODIFIED

SUPERSEDES DECISION NO.: MA78-3033 dtd 4-21-78

SUPERSEDEAS DECISION

STATE: Massachusetts COUNTY: Worcester
DECISION NUMBER: MA78-2090 DATE: Date of Publication 9-22-78
Supersedes Decision No. MA78-3033, dated April 21, 1978 in 43 FR 17200
DESCRIPTION OF WORK: Building Constructin (including Residential) heavy and highway construction

BUILDING, HEAVY AND HIGHWAY CONSTRUCTION	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
ASBESTOS WORKERS	$ 10.47	.57	.65		
BOILERMAKERS	11.80	1.05	10%		.02
BRICKLAYERS:CEM.MASONS,PLASTERERS, and STONEMASONS: Warren	10.05	.70	.95		.06
Hopedale, Milford and Southboro	10.60	1.20	1.00		.09
Residential	8.48	1.20	1.00		.09
Ashburnham, Gardner, Harvard, Hubbardston, Lancaster, Leominster, Lunebuig, Petersham, Phillipston, Princeton, Ryalston, Sterling, Templeton, Wesminster and Winchendon	11.20	.90	.70		.09
Residential	8.96	.90	.70		.09
Veneer plasterers	9.30	.90	.70		.06
Remainder of County	10.00	.95	1.15		.02
CARPENTERS, SOFT FLOOR LAYERS:					
Blackstone, Millville	9.40	.65	.90		.05
Hardwick, Warren, W. Brookfield	10.00	.60	1.00		.02
Remainder of County	11.00	.65	1.00		.07
ELECTRICIANS:					
Warren W. Warren	10.88	.70	3%+.30		.03
Ashburnham, Athol, Bolton, Fitchburg, Gardner, Harvard, Hubbardston, Lancaster, Leominster, Lunenbueg, Phillipston, Westminster, and Winchendon	10.80	.75	3%+.70		.02
Remainder of County	10.79	8%	5½%+.30		.01
ELEVATOR CONSTRUCTORS	10.32	.445	.29	4%+b+c	.02
ELEVATOR CONSTRUCTORS' HELPERS	70%JR	.445	.29	4%+b+c	.02
ELEVATOR CONSTRUCTORS' HELPERS (PROB.)	50%JR				
GLAZIERS:					
East Douglas	8.68	.52	.85		.01
Remainder of County	10.40	.57	.64		.03
IRONWORKERS:					
Southboro	11.24	1.00	1.50		.06
Blackstone	9.43	.70	1.50		.03
Remainder of County	10.59	1.00	1.50		.06

Page 2 of 5

DECISION NO. MA78-2090

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
LABORERS (BUILDING):					
Laborers, Carpenter tenders and wrecking laborers	$ 8.25	.60	.75		.10
Jackhammer operators, Pavement breakers, Asphalt rakers, Carbide core drilling machine, Chain saw operators, Pipelayers, Barco type jumping tampers, Laser beam, Concrete pump, Mason tenders, Mortar mixers, Ride-on motorized buggies, and fence and beam rail erectors and plasterers' tenders	8.50	.60	.75		.10
Air track, Block pavers, Rammers and Curb setters	8.75	.60	.75		.10
Blasterers and powdermen	9.00	.60	.75		.10
Open air caisson and cylindrical work and boring crew:					
Laborer, Topman	8.25	.60	.75		.10
Helper	8.37	.60	.75		.10
Bottom man	9.00	.60	.75		.10
Driller	9.12	.60	.75		.10
LATHERS:					
Sturbridge and Warren	9.40	.45	.25		.01
Drywall	8.30	.45	.25		.01
Blackstone and Lunenburg	9.25	.45	.55		
Remainder of County	10.12	1.65	.25		.01
LEADBURNERS	9.25	.35		c	.01
LINE CONSTRUCTION:					
Linemen	12.00	.70	3%+.50	d	3/8of1%
Equipment operator	11.28	.70	3%+.50	d	3/8of1%
Driver, groundman	9.03	.70	3%+.50	d	3/8of1%
Groundman	7.69	.70	3%+.50	d	3/8of1%
MARBLE SETTERS:					
Ashburnham, Fitchburg, Harvard, Lancaster, Leominster, Lunenburg, Princeton, Sterling, Westminster	10.30	.85	1.10		

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
MARBLE SETTERS: (Cont'd)					
Auburn, Barre, Berlin, Blackstone, Bolton, Boylston, Brookfield, Charlton, Clinton, Douglas, Grafton, Hardwick, Holden, Leicester, Mendon, Millbury, Millville, New Braintree, Northboro, Northbridge, Oxham, Oxford, Paxton, Rutland, Shrewsburg, Southbridge, Spencer, Sturbridge, Sutton, Upton, Uxbridge, Webster, West Boylston, Westboro and Worcester	9.00	.70	.60		.02
Warren	9.55	.55	.55		.03
MARBLE SETTERS' HELPERS	9.33	.85	.50		
MILLWRIGHTS	10.90	.90	1.00		.10
PAINTERS:					
Warren, West Warren:					
Brush and Tapers	9.17	.88	.55		.05
Spray-epoxys & interior dry fogs & materials thinned with anything other than water &/or minerial spirits	12.2267	1.1733	.7333		.0667
Spray-materials thinned with water &/or minerial spirits, excluding epoxys & interior dry fogs	12.7567	1.1733	.7333		.0667
Swing Stage under 40' Steel	9.357	.88	.55		.05
Swing Stage over 40' Steel	9.67	.88	.55		.05
Holedale, Mendon, Milford, Southboro, Upton and Westboro:					
Brush (New Construction), Paperhangers and Tapers	9.00	.85	.70		.06
Brush (Repaint)	8.45	.85	.70		.06
Remainder of County:					
Brush	10.46	.82	1.20		.04
Steel	12.58	.82	1.20		.04
Sandblasting; Spray	11.46	.82	1.20		.04
Repaint	8.91	.82	1.20		.04
PILEDRIVERMEN	10.90	.85	1.00		
PIPEFITTERS:					
Holedale and Southboro	9.97	.53	.55		.05
Remainder of County	10.18	.45	.40		.05
Pondville	12.86	.94	1.20		.07
PLUMBERS:					
Hopedale and Southboro	11.47	1.23	.85		.05

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
PLUMBERS: (Cont'd)					
Ashburnham, Athol, Bolton, Fitchburg, Gardner, Harvard, Hubbardston, Lancaster, Leominster, Lunenburg, Petersham, Phillipston, Royalston, Templeton, Westminster and Winchendon	$ 10.02	.60	.65	.40	.05
Remainder of County	10.83	.65	.45		.05
ROOFERS	10.00	1.12	.63		
SHEET METAL WORKERS	10.38	.85	.75		.05
SPRINKLER FITTERS	12.08	.65	.95		.08
TERRAZZO WORKERS and TILE SETTERS:					
Ashburnham, Fitchburg, Harvard, Lancaster, Leominster, Lunenburg, Princeton, Sterling and Westminster Counties	9.80	.85	1.10		
Auburn, Barre, Berlin, Blackstone, Bolton, Boylston, Brookfield, Charlton, Clinton, Douglas, Dudley, Grafton, Hardwick, Holden, Leicester, Mendon, Millbury, Millville, New Braintree, Northboro, Northbridge, Oakham, Oxford, Paxton, Rutland, Shrewsbury, Southbridge, Spencer, Sturbridge, Sutton, Upton, Uxbridge, Webster, W. Boylston, Westboro and Worcester Counties	9.00	.70	.60		.02
Warren County	9.55	.55	.85		.03
Hubbardston, Gardner, Phillipston, Petersham, Athol, Royalston, Winchenden (only Tile Setters)	9.45	.60	.60		.04
TERRAZZO WORKERS' HELPERS	9.95		.25		.05
TILE SETTERS' HELPERS	9.33	.85	.50		

PAID HOLIDAYS:
A-New Year's Day; B-Memorial Day; C-Independence Day; D-Labor Day; E-Thanksgiving Day; F-Christmas Day.

FOOTNOTES:

a. Employer contributes 4% of basic hourly rate for 5 years or more of service or 2% of basic hourly rate for 6 months to 5 years of service as Vacation Pay Credit.
b. Holidays: A through F.
c. Holidays: A through F, Washington's Birthday, Good Friday and Christmas Eve, provided the employee has worked at least 45 full days during the 120 calendar days immediately prior to the holiday and the regular scheduled work days immediately preceding and following the holiday.
d. Holidays: A through F and Bunker Hill Day, provided the employee has worked 10 days prior to the listed holidays.

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HEAVY + HIGHWAY

LABORERS	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
Class I	$ 8.25	.60	.75		.10
Class II	8.50	.60	.75		.10
Class III	8.75	.60	.75		.10
Class IV	9.00	.60	.75		.10

CLASSIFICATIONS

Class I: Carpenter tenders, Cement finisher tenders, Laborers, Wrecking laborer

Class II: Asphalt rakers, Fence and guard rail erectors, Laser beam operator, Mason tender, Pipelayer, Pneumatic drill operator, Pneumatic tool operator, Wagon drill operator

Class III: Air track operator, Block pavers, Rammers, Curb setters

Class IV: Blasters, Powdermen

DECISION NO. MA78-2090

HEAVY & HIGHWAY CONSTRUCTION:

Remainder of County:

	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
POWER EQUIPMENT OPERATORS					
GROUP 1	11.75	1.10	1.00	a	.03
Hourly premium for boom lengths including jib					
Over 150 feet + $ .45					
Over 185 feet + .80					
Over 210 feet + 1.15					
Over 250 feet + 1.75					
Over 295 feet + 2.50					
GROUP 2	11.63	1.10	1.00	a	.03
GROUP 3	9.81	1.10	1.00	a	.03
GROUP 4	10.71	1.10	1.00	a	.03
GROUP 5	8.68	1.10	1.00	a	.03
GROUP 6	9.21	1.10	1.00	a	.03

CLASSIFICATIONS

GROUP 1 Power shovels, cranes, truck cranes, derricks, pile drivers, trenching machines, mechanical hoist pavement breakers, cement concrete pavers, draglines, hoisting engines, three drum machines, pumpcrete machines, uke loaders, shovel dozers, front end loaders, mucking machines, shaft hoists, steam engines, backhoe, gradalls, cable ways, fork lifts, cherry pickers, boring machines, rotary drills, post hole hammers, port hole diggers, asphalt plant on job site, concrete batching and/or mixing plant on job site, crusher plant on job site, paving concrete mixers, timber jacks

GROUP 2 Sonic or vibratory hammers, graders, scrapers, tandem scrapers, bulldozer, tractors, mechanic maintenance, York rakes, mulching machines paving screed machines, stationary steam boilers, paving concrete finishing machine, grout pumps, portable steam boilers, portable steam generators, rollers, spreaders. asphalt pavers, locomotives or machines used in place thereof, tampers, self propelled or tractor drawn, cal tracks, ballast regulators, rail anchor machines, switch tampers

GROUP 3 Pump (1-3 grouped), compressors, welding machine (1-3 grouped), generators, lighting plants, heaters (power driven) (1-5), syphons-pulsometers, concrete mixers, valves controlling permanent plant air steam, conveyors, wellpoint system (operating and installing)

GROUP 4 Assistant engineers (firemen)

GROUP 5 Oilers (other than truck cranes & gradalls)

GROUP 6 Oilers (on truck cranes & gradalls)

FOOTNOTES:

a. Holidays - New Years' Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day, Washington's Birthday, Columbus Day, Veterans Day and Patriots Day

DECISION NO MA78-2090

BUILDING, HEAVY AND HIGHWAY CONSTRUCTION	Basic Hourly Rates	Fringe Benefits Payments			
		H & W	Pensions	Vacation	Education and/or Appr. Tr.
TRUCK DRIVERS					
CLASS I	8.215	.75	.80	a+b	
CLASS II	8.365	.75	.80	a+b	
CLASS III	8.415	.75	.80	a+b	
CLASS IV	8.515	.75	.80	a+b	
CLASS V	8.615	.75	.80	a+b	
CLASS VI	8.865	.75	.80	a+b	
CLASS VII	9.115	.75	.80	a+b	

CLASS I - Station wagons, Panel trucks and pickup truck

CLASS II - Two axle equipment; Helpers on low bed when assigned at the discretion of the employer , warehouseman, Forklift operators

CLASS III - Three axle equipment and Tiremen

CLASS IV - Four and five axle equipment

CLASS V - Specialized earth moving equipment under 35 tons other than convential type trucks, Low bed, Vachual, Mechanics, Paving restoration equipment, Mechanic

CLASS VI - Specialized earth moving equipment over 35 tons

CLASS VII - Trailers for earth moving equipment (double hookup)

FOOTNOTES:

a. One half day's pay each month in which an employee has worked 15 days provided he has been employed for 4 months.

b. Holidays: A through F, Washington's Birthday, Columbus Day, Veteran's Day and Patriots' Day provided an employee works two days of the calendar week in which the holiday falls.

SAMPLE -*Typical Form for Contractor's Quality Control Representative's Report

CONTRACTOR"S NAME
(Address)

DAILY CONSTRUCTION QUALITY CONTROL REPORT

Date 5 March 1974

Contract No: DACW33-73-C-0199

Description and Location of Work: As noted on attached sheets

WEATHER: (Clear) (P. Cloudy) (Cloudy); TEMPERATURE: 39° Min 61° Max; Rainfall 0 Inches

Contractor/Subcontractors and Area of Responsibility
a. Federal Constr. Corp. - Excavation for and Placement of
b. drainage Culverts; Placing Concrete at Pumping
c. Sta. No. 3 - Placing impervious & random fill
d. for Dike Constr. - See attached reports
e. Local Metal Products - Erection of struct. steel -
f. Redi-Mix Concrete Co. - Concrete Supplies
g.

1. Work Performed Today: (Indicate location and description of work performed. Refer to work performed by prime and/or subcontractors by letter in table above.)

A. Excavation for 72" drain - Excavation & placement of 48" drain
Placement of random & impervious fill - Dike Constr. Concrete
placement, pumping Sta. No. 3
E. Erection of struct. steel - Pumping Sta. No. 2
F. Supplier of Redi-mixed Concrete

2. Results of Surveillance: (Include satisfactory work completed, or deficiencies with action to be taken. Refer to Spec. Section No. and particular Para. No.)

Local metal products was directed to touch up newly installed steel per Spec. Sect. 9 - Para. 9-3.2 - Federal Constr. Corp was directed to re-compact area of dike fill - unsatisfactory test.

3. Tests Required by Plans and or Specifications Performed and Results of Tests:

a. Zinc Chromate Primer for struct. steel has been approved per submittal # 009-003 - 12/12/73
b. Compaction tests by Corps of Engineers proved unsatisfactory - Re-Compaction required.
c. Concrete mix approved per transmittal No. 003-003
d. 11/3/73 - Slump and Concrete Cylinders taken

*To be used as forwarding cover for quality control reports of various trades and clarification or enlargement of their reports.

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4. Verbal Instructions Received: (List any instructions given by Government personnel on construction deficiencies, retesting required, etc., with action to be taken.)

Resident Engineer informed the undersigned that Cold weather has been forecasted for the next few days. Concrete protection might be required.

5. Remarks: (Cover any conflicts in plans, specification, or instructions.)

Field painting of struct. steel to begin week of 3/11/74. The contract specs. were reviewed with the subcontractor's painting foreman to clarify particulars relative to the painting requirements.

6. Safety Inspection: (Report violations noted; corrective instructions given; and corrective actions taken.)

Men installing pipe in trench for 48" line, wet and without shoring.
Foreman requested to pump water out of trench 9 feet deep for 48" pipe line and to shore and brace the sides of the trench.
Foreman said he had no pump, so trench was filled up to face of pipe.

JOHN FORMAN, SAFETY
Contractor's Inspector

CONTRACTOR'S VERIFICATION: The above report is complete and correct and all material and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications except as noted above.

FRED JOHNSON Q.C.R.
Contractor Quality Control Representative

FEDERAL CONSTRUCTION COMPANY, INC.

DAILY QUALITY CONTROL REPORT

Date 5 March 1974

Contract No.	Project: Shifting Dunes Local Protection Project Maine	Item # 88, 89, 90
DACW 33-73-C-0199		

Description of work: EXCAVATION & FILL

Check One: On site ✓ Off site

Location: Excavation - Sta. 8+00 to Sta. 12+50
Random fill - Sta. 6+50 to Sta. 8+00
Impervious fill - Sta. 8+00 to Sta. 9+00

Contractor: Prime ✓ Sub _____ (Name) Supplier _____ (Name)

Following Checked for (List)

Excavation - to elev. 98.50
Fill - Impervious - to elev. 105.00

EXCAVATING TO REQUIRED LINE AND GRADE (Specify location and grade) Random - to elev. 109.

PROPER STORAGE OF REUSABLE MATERIAL ✓

PROPER DISPOSAL OF WASTE MATERIAL Unsuitable material to Spoil Pile

GRADING TO CORRECT LIMITS Exc. to elev. 98.50± Sta. 8+00 to 12+50

PROPER SHAPING OF SUBGRADE (Indicate area and elevation) ✓

COMPACTION EQUIPMENT TO MEET SPECIFICATIONS D-7 Dozer - Sheepsfoot Roller

MAXIMUM LAYER OF THICKNESS NOT EXCEEDED Random - 8" Impervious - 6"

UNIFORM APPEARANCE OF STONE PROTECTION (Specify thickness of stone protection and area of deviation from specifications)

NO FILL PLACED UNTIL APPROVED BY CONTRACTING OFFICER

SOFT AND YIELDING MATERIALS CORRECTED (Indicate Area & elevation) Unsuitable material removed from elev. 102.0 to elev. 98.5 between Sta. 9+00 and 9+45.

Items Inspected By:

Mike Thomas Supt.
Signature & Title

Items Approved By:

Fred Johnson/QCR
Signature & Title

Approval is limited to one of the following:

Check One: Project Superintendent

Project Engineer

✓ Quality Control Representative

SP-38c(1) TSR

FEDERAL CONSTRUCTION COMPANY, INC.

DAILY QUALITY CONTROL REPORT

Date 5 March 1974

Contract No.	Project: Shelting Dunes Local Protection Project Maine	Item #
DACW 33-73-C-0199		34

Description of work: CONCRETE AND REINFORCING STEEL FORMING & PLACING

Check One: On Site ✓ Off Site

Location: Pumping Sta. No. 3 Foundation

Contractor: Prime ✓ Sub _____ (Name)

Supplier Redi-Mix Concrete Co. (Name)

Following Checked for (list)

NO SEGREGATION IN PLACING (Method of Placement) 8 cy Transit Mixed

VERTICAL DROPS NOT TO EXCEED 5 FT. Additional Concrete Chute used.

FOUNDATION FREE OF ICE AND WATER (Dewatering Method) 1-3" Submersible Pump

FOUNDATION CLEAN BEFORE PLACING All foreign Material Removed, wood, etc.

CONCRETE IN 1.5 FT. LIFTS 3 lifts of 1.5' ea. Placed

VIBRATORS IN USE (Specify type of vibrator) 5" spud at 6000 cycles/Min.

CONSTRUCTION JOINTS CLEAN (Specify method of cleaning) Cleaned with water pressure

PROPER TYPE OF FINISH Screed finish on foundation Conc. Joint

CURING DONE PROPERLY (Specify method of curing) 7-Day Moist Curing + 50° F

FORMS & GRADES CHECKED (Indicate location within structure) Concrete placed to elev. 105.60

FORMS OILED Approx. 2 hrs. prior to placement of Concrete

PROPER CLEARANCE OVER EMBEDDED ITEMS 4" of Concrete - in Contact w/ ground

LAPPING & SPLICING PERFORMED PROPERLY (Specify min. Re-Bar Lap) #8 Bar 24 Bar dia. 24" Lap

Items Inspected By:

FRANK BLAKE, Supt.
Signature & Title

Items Approved By:

FRED JOHNSON, Q.C.R.
Signature & Title

Approval is limited to one of the following:

Check One: Project Superintendent

Project Engineer

Quality Control Representative

SP-38c(1) TSR

SAMPLE

FEDERAL CONSTRUCTION COMPANY, INC.

DAILY QUALITY CONTROL REPORT

Date 5 March 1974

Contract No.	Project	Item #
DACW33-73-C-0199	Shifting Dunes Local Protection Project Maine	52 & 54

Description of work: DRAINAGE & SEWERS Check One: On Site ✓ Off Site

Location: Sta. 34+50 to Sta. 35+50 ℄ pc. - 72" drain
Sta. 52+25 to Sta. 54+00 ℄ pc. & placement of 48" drain

Contractor: Prime ✓ Sub _____ (Name) Supplier _____ (Name)

Following Checked for (list)

EXCAVATING TO CORRECT LINE, GRADE & WIDTH (Specify elev. & area) 8' trench for 72" Drain S = .005; 6' trench for 48" Drain S = .003

SHEETING & SHORING, IF REQUIRED Const. sheeting installed for 72" drain

STABLE SOIL @ PIPE GRADE Gravelly sand at both locations

DEWATERING, IF NECESSARY 2-6" submersible pumps onsite - not required

PIPE PLACED & BEDDED O.K. 10" Layer of Crushed stone for 48" drain

PROPER PROTECTION OF PIPE COATING

PIPES CLEAN BEFORE PLACING

FILTER STONE PROPERLY PLACED Placed 1 - 10" Layer

PROPER SIZE PIPE (Specify size and type of pipe) 48" RCP

NO DAMAGED PIPE USED

PIPE LAYING TO PROCEED UP-GRADE Placement of pipe 48" drain start elev. 96.33 to 96.53 @ Sta. 53+25

INSIDE OF JOINTS CLEAN

Items Inspected By:

V. O'Leary Supt
Signature & Title

Items Approved By:

Fred Johnson Q.C.R.
Signature & Title

Approval is limited to one of the following:

Check One: Project Superintendent

Project Engineer

✓ Quality Control Representative

SP-38c(1) TSR

SAMPLE

FEDERAL CONSTRUCTION COMPANY, INC.

DAILY QUALITY CONTROL REPORT

Date 5 March 1974

Contract No.	Project: Shifting Dunes Local Protection Project Maine	Item # 109
DACW33-73-C-0199		

Description of work: ERECTION OF STRUCTURAL STEEL

Check One: On Site ✓ Off Site

Location: Pumping Station No. 2

Contractor: Prime Sub Local Metal Co. (Name) Supplier (Name)

Following Checked for (list)

DIMENSIONAL TOLERANCE (Specify tolerances) See Supplier Material Register for Beams & Col. tolerances

WELDING PROCEDURES & QUALITY (Specify weld procedures & Name of Welder) See Remarks

PAINT PREPARATION (Specify spec. section & paint system and coat-number or film thickness.)
Contractor field prepared spots and field primed with approved Zinc Chromate Primer - 1 Coat.

Remarks: Bolted connections throughout - Bolts checked for min. torque - Col. anchor bolts field - 1802 ft# Specs. 1750 ft# Clip & Connections field 1000 ft# Para. 9-7.2. 900 ft# Measurements taken from Col. line 1A - Sect. B

Items Inspected By:

Signature & Title

Items Approved By:

Signature & Title

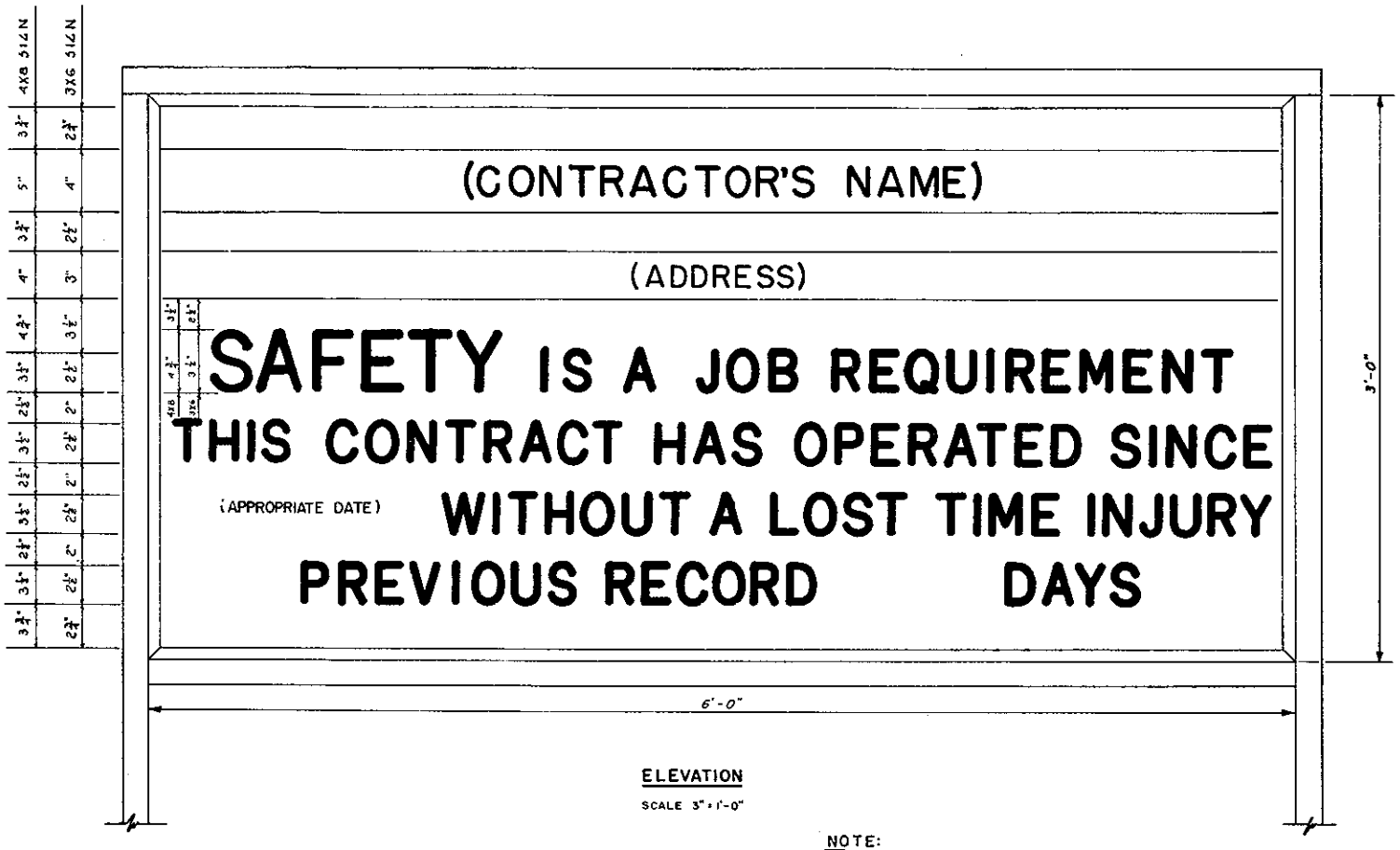
Approval is limited to one of the following:

Check One: Project Superintendent

Project Engineer

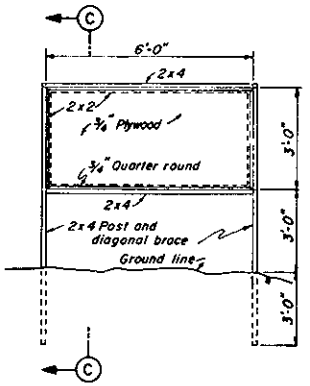
✓ Quality Control Representative

SP-38c(1) TSR



ELEVATION

SCALE 3" = 1'-0"



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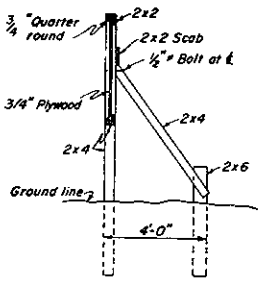


SECTION C-C

3' x 6' SIGN

(4' x 8' SIGN SIMILAR)

NOTE:

This elevation is of a 3' x 6' Sign. See specifications for size required under this contract.

SPECIFICATIONS

1. Posts, rails and bracing shall be No.1 yellow pine or approved equal, S4S, Fed. Spec. MM-L-751c.

2. All exposed surfaces, including edges, shall be given one coat of exterior wood primer conforming to Fed. Spec. TT-P-25c, as amended. Background of sign, shall be given two finish coats of green paint conforming to Fed. Spec. TT-P-81d, color 24260. All other surfaces shall be given two finish coats of white exterior paint conforming to Fed. Spec. TT-P-104

3. White lettering paint shall be Kem Bulletin Color C20 W1 as manufactured by Sherwin-Williams Co., or approved equal.

4. Plywood shall conform to Product Standard PS 1-66, A-C, EXT-DFPA.

SAFETY PAYS

GRAPHIC SCALE

3" = 1'-0" 3" 0 3" 6" 9"

REVISION	DATE	DESCRIPTION	BY

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DR. BY | CK. BY | CA. BY

SUBMITTED: CHIEF, DRAFTING SECTION

APPROVAL RECOMMENDED: CHIEF, TECH. ENG. BRANCH

STANDARD CONSTRUCTION DETAIL

SAFETY SIGN

ELEVATIONS AND SECTION

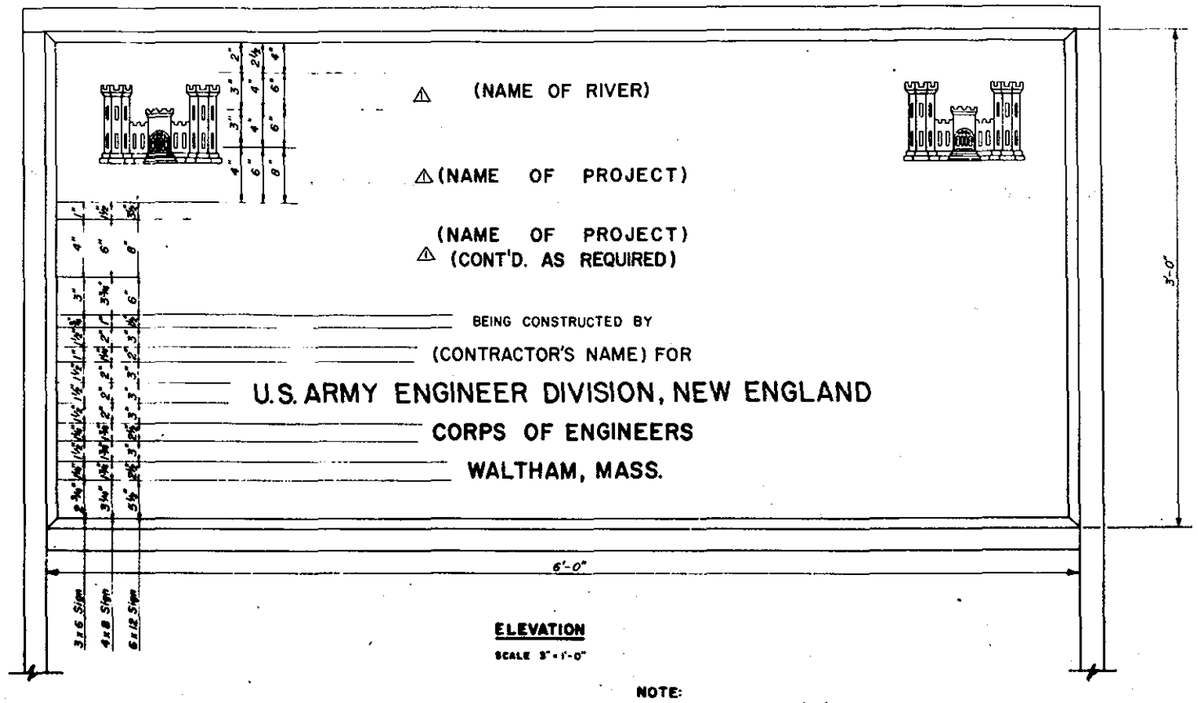
APPROVED: CHIEF, ENGINEERING DIVISION

DATE JUNE 1967

SCALE: AS SHOWN | SPEC. NO

DRAWING NUMBER STD-36

SHEET 1

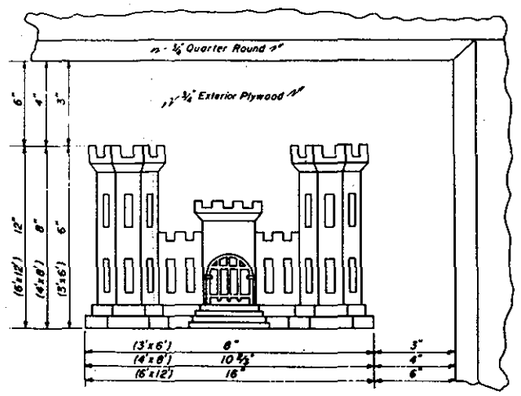


ELEVATION

SCALE 3" = 1'-0"

NOTE:

This elevation is of a 3'x 6' sign. See specifications for size required under this contract.

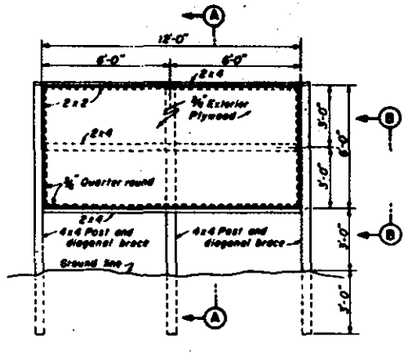


DETAIL OF CASTLE

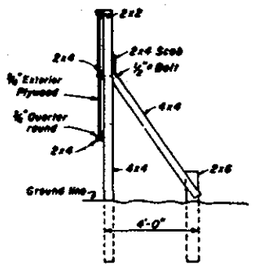
SCALE 6" = 1'-0"

SPECIFICATIONS

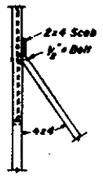
1. Posts, rails and bracing shall be No.1 yellow pine or approved equal S4S-Fed. Spec. MM-L-751c.
2. All exposed surfaces shall be given one coat of linseed oil and wiped prior to primer coat
3. All exposed surfaces shall be given one coat of exterior lead and oil primer-Fed. Spec TT-P-25a and two finish coats of white exterior oil paint-Fed. Spec. TT-P-104b.
4. Black lettering and red Engineer Castles shall be Kem Bulletin Colors C20 B1 and C20 R7 respectively as manufactured by Sherwin-Williams Co., or approved equal.
5. Exterior Plywood shall conform to Commercial Standard CS-45, exterior type, Grade A-C.



ELEVATION

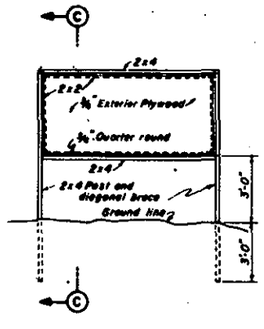


SECTION A-A

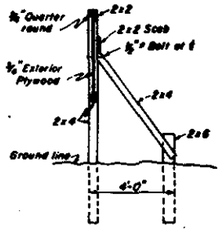


SECTION B-B

6' x 12' SIGN



ELEVATION



SECTION C-C

3' x 6' SIGN AND 4' x 8' SIGN

CONSTRUCTION SIGNS

SCALE ⅜" = 1'-0"

REVISION	DATE	DESCRIPTION	BY
1	8-2-65	Drawing revised for a standard sign.	

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY G.A.K. | DR. BY A.O. | CK. BY C.J.A.

SUBMITTED: SUPV. DRAFT. SECTION
REVIEWED: PROJECT ENGINEER
APPROVED: CHIEF, CIVIL DESIGN SECTION
APPROVED: CHIEF, CONSTRUCTION DIVISION

STANDARD CONSTRUCTION SIGN

LOCAL PROTECTION

ELEVATIONS, SECTIONS AND DETAIL

DATE AUG. 1965

SCALE: AS SHOWN | SPEC NO CIV ENG 19-016-

DRAWING NUMBER STD-21

SHEET 1 OF 1

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DIVISION 1 - GENERAL REQUIREMENTS

SECTION 1B - SUMMARY OF WORK

1. GENERAL.

1.1 Scope of Section. This section provides a summary of all work to be performed under this contract and various general requirements and information. The summary is intended to be an organizational tool, furnished to facilitate direct and simple association of the work involved to its location, and to supplement the contract drawings. Work to be performed in each "Area", as listed below, is keyed to the contract drawings and to the UNIT PRICE SCHEDULE payment items by letter designation. Right and left riverbank identification is made looking downstream. Work summarized in this section shall be accomplished in accordance with the applicable specification sections contained hereinafter.

1.2 Sequence of Construction. The order in which the work is listed in this section is not intended to be a required sequence of construction. The Contractor shall determine his own sequence of construction based on the work to be performed and other requirements specified throughout the contract documents. However, the majority of work should be accomplished during June through September of the construction year in order to take advantage of that period of time when the river flows are normally low.

1.3 Photographs. Photographs of portions of some of the areas of work are shown on the contract drawings. These pictures are provided only for reference, information and the convenience of the Contractor. They represent conditions at the time they were taken and not necessarily conditions at the site when work is scheduled to commence. No assurance is given that the conditions represented by the photographs are applicable to other areas not shown by photograph.

1.4 Work Common to All Areas. The work covered by the following specification sections is common to all areas and shall be accomplished in accordance with the provisions as specified therein:

(1) SPECIAL PROVISIONS
(2) SUBSURFACE EXPLORATIONS
(3) PREPARATION OF SITE
(4) CONTROL OF WATER
(5) EXCAVATION, GENERAL
(6) EARTHEN FILLS
(7) TOPSOILING AND SEEDING
(8) ENVIRONMENTAL PROTECTION

1.5 Construction Access to Work Areas. A direction or location outboard of the riverbank from which construction access to each specific work area may be made is given below under each area heading. The Contractor shall be responsible for coordinating his access to the work sites with property owners in the vicinity of such access or any other access the Contractor desires to use. Should the Contractor desire any additional or alternate access to specific work areas, request for approval shall be made in writing to the Contracting Officer. In some locations the existing riverbed may provide access from one work area to another area in lieu of lands outboard of the riverbanks. Due to steep riverbanks, access to some specific work areas may be difficult. In such cases the Contractor may construct earthen ramps to the riverbed, provided written approval is received from the Contracting Officer. All ramps or other temporary construction for the purpose of obtaining access to work areas shall be removed and the sites restored to their original or design condition prior to the completion of the work under this contract. All costs pertaining to the construction and removal of temporary access shall be included in the contract lump sum and/or unit prices for the particular area concerned. In the event of potential flooding, ramps or any other temporary construction that may restrict flood flows shall be removed from the channel at the request or approval of the Contracting Officer.

2. AREA "A"

2.1 Location of Area "A". The new stone and gabion slope protection work is to be located approximately 720' upstream from the Oak Hill Road Bridge on the right bank of the river at the west end of the James River Mass. Inc. building as shown on the contract drawings.

2.2 Construction Access to Area "A". Access to Area "A" may be made by Cleghorn Street and the James River Inc. property.

2.3 Scope of Work - Area "A".

(1) Relocate "Toluol Pipe" as shown and in accordance with Section, MODIFICATIONS TO EXISTING UTILITIES.

(2) Install temporary earth support systems at the locations shown in accordance with Section, EARTH SUPPORT SYSTEMS.

(3) Install permanent steel sheet piling at the existing pump station in accordance with Section, STEEL SHEET PILING.

(4) Construct gabion walls and mattress as shown and in accordance with Section, GABION CONSTRUCTION.

(5) Construct stone protection as shown and in accordance with Section, STONE PROTECTION.

(6) Construct concrete cut-off wall adjacent to gabion wall as shown and in accordance with the Sections in DIVISION 3 - CONCRETE.

(7) Remove shoaling in the river channel at the location shown and in accordance with Section, EXCAVATION, GENERAL.

2.4 Payment Items - Area "A". The payment items listed below collectively provide for payment of all work as required in Area "A". Work shall be performed and payment will be made in accordance with the applicable specification sections to which the work and payment items pertain:

(1) Item No. A1, "Relocation of Toluol Pipeline." See Section, MODIFICATIONS TO EXISTING UTILITIES.

(2) Item No. A2, "Earth Support Systems."

(3) Item No. A3, "Permanent Steel Sheet Piling." See Section, STEEL SHEET PILING.

(4) Item No. A4, "General Excavation."

(5) Item No. A5, "Gabion Construction."

(6) Item No. A6, "Filter Stone."

(7) Item No. A7, "Gravel Bedding."

(8) Item No. A8, "Stone Bedding."

(9) Item No. A9, "Stone Protection."

(10) Item No. A10, "Concrete."

(11) Item No. A11, "Gravel Fill." See Section, EARTHEN FILLS."

(12) Item No. A12, "Shoaling Excavation." See Section, EXCAVATION, GENERAL.

(13) Item No. A13, "Rock Excavation."

(14) Item No. A14, "Topsoiling, Seeding and Erosion Control".

3. AREA "B".

3.1 Location of Area "B". This area of work is located about 500' upstream from the Oak Hill Road Bridge on the left bank of the river across from the west end of the James River Mass. Inc. building as shown on the contract drawings.

3.2 General. Approximately 43' of the cut granite stone wall in Area "B" has collapsed and the stones have fallen into the river. There are also loose stones which require resetting and pointing. Stonework above El. 495 is to be removed and the collapsed wall section rebuilt up to El. 495. Random stones not used in wall repair or reconstruction shall be removed.

3.3 Construction Access to Area "B". Access to the Area may be made by River Street and land owned by the city of Fitchburg.

3.4 Scope of Work - Area B.

(1) Construct new cut granite stone and repair existing stone wall as shown and in accordance with Section, STONE MASONRY.

3.5 Payment Items - Area "B". No separate measurement or unit price payment will be made for the work or materials as specified for Area "B". All costs in connection therewith shall be included in the lump sum contract bid price for Item No. B, "All Work - Area B"

4. AREA "C"

4.1 Location of Area "C". This area of work is located immediately upstream from the Daniels Street Bridge on the right bank of the river.

4.2 Construction Access to Area "C". Access to Area "C" may be made by the riverbed from Area "D", as the clearance of the R.R. Bridge may permit.

4.3 Scope of Work - Area "C".

(1) Chink and repoint cut stone masonry wall for a distance of about 100 feet and in accordance with Section, STONE MASONRY.

(2) Remove shoaling in designated areas in accordance with Section, EXCAVATION, GENERAL.

(3) Perform channel bottom grading as defined and specified in Section, EXCAVATION, GENERAL.

(4) Furnish and install planting materials as shown in accordance with Section, PLANTING.

(5) Selectively clear trees as indicated on the contract drawings and in accordance with Section, PREPARATION OF SITE.

4.4 Payment Items - Area "C". The payment items listed below collectively provide for payment of all work as required in Area "C". Work shall be performed and payment will be made in accordance with the applicable specification sections to which the work and payment items pertain.

(1) Item No. C1, "Repoint Stone Masonry."
(2) Item No. C2, "Shoaling Excavation."
(3) Item No. C3, "Channel Bottom Grading."
(4) Item No. C4, "Planting."
(5) Item No. 1, "Tree Clearing."

5. AREA "D".

5.1 Location of Area "D". This area is located immediately downstream from the Daniels Street Bridge on the right bank of the river.

5.2 General. In Area "D" a storm water outfall has eroded a portion of the riverbank.

5.3 Construction Access to Area "D". Access to Area "D" may be made by the Caravella property on the right bank or by city owned land on the left bank.

5.4 Scope of Work - Area "D".

(1) Remove existing stormwater outfall and replace extended pipe as detailed on the contract drawings and specified in Section, MODIFICATIONS TO EXISTING UTILITIES.

(2) Remove shoaling and broken boulders from locations indicated on the contract drawings and as specified in Section, EXCAVATION, GENERAL.

5.5 Payment Items - Area "D". The payment items listed below collectively provide for payment of all work as required in Area "D". Work shall be performed and payment will be made in accordance with the applicable specification sections to which the work and payment items pertain.

(1) Item No. D1, "Storm Water Outfall Repair," See Section, MODIFICATIONS TO EXISTING UTILITIES.

(2) Item No. D2, "Shoaling Excavation." See Section, EXCAVATION, GENERAL.

6. AREA "E"

6.1 Location of Area "E". This area is located between the Kimball Street Bridge and the B&M R.R. Bridge as shown.

6.2 Construction Access to Area "E". Construction access to Area "E" may be made by Caravella property on the right bank and by city owned land on the left bank.

6.3 Scope of Work - Area "E".

(1) Repair approximately 30 square yards of eroded channel bottom stone protection with grouted cut stone to match existing undamaged stone protection as shown and in accordance with Section, STONE PROTECTION.

(2) Remove shoaling from locations shown on the contract drawings and as specified in Section, EXCAVATION, GENERAL.

6.4 Payment Items - Area "E". The payment items listed below collectively provide for payment of all work as required for Area "E". Work shall be performed and payment will be made in accordance with the applicable specification sections to which the work and payment items pertain.

(1) Item No. E1, "Grouted Hand Placed Stone Protection".
(2) Item No. E2, "Gravel Bedding."
(3) Item No. E3, "Shoaling Excavation."

7. AREA "F".

7.1 Location of Area "F". This area is located immediately north of River Street on the right and left banks of the river at Crib Sites Nos. 1 and 2.

7.2 General. The existing concrete crib sites have been covered with dumped granite riprap. At Crib Site No. 1, the crib and riprap will be replaced by a reinforced concrete wall. At Crib Site No. 2, the crib and riprap will be replaced by walls and a ramp which is designed to accommodate the physically handicapped. Large stones in the channel are to be removed selectively. Shoaling is also to be removed in the Area.

7.3 Construction Access to Area "F". Access to Crib Site No. 1 may be made by land owned by Independent Cleaners. Access to Crib Site No. 2 and shoaling areas may be made by land owned by Speedway Gasoline and Fitchburg Yarn Co.

7.4 Scope of Work - Area "F"

(1) Furnish and install earth support systems as specified in Section, EARTH SUPPORT SYSTEMS.

(2) Remove dumped granite riprap which covers both banks of the river for about 125' and existing bituminous concrete pavement as indicated and in accordance with Section, EXCAVATION, GENERAL.

(3) Remove concrete cribbing at Crib Sites Nos. 1 and 2 and existing wood fence as shown and in accordance with Section, EXCAVATION, GENERAL.

(4) Replace left bank with concrete "T" wall and right bank with concrete ramp and walls as shown and in accordance with the applicable requirements of DIVISION 3 - CONCRETE.

(5) Remove shoaling from the location shown on the contract drawings and as specified in Section, EXCAVATION, GENERAL.

(6) Furnish and install stone protection materials as shown on the contract drawings and as specified in Section, STONE PROTECTION.

(7) Perform channel bottom grading at the location indicated and as specified in Section, EXCAVATION, GENERAL.

(8) Furnish and install planting materials as indicated on the contract drawings and as specified in Section, PLANTING.

(9) Furnish and install wood posts and nails as shown and in accordance with Section, MISCELLANEOUS SITE WORK.

(10) Selectively clear trees from the channel bottom and riverbanks in accordance with Section, PREPARATION OF SITE.

(11) Construct bituminous concrete pavement within the limits shown, in accordance with Section, BITUMINOUS CONCRETE PAVEMENT.

7.5 Payment Items - Area "F". The payment items listed below collectively provide for payment of all work as required for Area "F". Work shall be performed and payment will be made in accordance with the applicable specification sections to which the work and payment items pertain.

(1) Item No. F1, "Earth Support Systems."

(2) Item No. F2, "General Excavation."

(3) Item No. F3, "Shoaling Excavation."

(4) Item No. F4, "Concrete."

(5) Item No. F5, "Hand Railing."

(6) Item No. F6, "Random Fill."

(7) Item No. F7, "Gravel Fill."

(8) Item No. F8, "Pervious Fill."

(9) Item No. F9, "Stone Bedding."

(10) Item No. F10, "Gravel Bedding."

(11) Item No. F11, "Stone Protection."

(12) Item No. F12, "Hand-Placed Stone Protection."

(13) Item No. F13, "Channel Bottom Grading."

(14) Item No. 1, "Tree Clearing."

(15) Item No. F15, "Planting."

(16) Item No. F16, "Wood Posts and Rails."

(17) Item No. F17, "Topsoiling, Seeding and Erosion Controls."

(18) Item No. F18, "Bituminous Concrete Pavement."

8. AREA "G"

8.1 Location of Area "G". This area of work is located at and in the vicinity of the Sheldon Street Bridge as shown on the contract drawings.

8.2 Construction Access to Area "G". Access to this area may be made at the right bank through the Caravella property.

8.3 Scope of Work - Area "G".

(1) Repair a portion of the downstream wingwall on the south side of the Sheldon Street Bridge by cutting out eroded concrete and replacing with new concrete as shown on the contract drawings and specified in DIVISION 3 - CONCRETE.

(2) Reset existing stone and furnish and set new stone as necessary, and grout river channel stone protection in location as indicated and in accordance with Section, STONE PROTECTION.

(3) Construct new layers of stone protection as indicated and in accordance with Section, STONE PROTECTION.

(4) Selectively clear trees from the channel bottom and riverbanks in accordance with Section, PREPARATION OF SITE.

8.4 Payment Items - Area "G". No separate measurement or unit price payment will be made for the work or materials as specified for Area "G". All costs in connection therewith shall be included in the applicable lump sum contract bid price for Item No. G, "All Work - Area G" and Item No. 1, "Tree Clearing".

9. AREA "H"

9.1 Location of Area "H". This area is located downstream from the Nockage Street Bridge as shown on the contract drawings.

9.2 Construction Access to Area "H". Access to this area may be made through the Caravella property. The Contractor may remove and replace existing chain link fencing as necessary to gain access to the work sites.

9.3 Scope of Work - Area "H".

(1) Remove shoaling from the location shown and as specified in Section, EXCAVATION, GENERAL.

(2) Perform channel bottom grading in the location shown in accordance with Section, EXCAVATION, GENERAL.

(3) In area indicated, install grouted hand-placed stone protection as specified in Section, STONE PROTECTION. Utilize existing stone and furnish new stone as necessary.

9.4 Payment Items - Area "H". The payment items listed below collectively provide for payment of all work as required for Area "H". Work shall be performed and payment will be made in accordance with the applicable specification sections to which the work and payment items pertain.

(1) Item No. H1, "Shoaling Excavation."

(2) Item No. H2, "Channel Bottom Grading."

(3) Item No. H3, "Grouted Hand-Placed Stone Protection."

(4) Item No. H4, "Hand-Placed Stone Protection."

(5) Item No. H5, "Gravel Bedding."

10. AREA "I".

10.1 Location of Area "I". This area is located downstream from the River Street Bridge, near West Street, as shown on the contract drawings.

10.2 Construction Access to Area "I". Access to this area may be made at the northeast side of the upper River Street Bridge.

10.3 Scope of Work - Area "I".

(1) At 12" utility line crossing, repair existing stone protection by resetting existing large stones and filling voids with well graded Contractor furnished stone protection material in accordance with Section, STONE PROTECTION.

(2) Selectively clear trees from the channel bottom and riverbanks in accordance with Section, PREPARATION OF SITE.

10.4 Payment Items - Area "I". No separate measurement or unit price payment will be made for the work or materials as specified for Area "I". All costs in connection therewith shall be included in the applicable lump sum contract bid price for Item No. I, "All Work - Area I" and Item No. 1, "Tree Clearing".

11. AREA "J"

11.1 Location of Area "J". This area of work is located immediately downstream from the Circle Street Bridge.

11.2 Construction Access to Area "J". Access to this work area may be made over lands owned by Nest Fresh Eggs Inc. (United Farmers).

11.3 Scope of Work - Area "J"

(1) Remove the existing undersized granite stone protection, as necessary, to construct a 3' layer of new larger size stone protection as shown and as specified in Section, STONE PROTECTION.

(2) Perform channel bottom grading in river channel at the location indicated to present a smooth gradient.

(3) Remove shoaling in the vicinity of Sta 507+00 to Sta. 508+00 in accordance with Section, EXCAVATION, GENERAL.

(4) Furnish and install planting materials in accordance with Section, PLANTING.

11.4 Payment Items - Area "J". The payment items listed below collectively provide payment for all work as required in Area "J". Work shall be performed and payment will be made in accordance with the applicable specification section to which the work and payment items pertain:

(1) Item No. J1, "General Excavation."

(2) Item No. J2, "Channel Bottom Grading."

(3) Item No. J3, "Stone Protection."

(4) Item No, J4, "Shoaling Excavation."

(5) Item No. J5, "Planting."

(6) Item No. J6, "Topsoiling, Seeding and Erosion Control."

12. AREA "K"

12.1 Location of Area "K". This work area is located downstream from the Rollstone Street Bridge in the vicinity of the city public works maintenance yard.

12.2 Construction Access to Area "K". Access to this area may be made by way of the Fitchburg Highway and Sewer Dept. yard on the right riverbank.

12.3 Scope of Work - Area "K".

(1) Repair approximately 100' of eroded opening at the base of the granite block masonry wall on the right riverbank adjacent to the public works maintenance yard. The repair work shall be performed as indicated on the contract drawings and as specified in DIVISION 3 - CONCRETE

(2) Perform channel bottom grading at the location shown as specified in Section, EXCAVATION, GENERAL.

12.4 Payment Items - Area "K". The payment items listed below collectively provide for payment of all work in Area K. Work shall be performed and payment will be made in accordance with the applicable specification sections to which the work and payment items pertain:

(1) Item No. K1, "Stone Wall Repair." See Section, CONCRETE.

(2) Item No. K2, "Channel Bottom Grading."

13. AREA "L".

13.1 Location of Area "L". This work area is located approximately 400' downstream from the Rollstone Street Bridge on the left bank of the river as shown on the contract drawings.

13.2 Construction Access to Area "L". Construction access to this area may be by way of the Fitchburg Highway and Sewer Dept. yard on the right riverbank.

13.3 Scope of Work - Area "L".

(1) Repair approximately 230 linear feet of eroded grouted stone slope protection along the river bottom by grouting existing stone and furnishing, placing and grouting new stone as shown and in accordance with Section, STONE PROTECTION.

13.4 Payment Items - Area "L". No separate measurement or unit price payment will be made for the work or materials as specified for Area "L". All costs in connection with this work shall be included in the lump sum contract bid price for Item No. 1, "All Work - Area L."

14. AREA "M"

14.1 Location of Area "M". This area of work is located immediately upstream from the intersection of Putman Street and the Boston and Maine R.R. Bridge on the right bank of the river at Crib Site No. 4 as shown.

14.2 Construction Access to Area "M". Construction access to this work area may be made over lands owned by the Jennison Co.

14.3 Scope of Work - Area "M".

(1) Repair, as necessary, eroded concrete crib stretcher members by patching, rebuilding or replacing the members in accordance with the applicable requirements of DIVISION 3 - CONCRETE.

(2) Construct new concrete curb at existing concrete crib as shown and in accordance with the applicable requirements of DIVISION 3 - CONCRETE.

(3) Remove shoaling from the left side of the channel at the location indicated in accordance with Section, EXCAVATION, GENERAL.

(4) Selectively clear trees from the channel bottom and riverbanks in accordance with Section, PREPARATION OF SITE.

14.4 Payment Items - Area "M". The payment items listed below collectively provide for payment for all work in Area "M". Work shall be performed and payment will be made in accordance with the applicable specification sections to which the work and payment items pertain:

(1) Item No. M1, "Resurfacing Eroded Stretcher Members."

(2) Item No. M2, "Concrete.

(3) Item No. M3, "Shoaling Excavation."

(4) Item No. 1, "Tree Clearing".

15. AREA "N"

15.1 Location of Area "N". Area "N" is located on the right bank of the river between the Commercial Street Bridge and the Cushing Street Bridge.

15.2 Construction Access to Area "N". The Contractor may access this work area over land owned by the Hope Company. However, the Contractor shall notify the Hope Co. a minimum of 60 days in advance of accessing Area "N" via the Hope Co. property to allow substitute parking arrangements for tenants. Also, the required work in Area "N" shall be performed in two approximately equal phases so as to minimize interference with the operations of the Hope Co.

15.3 Scope of Work - Area "N".

(1) Construct a concrete cap on approximately 325' of the existing stone masonry wall as shown on the contract drawings and in accordance with the applicable requirements of DIVISION 3 - CONCRETE. Remove bituminous concrete curbing as necessary for the new construction.

(2) Perform channel bottom grading at the location indicated as specified in Section, EXCAVATION, GENERAL.

15.4 Payment Items - Area "N". The payment items listed below collectively provide payment for all work as required in Area "N". Work shall be performed and payment will be made in accordance with the applicable sections to which the work and payment items pertain.

(1) Item No. N1, "Concrete."

(2) Item No. N2, "Channel Bottom Grading."

16. AREA "O"

16.1 Location of Area "O". Area "O" is located at Crib Sites Nos. 5 and 6. Crib Site No. 5 is located between the Boston and Maine R.R. Bridge and the Laurel Street Bridge on the right bank of the river. Crib Site No. 6 is located just downstream from the Laurel Street Bridge on the right bank of the river.

16.2 Construction Access to Area "O". Access to this work area may be made over lands owned by the Vermont and Massachusetts R.R. and leased to the B&M R.R.

16.3 Scope of Work - Area "O".

(1) Furnish and install earth support systems at the locations shown in accordance with Section, EARTH SUPPORT SYSTEMS.

(2) Remove and replace existing railroad spurtrack as necessary for the construction of the concrete gravity walls as shown and in accordance with Section, RAILROAD WORK.

(3) Remove existing concrete cribbing and perform other excavation to the lines and grades as indicated and as specified in Section, EXCAVATION, GENERAL.

(4) Construct concrete gravity walls as shown and in accordance with the applicable requirements of DIVISION 3 - CONCRETE.

(5) Furnish and install steel pipe hand railing at gravity walls as shown and in accordance with Section, MISCELLANEOUS SITE WORK.

(6) Furnish and install stone protection materials as shown in accordance with Section, STONE PROTECTION.

(7) Remove shoaling from under right span of railroad bridge as specified in Section, EXCAVATION, GENERAL.

16.4 Payment Items - Area "O". The payment items listed below collectively provide payment for all work as required in Area "O". Work shall be performed and payment will be made in accordance with the applicable sections to which the work and payment items pertain:

(1) Item No. 01, "Earth Support Systems."

(2) Item No. 02, "Remove and Replace RR Spur Track."

(3) Item No. 03, "General Excavation."

(4) Item No. 04, "Shoaling Excavation."

(5) Item No. 05, "Concrete."

(6) Item No. 06, "Random Fill."

(7) Item No. 07, "Pervious Fill."

(8) Item No. 08, "Hand-Placed Stone Protection."

(9) Item No. 09, "Gravel Bedding."

(10) Item No. 010, " Hand Railing."

(11) Item No. 011, "Topsoiling, Seeding and Mulching."

17. AREA "P"

17.1 Location of Area "P". Area "P" is located approximately 500' downstream from the Laurel Street Bridge.

17.2 Construction Access to Area "P". Access to this work area may be made over lands owned by the Vermont and Massachusetts R.R. and leased to the B&M R.R.

17.3 Scope of Work - Area "P".

(1) Furnish and install earth support systems at the locations shown and in accordance with Section, EARTH SUPPORT SYSTEMS.

(2) Remove approximately 110' of cut stone and concrete wall and material stockpiled at top of wall and along base of wall as indicated and in accordance with Section, EXCAVATION, GENERAL.

(3) Construct new concrete gravity wall in accordance with the applicable requirements of DIVISION 3 - CONCRETE.

(4) Furnish and install 12" corrugated metal pipe and flap gate at location shown in accordance with Section, MODIFICATIONS TO EXISTING UTILITIES.

(5) Furnish and install stone protection materials as shown in accordance with Section, STONE PROTECTION.

(6) Remove existing chain link fencing and install new fencing within the limits shown in accordance with Section, MISCELLANEOUS SITE WORK.

(7) Sand blast riverside face of existing concrete wall within the limits shown in accordance with Section, MISCELLANEOUS SITE WORK.

(8) Construct bituminous concrete pavement within the limits and as shown, in accordance with Section, BITUMINOUS CONCRETE PAVEMENT.

(9) Remove shoaling in designated areas in accordance with Section, EXCAVATION, GENERAL.

(10) Perform channel bottom grading at the location indicated as specified in Section, EXCAVATION GENERAL.

17.4 Payment Items - Area "P". The payment items listed below collectively provide payment for all work as required in Area "P". Work shall be performed and payment will be made in accordance with the applicable sections to which the work and payment items pertain.

(1) Item No. P1, "Earth Support Systems."

(2) Item No. P2, "General Excavation."

(3) Item No. P3, "Shoaling Excavation."

(4) Item No. P4, "New 12" CMP with Flap Gate."

(5) Item No. P5, "Concrete."

(6) Item No. P6, "Pervious Fill."

(7) Item No. P7, "Gravel Fill."

(8) Item No. P8, "Random Fill."

(9) Item No. P9, "Hand-Placed Stone Protection."

(10) Item No. P10, "Gravel Bedding."

(11) Item No. P11, "Chain Link Fencing."

(12) Item No. P12, "Abrasive Blast Cleaning Concrete Wall." See Section, MISCELLANEOUS SITE WORK.

(13) Item No. P13, "Bituminous Concrete Pavement."

(14) Item No. P14, "Channel Bottom Grading."

(15) Item No. P15, "Topsoiling, Seeding and Erosion Control."

18. AREA "Q".

18.1 Location of Area "Q". This area of work is located on the right bank of the river approximately 800' downstream from the Laurel Street Bridge at Crib Site No. 7 as shown on the contract drawings.

18.2 Construction Access to Area "Q". Access to this area of work may be made over lands owned by the Vermont and Massachusetts R.R. and the Keating Co. property.

18.3 Scope of Work - Area "Q".

(1) Construct new 1.5' thick reinforced concrete veneer facing doweled to the existing concrete crib as shown, and in accordance with the applicable requirements of DIVISION 3 - CONCRETE.

(2) Selectively clear trees from the channel bottom and riverbanks in accordance with Section, PREPARATION OF SITE.

18.4 Payment Items - Area "Q". The payment items listed below collectively provide payment for all work as required in Area "Q". Work shall be performed and payment will be made in accordance with the applicable sections to which the work and payment items pertain:

(1) Item No. Q1, "General Excavation."
(2) Item No. Q2, "Concrete."
(3) Item No. Q3, "Random Fill."
(4) Item No. 1, "Tree Clearing."

19. AREA "S"

19.1 Location of Area "S". Area "S" is located approximately 850' downstream from the private bridge to the Fitchburg Light and Gas Company.

19.2 Construction Access to Area "S". Construction access to Area "S" may be made over lands owned by the Fitchburg Gas and Electric Co.

19.3 Scope of Work - Area "S".

(1) Remove broken stones just downstream of dam, reset stones to form rock apron, as shown in accordance with Section, STONE PROTECTION. The extent of this work shall be limited to resetting that quantity of stone available in the immediate vicinity of the dam.

19.4 Payment Items - Area "S". No separate measurement or unit price payment will be made for the work or material as specified for Area "S". All costs in connection with this work shall be included in the contract lump sum price bid for Item No. S "All Work - Area "S".

20. AREA "T"

20.1 Location of Area "T". This work site is located approximately 250' upstream from the Fifth Street Bridge.

20.2 Construction Access to Area "T". Access to Area "T" may be made over lands owned by the Fitchburg Gas and Electric Co.

20.3 Scope of Work - Area "T".

(1) Remove two midstream cut granite block and concrete piers as specified in Section, EXCAVATION, GENERAL.

(2) Clean and repoint the top two courses of granite stone masonry bridge abutment on the left riverbank.

20.4 Payment Items - Area "T". No separate measurement or unit price payment will be made for the work and materials as specified for Area T. All costs in connection with this work shall be included in the lump sum contract bid price for Item No. T, "All Work - Area T."

21. AREA "U".

21.1 Location of Area "U". Area "U" is located approximately 100' downstream from the Bemis Road Bridge as shown on the contract drawings.

21.2 Construction Access to Area "U". Access to this area may be made through the Simonds Saw Co. property.

21.3 Scope of Work - Area "U".

(1) Reset large broken stones just downstream from the Bemis Road Dam within the limits as shown and in accordance with Section, STONE PROTECTION. Clear debris from flashboards at dam.

(2) Plug two existing openings in mill race intake with concrete as indicated on the contract drawings and as specified in Division 3 - CONCRETE.

(3) Selectively clear trees from the channel riverbanks in accordance with Section, PREPARATION OF SITE.

21.4 Payment Items - Area "U". No separate measurement or unit price payment will be made for the work or materials as specified for Area "U" Except for tree clearing, all costs in connection with this work shall be included in the contract lump sum price bid for Item No. U, All Work - Area U". All costs in connection with tree clearing in this Area shall be included in the lump sum contract price for Item No. 1, "Tree Clearing".

22. AREA "V".

22.1 Location of Area "V". This area of work is located about 1000 feet upstream from the Falulah Road Bridge and about 2000 feet downstream from the Bemis Road Bridge.

22.2 Construction Access to Area "V". Access to this area may be made over lands owned by the city of Fitchburg.

22.3 Scope of Work - Area "V".

(1) Remove the remains of the existing Syphon Dam in the vicinity of river Sta. 364+50 in accordance with the applicable requirements of Section, EXCAVATION, GENERAL.

(2) Construct layers of stone slope protection and gravel bedding and rock sills as detailed on the contract drawings and in accordance with the applicable requirements of Section, EXCAVATION, GENERAL and STONE PROTECTION

(3) Selectively clear trees from the riverbanks in accordance with Section, PREPARATION OF SITE.

22.4 Payment Items - Area "V". The payment items listed below collectively provide payment for all work as required in Area "V". Work shall be performed and payment will be made in accordance with the applicable sections to which the work and payment items pertain:

(1) Item No. V1, "General Excavation."
(2) Item No. V2, "Stone Protection."
(3) Item No. V3, "Stone Bedding."
(4) Item No. V4, "Gravel Bedding."
(5) Item No. V5, "Random Fill."
(6) Item No. 1, "Tree Clearing."
(7) Item No. V7, "Topsoiling, Seeding and Erosion Control."

23. AREA "W"

23.1 Location of Area "W". Work Area "W" consists of various shoaling areas to be removed located upstream and downstream of the Falulah Road Bridge as shown on the contract drawings.

23.2 Construction Access to Shoaling Sites in Area "W". Access to this area maybe made over lands owned by the city of Fitchburg.

23.3 Scope of Work - Area "W".

(1) Remove shoaling in designated areas in accordance with Section, EXCAVATION, GENERAL

(2) Selectively clear trees at locations shown on the contract drawings and in accordance with Section, PREPARATION OF SITE.

23.4 Payment Items - Area "W". All costs in connection with shoaling excavation in Area "W", as specified in Section, EXCAVATION, GENERAL and shown on the contract drawings, shall be included in the contract price for Item No. W1, "Shoaling Excavation." All costs in connection with tree clearing within Area "W", as specified in Section, PREPARATION OF SITE, shall be included in the contract lump sum bid price for Item No. 1, "Tree Clearing."

INDEX

DIVISION 2 - SITE WORK

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1.3	The Classification of Soil Samples	2A-1
1.4	Interpretation	2A-1

DIVISION 2 - SITE WORK

SECTION 2A - SUBSURFACE INVESTIGATIONS

1. GENERAL.

1.1 Investigations. The physical conditions indicated on the contract drawings and in the specifications are the result of site investigations by surveys, core borings, and seismic refraction surveys. The locations at the site where subsurface investigations and seismic refractions surveys were performed are shown on the contract drawings. Inspectors field logs are appended to this section. The subsurface data included in these specifications supersedes any previous presentations of same.

1.2 Examination of Samples and Reports. The explorations were performed by the Corps of Engineers. Materials obtained from the subsurface explorations, together with the field logs, and seismic refraction surveys are available for examination at the Foundations and Materials Branch, U.S. Army Engineer Division, New England, 424 Trapelo Road, Waltham, Mass., 02154, telephone 617-894-2400, Ext. 367. Two working days advance notice is required by F&M Branch in order that samples can be removed from storage and set up for examination. Design analyses are available for review at the Project Management Branch (same address as above) Ext. 512.

1.3 The Classification of Soil Samples. The classification of the Corps of Engineers soil samples is in accordance with Drawing No. NEDGL 61-5C, "Unified Soil Classification" attached at the end of this section.

1.4 Interpretation. Subsurface investigation data is provided only for information and the convenience of the Contractor. The data shown on the boring logs is for the specific locations indicated only and no assurance is given that these conditions are representative of conditions between borings or areas adjacent thereto.

1.4.1 The responsibility lies with the Contractor to interpret excavation conditions that may affect his work. It is expressly understood that the Government will not be responsible for any interpretation or conclusion drawn from the subsurface information furnished the Contractor.

U. S. ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

FIELD LOG OF TEST BORING

Site FITCHBURG, MASS. Page 1 of 3 Pages

Boring No. FD-1 Desig. _____ Diam. (Casing) NX & BX

Co-ordinates: N _____ E _____

Elevation Top of Boring 500± M.S.L.
Total Overburden Drilled 17.2 Feet
Elevation Top of Rock 483± M.S.L.
Total Rock Drilled 8.9 Feet
Elevation Bottom of Boring 24± M.S.L.
Total Depth of Boring 26.1 Feet
Core Recovered 95 % No. Boxes 1
Core Recovered 8.4 Ft : BX Diam. ____ In.
Soil Samples 2" ID x 5 In. Diam. 10 No.
Soil Samples _____ In. Diam. ____ No. Job

Hammer Wt. 350 LBS Boring Started 5/23/77
Hammer Drop 18" Boring Completed 6/3/77
Casing Left NONE
Subsurface Water Data _____ Page _____
Obs. Well _____
Drilled By COFE (FINNERTY)
Mfg. Des. Drill CP-3
Inspected By: Pendergast & Finnerty
Classification By:
Classification By: Anthony J. Zappone

DEPTH	1" =	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE REC'VY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
0.4		NONE	2 1/2"	0.4	47	DROVE DRY THE 2 1/2" ID x 5 SOLID SAMPLE SPOON FROM 0.0 TO 5.0 BY IMPACT OF 350 LB. HAMMER FALLING 18" EACH BLOW PULLED SPOON AND HOLE REMAINED OPEN TO 5.0'	TOPSOIL
0.7		T-1		0.7			DARK BROWN - GRAVELLY - SILTY - C-F SAND MOIST (SM)
			I		15		
		T-2 (2)	D		8		BROWN - GRAVELLY - SILTY - C-F SAND MOIST (SM)
3.3			x 5	3.3	7		~~REDDISH BROWN - SILTY - C-F SANDY - GRAVEL~~
		T-3 (1)		5.0	7		DECOMPOSED ASHES & FILL CINDERS ~~(SM)~~
5.0		T-4 (1)	2"	5.0	4	DROVE DRY THE 2" ID x 5 SOLID SAMPLE SPOON FROM 5.0' TO 10.0' PULLED SPOON TETTED NXFJ CASING TO 10.0'	Reddish Brown Silty Sandy GRAVEL (GM) w/ Decomposed Red Brick
6.1			I	6.1	6		GREY - SILTY - GRAVELLY - C-F SAND
			D		7		MOIST (SM) w/ Glueodor
		T-5 (1)	x 5'		5		
9.4		T-6 (1)		9.4	4		GREY BROWN - SILTY - C-F SANDY - GRAVEL MOIST (SM)

GENERAL REMARKS:

NED FORM 68 (Test) MAR 71

Boring No. FD-1

Site: FITCHBURG, MASS	Boring No. FD-1	Page 2 of 3

DEPTH		CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECV'Y	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
	10.0		2"	10.0	5	DRILL DRY THE 2" DIA. SOLID SPOON SAMPLER FROM 10.0' TO 14.5' WITH HAND SOLID WALL PULLED SAMPLER	DARK BROWN SILTY GRAVELLY C-F SAND. MOIST w/ SOLVENT ADHESIVE odor (SM)
	12	T-7 (1)	3		11		
			0		24		
			x		56	SET UP TO CORE [illegible]	
14.1	14	T-8 (1)	5"	14.1	152	ROTARY DIAMOND DRILLED FROM 14.1 TO 14.8 0.6 FOOT. 37 MINUTES DRILLING TIME WATER RUN - GOOD	GREY SILTY GRAVELLY C-F SAND MOIST w/ SOLVENT ADHESIVE odor (SM)
14.8		B-9	NX 5 8 1 0 2	14.8	11/12 C O P E D		BOULDER
15.8	16	T-10 (1)	2" C D x 5	15.8	12 206	DRIVE THE 2" SPOON FROM 15.8 TO 17.2. AT 17.2 BLOWS PULLED SPOON. TIMED BOX FROM 15.8 TO 17.2.	BROWN SILTY GRAVELLY C-F SAND MOIST (SP-SM)
17.2			B x N	17.2	100 3.9'	ROTARY DIAMOND DRILLED BROKEN FROM 17.2' TO 21.1' BROKEN RECORD WATER RUN - GOOD	Diorite, dark, massive very hard Coarse grained, unweathered stained and slightly weathered along low angle joints. Rock is slightly foliated at 70° dip 19.9-20.4
	18	Box 1	5 P K		REC'D 3.5'	HYD FEED HIGH FLOWING BROKEN	
	20		1 7 1 1		REC'D 90%	BROKEN BOX FROM DRILLING FROM 17.2' TO 21.4'	
21.1			B x N	21.1	RUN 5.0'	ROTARY DIAMOND DRILLED FROM 21.1' TO 26.1. USING BOTTOM DRILL BIT. BROKEN BOX. GOOD WATER RUN	
	22		5 P				
		Box 1	K 1		REC'D 4.9'	HIGH FLOWING - GOOD HYD. FEED	
	24		7 1 1		REC'D 98%		
26.1	26			26.1		[illegible] @ 26.1' Drill Completed [illegible]	

NED FORM 58A (Test) MAR 71

Boring No. FD 1

Site: _____

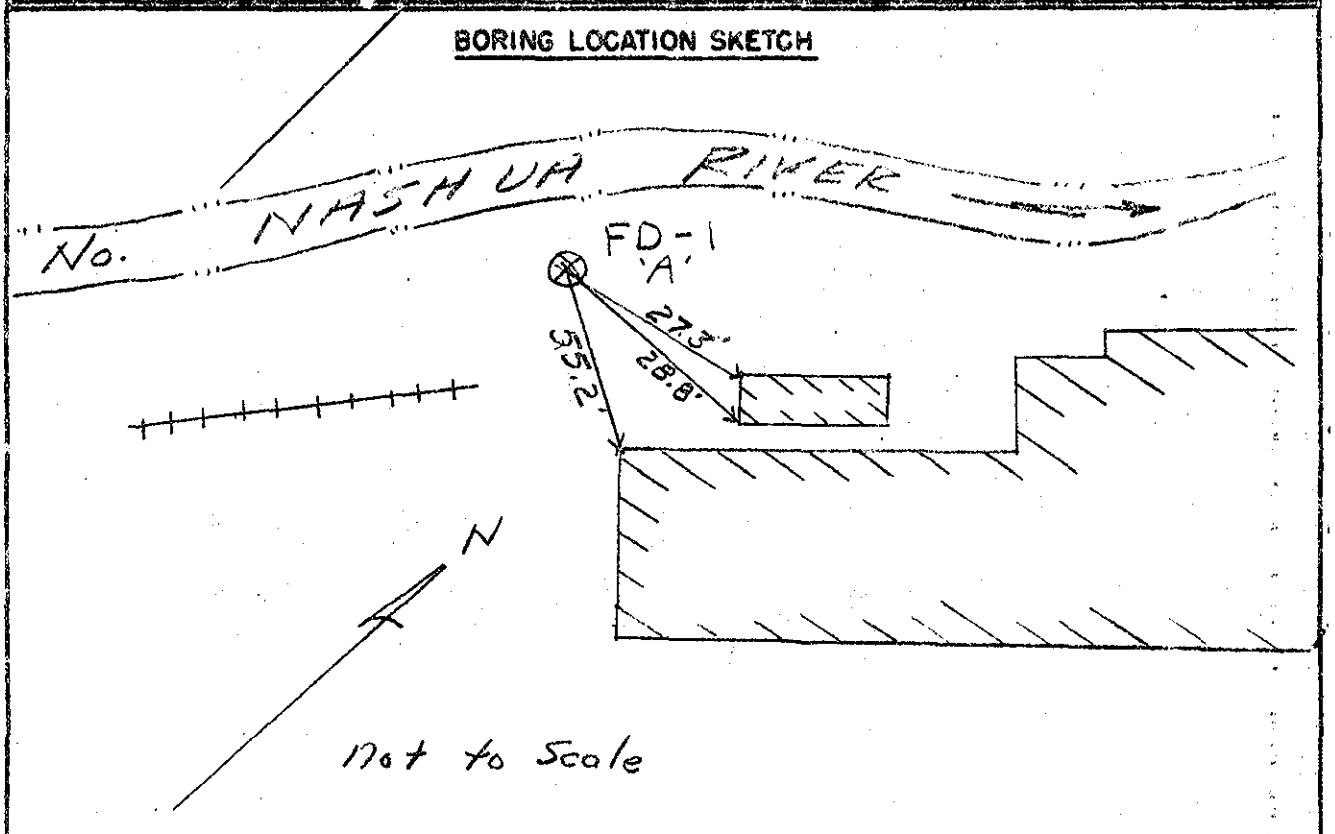
Boring No: _____

SUBSURFACE WATER OBSERVATIONS

DATE	TIME	DEPTH-BOT. OF CASING	DEPTH-BOT. OF BORING	DEPTH TO WATER	ELEVATION WATER	REMARKS

Note: Depths are in feet below original ground

BORING LOCATION SKETCH



NED FORM 69 (Test) MAR 72

Boring No. FD-1

U. S. ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

FIELD LOG OF TEST BORING

Site FITCHBURG, MASS. Page 1 of 4 Pages

Boring No. FD-2 Desig. _____ Diam. (Casing) _____

Co-ordinates: N _____ E _____

Elevation Top of Boring _____ M.S.L.
Total Overburden Drilled 31.6 Feet
Elevation Top of Rock UNKNOWN M.S.L.
Total Rock Drilled NONE Feet
Elevation Bottom of Boring _____ M.S.L.
Total Depth of Boring 31.6 Feet
Core Recovered N/A % No. Boxes _____
Core Recovered N/A Ft. _____ Diam. _____ in.
Soil Samples 2½" ODS in. Diam. 1 No.
Soil Samples 2" ODS in. Diam. 2 No. 1 & 2

Hammer Wt. 350 LBS
Hammer Drop 18"
Casing Left NONE
Subsurface Water Data _____ Page _____
Obs. Well NONE
Drilled By CARR (FITCHBURG)
Mfg. Des. Drill CR-3
Inspected By: Richard H. Rivers
Classification By: _____
Classification By: Anthony J. Zappala

Boring Started June 6, 1977
Boring Completed June 13, 77

DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	SLOWS PER FT. / CORE REC'VY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
0.0	FD-1 (1)	2½" T O K 5"	0.0 – 5.0	14, 16, 7, 34, 84	DROVE DRY THE 2½" ODS SOLID SAMPLE SPOON FROM 0.0 TO 5.0' BY IMPACT OF 350 LB. HAMMER FALLING 18" EACH BLOW. BUMPED OUT SPOON AND TOOK SAMPLE. HOLE OPEN TO 5.0'.	BROWN - Gravelly M-F SILTY - SAND (SM) MOIST INJURED & FOREIGN MATTER
5.0	FD-2 (1)	2" T O K	5.0 – 8.8	21, 40, 31, 141	DROVE DRY THE 2" ODS SOLID SAMPLE SPOON FROM 5.0 TO 10.0 BUMPED OUT SPOON AND TOOK SAMPLE. JETTED WATER CASING TO 10.0'.	BROWN - Gravelly Silty C-F SAND (SM) MOIST w/ Metal Fragment.
8.8	FD-3 (1)	5"	8.8 – 10.0	126		GREY BROWN - SILTY C-F SANDY - GRAVEL MOIST (GM)

GENERAL REMARKS: BORING LOCATED IN SOIL AREA IN REAR OF BURLINGTON CO. LAND, NEAR TOP OF RIVER BANK

NED FORM 58 (Test) MAR 71

Boring No. FD-2

Site: FITCHBURG, MASS.	Boring No. FD-2	Page 2 of 4

DEPTH	1" =	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. CORE REC'VY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
10.0		JA (1)	2"	10.0	67	DROVE DRY THE 2" ED x 5' SOLID SAMPLE SPOON FROM 10.0' TO 15.0'	GREY SILTY (GRAVELLY) M-f ~~FINE~~ SAND (SM) MOIST
			1		92	PULLED SPOON AND TOOK SAMPLE	JA 10.0-10.9 Brown Silty Sandy GRAVEL (GM)
		J-5 (1)	0		99	JETTED NXFJ CASING TO 15.0'	
			x		344		
			5	15.0	393		
15.0'			2"	15.0	87	DROVE DRY THE 2" ED x 5' SOLID SAMPLE SPOON FROM 15.0' TO 18.0'	
		J-6 (1)	1		237	PULLED SPOON AND TOOK SAMPLE.	
			0	18.0	414	WASHED & CHOPPED FROM 18.0' TO 20.0'. JETTED NXFJ CASING TO 20.0'.	
18.0'		NONE	x 5"	18.0 / 20.0	WASHED & CHOPPED		
20.0'			2"	20.0	63	DROVE DRY THE 2" ED x 5' SOLID SAMPLE SPOON FROM 20.0' TO 24.2'	Grey Silty fine SAND (SM) & Grey SILT (ML)
			1		127	BUMPED OUT SPOON AND TOOK SAMPLE	
		J-7 (1)	0		120	WASHED AND CHOPPED FROM 24.2' TO 26.6'. TOOK WASH SAMPLE	
			x		187	JETTED NXFJ CASING FROM 20.0' TO 26.6'	
			5"	24.2	37		
24.2		NONE		WASHED CHOPPED			GREY Silty ~~fine~~ M-f SAND ~~SAND~~ WET (SP-SM) ~~(SM)~~ WASH SAMPLE
24.6		J-8 (1)		24.6 / 26.6	WASHED & CHOPPED		
26.6'							

NED FORM 58A (Test) MAR 71

Boring No. FD-2

Site: FITCHBURG, MASS.	Boring No. FD-2	Page 3 of 4

DEPTH	1"=	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. CORE REC'VY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
						REFUSAL AT 26.6'	
26.6			B	26.6		ROTARY DIAMOND DRILLED	
			X		RAN	OVERBURDEN FROM 26.6'	
			M		5.0'	TO 31.6' USING BXM SERIES	
	28					BOATZ BIT & D.T. CORE	
			5			BARREL.	
						RECOVERED 0.3' OF GRAVEL.	
		NONE			REC'D		
			P		0.3'		
	30		C				
			I				
			7		REC'Y		
			1		%		
			1		6%		
31.6				31.6			

BOTTOM OF EXPLORATION AT 31.6'
Depth Considered Sufficient

Site: FITCHBURG, MASS

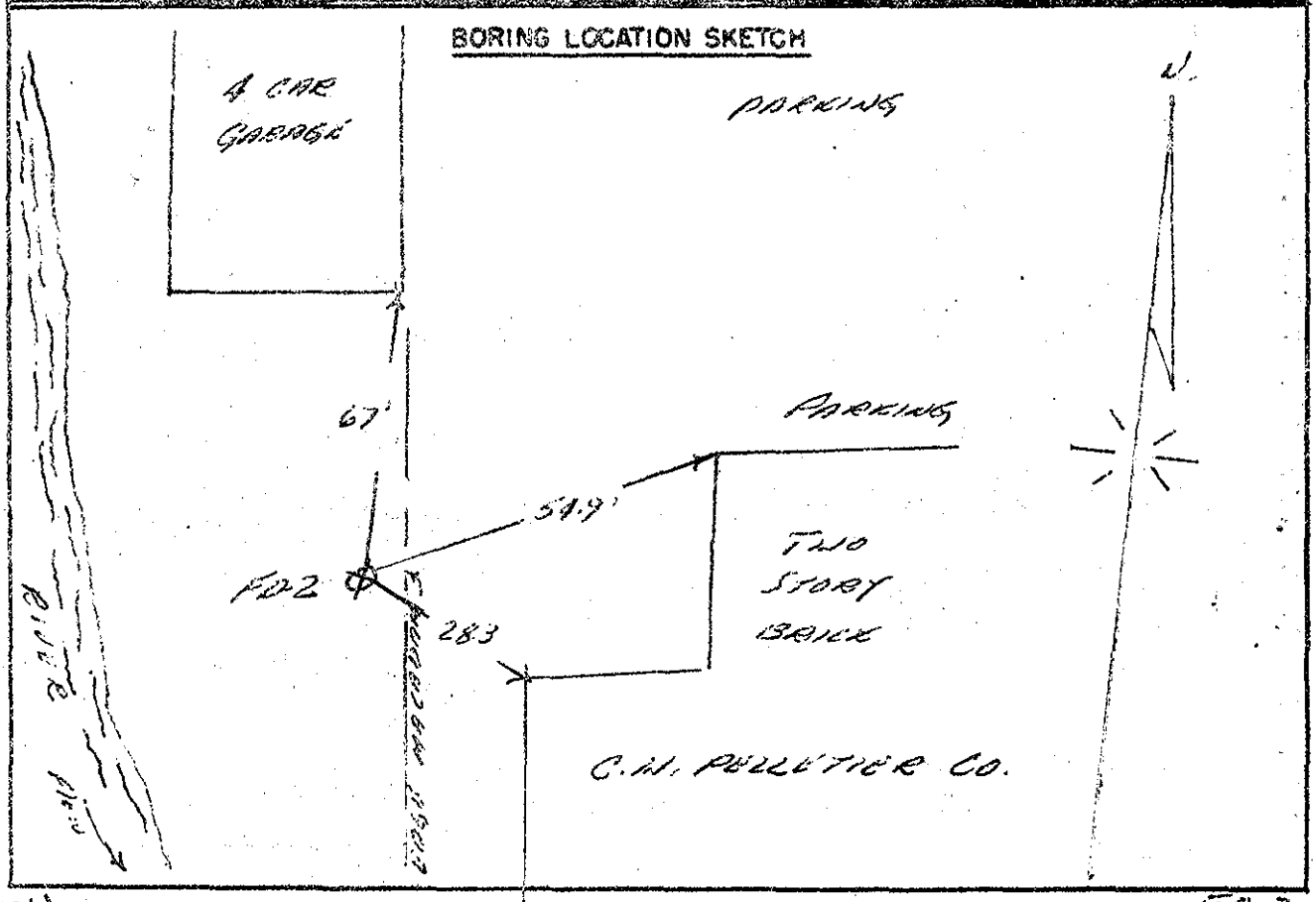
Boring No: FD-2

SUBSURFACE WATER OBSERVATIONS

DATE	TIME	DEPTH-BOT. OF CASING	DEPTH-BOT. OF BORING	DEPTH TO WATER	ELEVATION WATER	REMARKS
			RIVER LEVEL			

Note: Depths are in feet below original ground

BORING LOCATION SKETCH



NED FORM 50 (Test) MAR 71

Boring No. FD-2

U. S. ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION

FIELD LOG OF TEST BORING

Site FITCHBURG, MASS. Page 1 of 4 Pages

Boring No. FD-3 Desig. _____ Diam. (Casing) NXET

Co-ordinates: N _____ E _____

Elevation Top of Boring _____ M.S.L.
Total Overburden Drilled 28.3 Feet
Elevation Top of Rock Unknown M.S.L.
Total Rock Drilled None Feet
Elevation Bottom of Boring _____ M.S.L.
Total Depth of Boring 28.3 Feet
Core Recovered N/A % No. Boxes _____
Core Recovered N/A Ft: _____ Diam. _____ In.
Soil Samples _____ In. Diam. _____ No.
Soil Samples _____ In. Diam. _____ No.

Hammer Wt. _____ Boring Started 16 JUNE 77
Hammer Drop _____ Boring Completed 23 JUNE 77
Casing Left 5' CSG BIT # 2 PB 734
Subsurface Water Data # HOLE Page _____
Obs. Well None
Drilled By Carl E. (Flaherty)
Mfg. Des. Drill CP-3
Inspected By: Michael H. Pennypacker
Classification By: _____
Classification By: _____

DEPTH	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE RECV'Y	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
	Box 1	N X M 5 3 B 1 0 6	0.0	Run 3.0 / Rec'd 1.5 / End 0.0	ROTARY DIAMOND DRILLED THROUGH RIP RAP FROM 0.0 TO 3.0'. NATURE: BROWN 0.5' TO PIECES. HOLE DRILLED AT 20° ANGLE DRILLED NXET CASING TO 3.0	
3.0	Box 1	N K M 5 3 B 1 0 6	3.0 / 7.2	Run 4.2 / Rec'd 0.3 / End 7	ROTARY DIAMOND DRILLED OVERBURDEN FROM 3.0 TO 7.2'. NATURE: GREY TO BROWN PIECES DRILLED NXET CASING OVER CORE BARREL TO 7.2'. WASHED AHEAD TO 7.6'	
7.2'	Box 1	N X M 5 3 B 1 0 6	7.2 / 11.5	Run 3.9 / Rec'd 1.5 / End 10	ROTARY DIA. DRILLED OVB. FROM 7.2 TO 11.5'. NATURE: BROWN ROTARY DRILLED CASING OVER CORE BARREL TO 11.5'. BIT # 2 PB 734	
10.0 B						

GENERAL REMARKS: HOLE DRILLED AT AN ANGLE OF 20° THROUGH CRIBBING ON BANK OF RIVER. HOLE LOCATED IN CENTER OF CRIBBING ON UP FROM RIVER BOTTOM.

NED FORM 58 (Test) Boring No. FD-3

Site: FITCHBURG, MASS.	Boring No. FD-3	Page 2 of 4

DEPTH	1" =	CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE REC'VY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
10.0		Box 1	7.2 / 11.5	NxM 53B106	RAN 3.9 REC'D 1.5' REC'Y 40%	1.1 TO GRAVEL	
11.5		Box 1	11.5" NxM 53B106	11.5 / 15.9	RAN 4.4 REC'D 2.5' REC'Y % 57	ROTARY DIAMOND DRILLED OVB. FROM 11.5" TO 15.9' WATER: WHITE TO BROWN. DRILLED NxFJ CASING OVER BARREL TO 15.9'. 1.4' TO GRAVEL	
15.9'		Box 1	NxM 53B106	15.9 / 20.9	RAN 5.0 REC'D 0.5' REC'Y % 10	ROTARY DIAMOND DRILLED OVB. FROM 15.9' TO 20.9 WATER: BROWN DRILLED NxFJ. CASING OVER BARREL TO 20.9' GRAVEL	
20.9		Box 1	NxM 53B106	20.9 / 25.9	RAN 5.0 REC'D 0.0 REC'Y % 0	ROTARY DIAMOND DRILLED OVB. FROM 20.9' TO 25.9. WATER: 100% LOSS. DRILLED NxFJ CASING OVER BARREL TO 25.9' CORE BARREL STUCK IN CASING. NO RECOVERY.	
25.9						DRILLED NxFJ CASING AHEAD OF BARREL FROM 25.9' TO 28.3'	

NED FORM 58A (Test) MAR 71

Boring No. FD-3

Site: FITCHBURG, MASS.	Boring No. FD-3	Page 3 of 4

DEPTH		CORE/SAMPLE NO.	SIZE	DEPTH RANGE	BLOWS PER FT. / CORE REC'VY	SAMPLING AND CORING OPERATIONS	CLASSIFICATION OF MATERIALS
27.0	3	NONE	NX CSG	25.4 / 28.3	NONE	DRILLING BEHAVIOR SIMILIAR TO OUT. CASING WOULD NOT ADVANCE BEYOND 28.3'. CASING SEPARATED AND LEFT 5' OF CASING IN HOLE WITH CSG. BIT. 2PB734	
28.3'						BOTTOM OF EXPLORATION @ 28.3. TOOLS STUCK IN HOLE	

NED FORM 56A (Test) MAR 71

Boring No. FD-3

Site: FITCHBURG, MASS.
Boring No: FD-3

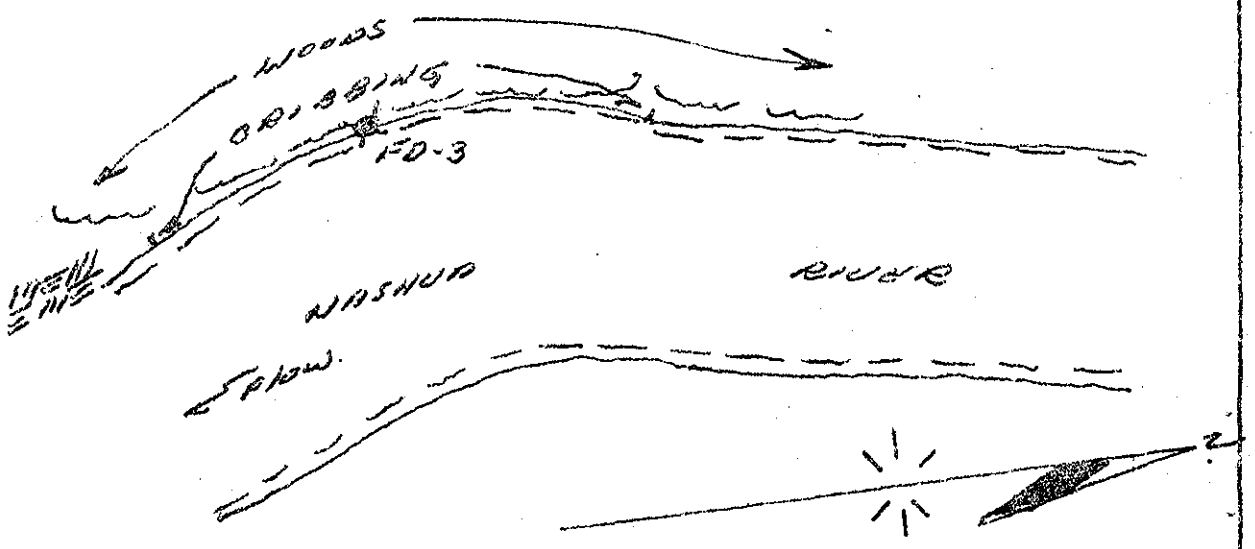
SUBSURFACE WATER OBSERVATIONS

PAGE 1 OF 1

DATE	TIME	DEPTH-BOT. OF CASING	DEPTH-BOT. OF BORING	DEPTH TO WATER	ELEVATION WATER	REMARKS
			AUGER	HOLE		

Note: Depths are in feet below original ground

BORING LOCATION SKETCH



HOLE LOCATED IN CENTER OF CRIBBING 0.4' UP FROM RIVER BOTTOM ON 30° ANGLE 70° OFF VERTICAL.

V. PELLETIER
DRYWALL & PLASTERING.

NED FORM 59 (Test) MAR 71

Boring No. FD-3

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DIVISION 2 - SITE WORK

SECTION 2B - PREPARATION OF SITE.

1. GENERAL.

1.1 Scope.

1.1.1 Clearing and Grubbing. The work covered by this section consists of furnishing all labor, equipment and materials and performing all work required to clear and grub areas within the limits specified herein as required for construction of the various project features and to clear other tree areas as indicated on the contract drawings. The work also includes the disposal of all cleared and grubbed materials and the filling of all grubbing holes, as specified herein.

1.1.2 Access to Work Areas. All excavation, fill, grading, or other work and temporary facilities necessary to provide or maintain access to, or drainage of, any area being used in connection with the work or for maintaining right-of-way to adjacent properties, will be considered incidental to site preparation.

1.1.3 Existing Utilities. Temporary diversion of existing utilities will be considered incidental to site preparation, unless otherwise included in other sections of these specifications, in which case, such work shall be included under those other sections. If it becomes necessary to interrupt any utility systems not a part of this contract, prior approval of the Contracting Officer and the owners of the utility systems shall be obtained in writing before interrupting or affecting such systems.

1.2 Locations to be Cleared and Grubbed.

1.2.1 Locations to be cleared and grubbed include all areas at the site of all new permanent works, graded areas, areas of excavations required for construction of project items, and stockpile areas, together with a 10-foot strip measured horizontally beyond and/or contiguous thereto or to the limits of the work areas, whichever is the least distance, for the foundation areas for structures and for all other fill areas.

1.3 Trees to be Cleared Only. Individual trees that are to be cleared under this contract are indicated on the "TREE REMOVAL PLANS" of the contract drawings. These trees have been marked at the site with orange paint for easy identification.

1.4 *Disposition of Materials.*

1.4.1 Burning of materials and debris from clearing or other operations will not be permitted.

1.4.2 Title to Materials. Title to all debris and other materials specified in this section to be removed from the site and disposed of is vested in the Contractor upon receipt of notice to proceed.

1.4.3 Disposal. Cleared and grubbed materials, debris and other items specified to be removed from the site may be placed in an approved local land fill location in accordance with local, State and Federal regulations. However, the Contractor may at his option salvage for his own use any materials or other items specified to be removed from the site and not required in the new work.

2. CLEARING. The clearing operation shall consist of the complete removal of all obstructions, rubbish and other debris above the ground surface. Clearing includes the satisfactory felling, trimming and disposal of all trees and vegetation (except grass) together with down timber, snags, brush, and rubbish and other objectionable material occurring within the limits of the areas to be cleared. Trees in areas to be grubbed may be cut off at any height above the ground surface convenient for grubbing operations. Where grubbing is not required, trees and brush shall be removed flush with or below the adjacent ground surface. Clearing shall be done to the minimum extent necessary for construction operations. Trees outside a construction area shall have their branches trimmed as directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Cuts more than 1-1/2 inches in diameter thus made shall be painted with an approved tree wound paint. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing and construction operations by the erection of barriers or by such other means as the circumstances require.

2.1 Clearing for the Contractors Convenience. Clearing will not be required outside the limits specified below; however, upon approval of the Contracting Officer, minor selected additional clearing for the Contractor's convenience will be permitted within the limits of rights-of-way indicated on the contract drawings.. Within these areas of additional clearing, removal of trees over 3 inches in diameter measured 6 inches above ground, shall only be as directed in writing by the Contracting Officer. Any trees damaged or removed, other than as specified herein, shall be replaced at the Contractor's expense. It is the intent of these specifications that the Contractor in performing clearing, as permitted for his convenience, shall exercise the greatest care that no clearing other than that absolutely required to accommodate Contractor operations shall be performed in order to preserve to the maximum extent, consistent with good construction methods, the maximum screening and aesthetic benefits to be obtained from preserving existing lines and groups of trees. Clearing outside of the rights-of-way shown on the drawings will not be permitted.

3. GRUBBING. Grubbing shall consist of the below ground removal and disposal of all stumps, roots larger than 1-1/2 inches in diameter, matted roots and buried logs. All top and lateral roots over 1-1/2 inches in diameter shall be removed to a depth of 1-1/2 feet below the stripping line in areas to be stripped and to a depth of 1-foot below the ground surface in grubbing areas not to be stripped. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surfaces of the ground unless otherwise indicated or directed.

4. *MEASUREMENT AND PAYMENT.*

4.1 Areas to be Cleared and Grubbed. No separate measurement or payment will be made for clearing and grubbing trees as required for the construction of project features, and all costs in connection therewith will be considered incidental to excavation.

4.2 Trees to be Cleared Only. All costs in connection with clearing and disposing of trees indicated on the "TREE REMOVAL PLANS" as specified in this section shall be included in the lump sum contract price for Item No. 1, "Tree Clearing."

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DIVISION 2 - SITE WORK

SECTION 2C - CONTROL AND DIVERSION OF WATER

1. SCOPE. The work covered by this section of these specifications consists of furnishing all plant, labor and materials and performing all work in connection with preventing the waters of the North Nashua River from inundating or eroding specific areas, as necessary for the construction of various project features in the dry and to prevent erosion of foundation materials of project features during construction. This work may consist of dewatering, excavation for any diversion channels and conduits, installing and removing conduits, constructing and removing earth and/or sandbag dikes, installing and removing temporary stone protection and all other work as necessary for the control and/or diversion of surface and subsurface water.

2. GENERAL REQUIREMENTS.

2.1 General. The requirements stated in this paragraph shall be supplemented for specific areas of work by the requirements stated in paragraph 3.

2.2 Cofferdams.

2.2.1 General. Cofferdams are defined as structures constructed to prevent the waters of the North Nashua River from inundating specific construction operations. These cofferdams shall also include any sheeting and shoring as may be required to excavate within the limits of the cofferdam. Certain portions of the permanent works may be incorporated into cofferdams.

2.2.2 Design and Construction. The Contractor shall be responsible for the design and construction of all cofferdams and bypass construction. All materials for the construction shall be furnished, installed and removed by the Contractor. Each cofferdam shall be constructed to provide only a minimum of work area needed to properly place materials and accomplish the construction in the dry and to avoid, to the extent possible, restriction of the flow of the river. The Contractor shall prepare and submit to the Contracting Officer for review and approval a control and diversion of water scheme, which he intends to implement during construction, for each of the project features where temporary structures are required to allow construction in the dry or to prevent erosion of foundation materials during placement.

2.2.3 Dewatering. The area within a cofferdam and all excavation areas therein shall be dewatered and maintained in a dry condition to the extent required to construct the work within the area in accordance with all applicable provisions in other sections of these specifications.

2.3 Control of River. The construction operation shall be in a sequence and measures shall be provided that will permit the passage of flows of the river past or through work areas and minimize flooding outside of the river banks during periods of large river flows. The river bed areas shall be maintained free of down timber, unused materials forms, equipment, piles of earth and other similar materials which would obstruct the passage of floods. Any plans for river control which require excavation for bypass channels below the required excavations for construction or which require features that might affect the permanent work shall be submitted for review at least 30 days prior to the start of the work for the particular area. Cofferdams shall be confined to the work area as much as possible to provide adequate areas for the flows of the river during floods.

2.3.1 During all time periods when diversion systems are in operation, the Contractor shall provide and maintain at the site suitable equipment for the breaching and removal from the channel of cofferdams and all other portions of diversion systems which may obstruct the passage of flood flows. The breaching and removal of cofferdams, in the event of potential flooding, shall be done only at the request of, or with the approval of, the Contracting Officer.

2.4 Control of Surface Water. The Contractor shall furnish and operate pumps and provide ditches and temporary pipes as required to maintain work areas dry from the flow of surface water runoff and small streams as required to construct the work in accordance with provisions in this and other sections of these specifications. All areas disturbed by ditching and other items outside the limits of permanent work shall be restored to their original condition to the satisfaction of the Contracting Officer.

2.5 Underground Drainage Systems Diversion. The Contractor shall provide temporary pipes, troughs, ditches and other measures required to prevent any underground flows from affecting the work areas during excavation, and to allow the preparation of foundations, and placement of materials. During the placement of fills and backfills the control measures will be shifted as required for proper placement and compaction of materials.

3. CONTRACTOR'S DIVERSION SCHEMES.

3.1 General. Temporary diversion of river flows from one side of the riverbed to the other will be required for construction of rock slope protection and concrete walls, rebuilding and regrouting cut stone walls, and repair of grouted riprap in the river bottom. Work sites where river diversion is required include, but are not necessarily limited to Areas A, B, C, E, F, G, J, K. L, O, P and Q.

3.2 Diversion Schemes. The Contractor shall prepare and submit for review and approval a North Nashua River diversion scheme for each of the above listed areas and other areas as required, which he intends to implement during construction. The Contractor's diversion schemes shall be submitted for review at least 30 days prior to the start of work in each area and shall include the procedure, time schedule, alignment, type, size and material to be used. All submittals shall be made in accordance with SPECIAL PROVISIONS.

3.2.1 The procedure and materials for control and diversion of water shall be in accordance with the Contractor's approved scheme and this and associated sections of these specifications. Any plans for control and diversion departing from the approved scheme or these specifications either total or in part shall be submitted for review and approval prior to start of work for the particular area involved.

4. RESPONSIBILITY FOR DAMAGES.

4.1 Existing Structures. The Contractor shall be responsible for and pay for any and all damages to existing structures caused as a result of his operations.

4.2 New Work. The Contractor shall pay all expenses for damages resulting from the failure or overtopping of cofferdams departing from the Contractor's approved control and diversion of water schemes.

The Government will be responsible for all costs for the repair of flood damages to the cofferdam or any part of the permanent work within the area of protection resulting from the overtopping of cofferdams constructed in accordance with the Contractor's approved control and diversion schemes. See SPECIAL PROVISIONS, Paragraph SP-42.

5. PAYMENT.

5.1 No separate payment will be made for the work covered in this section of the specifications. All cost in connection with the design, construction, maintenance, and removal of cofferdams, materials for cofferdams, dewatering of cofferdammed areas, control of the flow of surface drainage water, care of water flowing from existing or partially constructed utilities and similar items, repair or reconstruction of all temporary and permanent work damaged as the result of overtopping of cofferdams or lack of cofferdams, except as otherwise stated in this section of the specifications, construction of revetments to prevent erosion and for all other work, and furnishing all materials and incidental costs for work specified in this section of the specifications will be included under the applicable contract unit and lump sum prices for the items or structures to which the work pertains.

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DIVISION 2 - SITE WORK

SECTION 2D - EXCAVATION, GENERAL

1. SCOPE. The work covered by this section of the specifications consists of furnishing all plant, labor, equipment, materials and performing all operations in connection with all excavations in accordance with this section of the specifications and the contract drawings. This section does not cover the excavations of materials to be furnished by the Contractor from off-site sources.

2. GENERAL. Excavation covered in this section shall consist of the satisfactory removal, separation and disposal of all materials of any description from within the lines, grades and slopes shown on the drawings, specified herein or as modified or directed in the field by the Contracting Officer. The disposal of the excavated material shall include hauling to the project features, hauling to and placing in stockpiles and excavation and hauling from stockpiles. Disposal shall also include the hauling to and placing waste materials in off-site areas furnished by the Contractor and hauling to and placing excess materials in an off-site "Spoil Areas" furnished by the Government, all in accordance with the provisions of Paragraph 8 and 16 of this section. Excavation shall include the grading of ditches and open areas as directed and all required stripping. The Contractor shall be responsible for producing and maintaining the stability of all side slopes of excavations. The Contractor shall excavate below the foundation grades and excavation limits shown on the drawings, when and as directed, to remove buried objects and unsuitable foundation materials. Material encountered during excavation shall be designated as general excavation, or as rock excavation, as defined hereinafter.

2.1 General Excavation. General excavation shall consist of the satisfactory removal of all materials, including those removed with the aid of drilling and blasting, except the materials removed as rock excavation, as defined in subparagraph 2.2 below.

2.2 Rock Excavation. Rock excavation shall consist of the satisfactory removal of bedrock which, as determined by the Contracting Officer, can be removed only by systematic and continuous drilling and blasting. Where material is encountered for which the Contractor claims classification as rock excavation for its removal, such material shall be uncovered and exposed and the Contracting Officer notified before proceeding with its excavation. The Contractor shall not proceed with the excavation of such material until it has been cross-sectioned and classified by the Contracting Officer. Failure on the part of the Contractor to uncover and expose

such material, to notify the Contracting Officer, and allow time for cross-sectioning the undisturbed surface of such material will forfeit the Contractor's right of claim to any classification other than general excavation.

3. PAYMENT AND REQUIRED EXCAVATION LINES. Except as otherwise specified herein, the Contractor shall excavate to the limits shown on the drawings or to limits modified by the Contracting Officer to complete the construction of the temporary work and permanent work as shown on the drawings and as specified and to remove a portion of the material required to be excavated for the installation of utilities in some areas. All excavation limits as shown on the drawings or as modified by the Contracting Officer shall be "required excavation lines." Excavation shall be made to and not outside or below required excavation lines without approval, except for the tolerance permitted in this and other sections of these specifications. The required excavation lines defined above, exclusive of tolerances, shall be used to compute measurements for payment.

4. SHORING, SHEETING, BRACING AND STEEL SHEET PILING. The Contractor shall be responsible for the unfinished work, existing structures, utilities, and for the safety of workmen from dangers of caving and slides. Sheeting, shoring, bracing and steel sheet piling shall be constructed or installed in accordance with the provisions of Section, CONTROL AND DIVERSION OF WATER and Section, EARTH SUPPORT SYSTEMS. Shoring, sheeting and steel piling may be used at locations other than those described above. If approved, at the option of the Contractor except that if considered necessary at any location, and the Contractor does not use them, their use will be ordered by the Contracting Officer at no additional cost to the Government. Portions of sheeting or piling shall not be removed which, in the opinion of the Contracting Officer, might cause settlement in a structure if removed. When sheeting or piling is left in place, all voids behind the sheeting or piling shall be filled to the satisfaction of the Contracting Officer. Shoring, sheeting and steel piling shall be erected in a safe and workmanlike manner, in accordance with the requirements of the Corps of Engineers Manual "General Safety Requirements," and shall be placed in such a way as to afford ample clearance for construction and ready inspection of permanent work. Shoring, sheeting and steel piling not to be left in place shall be removed upon completion of the permanent work or as soon as the construction does not require their use. Wood sheeting left in place shall be brushed or dipped to provide a creosoted-treated wood conforming to the requirements of Federal Specification TT-C-655 and Int. Am-2, "Creosote, Technical Wood Preservation (for) Brush, Spray or Open Tank Treatment." No separate payment will be made for shoring and sheeting covered in this paragraph and all costs

therefore shall be a subsidiary obligation of the Contractor relative to excavation.

5. TEMPORARY DRAINS, PUMPING AND DEWATERING. The Contractor shall maintain the sites of work on land and adjacent land areas in a well drained condition. Temporary drains and ditches required shall be constructed by the Contractor at no additional expense to the Government. The Contractor shall provide all necessary equipment and materials, and shall unwater and maintain in a dry condition the foundation and excavation areas for the various features of the work to the extent required by the provisions in this and other sections of the specifications. The Contractor shall be responsible for furnishing and operating adequate dewatering and soil stabilization systems such as well points, educter wells, pervious ballast layers or other systems, to dry and stabilize excavation slopes and foundation areas. Payment for furnishing equipment and materials, pumping, dewatering stabilizing slopes and lowering of the ground water table for the various features shall be included in the payment for excavation except as otherwise provided in section, CONTROL AND DIVERSION OF WATER.

6. UTILIZATION OF MATERIALS. All excavated materials shall be satisfactorily utilized or disposed of as directed. With the exception of waste materials and materials in excess of those required for the construction of permanent work, all excavated materials shall be utilized in the construction of earthen fills in accordance with the applicable provisions of Section, EARTHEN FILLS. The materials shall be excavated, separated, stockpiled, and utilized in the permanent work as specified in this and other sections of these specifications. The Contracting Officer shall be the sole judge as to the suitability of a material or load of material for use in the construction of a specific type of fill.

7. STRIPPING. Stripping shall consist of the removal of surface materials judged by the Contracting Officer to be unsatisfactory as foundation materials or for use in the construction of earth or channel fills, which materials comprise sod, topsoil, existing pavements, riprap, surface boulders, open trash, debris and other similar objectionable materials. Only portions of areas, as directed, in which excavations will be made for concrete structures, stone protection, channel improvement, pavements, walls, grading and similar construction shall be stripped. In all areas where stripping is required, the depth of stripping and the excavation of masonry walls shall be limited so as to remove only those surface materials considered unsuitable by the Contracting Officer for use as foundation or fill materials. The depth and areas of all stripping shall be as directed regardless of the limits shown on the drawings.

8. DEFINITION AND DISPOSAL OF WASTE MATERIALS.

8.1 Waste Material. The term "waste material," as used in these specifications, is defined as any and all excavation material

not specified as suitable for use as earth fill material. Waste materials shall also include all roots and oversize stone and concrete crib sections removed prior to or during construction of temporary and permanent fills and permanent structures.

8.2 Disposal. All waste material shall become the property of the Contractor and shall be removed from the project site to a Contractor furnished disposal area.

9. GRADING. Roads, ramps, parking areas, and other required areas shall be graded in accordance with the sections indicated on the drawings or as directed in the field. Shoulders, side slopes, ditches subgrades and other designated areas shall be trimmed and dressed in a neat and workmanlike manner to the lines and grades shown on the drawings or directed in the field. The Contractor shall grade any area within the work area limits as directed in the field to provide proper drainage and finished grades. At all stages of construction, flying dust shall be controlled in the areas traversed by mobile equipment or wheeled vehicles through applicaton of water, oil, lime slurry, or calcium chloride as approved by the Contracting Officer.

10. EXCAVATION FOR CONCRETE AND MASONRY STRUCTURES

10.1 Excavation for concrete and masonry structures shall be to the lines, grades and limits as specified in Paragraph 3 of this section. Where the limits are defined in Paragraph 3 of this section as "required excavation lines," material shall not be removed beyond or below the specified lines, grades and limits except as otherwise allowed or directed and the surfaces formed by the excavations shall be trimmed and carefully graded to conform with the specified lines, grades and limits. A tolerance of 0 to 6 inches will be allowed for excavation below required bottom grade. Special care shall be taken not to disturb the foundation soil on which compacted gravel fill under concrete slabs or footing is to be placed. Excavations below an elevation 24 inches above final grade for these slabs or footings shall in no case be made until just before placement of the compacted gravel fill material. Excavation below the specified foundation grades shall be made to the extent directed to remove unsuitable foundation material. Overdepth excavation below the foundation grade shall be filled with compacted gravel fill, in accordance with the requirements in Section, EARTHEN FILLS, all as directed. No payment will be made as a result of additional work and material if the overage was not directed or if the overage is required as specified in Paragraph 10.2 below. If directed, payment will be made at the applicable contract unit price for excavation and fill, respectively, as applicable.

10.2 The Contractor shall be responsible for maintaining foundation soils in a firm condition by control of seepage and

and ground water and by limiting construction operations or by other approved means. If a suitable foundation soil becomes soft due to any cause, in the opinion of the Contracting Officer, the softened material shall be removed and all provisions of Paragraph 10.1 above for excavation and filling shall be applicable and no payment therefore will be made.

11. EXCAVATIONS FOR CHANNELS. Excavation for channels in areas of new structures or repair work shall be to the lines and grades as indicated on the contract drawings or as modified by the Contracting Officer. The channel bottoms and side slope surface upon which gravel bedding is to be placed shall be excavated and trimmed to meet the requirements and tolerances specified in Section, STONE PROTECTION. The Contractor shall be responsible for any erosion of materials in the channel areas. The Contractor shall coordinate the sequences of channel excavation with the other features of the work. The final excavation of the channel bottom and side slopes in areas subject to erosion from seepage or running water shall be done in short reaches just prior to the placement of gravel bedding.

12. EXCAVATION FOR SHOAL REMOVAL. The term "shoals" as used in these specifications is defined as accumulated deposits of silt, sand and gravel that restrict or divert the normal flow of water in the river channel. Shoals may also contain buried or surface boulders, broken stone, cobbles, trash and debris. Shoals shall be removed from areas or reaches designated for shoal removal as shown on the contract drawings or as directed in the field. The limits of shoal removal in each area or reach shall be determined by the Contracting Officer. Shoal removal shall consist of the satisfactory excavation and removal of any and all materials within the shoal removal limits. Shoal material shall be excavated to the general elevation and grade of the adjoining channel bottom and side slopes except as otherwise directed by the Contracting Officer. Side slopes shall be excavated to continue the existing river bank slope to the channel bottom except that no side slopes shall be cut steeper than 1 vertical on 2 horizontal. Excavated shoal material shall be utilized in the construction of earthen fills or disposed of by hauling to and placing in a Government furnished "Spoil Areas" in accordance with Paragraph 16.

13. CHANNEL BOTTOM GRADING. Channel bottom grading shall be performed in the reaches designated on the contract drawings or as directed in the field. The exact limits of work in each reach shall be determined by the Contracting Officer. Shoal removal work is not included in channel bottom grading and is specified elsewhere. Channel Bottom Grading as used in this paragraph does not include grading in the river bottom incidental to the construction of other

items of work specified in this contract. Channel bottom grading shall consist of the leveling of the channel bottom to a fairly uniform grade and cross-section by the use of bulldozers, front end loaders or other suitable equipment of sufficient size to perform the work satisfactorily. The channel bottom in the reaches designed for channel bottom grading consists, in general of concentrations of individual and clustered broken stones and boulders. The channel bottom grading shall consist of leveling off these broken stones and boulders to fairly uniform and even surface. Large broken stones and boulders that obstruct the flow of the river and cannot be rearranged or placed so that the top surface of the stone is fairly level with the surrounding stone, shall be removed. Debris, old automobile tires, shopping carts, and other such trash shall be classified as waste material, become the property of the Contractor and shall be removed from the site.

14. ROCK EXCAVATION.

14.1 General. The Contractor shall perform rock excavation required for the permanent work, to the lines and grades indicated on the drawings or as otherwise directed. The Contractor shall mark the edge of rock cut with paint or other suitable means to an accuracy of 1-inch ± from the theoretical line of drilling prior to drilling operations. Excavations to lines and grades other than those shown on the drawings will be directed in writing.

14.2 Final Grades and Excavation Lines. From observation of the breaking characteristics of the rock as the excavation progresses, the charges used in blasting and the loading and spacing of holes may be revised, as necessary, to prevent overbreak and shattering of rock outside the design lines or grades. The intent is to limit the blasting so as to break the rock to the lines and grades shown on the drawings and yet not fracture the rock, open incipient fractures, enlarge existing fractures, make the excavation unduly large or irregular, or cause other damage outside the prescribed limits of excavation. When, in the opinion of the Contracting Officer, damage is being done to the rock at the prescribed limits of excavation, the Contractor will be requird to revise his drilling and blasting procedure to obtain sound slopes and grade lines. Such revisions, if necessary, shall include the drilling of holes as closely spaced as 24 inches, at no additional cost to the Government. The side of all rock cuts will be carefully scaled of all loose and projecting rock as excavation progresses. The contract price for rock excavation shall include scaling of the side slopes. Rescaling will be required at no additional cost to the Government as often as may be necessary to permit thorough inspection of the rock surface or whenever rock remaining in the side slope loosens to the extent that it becomes a potential safety hazard in the opinion of the Contracting Officer.

14.3 Blasting Procedures. The Contractor shall submit for approval a plan of operations for the removal of rock. The submittals shall be made in triplicate and shall describe the proposed methods with variations in procedures together with sketches indicating bench depths, number, location, diameter, depth, and inclination of holes, amount, type and strength of explosives per hole and per blast, sequence and delays in firing, stemming, and any other data which the Contracting Officer may deem pertinent to his consideration for approval.

14.4 Blasting. Blasting shall be governed by the safety requirements of Paragraph SP-27 of the SPECIAL PROVISIONS, and the following requirements. All damage resulting from blasting beyond the limits of the work shall be repaired or otherwise satisfactorily cared for by the Contractor at his expense. Blasting within 100 feet of concrete which has been in place less than seven (7) days will not be permitted under any circumstances, and blasting in the vicinity of concrete older than seven (7) days will be permitted only if approved in advance by the Contracting Officer. The Contractor or his surety shall make prior inspection or investigations of structures near the areas of blasting and shall provide such vibration monitoring as necessary during the blasting operations to assure conformance with regulatory statutes or directives established by the state or other authorities to limit vibratory effects. Such investigations shall be conducted and reported by a qualified vibration engineer, and copies in triplicate of any reports will be furnished to the Contracting Officer. Reports shall include plans of drilling, amount and type of loadings, kind and distribution of caps, delays used and amount of explosive per delay, order of firing, names of observers and interpreter, distance and direction of recording station from blast area, type of ground at recording station, exact time of reading, displacement and frequency, copy of records and brief comment on vibratory effects. Costs of vibration monitoring or other investigations in connection with vibration engineering shall be met by the Contractor.

15. STOCKPILING.

15.1 Material furnished by the Contractor. Materials to be furnished by the Contractor shall not be stockpiled at the project site without approval. Due to limited areas within the specified Contractor's work limits, approval will only be given for small stockpiles of specific materials which must be available in small quantities. The location, grading and final condition of any stockpile area shall be as directed.

15.2 Earth Fill and Channel Fill Materials. The Contractor shall stockpile earth fill material from site excavation as required to (a) maintain the construction schedule, (b) provide the required river and water control, (c) make available when needed, materials for the construciton of temporary and permanent fills, (d) utilize to

the extent required, all suitable materials from the excavation and (e) if necessary, aid in the drying of fill material prior to placement. The areas for stockpiling earthfill materials shall be within the Contractor's work limits including areas for actual construction and required excavation. All stockpiling areas shall be approved, stripped and graded. All final stockpile areas outside the limits required for construction of permanent work shall be graded to the satisfaction of the Contracting Officer.

16. DISPOSAL OF EXCESS MATERIAL. All suitable material not required for the construction of earth fills, including materials in stockpiles and materials removed by shoaling excavation when declared as excess material by the Contracting Officer, shall be hauled to and placed in Government furnished "Spoil Areas" located as shown on the contract drawings. Only excess material removed by shoaling excavation from Area "W" shall be placed in "Spoil Area No. 2." All other excess material may be placed in "Spoil Area No. 1." Material deposited in Spoil Areas shall be end dumped and spread to a uniform thickness, smooth surface and gently sloped to drain. Final depth of material placed in "Spoil Area No. 2" shall not exceed 2-feet at any point.

17. MEASUREMENT.

17.1 General and Shoaling Excavation. The quantities of general and shoaling excavation to be paid for as defined in paragraphs 2 and 12, will be the total volume in cubic yards of materials removed as general and shoaling excavation, and disposed of in accordance with these specifications. Areas within which general and/or shoaling excavation is to be performed will be surveyed after clearing, but prior to the start of excavation. This survey will be the basis for all measurements, regardless of any changes which may occur in the areas surveyed during prosecution of the work. In general, the volumes will be measured as those between the ground surface as determined by this survey and the final excavated surface, as indicated by the lines, grades, slopes and limits shown on the drawings or as directed by the Contracting Officer. In areas where the excavation extends to bedrock or to grades not definitely established on the drawings, a survey will be made to determine the final excavated surfaces and the volumes measured as those between the ground and final excavated surface as determined by these surveys. The total volume of general excavation and shoaling excavation to be paid for will not include volumes of materials excavated outside or below the lines, grades, slopes and limits shown on the drawings or as directed, except where such excavation has been specifically authorized by the Contracting Officer.

17.2 Rock Excavation. Measurement for rock excavation as classified in Subparagraph 2.2 will be by the cubic yard of materials satisfactorily removed by rock excavation and disposed of in accordance with the specifications and drawings. Quantities of bedrock excavation as rock excavation, including the removal of overhanging rock during foundation preparation will be measured in

place as the volumes between the finish grades and lines indicated on the drawings, or as modified by the Contracting Officer, and the surface of the rock as indicated by the specified surveys.

17.3 Channel Bottom Grading. The quantity of channel bottom grading to be paid for will be the total length in linear feet of channel bottom graded as specified herein, and to the limits as directed in the field by the Contracting Officer. All measurements shall be made by the Contractor and will be checked by the Contracting Officer. Measurements shall be made along the center line of the channel after grading operations have been completed.

18. PAYMENT.

18.1 Lump Sum Items. No seperate measurement or unit price payment will be made for excavation or any other work which is performed in specific areas or on project features where payment for all work is specified to be made as a lump sum.

18.2 General and Shoaling Excavation. General excavation, measured in accordance with the provisions of Paragraph 17.1 above, will be paid for at the applicable contract unit bid prices per cubic yard for Item Nos. A4, F2, J1, O3, P2, Q1, and V1, "General Excavation". Shoaling excavation, measured in accordance with the provisions of Paragraph 17.1 above, will be paid for at the applicable contract unit bid prices per cubic yard for Item Nos. A12, C2, D2, E3, F3, H1, J4, M3, O4, P3, and W1 "Shoaling Excavation". Such payment shall constitute full compensation for all work in connection with stripping, excavating, grading, hauling, stockpiling and rehandling from stockpiles, drainage, dewatering and pumping not paid for under other items, placement of material in and grading of spoil areas, the stabilization of construction slopes, shoring, sheeting, steel sheet piling and all other work specified herein in connection with general excavation.

18.3 Rock Excavation. Rock excavation as defined and covered in this section of the specifications and measured in accordance with the provisions of Paragraph 17.2 above, will be paid for at the applicable contract unit prices per cubic yard for Item No. A 15, "Rock Excavation." Such payment shall constitute full compensation for all work in connection with drilling, blasting, excavation, hauling, disposal of materials, cleaning excavated surfaces scaling, and all other work specified herein in connection with rock excavation which is not paid for under other items.

18.4 Channel Bottom Grading. Channel bottom grading, measured in accordance with the provisions of Paragraph 17.3 above, will be paid for at the contrct unit bid prices per linear foot for Item Nos. C3, F13, H2, J2, K2, N2, and P14, "Channel Bottom Grading." Such payment shall constitute full compensation for all work in connection with grading, and the removal of large broken stone and boulders, trash and other debris as necessary, and all other work specified herein in connection with channel bottom grading.

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DIVISION 2 - SITE WORK

SECTION 2E - EARTHEN FILLS

1. SCOPE. The work covered by this section consists of furnishing all plant, labor, equipment, appliances and certain specified fill materials and of performing all operations in connection with the construction of all types and classes of fills, all in accordance with the contract drawings and specifications.

2. APPLICABLE PUBLICATIONS. The procedures in the following publication of the American Society for Testing and Materials shall be followed, as applicable, for sampling fill materials:

D-75-71 Sampling Aggregates

The applicable procedures prescribed in Department of the Army Engineer Manual 1110-2-1906, November 30, 1970, Laboratory Soils Testing, shall be used in determining the gradation and plasticity characteristics of fill materials.

3. GENERAL REQUIREMENTS

3.1 General. The term "fill" as used in this section includes all types of fills, backfills and refills constructed of the materials specified in Paragraph 4 below. The various fill zones shall be constructed to the lines, grades and cross-sections indicated on the drawings or specified herein unless otherwise directed. Each fill zone shall extend to the actual bottom and side slopes of an excavation regardless of the locations of the payment or excavation lines indicated on the drawings or specified. Compacted fills shall be constructed by placing the fill material in layers and compacting each layer as specified in Paragraph 3 herein. Except as otherwise specified, the ground water and surface water levels shall be controlled so as not to adversely affect fill materials during placement or compaction operations. No fill material shall be placed upon a surface of frozen material nor shall snow, ice or frozen materials be incorporated into any fill. The Contractor shall maintain and protect all excavations, foundation areas and fills in completed and uncompleted portions of the work in a satisfactory condition at all times until final completion and acceptance of all work under the contract.

3.2 Sequence. The Contractor shall plan the sequence of work covered herein with that of work covered in other sections of the specifications so as to minimize damage due to all causes, including floods; to comply with the requirements of the specifications; and to permit all phases of work to be done according to schedules.

3.3 Operational Restrictions. No fill material shall be placed against concrete until the concrete has been in place at least 14 days.

Except as otherwise specified herein, fills on both sides of a wall, structure, conduits or appurtenant structure shall be constructed concurrently at such rates that the top levels of the fills are within 24 inches of each other at all times prior to completion. No heavy equipment such as bulldozers, tractors, trucks, or graders, shall be operated in the following areas:

3.3.1 Within 3 feet, measured horizontally, of the outer surface of utility pipes and appurtenant structures, small conduits and similar items until the fill has been constructed to a level 24 inches above the level of the top of the item.

3.3.2 Over concrete slabs and footings until the concrete has been covered with 8 inches of fill material.

4. MATERIALS.

4.1 General.

4.1.1 Sources. Material for the construction of random fills shall be obtained from the required excavations for the project. Materials for the construction of all other fills shall be furnished by and at the expense of the Contractor. The Contracting Officer shall be the sole judge of the suitability of any material for use as a fill material regardless of its source. Excess moisture will not be a factor in determining suitability. Material that is too wet for immediate use shall be dried for future use. If the quantity of suitable random fill material available from the required excavations is not sufficient for the completion of the random fill zones, these zones shall be completed using gravel fill material. Compacted gravel fill constructed to complete random fill zones will be measured and paid for in accordance with those provisions of Paragraphs 9 and 10 applicable to other gravel fills.

4.1.2 Processed Materials. Gravel and pervious fill material may be commercially processed. Upon delivery to the site, commercially processed material will be examined and, at the option of the Contracting Officer, may be sampled and tested by, and at the expense of, the Government to determine its conformity to the specified requirements. Any commercially processed material placed in the permanent work which does not meet the specified requirements shall be removed and replaced with satisfactory material at no additional cost to the Government.

4.1.3 Oversize Stones. The maximum permissible size stone for random fill materials to be compacted by a tamping roller or tractor shall be a stone with a maximum dimension of 2/3 the specified loose thickness of the layer being placed. The maximum permissible size stone for any fill material to be placed in a restricted area, as defined in Paragraph, COMPACTION OF FILL MATERIALS, shall be a stone with a maximum dimension of 2/3 the specified loose thickness of the

layer being placed. Except as otherwise specified herein, the maximum permissible size stone in any other fill material shall be a stone with a maximum dimension equal to the specified spread thickness of a layer of that material. Material for use in the construction of a dumped fill zone shall contain no stone too large to be placed in the zone or of more than 1/2 cubic yard in volume.

4.1.4 Removal of Oversize Stones. The Contractor shall remove oversize stones from random fill material either prior to or during its placement. Except as otherwise specified herein, the Contractor shall remove oversize stones from all other fill materials prior to their delivery to the site. Oversize stone removed during the placement of any fill material shall be placed in piles on the fill surface and then loaded and removed daily from the site.

4.2 Random Fill. Material for the construction of Random Fill shall consist of suitable earth material obtained from the required excavations. The material shall be free of stumps and debris, and shall not contain cinders, ashes, topsoil, sod, roots and organic soils such as muck or peat in quantities considered objectionable by the Contracting Officer.

4.3 Gravel Fill Material. Material for the construction of gravel fills shall consist of sand, gravel or crushed stone composed of tough, durable particles. It shall be reasonably free from thin, flat and elongated pieces and shall contain no organic matter or soft, friable particles in quantities considered objectionable by the Contracting Officer. The requirements for approval of the soundness and durability of gravel bedding materials specified in Paragraph 3 of Section, STONE PROTECTION shall be applicable to gravel fill material. The material shall be reasonably well graded within the following limits:

Sieve Size (U.S. Standard)	Percent Passing by Dry Weight
6-inch	100
1-inch	50-80
No.4	30-60
No.16	15-40
No.200	0-5

In addition, not more than 3 percent, by dry weight, of the component passing the No.4 sieve shall consist of particles finer than 0.01 millimeters.

4.4 Pervious Fill Material. Material for the construction of pervious fill zones should be clean sand or gravelly sand composed of tough, durable particles and shall contain no organic matter or soft friable particles in quantities considered objectionable to the

Contracting Officer. Pervious fill material shall be reasonably well graded and shall contain not more than 30 percent by dry weight of particles retained on the No.4 U.S. Standard Sieve and not more than 8 percent passing the No.200 sieve. The maximum size stone in pervious fill material shall be 3-inches.

5. PREPARATION OF FOUNDATION. The foundation areas for all fills to be constructed on existing materials shall be excavated or stripped as specified in Section, EXCAVATION, GENERAL. No fill material shall be placed in any foundation area until the area has been inspected and approved. No foundation area will be approved unless it is free of all mud, debris, trash, paving, lumber, stumps, concrete masonry fragments and other similar material. All foundation areas shall be dry and free of water at the surface during placement of fill material thereon.

6. PLACEMENT OF MATERIALS FOR COMPACTED FILLS.

6.1 General. No material for a compacted fill shall be placed in an inundated fill or foundation area. No fill material shall be placed on previously compacted fill material which in the opinion of the Contracting Officer has been affected detrimentally by frost or freezing of water until the affected surface material has been loosened, conditioned and reconstructed to the depth directed in the manner specified hereon for the construction of the applicable type of compacted fill. No fill material shall be placed in an area within which compaction equipment is being operated. Layers of fill material to be compacted shall be placed and spread over areas of sizes sufficient to permit the operation of the compaction equipment in an orderly pattern. Special care shall be taken to prevent the contamination of layers of sand and gravel materials with soil or other material during placement and compaction. Any of these fill materials that become contaminated shall be removed and replaced with suitable uncontaminated material at no additional cost to the Government.

6.2 Spreading.

6.2.1 Materials for compacted fills shall be spread with bulldozers or other approved equipment or by hand to form uniform loose layers of the following thicknesses except as otherwise specified herein. Restricted areas are defined in Paragraph, Compaction in Restricted Areas, herein.

Material	Maximum Loose Layer Thickness in Inches	
	General	Restricted Areas
Random Fill Material	12	8
Gravel Fill Material	8	4
Pervious Fill Material	8	4

6.2.2 Fill materials shall be spread in restricted areas by hand shovelling in horizontal layers as directed.

6.2.3 During the spreading operations, all remaining oversize stones as defined in Paragraph, Oversize Stones, herein shall be removed from the fill material.

7. MOISTURE CONTROL. The moisture contents of fill materials during placement and compaction shall be such as to prevent excessive rutting and dust and to permit the satisfactory operation of hauling and compaction equipment. The material in each layer shall be moistened or dried back to the extent necessary to meet these requirements.

8. COMPACTION OF FILL MATERIALS.

8.1 Equipment. Compaction equipment shall conform to the following requirements and shall be used as prescribed in subsequent paragraphs.

8.1.1 Heavy Tractor. A heavy tractor to be used for compacting fill material shall be a standard commercial make crawler type tractor weighing not less than 35,000 pounds and exerting a tread pressure of not less than 9 pounds per square inch. The tractor shall be equipped with standard width treads.

8.1.2 Light Tractor. A light tractor to be used for compacting fill material shall be a standard commercial make crawler type tractor weighing between 7,500 and 12,000 pounds and having a width of 5-1/2 feet or less, measured between the outside edges of the crawler tracks.

8.1.3 Power Tamper. A power tamper shall be an approved pneumatic or mechanical tamper designed for the compaction of soils and the product of a manufacturer nationally recognized as a specialist in the design and manufacture of such equipment. Jackhammers or similar equipment not specifically designed for the compaction of earth material will not be approved. The tamper shall deliver no more than 1,000 blows per minute. A power tamper to be used for the compaction of fill materials beneath the haunches of conduits and pipes and in narrow spaces shall meet the foregoing requirements and in addition shall have a circular tamping foot not more than 6 inches in diameter and shall be of a type that can operate satisfactorily at angles of up to 45 degrees to the vertical.

8.1.4 Plate Vibrator. A plate vibrator shall be an approved plate surface vibrator designed for the compaction of soils by vibration and the product of a manufacturer of such equipment. The surface contact plate shall be between 15 and 18 inches in width.

8.2 Compaction, General.

8.2.1 After each layer of fill material has been dumped and spread and its moisture content is satisfactory, the entire surface of the layer shall be compacted as follows:

Fill Type	Compaction
Compacted Random Fill	At least 4 coverages of the treads of the heavy tractor or 6 coverages of the tread of the light tractor
Compacted Gravel and and Pervious Fill	At least 6 coverages of the tread of the heavy tractor or at least 8 coverages of the tread of the light tractor

8.2.2 If in the opinion of the Contracting Officer, the desired compaction of any portion of a layer of compacted fill material is not secured by the minimum number of tractor coverages specified, additional complete passes or coverages shall be made over the surface area of such designated portion until the desired compaction has been obtained.

8.3 Compaction in Restricted Areas. A restricted area is hereby defined as a horizontal area of a fill zone at any elevation within which compaction of the layers of fill material cannot be accomplished with tractors as specifiel in paragraph, 8.2.1, herein, due to space limitations or an area within which the operation of tractors, and spreading equipment is prohibited by the provisions of Paragraph, Operational Restrictions, herein. Except as otherwise specified below each layer of random, gravel, and pervious fill in a restricted area shall be compacted by at least 4 coverages of the active contact face of the plate vibrator. In portions of restricted areas where the plate vibrator cannot be operated satisfactorily, each layer of random, gravel, and pervious fill shall be compacted by at least 4 coverages of a power tamper of suitable size. Special care shall be taken to compact around and under the haunches of conduits and pipes.

9. MEASUREMENT.

9.1 Fills. The fills covered in this section of the specifications will be measured for payment as the volumes of fills in cubic yards computed from the applicable limits and payment lines indicated on the drawings, defined herein or otherwise established by the Contracting Officer, exclusive of the volumes of any fills, backfills or refills specified or indicated to be paid for under other items of work. Where applicable, excavation payment lines as defined in Section, EXCAVATION, GENERAL shall be the limits for measurement for the fills covered herein. The measurement for each type of fill shall include the sum of the volumes of compacted fills of that type. The measurements

shall not include the volumes of materials placed outside the excavation lines shown on the drawings or as defined herein. The limits of fills which are not sufficiently definite for measurements as shown on the drawings or as defined herein and which depend upon field conditions, availability of random fill material, topography and other conditions will be determined by field surveys.

10. PAYMENT.

10.1 Lump Sum Items. No separate measurement or unit price payment will be made for the various types of fills or any other work which is performed in specific areas or on project features where payment for all work is specified to be made as a lump sum.

10.2 Fills. The various types of fill satisfactorily constructed and measured in accordance with Paragraph 9.1 herein will be paid for at the applicable contract unit prices per cubic yard for Item Nos. F6, O6, P8, Q3, and V5, "Random Fill", Item Nos. A11, F7, and P7, "Gravel Fill", and Item Nos. F8, O7, and P6, "Pervious Fills". Such payments shall constitute full compensation for all work in connection with the preparation of foundation for fills, spreading, harrowing conditioning for moisture, compacting, removal of oversize stones and objectionable material, dewatering not covered in other sections of these specifications and all other work required for the construction, protection and maintenance of the partial or completed fill zones covered herein exclusive of compensation for the excavation and stockpiling of random fill materials from excavations and stockpiles at the project site. Such payments for all fills other than random fills shall also constitute full compensation for furnishing acceptable fill materials from off site sources and delivering them to the project site in sufficient quantity for the construction of the various fills.

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DIVISION 2 - SITEWORK

SECTION 2F - GABION CONSTRUCTION

1. SCOPE. The work covered by this section consists of furnishing all plant, labor, equipment, and materials, and performing all operations in connection with the construction of the gabion retaining wall and mattress. The Contractor shall furnish, assemble and fill with approved stones, heavily galvanized, P.V.C. coated steel wire mesh baskets, in accordance with this section of the specifications and the contract drawings.

2. 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:

2.1 Federal Specifications.

QQ-W-461 G Wire, Steel, Carbon (Round, Bare, and Coated)

2.2 American Society for Testing and Materials (ASTM).

A 90-69 Weight of Coating on Zinc-Coated Iron or Steel Articles

A 239-73 Locating the Thinnest Spot in Zinc (Galvanized) Coating on Iron or Steel Articles by the Preece Test (Copper Sulfate Dip)

G 23-69 Operating Light and Water Exposure Apparatus (Carbon ARC Type) for Exposure of Nonmetallic Materials.

3. MATERIALS.

3.1 Gabion Fabrication. Gabions shall be manufactured in such a manner that their sides, ends, lid and diaphragms can be assembled to form rectangular units of the specified dimensions. Gabion shall be a single unit construction. The front, base, back and lid shall be woven into a single unit. The ends and diaphragm(s) shall be factory connected to the base. All perimeter edges of the mesh forming the gabion shall be securely wired so that the joints obtained have at least the same strength as the wire mesh itself.

3.2 Gabion Dimensions. The gabions shall be supplied as specified, in various lengths and heights. The length shall be multiples (2,3 or 4) of the horizontal width. The horizontal width shall not be less than 3'-0". However, all gabions furnished by a manufacturer shall be of a uniform width.

3.3 Wire Mesh. Mesh openings shall be hexagonal in shape and uniform in size, measuring approximately 3-1/4 inches by 4-1/2 inches. All mesh joints shall be flexible and triple twisted to prevent unravelling.

3.4 Galvanizing. All steel wire used shall be galvanized having a minimum amount of zinc coating of 0.80 oz./sq.ft. of uncoated wire surface, and complying with Federal Specifications QQ-W-461 Finish 5, Class 3. The weight of the zinc coating shall be determined by ASTM test designation A90.

3.5 P.V.C. Coating. All galvanized steel wire shall be additionally coated with a minimum of 0.015 inches of black P.V.C. which shall be suitable to resist destructive effects of immersion in acidic, salt, or polluted water, exposure to ultra violet light and abrasion, and retain these characteristics after a period of not less than 3,000 hours under test in accordance with ASTM Test Designation G-23.

3.6 Mesh Wire. The diameter of the steel wire mesh shall be 0.1063 inches after galvanization.

3.7 Selvedge Wire, The diameter of the selvedge wire, running through all the edges (perimeter wire), shall be 0.1338 inches (U.S. Gage No. 10) after galvanization and an overall diameter (core wire plus P.V.C. coating) of 0.1638 inches.

3.8 Lacing Wire. The diameter of the wire, necessary for assembling the gabion units shall be 0.0866 inches (U.S. Gage No. 13) after galvanization and on overall diameter (core wire plus P.V.C. coating) of 0.1166 inches.

3.9 All wire gauges are subject to a tolerance of $\pm$ 2.50 percent of manufactures stated specifications, the thickness of P.V.C. coating excluded.

3.10 Tensile Strength of all wire used for gabions and lacing wire shall range from 60,000 to 75,000 psi in accordance with Federal Specifications (QQ-W-461 , Class 3).

3.11 Load and Elongation Tests shall be conducted in accordance with Federal Specifications (QQ-W-461 , Class 3).

3.12 Certification, the Contractor shall submit certificates of compliance in accordance with the SPECIAL PROVISIONS stating that the gabions, wire mesh, selvedge wire and lacing meet or exceed the requirements specified herein and signed by an authorized representative of the manufacturer.

3.13 Stone Fill. Stone fill for filling gabions shall be water worn smooth rounded cobbles ranging in size from 4 to 8 inches without skip gradation. The stone fill shall be hard, durable and clean. No stone shall have a minimum dimension less than 3 inches. The sources from which the Contractor proposes to obtain the stone fill materials shall be selected well in advance of the time when it will be required in the work. Representative samples of stone material shall be submitted to the Contracting Officer for approval prior to delivery to the site. All test samples shall be obtained by the Contractor and delivered at his expense to a point designated by the Contracting Officer at least 45 days in advance of the time when the placing of stone is expected to begin. All testing of the initially proposed material will be made by the Government and at its expense. Any retesting and all testing of subsequent sources due to the initially proposed sources failing to meet the requirements of these specifications will be done by the Government at the Contractor's expense.

3.13.1 The Contractor may, at his option, use selected stones salvaged from the removal of stone fill inside concrete crib walls in Areas F and O, provided the stone meets all of the above requirements specified for Contractor furnished stone fill.

3.14 Filter Stone Fill and Leveling Course. Fill material for construction of a leveling course under the gabion mattress and for behind the gabion wall shall consist of a crushed stone or screened gravel and shall be composed of hard, durable and sound rock particles furnished by and at the expense of the Contractor. The material shall range in size from approximately 1/2 to 2 inches without skip gradation.

4. FOUNDATIONS PREPARATION shall be as specified for stone protection and gravel fill in Section, STONE PROTECTION.

5. INSTALLATION.

5.1 Gabions shall be assembled and erected according to the manufacturer's instruction. The initial assembly and erection shall be done under the supervision of an authorized representative of the gabion manufacturer. Construction experience has shown that the P.V.C. coating on gabion wire mesh and lacing wire has split during the manipulation of assembly, when the materials were assembled after having been stored in freezing temperatures. In order to preserve the ductility of the P.V.C. coated mesh and lacing wire during basket assembly and stone filling baskets shall be assembled and filled only when the atmospheric temperature has not been below 35° for 12 hours, and the temperature in the shade is not less than 40°F, immediately prior to application.

5.2 Assembling. Gabions are usually supplied folded flat, tied in pairs and packed in bundles. Single gabions shall be removed from the bundle, unfolded flat on the ground, and all kinks and bends flattened. The gabions shall be assembled individually in the field, by erecting the sides, ends and diaphragms, ensuring that all creases are in the correct positions and the tips of all sides are level. The lacing procedure shall be in accordance with the manufacturer's instructions with loops at intervals of not more than five (5) inches.

5.3 Placement. The assembled gabions shall be placed in their proper location as shown on the contract drawings and all adjoining empty gabions shall be laced along the perimeter of their contact surfaces in order to obtain a monolithic structure. The upper empty gabion tier shall also be laced to the top of the lower filled one at all contact surfaces as specified. To facilitate this operation, sub-assemblies consisting of many gabions, may be assembled on land and then placed in their proper location and then laced along the perimeter of all contact surfaces. Gabions shall be constructed in the dry except that the lowest row of baskets for the retaining wall and revetment may be constructed in the wet provided the maximum depth of water is less than 1 foot.

5.3.1 The following method applies to three (3) foot high gabions. Once the gabion units are laced together, they shall be stretched to effective alignment. This operation shall be carried out after several empty gabion units have been positioned. The first gabion shall be partially filled to provide the necessary anchorage. Any stretching shall be carried out using a come-along or other means of at least one ton capacity. While under tension, the gabion joints shall be carefully controlled against possible unravelling.

5.4 Filling. The gabion units shall be carefully filled by earth handling equipment such as: backhoe, gradall, crane, etc. Care shall be taken when placing stone material to assure that P.V.C. coating will not be broken or damaged. The maximum height from which stone may be dropped into the basket units shall be 36 inches. Manual adjustment shall be made during filling operations as required to prevent undue voids.

5.4.1 Gabions shall be filled in layers no more than one foot at a time. Two connecting wires shall be placed between each layer in all cells along all exposed faces of the gabion structure. All connecting wires shall be looped around two mesh openings and the wire terminals shall be securely twisted to prevent their loosenings.

5.4.2 The cells in any row shall be filled in stages so that local deformation may be avoided. That is, at no time shall any cell be filled to a depth exceeding one foot more than the adjoining cell.

5.4.3 Along all exposed gabion faces, the outer layer of stone shall be carefully placed by hand, in order to ensure proper alignment and a neat, compact square appearance.

5.4.4 The last layer of stone in each tier shall be leveling with the top of the gabion to allow proper closing of the lid and provide an even surface of the new course. Each cell of the wall and mattress shall be slightly overfilled to allow for future settlement. The lids shall be stretched tight over the filling, using crow bars or lid closing tools, until the lids meets the perimeter edges of the front and end panels. The lid shall then be tightly laced along all edges, ends and diaphragms in accordance with the gabion manufacturer's recommendations.

5.5 Cutting and Folding Mesh. Where shown on the drawings or as otherwise directed by the Contracting Officer, the gabion mesh shall be cut, folded and wired together to suit existing site conditions. The mesh must be cleanly cut and the surplus mesh cut out completely or folded back and neatly wired to an adjacent gabion face. The cut edges of the mesh shall be securely laced together with lacing wire in the manner described above for assembling. The assembling installation, filling and lid closing of the reshaped gabions shall be as specified above in this paragraph 5.

6. MEASUREMENT AND PAYMENT. The gabion retaining wall and mattress and filter stone material will be measured as the total volumes computed from the applicable lines, grades, thickness and limits shown on the drawings or as modified by the Contracting Officer. Payment will be made at contract prices per cubic yard for Item No. A5, "Gabion Construction" and Item No. A6, "Filter Stone". Such payment shall constitute full compensation for furnishing material, assembling, filling with approved stone, labor, equipment and all other work incidental to the construction of gabion baskets, filter stone leveling course and filter stone backfill.

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DIVISION 2 - SITE WORK

SECTION 2G STONE PROTECTION

1. SCOPE. The work covered by this section consists of furnishing all plant, labor, equipment, and materials (except as otherwise indicated) and performing all operations in connection with the construction of sections of bedding layers and stone protection in accordance with the contract drawings and specifications and as directed by the Contracting Officer and subject to the terms and conditions of this contract.

2. APPLICABLE PUBLICATIONS. The procedures in the following publication of the American Society for Testing and Materials shall be used as applicable, for sampling and materials:

C97-47(1970)	Absorption and Bulk Specific Gravity of Natural Building Stone
D75-71	Standard Method of Sampling Aggregates

The applicable procedures prescribed in Department of the Army Engineer Manual 1110-2-1906, Laboratory Soils Testing, shall be used for determining the rock sizes and the gradation of the materials.

3. MATERIAL.

3.1 General. All materials for bedding layers and stone protection shall be furnished by and at the expense of the Contractor from approved sources. The materials shall not be stockpiled at the project site without approval. The stockpiling at the sources, loading and hauling of materials shall be performed in a manner that will prevent segregation and will assure placement of well graded materials. Bedding materials and stone protection materials placed in the permanent work which are not of approved quality or do not meet specified requirements shall be removed and replaced with the acceptable material at no additional cost to the Government.

3.2 Approval of Quality. The sources from which the Contractor proposes to obtain bedding and stone protection materials shall be selected well in advance of the time when there materials will be required in the work. Suitable samples of the material for testing from any source selected by the Contractor shall be submitted to the Contracting Officer for approval of the soundness and durability. All test samples for a material shall be obtained by the Contractor and delivered at his expense to a point designated by the Contracting Officer well in advance of the time when placing of the material is expected to begin. Sampling of the materials shall be done by the Contractor at his own expense and in the presence of a representative of the Contracting Officer. The samples shall be subjected to such tests as are necessary to determine the quality of the material unless suitable test reports, and/or service records are available that are satisfactory to the Contracting Officer. The Contracting Officer shall be the sole judge

as to the acceptability of a material. Tests to determine the suitability of rock materials may include petrographic analysis, wetting and drying, and freezing and thawing tests. All tests will be made by or under the supervision of the Government and at its expense. The approval of a material by the Government shall not relieve the Contractor, in any way, of the responsibility of placing a material which meets the requirements specified herein. Approval of a material from a source shall not be construed as approval of all materials from that source. The right is reserved to reject, at any time, any or all portions of the materials in a source or produced using materials from that source when such materials are unsuitable in the opinion of the Contracting Officer.

3.3 Sand and Cement for Grouting. Sand and cement for grouting shall conform to the requirements of SECTION 3D - CAST IN PLACE CONCRETE.

3.4 Gravel Bedding. Gravel bedding material shall consist of well-graded bank-run, nonplastic, sandy gravel or gravelly sand from which all oversize stones shall be removed either at the source or during placement. The material shall consist of tough, durable, particles, reasonably free from thin, flat and elongated pieces, and shall contain no organic matter, sod, roots, brush, debris, or soft friable pieces in quantities considered objectionable by the Contracting Officer. Gravel bedding material shall be reasonably well graded within the following limits:

Sieve Size (US Standard)	Percent Passing by Dry Weight
6-inch	100
3-inch	80 - 100
1-inch	50 - 90
No. 4	30 - 60
No. 40	10 - 35
No. 200	0 - 10

The Contractor shall be fully responsible to place material with the specified gradation and meeting other requirements. During or after placement, the material will be inspected and samples will be taken and tested as necessary to determine gradation, and other physical and structural characteristics. Such inspection, sampling and testing will be done by the Government.

3.5 Crushed Stone Bedding. Crushed stone bedding material shall be crushed quarried rock meeting the gradation and quality requirements for coarse aggregate specified in SECTION 3D - CAST IN PLACE CONCRETE.

3.6 Stone Bedding. - Stone bedding material shall be quarried rock meeting the following gradation requirements and all other requirements specified in Par 3.7 of this section for stone protection materials.

Sieve Size (US Standard)	Percent Passing by Weight (SSD)
8-inch	100
4-inch	50 - 85
2-inch	15 - 45
3/4-inch	0 - 5

3.7 Stone Slope Protection. Material for use as stone slope protection shall consist of quarried rock, composed of hard, durable, angular, and sound rock fragments each weighting not less than 162 pounds per cubic foot based on the saturated surface dry specific gravity determined in accordance with ASTM Designation C97. The stones shall be irregular and angular in shape and shall be free from cracks, seams, structural planes of weakness or other defects that would tend to increase unduly their deterioration from natural causes and from handling and placing. The stones shall not have the long dimension exceed 3 times the short dimension. Stone protection materials shall meet the following size requirements:

Stone Weight in Pounds	Percent by Weight (SSD) Lighter
700 - 1500	100
300 - 500	50
100 - 250	15
25	0

The stone protection material may contain up to 8 percent by weight of air dried rock fragments, spalls and dust with each particle weighing less than 25 pounds. No particles weighing less than the permissible minimum stone size shall be defined as stone in stone protection material. In computing percentages by weight of stones in the above table, the weight of a particle weighing less than the permissible minimum stone size shall not be included in the total weight. The stone protection material shall be well graded between the maximum and minimum stone sizes furnished. The maximum and minimum sizes furnished shall be selected by the Contractor within limitations in the above table and the material shall be without "skip gradation". The material shall be processed by the use of grizzlies, screens and similar equipment and, if necessary, by crushers to produce the gradation and specified sizes. The Contractor shall provide, construct, adjust, maintain and operate processing plants and establish placement operations that will provide acceptable materials in the permanent work.

3.8 Hand Placed and Grouted Hand Placed Stone Protection. Material for hand-placed and grouted hand-placed stone protection shall consist of quarried rock composed of hard, durable, angular, and sound rock fragments each weighing not less than 162 pounds per cubic foot based on the saturated surface dry specific gravity determined in accordance with ASTM Designation C-97. The stones shall be irregular in shape and shall be free from cracks, seams, structural planes of weakened or other defects that would tend to increase unduly their deterioration from natural causes and from handling and placing. Hand-placed stone protection material shall be reasonable well graded within the following limits:

	Stone Weight in Pounds	Percent by Weight (SSD) Lighter
18-inch layer	600*	100
	400	60 - 90
	300	25 - 50
	70	0 - 5
24-inch Layer	1500*	100
	1000	60 - 90
	700	25 - 50
	200	0 - 5
30-inch Layer	2500*	100
	2000	60 - 90
	1400	25 - 50
	300	0 - 5

* In the above gradation table the largest size stone permitted will be one that can be placed in the designated layer thickness while maintaining the required stone shape ratio.

Except for spalls for wedging, stone shall be roughly rectangular in shape of which the least dimension shall be not less than one-third the length.

3.9 Salvage of Existing Riprap. Subject to prior approval by the Contracting Officer, existing riprap stone being removed from required excavations may be salvaged and used in stone protection and stone bedding layers. Approval will be given only when it can be shown that incorporation of the salvaged stone will produce a material meeting the gradation and quality specifications for stone protection and stone bedding.

4. FOUNDATION PREPARATION. The surface areas upon which stone protection, stone bedding and gravel bedding materials are to be placed shall be trimmed and dressed to conform to the lines and grades and cross sections shown on the drawings, or as modified, and to within the tolerances specified herein. For surfaces produced by excavation upon which gravel bedding material to be placed, the tolerances shall be plus or minus 4 inches from the specified lines and grades. For surfaces of earth fill upon which gravel bedding material is placed, the tolerances shall be plus or minus 2 inches from the specified lines and grades. For surfaces of gravel bedding upon which stone bedding is to be placed, the tolerances shall be as specified in Paragraph 6 of this section. Where it is necessary or desirable to fill a low surface area of the excavation or gravel bedding surface, the fill material shall be gravel bedding material. No additional payment will be made for any material or work thus required. Immediately prior to the placement of any gravel bedding, stone bedding or protection stone material, the surface upon which it is to be placed will be inspected and no material shall be placed thereon until the surface has been approved.

5. SEQUENCE OF CONSTRUCTION. The Contractor shall plan the work sequence with the worked covered in other sections of the specifications to prevent damage due to all causes, including water flows and seepage of partially completed portions of the permanent work.

6. PLACEMENT AND TOLERANCES.

6.1 General. Stone protection, stone bedding and gravel bedding materials shall be placed to the lines, grades, areas and cross sections shown on the drawings, or as modified, within the tolerances specified herein. The Contractor shall construct temporary water diversion structures in accordance with Section, CONTROL AND DIVERSION OF WATER and such structures shall be maintained in good condition during excavation and all placement operations.

6.2 Gravel Bedding. The tolerances for the finish surface of the gravel bedding shall be plus or minus 2 inches from the specified lines. Compaction of the gravel bedding material will not be required. Any damage to the surface of a layer of gravel bedding prior to or during placement of the stone bedding material thereon shall be repaired before proceeding with the work.

6.3 Stone Bedding and Crushed Stone Bedding. The full thickness of a stone bedding layer shall be constructed in one operation. The tolerances for the finished surface shall be plus or minus 2 inches from the specified lines except that neither extreme of these tolerances will be allowed over a continuous area greater than 200 square feet. Placement by dumping into chutes, or by other methods likely to cause segregation or breakdown of materials will not be permitted.

6.4 Stone Slope Protection. Stone protection materials shall be placed on the bedding stone surface in such a manner as to avoid segregation and to produce a well-graded mass of stone with the minimum practicable percentage of voids and a uniform appearance of the exposed surfaces. The full thickness of the layer shall be constructed in one operation and in such a manner as to avoid displacing the bedding material. The stone protection material, after placement at any point, shall conform to the specified gradation. Placement by dumping into chutes, or by other methods likely to cause segregation or breakdown of materials will not be permitted. The finished surface shall be free of pockets of small stones and clusters of large stones. The tolerances for the finished surface shall be minus 2 inches and plus 4 inches from the specified lines, except that neither extreme of these tolerances will be allowed over a continuous area greater than 200 square feet. No bulldozer or similar equipment will be permitted to operate on the surface of any stone protection layer.

6.5 Hand-Placed Stone Protection. Hand-placed stone protection shall be placed in the locations listed below:

Area	Layer Thickness-Inches	Bedding Material
F,G,H,I	18	Gravel Bedding
S	30	Stone Bedding
U	24	Stone Bedding

The stone protection shall be carefully placed individually by hand and/or machine and chinked by hand on the specified bedding layer in such manner that adjacent stones are in close contact and, in general, have their greatest dimensions across the slope. "Through stones" shall be well-distributed throughout the mass and the sum of their cross sections, parallel to the slope being protected, shall be not less than two-thirds of such area. As used in this specification a "through stone" is defined as a stone whose dimension normal to the surface being protected is not less than the full depth of the stone protection. The stone protection along the lower edge of an area shall consist of the largest stones set in a trench so as to form a band as shown on the drawings. Except for spalls used to fill voids between larger stone, no stone shall be used in the exposed face of the stone protection which will extend less than one-half the layer thickness. Spaces between the larger stones shall be filled with spalls and smaller stones of the largest feasible size, to form a compact mass. Spalls and small stone shall not be placed in nests in lieu of larger size stone. A tolerance of plus or minus 4 inches from the slope lines and grades shown on the drawings will be allowed in the finished surface of the riprap provided either extreme of this tolerance is not continuous over an area greater than 200 square feet.

6.6 Grouted Hand-Placed Stone Protection. Grouted hand-placed stone protection shall be placed in the locations listed below:

Area	Layer Thickness-Inches	Bedding Material
E, G, H, I	18	Gravel Bedding
L	18	Crushed Stone
U	18	Stone Bedding

The stone protection shall be carefully placed on the bedding layer to form a layer in thickness as specified above. The stone protection shall be placed in conformance with the general requirements for ungrouted hand-placed riprap as specified in paragraph 6.5 except that the stone shall be laid with open joints to facilitate grouting and the smaller spaces between stones in the face of the paving shall not be filled with spalls but shall be left open to receive grout readily. Weep holes of a size and spacing as indicated on the drawings, shall be constructed and care shall be taken to prevent grout from entering the weep holes.

6.6.1 Grouting. Grout shall be composed of cement, water, an air-entraining admixture, and sand mixed in the proportions of 1 part of Portland cement to 3 parts of sand, sufficient water to produce a workable mixture, and that amount of admixture which will entrain sufficient air to produce durable grout, as determined by the Contracting Officer. The grout shall be mixed in a concrete mixer for the time of mixing necessary to produce a mixture having a consistency such as to permit gravity flow into the interstices of the rip-rap with the help of limited spading and brooming. The grout shall be used in the work within a period of 1 hour after mixing. Retempering of grout will not be permitted.

Riprap shall not be grouted when the ambient temperature is below 35 degrees F. or above 85 degrees F. unless approved by the Contracting Officer in writing; nor when the grout, without special protection, is likely to be subjected to freezing temperatures before final set has occurred.

Prior to grouting, all surfaces of riprap shall be wetted. The riprap shall be grouted in successive strips, approximately 10 feet in width, commencing at the lowest strip and working up the slope. Each batch of grout shall be dumped on the upper portion of the ungrouted part of the strip and worked into the voids between the stones and down the slope. Grout shall be brought to the place of final deposit by approved means, and in no case will grout be permitted to flow on the stone protection surface a distance in excess of 10 feet. Immediately after dumping the batch of grout, it shall be distributed over the surface of the strip by the use of brooms and the grout worked into place between stones with suitable spades, trowels, or vibrating equipment. Adequate precautions shall be taken to prevent grout from penetrating the bedding layer. As a final operation the grout shall be removed from the top surfaces of the upper stones and from pockets and depressions in the surface of the stone protection by use of a stiff stable broom.

After completion of any strip as specified, no workman or any load shall be permitted on the grouted surface for a period of at least 24 hours. The grouted surface shall be protected from rain, flowing water, and mechanical injury. The surface of all grouted riprap shall be cured by keeping the surface continuously wet for a period of not less than 7 days.

7. MEASUREMENT AND PAYMENT.

7.1 Lump Sum Items. No separate measurement or unit price payment will be made for the work specified in this section which is performed in specific areas where payment for all work in the area is to be made as a lump sum.

7.2 Measurement. Except as specified above for lump sum items, the quantity of stone protection and bedding materials to be paid for will be measured as the total volume in cubic yards computed from the lines, grades,

thicknesses and limits shown on the drawings or as modified by the Contracting Officer. The limits of protection stone and bedding layers which are not definite on the drawings and depend upon field conditions and topography will be determined by surveys made immediately prior to the placement of material.

7.3 Payment. Stone protection, stone bedding, gravel bedding and grouted hand-placed stone protection measured in accordance with Paragraph 7.2 above, will be paid for at the applicable contract unit prices per cubic yard for Item Nos. A9, F11, J3 and V2, "Stone Protection"; Item Nos. A8, F9 and V3, "Stone Bedding"; Item Nos. A7, E2, F10, H5, O9, P10, and V4, "Gravel Bedding"; Item Nos. E1 and H3, "Grouted Hand-Placed Stone Protection"; and Item Nos. F12, H4, O8 and P9, "Hand-Placed Stone Protection".

Such payment shall constitute full compensation for furnishing material, processing, stockpiling, placing, repairs, maintenance, preparation of foundations, control of water, testing not paid for under other items, and gravel bedding layers and sections as specified.

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DIVISION 2 - SITE WORK

SECTION 2H - STEEL SHEET PILING

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 permanent steel sheet piling in accordance with these specifications and applicable drawings.

2. 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:

2.1 American Society for Testing and Materials (ASTM) Standards.

A 328-75a Steel Sheeting Piling

2.2 Military Specifications (Mil. Spec.)

MIL-C-18480A (DOCKS) & Am-3 Coating Compound, Bituminous, Solvent, Coal Tar Base

3. SUBMITTALS.

3.1 Equipment Descriptions. The Contractor shall submit complete descriptions of pile driving equipment, including hammers, extractors, protecting caps and other appurtenances to the Contractor for approval prior to commencement of work.

4. MATERIALS. Steel for sheet piling shall conform to the requirements of ASTM A 328. Sheet piling shall be of the type indicated on the drawings, have a nominal web thickness of not less than 3/8-inch and be of a design such that when in place they will be continuously interlocked throughout their entire length. All piling shall be provided with standard pulling holes located approximately 4 inches below the top of the pile, unless otherwise shown or directed. Piling shall have the properties equivalent to those listed in the following table:

PROPERTIES OF SECTIONS

Type of Section	Nominal Web Thickness (Inches)	Section Modulus Per Lin Ft of Wall $(In)^3$	Weight Per Sq Ft of Wall (Lbs)	Weight Per Lin Ft of Pile (Lbs)
PZ 32	3/8	38.3	32	56.0

5. INSTALLATION.

5.1 Placing and Driving.

5.1.1 Placing. Piling shall be carefully located as shown on the drawings or as directed by the Contracting Officer. 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 wall. Interlocks shall be properly engaged with the thumb of each pile gripped by the thumb and finger of the adjacent pile. All piles shall be placed as true to line as possible. Suitable temporary wales or guide structures shall be provided to insure that the piles are driven to correct alignment.

5.1.2 Driving. All piles shall be driven to a firm seat against or into bedrock or to depths shown on the drawings and shall extend to the elevation indicated for the top of piles. A tolerance of 2-inches above the indicated top elevation will be permitted. Piles shall be driven by approved methods in such manner as not to subject the piles to serious damage and to insure proper interlocking throughout the length of the piles. Pile hammers shall be maintained in proper alignment during driving operations by use of suitable leads or by guides attached to the hammer. A protecting cap shall be employed in driving, when required, to prevent damage to the tops of piles. 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. If at any time the forward or leading edge of the piling wall is found to be out of plumb in the plane of the wall, the piles already assembled and partly driven shall be driven to full depth and the Contractor shall provide and drive tapered piles to interlock with the out of plumb leading edge or take other corrective measures to insure the plumbness of succeeding piles. The maximum permissible taper for any tapered pile will be one-eighth of an inch per foot of length. Each run of piling shall be driven to grade progressively from the start and no pile shall be driven to a lower grade than those behind it in the same run except when the piles behind it cannot be driven deeper. If the pile next to the one being driven tends to follow below final grade, it may be pinned to the next adjacent pile. Should boulders or other obstructions render it impracticable to drive a pile to the specified penetration, the Contractor shall make such changes in design alignment 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 material necessitated by such changes will be made at the applicable contract prices. Piles driven out of interlock with adjacent piles or otherwise damaged shall be removed and replaced by new piles at the Contractor's expense. Piles shall not be driven within 100 feet or concrete less than 7 days old.

5.2 Cutting and Splicing. Piles driven to bedrock and extending above grade in excess of the specified tolerance shall be cut off to required grade. 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 piles be necessary, the splice shall be made by an approved butt weld making full penetration of the web. Piles adjoining spliced piles shall be full length piles. The Contractor shall 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 work. 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 shall be drilled or may be burned and reamed in place by approved methods which will not damage remaining metal. Holes, other than bolt holes, shall be reasonably smooth and of proper size for rods or other items to be inserted.

6. PAINTING REQUIREMENTS.

6.1 General. All exposed surfaces of permanent steel sheet piling installed at the existing Pumping Station in Area "A" shall be cleaned and coated after installation as specified herein.

6.2 Submittals. The Contractor shall submit a certified test report showing the results of any required tests made on the proposed or a previous batch of paint produced by the same firm using the same ingredients and formulation.

6.3 Proprietary Brands of Paint. A proprietary name brand, shelf item paint of the same type and with similar properties to the material specified may be proposed. The Contractor shall submit a statement from the supplier that the paint is appropriate as to use, type, color and is a premium grade of paint.

6.4 Cleaning and Preparation of Surfaces to be Painted. All exposed surfaces of the steel sheet piling shall be cleaned by means of power tools or by dry blasting to the brush-off grade. Power tool cleaning shall conform to the requirements of the Steel Structures Painting Counsel SP-3, except that paragraph 3.5 shall not be applicable. Brush off blast cleaning shall conform to the requirements of the Steel Structures Painting Counsel SP-7, except that paragraphs 3.1, 3.2, 3.3 and 3.10 shall not be applicable.

6.5 Paint Formula to be Applied.

Surface Preparation	1st Coat	2nd Coat	3d Coat
Power tool or brush-off blast cleaning	Cold-applied coal tar base paint Mil. Spec. MIL-C-18480	Cold-applied coal tar base paint Mil. Spec. MIL-C-18480	Cold-applied coal tar base paint Mil. Spec. MIL-C-18480

6.6 Supplementary Application Instructions. A special primer shall be used under the coal tar base paint only if/as recommended by the coating manufacturer. The material shall be heavily applied by brush or with heavy-duty spray equipment at a coverage rate that will give a total dry film thickness of not less than 20 mils at any point for the completed system. The paint shall not be thinned unless recommended by the manufacturer. If brushed, the final strokes shall be at right angles to those of the preceding coat. Application and drying time between coats shall be as recommended by the coating manufacturer.

7. MEASUREMENT AND PAYMENT.

7.1 Measurement. The length of each pile driven will be measured to the nearest tenth of a linear foot. When driven piles are directed to be cut off before reaching penetration depths shown on drawings, that portion cut off will be measured for payment on the basis of its total length, provided that this length is not greater than the difference between the total length of piles shown on the plans for that location and the length of piles driven below the point of cut off.

7.2 Payment.

7.2.1 Sheet Piling. Payment for steel sheet piling quantities will be made at the applicable contract price per square foot for Item No. A3, "Permanent Steel Sheet Piling", price shall include all cost of furnishing, driving, cutting holes, painting and all other material and work incident thereto.

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DIVISION 2 - SITE WORK

SECTION 2I - EARTH SUPPORT SYSTEMS

1. SCOPE. This section covers the use of earth support systems utilized in the construction of gabion walls, concrete walls and associated structures. This work includes the design, cost of material, installation and the removal as necessary of the support systems. Earth support system utilized for gabion construction in Area "A" shall be left in place.

1.1 Related Work Specified Elsewhere.

1.1.1 The requirements for construction shoring, sheeting and bracing specified in this section are in addition to those contained in Section, EXCAVATION, GENERAL.

2. GENERAL. The contract drawings indicate areas where earth support systems are required. The Contractor is free to select the type system he wishes to install providing it is structurally sound and satisfactorily protects the adjoining properties. The Contractor shall engage the services of a Registered Professional Engineer experienced in this type of work to plan and design his earth support systems. Plans and calculations, as specified in Paragraph, DESIGN, shall be submitted to the Contracting Officer for review and information at least 60 days prior to work in any given area.

2.1 Protection of Existing Structures and Utilities.

2.1.1 As required by Clause 49 of the GENERAL PROVISIONS of the Construction Contract, the Contractor will be responsible for any damage to existing structures and utilities. These structures and utilities shall include buildings, pavements beyond the limits of new pavement, walls, wells, sewage systems and similar structures which are not to be removed and active storm drains, buried utilities and appurtenant structures, all of which are along, within the vicinity of, or within the area of excavation. The Contractor shall provide all necessary materials, work and equipment required to insure that such existing structures and utilities shall not be damaged due to any operations in connection with excavations, including but not limited to vibrations caused by driving or pulling piles, voids produced behind sheet piling or during pulling of sheet piling, lateral movement of sheeting and movement of soil through or beneath sheeting, compaction or a drag on foundation soil during the driving of piling, and lowering of the water table, lateral movement of excavation slopes and unstable excavation slopes.

2.1.2 The Contractor shall examine all the existing foundations and structures and select the support measures required to prevent damage. The Contractor shall design and install earth retaining system bracing, shoring, underpinning, tie-backs, anchors and provide means to prevent damage to existing foundations and structures. The Contractor shall arrange with the appropriate property owners for any work to be accomplished beyond the work area limits shown on the drawings.

2.1.3 The Contractor shall immediately protect, repair, rebuild or restore to the satisfaction of the Contracting Officer, at the Contractors expense, all or any portion of an existing structure or utility which has been damaged by his operations.

2.1.4 In the event movement or settlement occurs which causes or may cause damage to an existing structure, the Contractor shall immediately stop any or all work, except that which assists in making the work secure and in preventing further movement, settlement or damage. The Contractor shall resume construction only after obtaining approval of the Contracting Officer and only after all necessary precautions have been taken to prevent further movement, settlement or damage.

2.2 Shoring, Sheeting and Support Systems.

2.2.1 General. The Contractor shall be responsible for (a) the unfinished work, (b) the existing foundations, structures and buildings not to be removed, (c) active utilities and drains, (d) confinement of work and excavation within the work area limits shown on the drawings, (e) the dewatering and maintenance of work areas, (f) the stability of foundation areas, (g) the prevention of erosion, and (h) the safety of workmen from danger of caving and slides. The earth support system shall be used by the Contractor to carry out his responsibilities. The system shall be erected in a safe and workmanlike manner and the minimum requirements shall be in accordance with the Corps of Engineers Manual "General Safety Requirements." All elements shall be located as necessary to meet the excavation and other requirements of other sections of the specifications. All sheeting, piles, bracing, lagging, etc., not required to be left in place shall be salvaged after construction and shall become the property of the Contractor and removed from the site.

2.2.2 Sheeting to be left in place shall be either steel or wood. Wood sheeting to be left in place shall be brushed or dipped to provide a creosote-treated wood conforming to the requirements of Federal Specification TT-C-655 and Int. Am-2, "Creosote, Technical Wood Preservative (for) Brush, Spray or Open Tank Treatment." Wood sheeting shall not be less than 2 inches in thickness; actual thickness shall be as required to perform the work.

2.2.3 Concrete structures. No portions of bracing or supports in connection with shoring or sheeting will be permitted to remain in the permanent concrete structures. The Contractor will be required to rearrange the bracing as necessary as the work progresses.

2.2.4 Bracing. Bracing shall be jacked securely in place or installed by other approved methods compatible with the Contractor's support system design. Sheeting and/or lagging shall be adequately and properly wedged. Permanent bracing shall be designed and left in place at all locations where the bracing is for the purpose of protecting a structure. The Contracting Officer will determine the need for permanent bracing. All permanent wales and braces shall be steel.

3. MATERIALS.

3.1 All materials used in the installation of the construction sheeting and bracing, piles and lagging shall be furnished by the Contractor.

3.2 All wales, strut bracing, brackets, and vertical H-piles supporting the struts shall conform to ASTM A 36-75, "Structural Steel."

3.3 Steel for sheet piling shall conform to the requirements of ASTM Designation A 328-75a Standard Specification for "Steel Sheet Piling." Use of previously used supplies of good steel sheet piling, in lieu of new material, will be allowed provided that any used sheet piling utilized meets all of the requirements of ASTM A 328-75a and this section. The Contractor will remove from the jobsite, at no additional cost to the Government, any and all sheet piling sections which are rejected, and replace them with material meeting the requirements of this paragraph.

4. DESIGN. The Contractor shall be responsible for the design of the earth support systems for the specific conditions existing on the site. The Contractors plans and method of operations must be submitted to the Contracting Officer for review and information prior to start of the work. The Contractor's plan shall be sufficiently detailed to show the manner of construction, type of material and size of components. Where earth support systems are required and the earth excavation exceeds 15 feet in depth, the Contractor shall design the support in detail and submit computations for approval. Where the excavations are 15 feet or less, the Contractor need submit only sufficient detail to indicate the manner of control and size of components. The plans, computations and a detailed description of the proposed operation shall be submitted to the Contracting Officer at least sixty days prior to the start of the work in each area and in accordance with the conditions cited in Paragraph, GENERAL, of this section.

4.1 The plans and method of operation for excavation over 15 feet in depth shall clearly indicate method of construction, weight and shapes to be provided, locations of wales and braces and all computations in connection therewith. The submission furnished shall indicate the methods of installations and provisions for constructing the required new work.

4.2 The use of steel sheeting, the methods of placing and the methods of excavation will depend on each individual installation. Where driving with conventional equipment may endanger existing or new structures, sheeting shall be installed by special procedures selected by the Contractor. The Contractors plans and operations submitted shall clearly outline the methods of placement, rearrangement and removal.

4.3 Construction sheeting and bracing shall be designed so that bracing can be rearranged as the work progresses where necessary to avoid leaving portions of bracing, strutting or supports in a concrete structure.

5. SHOP DRAWINGS. Complete shop drawings shall be submitted in accordance with Paragraph SP-4 of the SPECIAL PROVISIONS for all construction sheeting pile arrangements including all bracing and/or anchor locations over 15 feet in depth relative to the construction and for construction sheeting to be left in place.

6. INSTALLATION.

6.1 Except as otherwise directed in writing, earth support systems shall be installed in accordance with the plans procedures submitted by the Contractor. Changes will be directed when, in the opinion of the Contracting Officer the planned procedure will cause damage to unfinished work or existing structures or utilities. Installation shall be done in a safe and workmanlike manner with bracing jacked into place and the sheeting and/or lagging adequately and properly wedged.

6.2 All installation operations shall be coordinated with local authorities and owners of adjacent structures and utilities so as to minimize interference with traffic, services and access.

7. MEASUREMENT AND PAYMENT.

7.1 Earth Support Systems. Except as specified below for construction sheeting directed to be left in place, no separate measurement will be made for earth support systems. Payment for furnishing and placing earth support systems at the locations indicated on the contract drawings as hereinbefore specified, and the removal of the systems, as applicable, when their use is no longer required will be made at the applicable contract lump prices for Item Nos. A2, F1, O1 and P1, "Earth Support Systems" as set forth in the Unit Price Schedule.

7.2 Construction Sheeting Left in Place. Construction sheeting installed at the gabion wall in Area "A" shall be left in place as shown and payment therefor will be made in accordance with Paragraph 7.1 above. Payment for any additional construction sheeting directed or approved to be left in place by the Contracting Officer during construction and not otherwise shown or directly specified to remain in place will be negotiated.

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DIVISION 2 - SITE WORK

SECTION 2J - MODIFICATIONS TO EXISTING UTILITIES.

1. GENERAL

1.1 Scope. The work of this section consists of furnishing all labor, equipment, materials and performing all operations in connection with modifications to existing utilities at locations along the new work as shown, specified or determined in the field by the Contractor. All utility work in connection with below and above ground utility lines, including storm drain lines, shall be performed by the Contractor.

1.1.1 Existing storm drains, currently discharging into the Nashua River, shall be extended through new work using the same type and size pipe as existing and conforming to the requirements as specified in Paragraph, PRODUCTS. This work includes the repair of the storm water outfall in Area "D" and the installation of new corrugated metal pipe and flap gate in Area "P", as shown on the contract drawings.

1.1.2 The "Toluene" chemical lines, air lines and electrical lines in Area "A" at the James River Mass. Inc. Plant shall be removed and new lines installed to the extent and at the locations shown on the contract drawings. The lines are estimated to be buried 2-feet or less. Provisions shall be made to evacuate toluene fluid from all pipes to be worked on prior to excavation. Any fluid remaining in pipes after excavation has commenced shall be caught in suitable containers and delivered to the James River Mass. Inc. Plant Engineer. Precautions shall be taken to avoid ground or water contamination. A 2-day maximum shut down time will be allowed for making all excavation, connections, tests and other work required to place the system back in operation.

1.1.2.1 *Relocation Scheme.* The Contractor shall coordinate all toluene line, air line and electrical line relocation work at Area "A" with the Plant Manager of the James River Mass. Inc. The Contractor shall then prepare and submit, for review and approval, a relocation scheme which he intends to implement during construction. The plan shall be submitted for review at least 30 days prior to the start of work in the area. The plan shall include the procedure, time schedule, type, size and description of all new materials to be installed and a detailed safety plan. The safety plan shall list safety related provisions and precautions the Contractor intends to implement during construction including the applicable requirements of EM 385-1-1, "General Safety Requirements Manual" and "OSHA" Standards.

1.2 Responsibility for Utility Locations. It shall be the Contractor's responsibility to investigate and determine the locations of all underground utilities that may interfere with the new work. Where sanitary, drainage or other lines not indicated or specified to be supported, removed or relocated are required to be temporarily supported, relocated or otherwise maintained or permanently removed in order to perform the new work, all costs in connection with this work shall be at the Contractor's expense and shall be included and paid for under the various contract prices.

1.3 Coordination of Work. The Contractor shall make all necessary investigations and arrangements and shall coordinate with the respective companies or agencies relative to the time when relocation or other utility work is to be performed, materials to be used, and construction methods to be employed.

1.3.1 Where temporary sanitary and drainage lines and relocations are required to maintain services and properly prosecute the work, the Contractor shall determine the requirements from the appropriate city official and furnish and install the temporary lines in accordance with their requirements, all at the Contractor's expense.

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.

1.4.1 Federal Specifications (Fed. Spec.)

J-C-30A & Am-1	Cable and Wire, Electrical (Power, Fixed Installation)
W-C-586B & Am-1	Conduit Outlet Boxes, Bodies, and Entrance Caps, Electrical: Cast Metal
W-J-800D	Junction Box; Extension, Junction Box; Cover, Junction Box (Steel, Cadmium, or Zinc-Coated)
WW-P-405B & Am-1	Pipe, Corrugated (Iron or Steel, Zinc-Coated)

1.4.2 American Association of State Highway and Transportation Officials Standards. (AASHTO)

M 170-76I	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
M 198-75I	Joints for Circular Concrete Sewer and Culvert Pipe Using Rubber Gaskets
M 217-73	Asbestos Cement Pipe for Culverts and Storm Drains

1.4.3 American National Standards Inst., Inc.

B16.3-1977	Malleable Iron Threaded

1.4.4 American Society for Testing and Materials Publications (ASTM)

A 120-77	Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses
C 76-76	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
C 443-76	Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
D 1869-66(1972)	Rubber Rings for Asbestos. Cement Pipe

1.4.5 American Water Works Assn., Inc. (AWWA)

C 203-73	Coal-Tar Enamel Protective Coatings for Steel Water Pipelines - Enamel and Tape-Hot-Applied

2. PRODUCTS.

2.1 Pipe for Storm Drains shall conform to the requirements for the following pertinent types:

(1) Reinforced Concrete Pipe shall conform to ASTM Specification C 76 or AASHTO Standard M 170, Class III.

(2) Fully Bituminous Coated, Corrugated Steel Pipe Culvert shall conform to Fed. Spec. WW-P-405, Class I, shape 1, with type A coating. Pipes shall be 14 gage.

(3) Asbestos Cement Pipe shall conform to the requirements of AASHTO Standard M 217.

2.2 Joints for storm drains and sewers shall conform to the requirements for the following pertinent types:

(1) Joints for concrete pipe shall conform to the requirements of AASHTO M 198.

(2) Joints for asbestos cement pipe shall conform to the requirements of ASTM D 1869.

2.3 Pipe for Toluene Lines and Air Lines. Pipe shall be of the sizes indicated, shall conform to ASTM A120, standard weight and shall be galvanized.

2.3.1 Pipe Fittings. Steel fittings shall be galvanized screwed fittings conforming to ANSI B16.3

2.3.2 Protective Coatings for Pipe and Fittings. Coatings for pipe shall be mechanically applied in a factory or plant especially equipped for the purpose. Steel pipe and fittings shall be thoroughly cleaned of foreign material by wire brushing and solvent cleaning, and then given one coat of coal-tar primer and two coats of coal tar enamel conforming to AWWA C203, threaded ends of pipe and fittings shall be adequately protected prior to coating.

2.4 Materials for Electrical Line Relocations Area "A."

2.4.1 Cable and wire shall conform to Fed. Spec. J-C-30, size and type as indicated or required.

2.4.2 Conduit shall conform to Fed. Spec. W-C-586, size as indicated or required.

2.4.3 Junction Boxes shall conform to the requirements of Fed. Spec. W-J-800.

2.5 Flap Gate - Area "P". The flap gate for installation at Area "P" shall be as specified on the contract drawings.

3. EXECUTION

3.1 Excavation.

3.1.1 General. All excavation of every description and of whatever substances encountered shall be performed to the depths indicated or as otherwise specified. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. All excavated materials not required or suitable for backfill shall be removed and wasted as directed by the Contracting Officer. Grading shall be done as may be necessary to prevent surface water from flowing into trenches or other excavation, and any water accumulating therein shall be removed by pumping or by other approved methods. The foundation shall be dry and approved at the time the pipe is placed. Sheeting and shoring shall be done as may be necessary for the protection of the work and for the safety of personnel. Unless otherwise indicated, excavation shall be by open cut except that short sections of a trench may be tunneled if, in the opinion of the Contracting Officer, the pipe can be safely and properly installed and backfill can be properly tamped in such tunnel section.

3.1.2 Trench Excavations. Trenches shall be of the necessary width for proper laying of pipe. The banks of pipe trenches shall be as nearly vertical as practicable. Care shall be taken not to over-excavate. The bottom of the trenches shall be accurately graded to provide uniform bearing and support for each section of the pipe on undisturbed soil at every point along its entire length, except for the portions of the pipe sections where it is necessary for proper sealing of pipe joints, and as hereinafter specified. Depressions for joints shall be dug after the trench bottom has been graded, and in order that the pipe rest on the prepared bottom for as nearly its full length as practicable, depressions shall be only of such length, depth, and width as required for properly making the particular type of joint. Stones shall be removed as necessary to avoid point bearing. Except as hereinafter specified for wet or otherwise unstable material, over-depths shall be backfilled as and with materials specified for back-filling the lower portion of trenches. Whenever wet or otherwise unstable material that is incapable of properly supporting the pipe, is encountered in the bottom of the trench, such material shall be removed to a depth to allow for construction of a stable pipe bedding. The trench shall be backfilled to the proper grade with suitable approved material.

3.2 Placing Pipe. Each pipe shall be carefully examined before being laid, and defective or damaged pipe shall not be used. Pipelines shall be laid to the grades and alinement indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Under no circumstances shall pipe be laid in water, and no pipe shall be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary. All pipe in place shall have been inspected before backfilling.

3.3 Pipe Joints shall be made in accordance with the pipe manufacturers written recommendations.

3.4 Backfilling. The trenches shall not be backfilled until the utilities lines as installed conform to the requirements specified herein. Where, in the opinion of the Contracting Officer, damage is likely to result from withdrawing sheeting, the sheeting shall be left in place and the contract price will be adjusted accordingly. Trenches shall be backfilled to the ground surface with selected material from excavation that is suitable for the specified compaction and as hereinafter specified. Settling the backfill with water will be permitted, and will be a requirement when so directed by the Contracting Officer. Trenches improperly backfilled shall be reopened to the depth required for proper compaction, then refilled and compacted as specified, or the condition shall be otherwise corrected as approved. The surface shall be restored to its original condition as near as practicable.

3.4.1 Lower Portion of Trench. Backfill material shall be deposited in 6-inch maximum thickness layers and compacted with at least two coverages of the plate of suitable tampers or plate or compactors, and graded, until there is a cover of not less than 2 feet. The backfill material in this portion of the trench shall consist of the excavation material at a moisture content that will facilitate compaction, free from stones larger than 3 inches in any dimension and hard clods and frozen conglomerates larger than 6 inches in any dimension, except that where the pipe is coated or wrapped for protection against corrosion the backfill material shall be free from stones larger than 1-inch in any dimension and the backfill material for electrical cables shall be free from stones larger than 3/8-inch in the greatest dimension. Special care shall be taken not to damage any coating or wrapping of pipes.

3.5 Electric Lines at Toluene Piping System. The installation shall conform to the applicable requirements and rules of the National Electrical Code and the National Electrical Safety Code. The capacities of equipment and material shall be not less than those indicated.

3.6 Toluene and Air Line Testing. The Contractor shall prove all new toluene and air lines installed by him to be leakproof by air tests under a pressure of 50 psi for toluene lines and a pressure of 150 psi for air lines. The lines shall show no less of pressure for a period of one hour. The testing equipment shall meet the approval of the Contracting Officer and shall be subject to his inspection at all times during the test.

4. PAYMENT. Except for the specific items of work as listed hereinbelow, separate payment will not be made for the work as specified in this section; all costs in connection therewith shall be included in the applicable unit or lump sum prices bid for the Item or Items of the UNIT PRICE SCHEDULE to which the work pertains.

4.1 Item No. A1, "Relocation of Toluene Pipeline". This item includes all work and materials as required for the relocation of toluene, air and electrical lines as specified and as shown on the contract drawings.

4.2 Item No. D1, "Storm Water Outfall Repair". This item includes all work and materials as required for the repair of the existing outfall in Area "D" as specified and as shown on the contract drawings.

4.3 Item No. P4, "New 12" CMP". This item includes all work and materials as required to extend the existing 12" storm drain to the face of the new concrete wall and install flap gate in Area "P" as specified and as shown on the contract drawings.

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DIVISION 2 - SITE WORK

SECTION 2K - RAILROAD WORK

1. SCOPE. The work covered by this section of the specifications consists of furnishing all labor, equipment, materials and of performing all operations in connection with the temporary removal and replacement of rails, ties, ballast and appurtenances, and the restoration of disturbed areas, all at Crib Sites No. 5 and 6 in Area "O" shown on the contract drawings. The Contractor shall coordinate his work with plant operations in the vicinity of necessary work on or adjacent to railroads and shall comply with other special requirements as specified in these specifications and shown on the the contract drawings.

2. GENERAL. At the locations indicated on the contract drawings where concrete gravity wall construction is adjacent to track lines; rails, ties and ballast shall be removed, placed aside away from construction excavations as necessary for the proper prosecution of the work. Any required excavation, fill, grading and compaction of base material (subgrade), and the reconstruction of ballast, ties and rails, shall be performed by the Contractor.

2.1 All plant, labor, equipment, materials and procedures used in railroad work, including techniques for railroad surveying and layout, shall conform to the requirements of the applicable parts of the following publication:

Manual for Railroad Engineering Volumes I & II published by the American Railway Engineering Association (AREA).

In areas where the track has been removed, existing rail, angle bars, track bolts, tie plates, and sound ties shall be reused. Unsound ties shall become the property of the Contractor, shall be removed from the site, and shall be replaced with new ties at no additional cost to the Government. All track spikes shall be new. Ballast consisting of 3/4-inch stone shall be placed 12-inches below the ties and all cribs shall be filled level with the top of the ties. The track shall be aligned to its original alignment and tamped to final grade.

3. COORDINATION. The section of spur track adjacent to Crib Site No. 5 in Area O is owned by the Vermont and Massachusetts R. R. and leased to the Boston and Maine R.R. It will be incumbent on the

Contractor to meet with railroad officials before and during the course of construction to inform them of his construction schedule. The Contractor shall cooperate at all times with railroad officials and use reasonable care and diligence in the work to avoid accidents and damage to railroad property. It shall be the responsibility of the Contractor to obtain from the Chief Engineer of the Railroad and to comply with the requirements of Railroad relative to right-of-entry, indemnification for damage, protective insurance, clearances, and flagging protection. The costs of complying with such requirements shall be at the Contractor's expense and will be included and paid for under the applicable contract bid price.

4. RAILROAD ENGINEERING AND INSPECTION. The Railroad will furnish and assign an Engineer and/or Inspector for the general protection of Railroad property during removal and replacement of the spur track. All costs of engineering and/or inspection services provided by the Railroad shall be paid by the Contractor.

5. MEASUREMENT AND PAYMENT. Measurement and payment for the work covered by this section will be by lump sum. No individual measurement and payment will be made for any of the work or materials. All costs of furnishing all, labor, materials, equipment, and incidentals required to complete the railroad work in its entirety as shown on the contract drawings and as specified herein shall be included in the contract bid price for Item No. 02, "Remove and Replace R.R. Spur Track."

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DIVISION 2 - SITE WORK

SECTION 2L - MISCELLANEOUS SITE WORK

1. SCOPE. This section covers miscellaneous items of site work not covered in other sections of these specifications. The work consists of furnishing all plant, labor, equipment and materials, and performing all operations in connection with miscellaneous items of work, complete, in accordance with the contract drawings and as specified herein below.

2. APPLICABLE PUBLICATIONS. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of these specifications to the extent indicated by the references thereto.

2.1 American Society for Testing and Materials (ASTM) Standards.

A 120-76	Pipe, Steel, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless, for Ordinary Uses.

2.2 Federal Specifications (Fed Spec.).

RR-F-191G/ GEN	Fencing, Wire and Post Metal (and Gates, Chain-Link Fence Fabric, and Accessories) (General Specification)

2.3 American Wood Preservers Bureau.

LP-22	Softwood Lumber and Plywood, Pressure Treated Water-Borne Preservatives for Ground Contact Use.

3. HANDRAILS. - AREAS "F" AND "O"

3.1 General. Steel hand railings shall be fabricated and installed by the Contractor at the Wall and Ramp in Area "F" and at the gravity walls in Area "O".

3.2 Materials. Steel railings including pipe inserts in concrete shall be extra heavy weight steel pipe conforming to ASTM Specification A 120. Except as otherwise shown on the contract drawings for Area "F", pipe for railings shall be 2-inch size. All pipe railings and fittings shall be hot-dipped galvanized after fabrication.

3.3 Fabrication. Except at Area "F", jointing of post, rails and corners shall be by one of the following methods:

(1) Flush-type rail fittings of commercial standard, welded and ground smooth with railing splice locks secured with 3/8-inch hexagonal-recessed-head setscrews.

(2) Mitered and welded joints made by fitting post to top rail and intermediate rail to post, mitering corners, groove welding joints, and grinding smooth. Railing splices shall be butted and reinforced by a tightfitting interior sleeve not less than 6 inches long.

(3) Railings may be bent at corners in lieu of jointing, provided bends are made in suitable jigs and that the pipe is not crushed.

3.4 Fabrication - Area "F". At Area "F", jointing of posts, rails and corners shall be as detailed on the contract drawings.

3.5 Installation. In concrete, rails shall be installed by means of steel pipe sleeve inserts set and anchored in the concrete as indicated. Posts shall be inserted into the steel pipe sleeves, leveled, plumbed, and alined. The annular space between pipe posts and pipe sleeve inserts shall be filled solid and finished concave with molten lead or sulphur or a quick-setting hydraulic cement. Anchorage joint shall be covered with pipe collar pinned to post. Ends of rails shall be secured by means of standard steel pipe flange anchored to concrete walls by expansion shields and bolts.

3.6 Installation - Area "F". At Area "F", posts shall be installed by means of standard steel pipe flanges anchored to concrete by expansion shields and bolts.

4. ABRASIVE BLAST CLEANING CONCRETE WALL-AREA "P".

4.1 General. The Contractor shall clean by light abrasive blasting using fine sand and/or his own approved method, all exterior surfaces of the concrete retaining wall in Area "P" on the left bank of the river. The wall is approximately 280' long and 13' high. The Contractor shall furnish all scaffolding and any other equipment as required to complete the work as specified. Light abrasive blast cleaning shall be performed to produce a smooth clean surface, uniform in color and texture without exposing the large aggregate of the concrete.

4.2 Safety Provisions For Abrasive Blasting.

4.2.1 Hoses and Nozzles. Hose for a type to prevent shocks from static electricity shall be used. Hose lengths shall be joined by metal couplings to the outside of the hose to avoid erosion and weakening of the couplings. The couplings shall be fastened together in a way which will prevent accidental disengagement. Nozzles shall be attached to the hose by fittings that will prevent the nozzle from unintentionally becoming disengaged. Nozzle attachments shall be of metal and shall fit onto the hose externally. A dead man control device shall be provided at the nozzle end of the blasting hose to cut off the flow in the event the blaster loses control of the hose. Hoses and all fittings used for abrasive blasting shall be inspected frequently to insure timely replacement before an unsafe amount of wear has occurred.

4.2.2 Blasting Helmets. Abrasive blasters under all circumstances shall be protected by air-line fed abrasive blasting helmets of a positive pressure type certified by the National Institute for Occupational Safety and Health (NIOSH) or the Mining Enforcement Safety Administration (MESA).

4.2.3 Protective Clothing. The blaster shall be protected against injury from exposure to the blast by appropriate protective clothing including gloves.

4.2.4 Workers other than blasters, working in areas where unsafe concentrations of abrasive materials and dusts are present, shall be protected by safety goggles and filter type dust respirators. The safety goggles shall be kept clean, fit well, contain lenses of unbreakable glass or plastic, and allow adequate peripheral as well as straight ahead vision.

5. CHAIN-LINK FENCING - AREA "P".

5.1 General. Existing chain link fencing shall be removed in Area "P" within the limits as shown on the contract drawings. Existing posts shall be removed by heating and pulling, cutting and core drilling or other approved method that will insure leaving a hole of the proper diameter and depth for installation of new posts. Removed fencing shall become the property of the Contractor and shall be removed from the site. New polyvinylchloride coated steel fabric fencing shall be installed as specified herein. Barbed wire and supporting arms are not required.

5.2 Materials. Materials shall conform to Fed. Spec. RR-F-191G/GEN and other requirements specified below.

5.2.1 Chain-Link Fabric. Fed. Spec. RR-F-191/1A, Type V (Vinyl Coated) and shall be 9-gage wire woven in a 2-inch mesh. Fabric color shall be black.

5.2.2 Accessories. Fed. Spec. RR-F-191/4A vinyl coated, except as modified herein.

5.2.2.1 Reinforcing Wire. Minimum tensile strength of 80,000 pounds per square inch, zinc-coated.

5.2.2.2 Tie Wire. Aluminum alloy of 0.144-inch diameter for attaching fabric to top rail and to intermediate posts. Preformed clips of 6-gage, zinc-coated, steel wire may be used for attaching fabric to intermediate posts.

5.2.2.3 Truss Rods. For each corner, pull or end post. Truss rods shall be provided with turnbuckles or other equivalent provisions for adjustment.

5.2.3 Posts, Top Rails and Braces. Fed. Spec. RR-F-191/3A, Class 1, Vinyl Coated.

5.3 Installation.

5.3.1 General. Fence installation shall be in accordance with the fence manufacturer's written installation instructions for this particular type of installation.

5.3.2 Post Setting. Posts shall be set plumb and in alignment and leaded or grouted in place as recommended by the fencing manufacturer.

5.3.3 Top Rails. Top rail shall be installed before installing chain-link fabric and shall pass through intermediate post caps. The top rail shall have expansion couplings.

5.3.4 Fabric. Fabric shall be pulled taut and secured to the top rail and bottom wire close to both sides of each post and at intervals of not more than 24 inches on centers. Fabric shall be secured to posts using stretcher bars and ties or clips or by integrally weaving to integral fastening loops of end, corner, pull, and gate posts for the full length of each post.

6. WOOD POSTS AND RAILS.

6.1 General. This work shall consist of the construction of roadway wood posts and rails as specified herein and on the contract drawings.

6.2 Materials.

6.2.1 Wood Posts shall be Douglas Fir, Spruce or Southern Pine and shall be rough sawn 6 inches in cross section.

6.2.2 Rails shall be long leaf Yellow Pine or Douglas Fir and shall be rough sawn 4 inches by 8 inches in cross section.

6.2.3 All wood shall be construction grade or better and shall be pressure treated with water-borne preservative in conformance with the American Wood Preservers Bureau LP-22.

6.2.4 Nuts, Bolts, and Washers shall be of the size shown on the contract drawings and shall conform to the requirements of ASTM, A307, and shall be galvanized using the hot dip process conforming to the requirements of ASTM A153.

6.3 Construction.

6.3.1 Wood posts shall be set plumb, true to the line and grade as shown on the contract drawings. Post holes shall be backfilled with acceptable material placed in 12 inch layers and thoroughly compacted. Wood posts for railing shall be spaced 8 feet on center and individual wood posts shall be spaced 6 feet on center.

6.3.2 Rails shall be long enough to extend at least two sections where possible, butts shall be made on alternate posts and fastened to the wood posts with two 1/2 inch galvanized bolts with galvanized washers and nuts. All joints made in the field shall be with neat straight line cuts and painted with the preservative used in the water borne treatment.

6.4 Certificate of Compliance. Wood posts, rails and hardward shall be accompanied with a manufacturers certificate of compliance for preservative treatment and galvanized coating respectively.

7. MEASUREMENT AND PAYMENT.

7.1 Hand Rails - Areas "F" and "O". No separate measurement or unit price payment will be made for furnishing and installing steel pipe hand rails as shown on the contract drawings and specified herein. All costs in connection with this work shall be included in the applicable contract lump sum bid prices for Item Nos. F5 and O10, "Hand Railing."

7.2 Abrasive Blast Cleaning Concrete Wall - Area "P". No separate measurement or unit price payment will be made for blast cleaning of concrete wall as specified in this section. All costs in connection with this work shall be included in the contract lump sum price for Item No. P12, "Abrasive Blast Cleaning Concrete Wall".

7.3 Chain-Link Fencing - Area "P". No separate measurement or unit price payment will be made for removal of existing fencing and furnishing and installing new fencing as specified herein. All costs in connection with this work shall be included in the contract lump sum bid price for Item No. P11, "Chain-Link Fencing."

7.4 Payment for wood posts and rails provided and installed completed, in place and accepted by the Contracting Officer in accordance with this section and the contract drawings will be made at the contract lump sum price for Item No. F16, "Wood Posts and Rails."

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SECTION 2M - PAVEMENTS AND BASES

1. SCOPE. This section covers the preparation of subgrades, the construction of the gravel base courses, the application of prime coat, and the construction of bituminous concrete pavement as shown on the contract drawings.

2. APPLICABLE PUBLICATION. The following publication, of current issue, forms a part of this specification to the extent indicated by references thereto:

2.1 The Commonwealth of Massachusetts, Department of Public Works, Standard Specifications for Highways and Bridges (1973).

2.2 This publication will be referred to hereinafter as the "State Highway Specifications". References to the "Engineer" in the State Highway Specifications shall mean the Contracting Officer.

3. PREPARATION OF SUBGRADE. The area upon which gravel base course is to be placed is defined as the subgrade.

3.1 Compacting. The entire subgrade, prior to placing of gravel base, shall be compacted in accordance with the Massachusetts Department of Public Works, Standard Specifications for Highways and Bridges, Section 170.61.

4. GRAVEL BASE. Gravel base shall be constructed to the lines and grades indicated on the drawings and, except as modified below, shall conform to the provisions of Section 405 of the State Highway Specifications. Materials for the gravel base shall be Contractor furnished and shall conform to Article M1.02.0, Type b.

4.1 Placement and Compaction. Gravel base for the parking area shall be placed in two compacted 6-inch layers. Each layer of gravel base shall be compacted as specified in Section 405 of the State Highway Specifications.

5. PRIME COAT. A prime coat shall be applied to the surfaces of completed and approved gravel base courses at the parking area that are to be paved with bituminous concrete.

5.1 Bituminous Material. Bituminous material for the prime coat shall conform to the applicable requirements of Section M3.02.0 of the State Highway Specifications for cutback asphalt of Grade MC-70.

5.2 Rate of Application. Rate of application of prime coat material shall be approximately 0.40 gallons per square yard of base course. The exact quantity will be determined by the Contracting Officer and may be varied to suit field conditions. The temperature of bituminous material, during application, shall be within the range of 105 to 180 degrees, Farenheit.

5.3 Weather Limitations. The prime coat shall be applied only when the atmospheric temperature in the shade is not less than 50 degrees F., immediately prior to application.

5.4 Certified Analysis. The source from which the bituminous material is to be obtained shall be selected before the material is required for use in the work, and copies of the certified analysis representative of the material to be employed in the work shall be submitted for approval not less than 15 working days before commencement of the work.

5.5 Curing. Following application of the prime material, the surface shall be allowed to cure without being disturbed for a period of not less than 48 hours, or longer as may be necessary to attain penetration into the base and evaporation of the volatiles from the prime material.

6. BITUMINOUS CONCRETE PAVEMENT. The bituminous concrete for the binder course and top course shall conform to the applicable requirements of Section 460, Class 1, BITUMINOUS CONCRETE PAVEMENT, Type 1-1, standard binder and top course respectively of the State Highway Specifications.

6.1 Course Thickness. Locations as shown shall receive a bituminous concrete pavement of 2-1/2 inches placed in two courses consisting of one 1-1/2 inch binder course, and one 1-inch top course.

6.2 Job Mix Formulas, Testing and Approval. The required job mix formulas, including gradation and batch weights of each hot bin utilized in the development of the formulas, shall be submitted by the Contractor for tentative approval not less than 15 days prior to contemplated use in the work. Final approval shall be contingent on the conformance of the mixture furnished within job mix tolerance limits for gradation and asphalt content.

7. MEASUREMENT AND PAYMENT. Measurement of bituminous concrete pavement, complete and in place, including gravel base courses, will be by the square yard after acceptance and to the limits indicated on the contract drawings or as directed. Payment for the bituminous concrete pavement will be made at the contract unit price bid for Item Nos. F18 and P13, "Bituminous Concrete Pavement", which price shall constitute full compensation for furnishing and installing base courses, prime coat, bituminous concrete pavement and all other incidentals necessary to complete the work as required by this Section.

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SECTION 2N - PLANTING

1. 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.

1.1 Federal Specifications (Fed. Spec.)

O-F-241D Fertilizers, Mixed, Commercial

1.2 American National Standards Institute (ANSI) Publications.

Z60.1-1973 Nursery Stock

1.3 American Joint Committee on Horticultural Nomenclature (ANCHN) Publication.

Second Edition-1942 Standardized Plant Names

2. SUBMITTALS.

2.1 Certificates of Conformance or Compliance. Before deliver, notarized certificates attesting that the following materials meet the requirements specified, shall be submitted for approval.

(1) Plant Materials

(2) Fertilizers

2.2 Maintenance Instruction. Prior to the end of the contract maintenance period, 6 copies of written instructions for year round maintenance and care of installed plants shall be furnished to the Contracting Officer.

3. DELIVERY, STORAGE, AND HANDLING.

3.1 Delivery.

3.1.1 The Contractor shall notify the Contracting Officer of the delivery schedule in advance so the plant material may be inspected upon arrival at the job site. Unacceptable plant material shall be removed from the job site immediately.

3.1.2 Plants shall be protected during delivery to prevent damage to the root balls or desiccation of leaves. Trees shall be protected during transport by tying in the branches and covering all exposed branches.

3.1.3 Fertilizer and lime shall be delivered to the site in the original, unopened containers bearing the manufacturer's guaranteed chemical analysis, name, trade name or trademark, and in conformance to state and federal law. In lieu of containers, fertilizer and lime may be furnished in bulk and a certificate indicating the above information shall accompany each delivery.

3.2 Storage.

3.2.1 Plants not installed on the day of arrival at the site shall be stored and protected as follows:

(1) Outside storage shall be shaded and protected from the wind

(2) Bare root plants shall be heeled-in

(3) Plants stored on the project shall be protected from drying out at all times by covering the balls or roots with moist sawdust, wood chips, shredded bark, peat moss, or other similar mulching material

(4) Plants, including those in containers, shall be kept in a moist condition until planted by watering with a fine mist spray

3.2.2. Lime and fertilizer shall be kept in dry storage away from contaminants.

3.2.2 Storage of materials shall be in areas designated or as approved by the Contracting Officer.

3.3 Handling. Care shall be taken to avoid damaging plants being moved from the nursery or storage area to the planting site. Plants shall be protected from drying out. Balled and burlapped plants shall be handled carefully to avoid cracking or breaking the earth ball. Plants shall not be handled by the trunk or stems. Bare-root plants shall be "puddled" when removed from the heeling-in bed to protect the roots from drying out. Plants shall be protected from freezing or drying out by a covering of burlap, tarpaulin, or mulching material during transportation. Damaged plants will be rejected and shall be removed from the site.

4. ENVIRONMENTAL PROTECTION. All work and Contractor operations shall comply with the requirements of Section, ENVIRONMENTAL PROTECTION.

5. MATERIALS.

5.1 Plants.

5.1.1 Plants shall conform to the varieties specified in the plant list and be true to botanical name as listed in AJCHN Standardized Plant Names. Plants shall be in accordance with ANSI Z60.1 except as otherwise stated in the specifications or shown on the plans. Where the drawings or specifications are in conflict with ANSI Z60.1, the drawings and specifications shall prevail.

5.1.2 Planting stock shall be well-branched and well-formed, sound vigorous, healthy, and free from disease, sunscald, windburn, abrasion, and harmful insects or insect eggs and shall have healthy, normal and unbroken root systems. Deciduous trees and shrubs shall be symmetrically developed, of uniform habit of growth, with straight boles or stems and free from objectionable disfigurements. Evergreen trees and shrubs shall have well developed symmetrical tops with typical spread of branches for each particular species or variety. Plants shall have been grown under climatic conditions similar to those in the locality of the project. Plants budding into leaf or having soft growth shall be sprayed with an anti-desiccant at the nursery before digging.

5.1.3 The minimum acceptable sizes of all plants, measured before pruning and with branches in normal position, shall conform to the measurements indicated. Plants larger in size than specified may be used with the approval of the Contracting Officer with no change in the contract price. If larger plants are used, the ball of earth or spread of roots shall be increased in accordance with ANSI Z60.1.

5.1.4 The Contractor shall facilitate inspection and identification by labeling trees and bundles or containers of the same shrub with a durable waterproof label and weather-resistant ink. Labels shall state the correct plant name and size as specified in the list of required plants. Labels shall be securely attached to plants, bundles, and containers of plants and shall be legible for 60 days after delivery to the planting site.

5.1.5 Plant material shall be nursery grown unless otherwise indicated and shall conform to the requirements and recommendations of ANSI Z60.1. Plants shall be dug and prepared for shipment in a manner that will not cause damage to branches, shape, and future development after planting.

5.1.5.1 Balled and Burlapped (B&B) and Balled and Potted (B&P) plants shall have ball sizes and ratios conforming to ANSI Z60.1. Plants shall be balled with firm, natural balls of soil. B&B plants shall be wrapped firmly with burlap, strong cloth, or plastic and tied.

5.1.5.2 Bare-root (BR) plants shall be dug with the root system substantially intact but with the earth carefully removed. The roots shall be covered with a thick coating of mud by "puddling" after the plants are dug.

5.1.5.3 Container grown plants shall have sufficient root growth to hold the earth intact when removed from containers but shall not be root bound.

5.1.6 Plantation grown stock shall conform to ANSI Z60.1.

5.1.7 Substitutions shall be made only when a plant is not obtainable and the Contracting Officer authorizes a change order providing for use of the nearest equivalent obtainable size or variety of plant having the same essential characteristics with an equitable adjustment of the contract price.

5.2 Topsoil.

5.2.1 Topsoil shall be the existing surface soil stripped and stockpiled on the site.

5.2.2 If additional topsoil is required, it shall be furnished by the Contractor and shall be a natural, friable soil representative of productive soils in the vicinity. It shall be obtained from well-drained areas and shall be free of admixture of subsoil and foreign matter or objects larger than one inch in any dimension, toxic substances, and any material or substances that may be harmful to plant growth. The pH range shall be 6.0 to 7.0. Topsoil that does not meet this pH range shall be amended by the addition of pH adjusters.

5.3 pH Adjuster.

5.3.1 Lime shall be agricultural limestone containing not less than 90 percent of total carbonates and shall be ground to such fineness that at least 50 percent will pass a 100-mesh sieve and at least 98 percent will pass a 20-mesh sieve.

5.4 Soil Conditioners.

5.4.1 Peat shall be a natural product of sphagnum moss peat (peat moss), or derived from a freshwater site, except as otherwise specified herein. Peat shall be shredded and granulated to pass a 1/2-inch mesh screen and condition in storage piles for at least six months after excavation.

5.4.2 Rotted manure shall be unleached stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials and containing no chemicals or ingredients harmful to plants.

5.5 Planting Soil Mixture. The planting soil mixture shall be composed of 3 parts topsoil, 1 part manure, and 1 part peat.

5.6 Fertilizer. Fertilizer shall be commercial grade and uniform in composition and shall conform to applicable state and federal regulations.

5.6.1 Granular fertilizer shall conform to O-F-241, Type I, Level B, and shall bear the manufacturer's guaranteed statement of analysis. Granular fertilizer shall contain a minimum percentage by weight of: 10% nitrogen (of which 50 percent shall be organic), 10% available phosphoric acid, and 10% potash.

5.7 Mulch. Mulch shall be free from deleterious materials and shall be stored so as to prevent inclusion of foreign materials.

5.7.1 Wood chip mulch shall be an approved mulch material consisting of wood chips produced by cutting sound wood, and shall be 1/8-inch nominal thickness. At least 50 percent of the chips shall have a surface area between one (1) and six (6) square inches. Wood chip mulch having chips with surface areas larger than six (6) square inches will not be accepted. The material shall be free from rot, leaves, twigs, shavings, debris and any material injurious to plant growth.

5.8 Trunk Wrapping Material. Tree wrap shall be two thicknesses of crinkled paper cemented together with a layer of bituminous material. Wrapping material shall be a minimum of 4 inches in width and have a stretch factor of 33-1/3 percent. Twine for tying shall be a lightly tarred medium or coarse sisal yarn.

5.9 Guying and Staking Material.

5.9.1 Stakes for tree support shall be rough sawn wood, free from knots, rot, cross grain, or other defects that would impair the strength. Standard stakes shall be a minimum of 2 inches by 2 inches or 2-1/2 inches in diameter by 9 feet long and pointed at one end. Ground stakes shall be a minimum of 2 inches by 2 inches and 3 feet long and pointed at one end.

5.9.2 Guying wire shall be minimum 10-gauge annealed galvanized steel.

5.9.3 Hose chafing guards shall be new or used 2-ply reinforced rubber or plastic hose and shall be all the same color on the project.

5.9.4 Flags to be fastened to guys shall be surveyor's plastic tape, white or yellow in color and 6 inches in length.

5.10 Water. Water shall not contain elements toxic to plant life.

5.11 Antidesiccant. Antidesiccant shall be an emulsion that will provide a film over plant surfaces permeable enough to permit transpiration.

5.12 Tree Wound Dressing. Tree wound dressing shall be a black asphalt base antiseptic paint.

6. INSTALLATION.

6.1 Planting Seasons and Conditions. The planting dates for plant materials shall be April 1 to June 1 inclusive, and September 1 to October 15 inclusive. Actual planting shall be performed during above periods only when weather and soil conditions are suitable and in accordance with locally accepted practice. Deviation from the above planting dates will be permitted only when approved in writing by the Contracting Officer.

6.2 Layout. Plant material locations and bed outlines shall be staked on the project site by the Contractor and approved by the Contracting Officer before any plant pits or beds are dug. The Contracting Officer may adjust plant material locations to meet field conditions.

6.3 Excavation for Planting.

6.3.1 Prior to excavating for planting pits and beds the area shall conform to the lines and grades shown on the plans. If lawns have been established prior to planting operations, the surrounding turf shall be covered before excavations are made in a manner that will protect turf areas. Existing trees, shrubbery, and beds that are to be preserved shall be barricaded in a manner that will effectively protect them during planting operations.

6.3.2 Rocks and other underground obstructions shall be removed to a depth necessary to permit proper planting according to plans and specifications.

6.3.3 Plant pits may be dug by any method approved by the Contracting Officer provided that the pits have vertical sides and flat bottoms. When pits are dug with an auger and the sides of the pits become glazed, the glazed surface shall be scarified. The size of plant pits shall be as shown on NED STD Dwg. No. 1009A following this Section.

6.3.4 Where planting beds occur in existing turf areas, the turf shall be removed to a depth that will ensure the removal of the entire root system.

6.3.5 Excess topsoil shall be used to form watering basins around plants, as specified herein or removed from the project site.

6.4 Setting Plants. Balled and burlapped and container-grown plants shall be handled and moved only by the ball or container. Plants shall be set plumb and held in position until sufficient soil has been firmly placed around roots or ball. Plants shall be set in relation to surrounding grade so that they are even with the depth at which they were grown in the nursery, collecting field, or container.

6.4.1 Balled and burlapped stock shall be backfilled with planting soil mixture to approximately half the depth of the ball and then tamped and watered. Excess burlap and tying materials shall be carefully removed or folded back. If plastic wrap is used in lieu of burlap, it shall be completely removed before the placement of backfill. The remainder of backfill of planting soil mixture shall be tamped and watered. Earth saucers or water basins then shall be formed around isolated plants.

6.4.2 Bare-root stock shall be planted so that the roots are arranged in a natural position. Remove damaged roots with a clean cut. Paint cuts larger than 1/2 inch in diameter with tree wound dressing. Planting soil mixture shall be carefully worked in among the roots. Remainder of backfill of planting soil mixture shall be tamped and watered. Earth saucers of water basins approximately 3-inches high shall then be formed around isolated plants.

6.4.3 Container grown stock shall be removed from containers in such a way so as to prevent damage to plant or root system. Planting shall be completed as specified herein under balled and burlapped plants.

6.5 Fertiliztion.

6.5.1 After establishment of finished grade around plants, all pit and bed areas shall be topdressed with fertilizer at the rate of 3 pounds per 100 square feet of area. If any fertilizer adheres to plants, it shall be carefully flushed off.

6.6 Edging Plant Beds or Individual Plants.

6.6.1 Beds or individual plants shall be uniformly edged, using a sharp tool to provide a clear cut division line between the planted area and the adjacent lawn. Bed shape shall be as indicated on the plans. Individual plant pits shall be circular in shape.

6.7 Mulching.

6.7.1 Mulching shall take place within 2 days after planting.

6.7.2 Placing Organic Material. A mulch of woodchips or bark nuggets shall be spread to a uniform thickness of 4 inches.

6.7.3 Mulch shall be kept out of the crowns of shrubs and sidewalks, and other structures.

6.8 Wrapping. The trunks of deciduous trees shall be wrapped within 2 hours after planting. The Contracting Officer will inspect the trunks of the trees for physical damage or insect infestation and determine required treatment or rejection prior to the wrapping operation. The trunks of deciduous trees, 1-1/2 inches or greater in caliber, shall be wrapped with the specified material beginning at the base and extending to the first branches. The wrapping shall be securely tied at the top and bottom and at 18-inch maximum intervals with twine.

6.9 Staking and Guying.

6.9.1 Plants shall be staked and guyed as indicated or if not indicated, as directed by the Contracting Officer.

6.9.2 Standard stakes shall be driven vertically into the ground to a depth of 2-1/2 to 3 feet in such a manner as not to injure the ball or roots.

6.9.3 Ground stakes shall be driven into the firm ground outside of the plant pit and the top of the stake shall be flush with the ground.

6.9.4 Flags shall be securely fastened on each guy wire approximately two thirds of the distance up from ground level.

6.10 Pruning.

6.10.1 New plant material shall be pruned in the following manner: Dead and broken branches shall be removed. Deciduous trees and shrubs shall be pruned to reduce total amount of anticipated foliage by one fourth to one third. Typical growth habit of individual plants shall be retained with as much height and spread as is practicable. Cuts shall be made with sharp instruments, and shall be flush with trunk or adjacent branch to insure elimination of stubs. "Headback" cuts at right angles to line of growth shall not be permitted. Trees shall not be poled or the leader removed. Trimmings shall be removed from the site. Cuts 1/2 inch in diameter and larger shall be painted with the specified tree wound dressing.

6.11 Restoration and Clean-up. Excess and waste material shall be removed daily. When planting in an area has been completed, the area shall be cleared of all debris, spoil piles, and containers. Where existing grass areas have been damaged or scarred during planting operations the Contractor shall restore disturbed areas to their original condition at his expense.

6.12 Maintenance During Installation. Maintenance operations shall begin immediately after each plant is planted and shall continue as required until final acceptance. Plants shall be kept in a healthy, growing condition by watering, pruning, spraying, weeding, and any other necessary operations of maintenance. Plant saucers and beds shall be kept free of weeds, grass, and other undesired vegetation. Plants shall be inspected at least once per week by the Contractor during the installation period and needed maintenance performed promptly.

7. PLANT ESTABLISHMENT PERIOD. Final acceptance of all work and materials under this section shall be at the end of a period of establishment to be determined as follows:

7.1 Beginning of the Plant Establishment Period. The period of establishment shall begin on the date that an inspection by the Contracting Officer shows that all plants are in place and have been installed in accordance with the specifications and plans.

7.2 During the Plant Establishment Period.

7.2.1 During the plant establishment period, the Contractor shall water all plants as necessary to maintain an adequate supply of moisture within the root zone. An adequate supply of moisture is estimated to be the equivalent of one inch of absorbed water per week that is delivered at weekly intervals in the form of natural rain or is augmented as required by periodic waterings. Water shall not be applied with a force sufficient to displace mulch and shall not be applied so quickly that it cannot be absorbed by the mulch and plants.

7.2.2 Plants shall be pruned and mulch replaced as required.

7.2.3 Stakes, guys, and eroded plant saucers shall be replaced as required.

7.2.4 In plant beds, grass and weeds shall not be allowed to reach a height of 3 inches before being completely removed, including the root growth.

7.2.5 Plants shall be fertilized at least once during the period of establishment. Fertilization shall be either by topdressing at 3 pounds per 100 square feet of plant pit or bed area. Formula for the application shall be 10% N- 10% P-10% K.

7.2.6 Dead plants shall be removed immediately at the Contractor's expense. The Contractor will not be responsible for theft or damage to plants by vehicles or vandalism following completion and approval of the installation portion of the planting contract.

7.3 Termination of the Plant Establishment Period.

7.3.1 A preliminary inspection by the Contractor and the Contracting Officer will be held at the end of the planting season next succeeding the planting season during which all planting was completed to determine plant acceptability and the number of replacements. Alternate or substituted varieties of plants shall be used only if approved by the Contracting Officer.

7.3.2 A final inspection of all plants will be held after the replacement planting has been completed. No additional plant establishment period will be required for replacement plants. The establishment period will end on the date of this inspection and said inspection will be considered final acceptance provided the Contractor has complied with the following requirements.

(1) Dead, missing, and defective plant material shall have been replaced as directed by the Contracting Officer otherwise, final acceptance will be delayed until such replacements have been satisfactorily accomplished

(2) Plant beds and plant saucers shall have been properly mulched and shall be free of weeds

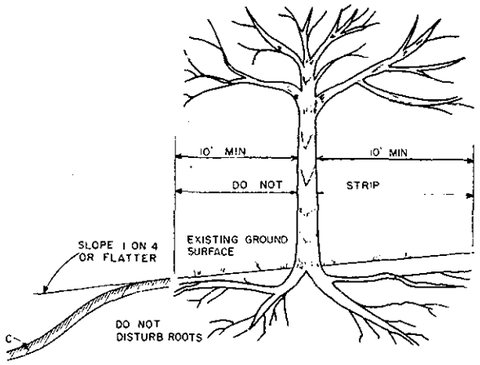
(3) Stakes and guys shall be in good condition

(4) Remedial measures directed by the Contracting Officer to ensure plant survival shall have been carried out

(5) Plant material shall have been fertilized as required prior to acceptance.

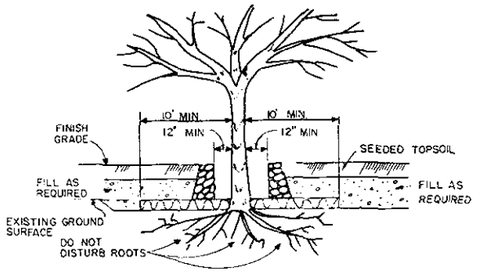
8. PAYMENT. No separate measurement or payment will be made for the work covered under this section of these specifications and all costs in connection therewith shall be included in the payment items as specified below:

(1) All costs in connection with furnishing and installing planting materials in Area "C", "F" and "J" as shown on the contract drawings and specified herein, shall be included in the applicable lump sum contract prices bid for Item No. C4, F15 and J5, "Planting", respectively.



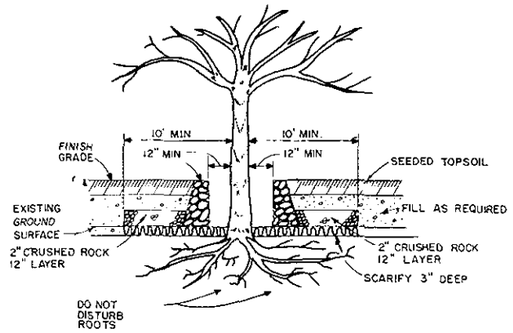
TYPICAL SECTION

TREE DETAIL "D"
VEGETATION IN CUT AREA



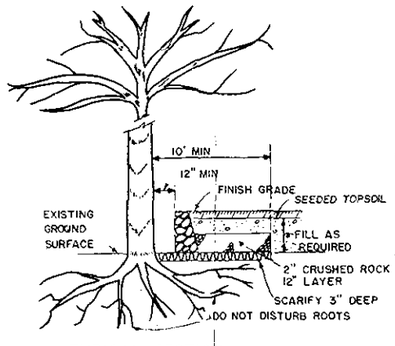
TYPICAL SECTION

TREE WELL
FOR FILLS UP TO 2'0"



TYPICAL SECTION

TREE WELL



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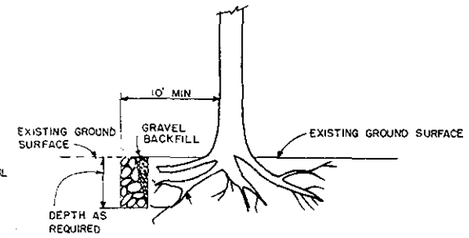

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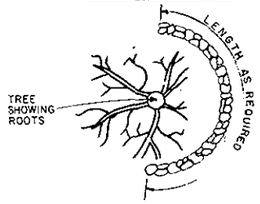
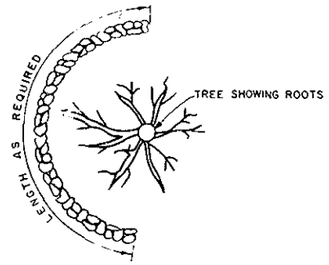


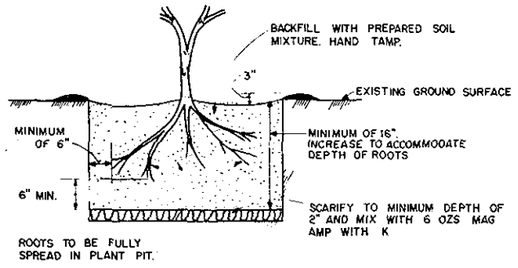
TYPICAL PLAN

RETAINING WALL - FILL AREA



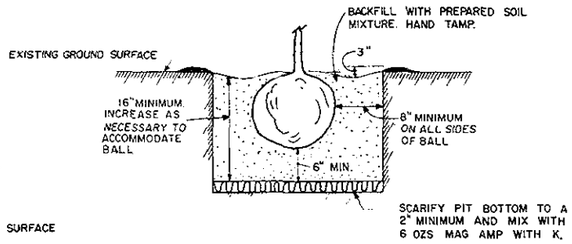
TYPICAL PLAN

RETAINING WALL - CUT AREA



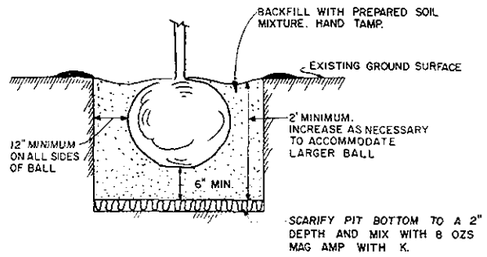
TYPICAL SHRUB PIT

FOR SHRUBS PLANTED SEPARATELY

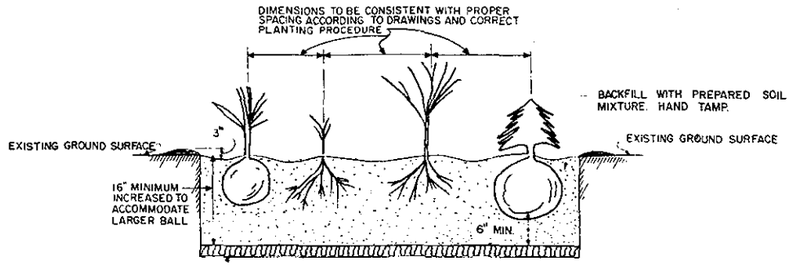


TYPICAL SHRUB PIT

FOR ALL SEPARATELY PLANTED
BALLED AND BURLAPPED SHRUBS



TYPICAL TREE PIT



TYPICAL PLANT BED

NOTES

1. DRY RUBBLE RETAINING WALLS SHALL BE CONSTRUCTED WITH A FACE SLOPE OF 2 ON 1.
2. STONES USED IN DRY RUBBLE WALLS SHALL BE RECTANGULAR IN SHAPE AND APPROXIMATELY 18"X 8"X 8".
3. IN PLANT BEDS THE DEPTH AND THE SPACINGS THEREIN SHALL ACCOMMODATE THE FULL SPREAD OF THE ROOTS.

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS

TREES AND SHRUBS PLANTING AND PRESERVATION STANDARD DETAILS

NED - 1009A

DATE: JULY 1965

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DIVISION 2 - SITE WORK

SECTION 20 - TOPSOILING AND SEEDING

1. 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:

1.1 Federal Specifications (Fed. Spec).

O-F-241D	Fertilizers; Mixed, Commercial

1.2 U.S. Department of Agriculture Federal Seed Act of August 9, 1939.

53 Stat. 1275	Rules and Regulations

2. SOURCE INSPECTIONS.

2.1 Topsoil. The source of contractor furnished topsoil will be inspected by the Contracting Officer to determine the acceptability of the topsoil and the depth to which it is to be stripped.

3. SUBMITTALS.

3.1 Certificates of Compliance. Before delivery, notarized certificates attesting that the following materials meet the requirements specified, shall be submitted for approval:

1. Seed

2. Fertilizer

3.2 Certified Laboratory Test Reports. In addition to the submittal of certificates specified herein, certified copies of the reports of all tests listed below and required in referenced publications for the following materials shall be submitted for approval:

1. Off-site Topsoil -- for pH

The testing shall have been performed by an independent laboratory approved by the Contracting Officer within six months of submittal of report for approval. Test reports on previously tested material shall be accompanied by notarized certificates from the manufacturer certifying that the previously tested material is the same type, quality, manufacture, and make as that proposed for this project.

3.3 Manufacturer's Literature. Manufacturer's literature on the following materials shall be submitted:

1. Hydro-Mulch (If Used)

2. Erosion Control Materials

3.4 Maintenance Instructions. Prior to end of the contract maintenance period, copies of written instructions for year-round maintenance and care of installed turf shall be furnished to the Contracting Officer.

4. DELIVERY, STORAGE, AND HANDLING.

4.1 Delivery.

4.1.1 The contractor shall notify the Contracting Officer of the delivery schedule in advance so material may be inspected upon arrival at the job site. Unacceptable material shall be removed from the job site immediately.

4.1.2 During delivery, seed shall be protected from drying out and contamination.

4.1.3 Fertilizer and lime shall be delivered to the site in the original, unopened containers bearing the manufacturer's guaranteed chemical analysis, name, trade name, trademark, and conformance to state and federal laws. In lieu of containers, fertilizer and lime may be furnished in bulk and a certificate indicating the above information shall accompany each delivery.

4.2 Storage.

4.2.1 Seed, lime, and fertilizer shall be kept in dry storage away from contaminants.

4.2.2 Storage of materials shall be in areas designated on the contract drawings as stockpile or storage areas, or as approved by the Contracting Officer.

5. ENVIRONMENTAL PROTECTION. All work and Contractor operations shall comply with the requirments of Section, ENVIRONMENTAL PROTECTION.

6. MATERIALS.

6.1 Seed. Seed shall be state-certified seed of the latest season's crop and shall be delivered in original sealed packages bearing the producer's guaranteed analysis for percentages of mixtures, purity, germination, weed seed content, and inert material.

Seed shall be labeled in conformance with U.S. Department of Agriculture rules and regulations under the Federal Seed Act and applicable state seed laws. Seed that has become wet, moldy, or otherwise damaged will not be acceptable. On-site seed mixing shall be done only in the presence of the Contracting Officer. Seed mixtures shall be proportioned by weight as follows:

SCIENTIFIC NAME	COMMON NAME	PERCENTAGE BY WEIGHT IN MIXTURE	MINIMUM PERCENTAGE PURITY	MINIMUM PERCENTAGE GERMINATION
Agrostis alba	Redtop	10		
Festuca rubra var.	Creeping Red Fescue	50	97	80
Lolium perenne	Perennial Rye-grass	10	98	90
Lotus corniculatus	Birdsfoot Trefoil	30		

Note: Weed seed shall not exceed 1.0% of total mixture be weight.

6.2 Topsoil.

6.2.1 Topsoil shall be the existing surface soil stripped and stockpiled on the site.

6.2.2 If additional topsoil is required, it shall be furnished by the Contractor and shall be a natural, friable soil representative of productive soils in the vicinity. It shall be obtained from well-drained areas and shall be free of admixture of subsoil and foreign matter or objects larger than one inch in any dimension, toxic substances, and any material or substance that may be harmful to plant growth. The pH range shall be 6.0 to 7.0. Topsoil that does not meet this pH range shall be amended by the addition of pH adjusters.

6.3 pH Adjusters.

6.3.1 Lime shall be agricultural limestone containing not less than 90 percent of total carbonates and shall be ground to such fineness that at least 50 percent will pass a 100-mesh sieve and at least 98 percent will pass a 20-mesh sieve.

6.4 Fertilizer. Fertilizer shall be commercial grade, free flowing, uniform in composition and shall conform to applicable state and federal regulations. Granular fertilizer shall conform to Fed. Spec. O-F-241, Type 1, Level B, and shall bear the manufacturer's guaranteed statement of analysis. Granular fertilizer shall contain a minimum percentage by weight of 5% nitrogen (of which 50 percent shall be organic), 10% available phosphoric acid, and 10% potash.

6.5 Mulch.

6.5.1 Straw shall be stalks from oats, wheat, rye, barley, or rice that are free from noxious weeds, mold, or other objectionable material. Straw shall be in an air-dry condition and suitable for placing with blower equipment.

6.5.2 Hay shall be of herbaceous mowings, free from noxious weeds, mold, or other objectionable material. Hay shall be in an air-dry condition and suitable for placing with blower equipment.

6.6 Water. Water shall contain no elements toxic to plant life and shall be obtained by the Contractor at no additional cost to the Government.

6.7 Erosion Control Material. Erosion Control Material shall be a wood excelsior mat consisting of a machine produced mat of curled wood excelsior of 80% six inch or longer fiber length, with consistant thickness and the fiber evenly distributed over the entire area of the mat. The top side of each mat shall be covered with a 2" x 1" biodegradable extruded plastic mesh. Mats shall be made smolder resistant without the use of chemical additives. Wood excelsior mats shall be similar or approved equal to that produced by the American Excelsior Company, Somerville, Massachusetts.

7. INSTALLATION.

7.1 General. The following areas shall be topsoiled, seeded and mulched or receive erosion control and otherwise treated as required by this section of these specifications:

1. Areas as indicated on the drawings.

2. Existing areas of vegetation disturbed by the Contractor due to removal and/or installation or modifications of utilities systems, the construction of new and permanent structures, or grading operations, when such areas are not indicated on the drawings or specified to be topsoiled and seeded or seeded only or to receive other finish, shall be restored by topsoiling and seeding as specified in this section. These areas shall be treated at no additional cost to the Government, the cost thereof being subsidiary to the applicable items of work involved.

3. Areas not indicated on the drawings but which fall within the meaning of Clause 49 of the GENERAL PROVISIONS. These areas shall be treated at no additional cost to the Government.

4. Areas disturbed by the Contractor including areas falling outside the limit of work lines, areas within the limit of work lines where no work is indicated on the drawings, and areas used for the convenience of the Contractor, including haul roads, storage

areas, borrow areas, access roads, field office sites, parking areas, stockpile areas and areas of similar use, unless specifically exempted in writing by the Contracting Officer. These areas shall be treated at no additional cost to the Government.

7.2 Tillage. After the areas required to be seeded have been brought to the grades as specified, they shall be thoroughly tilled to a depth of at least 3 inches by scarifying, disking, harrowing, or other approved methods. All debris and stones larger than 3 inches remaining on the surface after tillage shall be removed.

7.3 Topsoiling. Prior to placing topsoil the subgrade shall be scarified to a 2-inch depth for bonding of topsoil with subsoil. The topsoil shall be evenly spread to a minimum depth of 6 inches unless otherwise shown on the contract drawings. Topsoil shall not be spread when frozen or excessively wet or dry. Irregularities in finished surfaces shall be corrected to eliminate depressions. Finished topsoil areas shall be protected from damage by vehicular or pedestrian traffic. Seeding shall be accomplished only when areas are brought to finished grade.

7.4 Application of Fertilizer and pH Adjuster.

7.4.1 Fertilizer shall be applied at the rate of 25 pounds per 1,000 square feet. In addition, the Contractor shall adjust soil acidity and add soil conditioners as specified for suitable topsoil under paragraph 6.2 "Topsoil".

7.4.2 All fertilizer and pH adjuster shall be incorporated into the soil to a depth of at least 2-inches and may be incorporated as part of the tillage operation herein before specified. Immediately before seeding the soil shall be restored to an even condition.

7.5 Planting Seasons and Conditions. Planting shall be done within the following dates:

1. Seed shall be sown from 01 May to 15 June for spring planting and from 15 August to 15 September for fall planting.

Planting shall not be done when the ground is frozen, snow covered, or in an unsatisfactory condition for planting. If special conditions exist that may warrant a variance in the above planting dates or conditions, a written request shall be submitted to the Contracting Officer stating the special conditions and proposed variance.

7.6 Seeding.

7.6.1 Seed shall be broadcast by approved sowing equipment at the rate of 4 pounds per 1,000 square feet. One half of the seed shall be sown at right angles to the first sowing. The seed shall be

covered to an average depth of 1/4 inches by means of spike-tooth harrow, cultipacker, or other approved device.

7.6.2 Immediately after seeding, the entire area shall be firmed with a roller not exceeding 90 pounds for each foot of roller width. If seeding is performed with a cultipacker-type seeder or if seed is applied in combination with hydromulching, rolling may be eliminated.

7.6.3 Mulch shall be evenly spread at the rate of one 70 pound bale per 1,000 square feet. The mulch shall be anchored by either a mulch tiller, twine, or netting.

7.6.4 Erosion control material, as specified in paragraph 6.7, shall be installed according to manufacturer's instructions at the locations as indicated on the contract drawings.

7.7 Protection of Seeded Areas. Immediately after seeding, the area shall be protected against traffic or other use by erecting barricades, as required, and placing approved signs at appropriate intervals until final acceptance.

7.8 Restoration and Clean-Up. Excess and waste material shall be removed daily. When turfing in an area has been completed, the area shall be cleaned of all debris and excess material. Where existing turf areas have been damaged during turfing operations the Contractor shall restore the areas to their original condition at his expense.

8. TURF ESTABLISHMENT PERIOD.

8.1 General.

8.1.1 The turf establishment period will be in effect for 45 days after seeding is completed.

8.1.2 The Contractor shall be responsible for the establishment and proper care of a stand of turf over the entire seeded area.

8.2 Maintenance During the Establishment Period.

8.2.1 The Contractor shall provide the following maintenance: removal of excess clippings, eradicating weeds, watering, fertilizing, overseeding and any other operation necessary to promote the growth of grass.

9. FINAL ACCEPTANCE

9.1 General. Final inspection and acceptance will be at the end of the turf establishment period. Acceptance will be based upon a satisfactory stand of turf.

10. RETREATMENT OF AREAS. The contractor shall be responsible for retreating areas where washouts or other destruction of previously applied treatment occur because of rainfall or winds, provided that all work required by this contract. Retreatment shall consist of reapplication of seed, fertilizer and mulch as required for original application of these specifications.

11. MEASUREMENT AND PAYMENT

11.1 Lump Sum Items. No separate measurement or payment will be made for topsoiling, seeding and mulching or erosion control in areas where all work is specified to be paid for as a lump sum.

11.2 Topsoiling, Seeding and Mulching or Erosion Control.

11.2.1 Measurement. Except as specified above, topsoiling, seeding and mulching or erosion control will be measured for payment on the basis of the number of square yards of topseeding, seeding and mulching or erosion control materials acceptably placed.

11.2.2 Payment for topsoiling, seeding and mulching or erosion control will be made at the contract unit prices per square yard for Item No. 011, "Topsoiling, Seeding and Mulching" and Item Nos. A14, F17, J6, P15 and V7, "Topsoiling, Seeding and Erosion Control". The contract prices shall include all costs of salvaging existing topsoil from excavation, furnishing all additional required topsoil from off-site sources, loading, hauling, spreading topsoil, grading, tillage and all labor, equipment, and incidentals necessary to complete the turfing; and shall include all costs of finish grading, preparation of seedbed, application of fertilizer, lime and mulch or erosion control materials, establishment, necessary repairs, and incidentals necessary to complete the seeding.

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DIVISION 2 - SITE WORK

SECTION 2P - ENVIRONMENTAL PROTECTION

1. SCOPE. This section covers prevention of environmental pollution and damage as the result of construction operations under this contract and for those measures set forth in other Technical Provisions of these specifications. For the purpose of this specification, environmental pollution and damage 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 human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic, cultural and/or historical purposes. The control of environmental pollution and damage requires consideration of air, water, and land, and includes management of visual aesthetics, noise and solid waste, as well as other pollutants.

2. QUALITY CONTROL. The Contractor shall establish and maintain quality control for environmental protection of all items set forth herein. The Contractor shall record on daily reports any problems in complying with laws, regulations and ordinances and corrective action taken.

3. SUBMITTALS. The Contractor shall submit an environmental protection plan in accordance with provisions as herein specified.

3.1 Environmental Protection Plan shall include but not be limited to the following:

(1) A list of Federal, State and local laws, regulations, and permits concerning environmental protection, pollution control and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations and permits.

(2) Methods for protection of features to be preserved within authorized work areas. The Contractor shall prepare a listing of methods to protect resources needing protection, i.e., trees, shrubs, vines, grasses and ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, archeological and cultural resources.

(3) Procedures to be implemented to provide the required environmental protection and to comply with the applicable laws and regulations. The Contractor shall set out the procedures to be followed to correct pollution of the environment due to accident, natural causes or failure to follow the procedures set out in accordance with the environmental protection plan.

(4) Permit or license and the location of the solid waste disposal area.

(5) Drawings showing locations of any proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials.

(6) Environmental monitoring plans for the job site, including land, water, air, and noise monitoring.

(7) Traffic control plan.

(8) Methods of protecting surface and ground water during construction activities.

(9) Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas.

(10) Plan of borrow area(s).

3.2 Implementation. The Contractor shall submit in writing the above Environmental Protection Plan within 30 days after receipt by him of Notice to Proceed. Approval of the Contractor's plan will not relieve the Contractor of his responsibility for adequate and continuing control of pollutants and other environmental protection measures.

4. SUBCONTRACTORS. Assurance of compliance with this section by subcontractors will be the responsibility of the Contractor.

5. NOTIFICATION. The Contracting Officer will notify the Contractor in writing of any observed noncompliance with the aforementioned Federal, State or local laws or regulations, permits and other elements of the Contractor's environmental protection plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of proposed corrective action and take such action as may be approved. If the Contractor fails 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 time extensions shall be granted or costs or damages allowed to the Contractor for any such suspension.

6. PROTECTION OF ENVIRONMENTAL RESOURCES. The environmental resources within the project boundaries and those affected outside the limits of permanent work under this contract shall be protected during the entire period of this contract. The Contractor shall confine his activities to areas defined by the drawings and specifications. Environmental protection shall be as stated in the following subparagraphs.

6.1 Protection of Land Resources. Prior to the beginning of any construction, the Contractor shall identify all land resources to be preserved within the Contractor's work area. The Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, top soil, and land forms without special permission from the Contracting Officer. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. Where such special emergency use is permitted, the Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs.

6.1.1 Work Area Limits. Prior to any construction the Contractor shall mark the areas that are not required to accomplish all work to be performed under this contract. Isolated areas within the general work area which are to be saved and protected shall also be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, the markers shall be visible. The Contractor shall convey to his personnel the purpose of marking and/or protection of all necessary objects.

6.1.2 Protection of Landscape. Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques.

6.1.3 Reduction of Exposure of Unprotected Erodible Soils. Earthwork brought to final grade shall be finished as indicated and specified. Side slopes and back slopes shall be protected as soon as practicable upon completion of rough grading. All earthwork shall be planned and conducted to minimize the duration of exposure of unprotected soils.

6.1.4 Temporary Protection of Disturbed Areas. Such methods as necessary shall be utilized to effectively prevent erosion and control sedimentation, including but not limited to the following:

(1) Retardation and Control of Runoff. Runoff from the construction site shall be controlled by construction of diversion ditches, benches, and berms to retard and divert runoff to protected drainage courses, and any measures required by area-wide plans approved under paragraph 208 of the Clean Water Act.

6.1.5 Erosion and Sedimentation Control Devices. The Contractor shall construct or install all temporary and permanent erosion and sedimentation control features as required to limit erosion and control sedimentation. Temporary erosion and sediment control measures such as berms, dikes, drains, sedimentation basins, grassing and mulching shall be maintained until permanent drainage and erosion control facilities are completed and operative.

6.1.6 Location of Field Offices, Storage and Other Contractor Facilities. The Contractors' field offices, staging areas, stockpile storage, and temporary buildings shall be placed in areas designated on the drawings. Temporary movement or relocation of Contractor facilities shall be made only on approval by the Contracting Officer.

6.1.7 Temporary Excavations and Embankments for plant and/or work areas shall be controlled to protect adjacent areas from dispoilment.

6.1.8 Disposal of Construction Debris. All construction debris resulting from construction operations on this contract shall be disposed of by transport off the site in compliance with Federal, State and local requirements.

6.1.9 Disposal of Chemical Waste. Chemical waste shall be stored in corrosion resistant containers, removed from the work area and disposed of in accordance with Federal, State and local regulations.

6.1.10 Disposal of Discarded Materials. Discarded materials other than those which can be included in the solid waste category will be handled as directed by the Contracting Officer.

6.2 Preservation and Recovery of Historical, Archeological and Cultural Resources. Existing historical, archeological and cultural resources within the Contractor's work area will be so designated by the Contracting Officer and precautions taken to preserve all such resources as they existed at the time they were pointed out to the Contractor. The Contractor shall install all protection for these resources and shall be responsible for their preservation during the contract. If during construction activities the Contractor observes unusual items that might have historical or archeological value, such observations shall be reported as soon as practicable to the Contracting Officer.

6.3 Protection of Water Resources. The Contractor shall keep construction activities under surveillance, management and control to avoid pollution of surface and ground waters. Special management techniques as set out below shall be implemented to control water pollution by the listed construction activities which are included in this contract.

6.3.1 Washing and Curing Water. Waste waters directly derived from concrete curing, foundation and concrete lift cleanup, and other waste water producing activities shall not be allowed to enter water areas. These waste waters shall be collected and placed in retention ponds where suspended material can be settled out or the water evaporates so that pollutants are separated from the water.

6.3.2 Cofferdam and Diversion Operations. The Contractor shall plan his operation and perform all work necessary to minimize adverse impact or violation of the water quality standard for the North Nashua River. Construction operations for dewatering and removal of cofferdams, shall be controlled at all times to limit the impact of water turbidity on the habitat for wildlife and impacts on water quality for downstream use.

6.3.3 Stream Crossings shall be controlled during construction. Crossings shall provide movement of materials or equipment which do not violate water pollution control standards of the Federal, State or local government.

6.4 Protection of Fish and Wildlife Resources. The Contractor shall keep construction activities under surveillance, management and control to minimize interference with, disturbance to and damage of fish and wildlife.

6.5 Protection of Air Resources. The Contractor shall keep construction activities under surveillance, management and control to minimize pollution of air resources. All activities, equipment, processes, and work operated or performed by the Contractor in accomplishing the specified construction shall be in strict accordance with the State of Massachusetts and all Federal emission and performance laws and standards. Ambient Air Quality Standards set by the Environ-mental Protection Agency shall be maintained for those construction operations and activities specified in this section. Special management techniques as set out below shall be implemented to control air pollution by the construction activities which are included in the contract.

6.5.1 Particulates. Dust particles, aerosols, and gaseous by-products from all construction activities, processing and preparation of materials, such as from asphaltic batch plants, shall be controlled at all times, including weekends, holidays and hours when work is not in progress.

6.5.1.1 Particulates Control. The Contractor shall maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and all other work areas within or outside the project boundaries free from particulates which would cause the air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, light bituminous treatment or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated at such intervals as to keep the disturbed area damp at all times. The Contractor must have sufficient competent equipment available to accomplish this task. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs.

6.5.2 Hydrocarbons and Carbon Monoxide. Hydrocarbons and carbon monoxide emissions from equipment shall be controlled to Federal and State allowable limits at all times.

6.5.3 Odors. Odors shall be controlled at all times for all construction activities, processing and preparation of materials.

6.6 Protection of Sound Intrusions. The Contractor shall keep construction activities under surveillance, and control to minimize damage to the environment by noise. The Contractors method of noise abatement shall include times and methods of concrete removal, working hours in the construction site, replacement of faulty mufflers and noisy engines, construction methods, and times of hauling through residential and congested areas.

7. POST CONSTRUCTION CLEAN UP. The Contractor shall clean up all areas used for construction.

8. RESTORATION OF LANDSCAPE DAMAGE. The Contractor shall restore all landscape features damaged or destroyed during construction operations outside the limits of the approved work areas. Such restoration shall be in accordance with the plan submitted for approval by the Contracting Officer. This work will be accomplished at the Contractor's expense.

9. MAINTENANCE OF POLLUTION CONTROL FACILITIES. The Contractor shall maintain all constructed facilities and portable pollution control devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

10. PAYMENT. No separate payment or direct payment will be made for the cost of the work covered under this section, and such work will be considered as a subsidiary obligation of the Contractor.

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DIVISION 3 - CONCRETE

SECTION 3A - FORMWORK FOR CONCRETE

1. RELATED WORK SPECIFIED ELSEWHERE.

1.1 Cast in Place Concrete. Section 3D.

1.2 Reinforcing Steel. Section 3C.

2. REFERENCE STANDARDS.

2.1 American Concrete Institute (ACI) Standards.

ACI 347-68	Recommended Practice for Concrete Formwork

2.2 American Society for Testing and Materials (ASTM) with Corresponding CRD Standard Indicated where Available.

A 446-76	Steel Sheet, Fine-Coated (Galvanized) by Hot Dip Process, Physical (Structural) Quality
C 31-69 (CRD-C 11)	Making and Curing Concrete Test Specimens in the Field
C 39-72 (CRD-C 14)	Compressive Strength of Cylindrical Concrete Specimens

2.3 U.S. Department of Commerce, National Bureau of Standards (NBS) Product Standard.

PS 1-74	For Construction and Industrial Plywood

3. SUBMITTALS.

3.1 Shop Drawings. Drawings and computations for all formwork required shall be submitted at least 30 days before either fabrication on site or before 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 made, the plan for jointing of facing panels, details affecting the appearance, and the assumed design values and loading conditions.

3.2 Manufacturers Literature. Manufacturers literature shall be submitted for plywood, concrete form hard board, for accessories, prefabricated forms, form coating and form lining materials.

3.3 Sample Panels. After shop drawings have been approved, sample panels for Class A or Class F finish with applied architectural treatment including rustification strips shall be built on the project site where directed. Panels shall be of sufficient size to contain joints and shall be not less than 6 feet long and 4 feet wide. The panels shall be of typical wall thickness and constructed containing the full allocation of reinforcing steel that will be used in the structures, with the forming system that duplicates in every detail the one that will be used in construction of the structure. The same concrete mix design and materials, the same placement techniques and equipment, and the same finishing techniques and timing shall be used that are planned for the structure. Construction of Class A or Class F finish will not be permitted until sample panels have been approved. Sample panels shall be protected from construction operations in a manner to protect approved finish and are not to be removed until all Class A or Class F finish concrete has been accepted.

4. DESIGN. The design and engineering of the formwork, as well as its construction, shall be the responsibility of the Contractor. The formwork shall be designed for loads, lateral pressure and allowable stresses in accordance with Chapter 1 of ACI Standard 347. Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete and shall have sufficient rigidity to maintain specified tolerances.

5. MATERIALS.

5.1 Forms. Forms shall be fabricated with facing materials that produce the specified construction tolerance requirements of Section 3D, paragraph 4.2 and the surface requirements of Section 3D, paragraph 4.3.

5.1.1 Class "A" Finish. This class of finish shall apply to surfaces indicated on the drawings. The form facing material shall be composed of new, well matched tongue and groove lumber or new plywood panels conforming to NBS Product Standard PS-1, Concrete Form, Class I, Grade B-B Plyform, High Density Overlay, Exterior Type or Structure I, Grade B-B Plyform, High Density Overlay, all Exterior Type.

5.1.2 Class "B" Finish. The class of finish shall apply to all surfaces except those specified to receive Class A, Class D or Class F. The sheathing shall be composed of tongue-and-groove or shiplap lumber, plywood conforming to NBS Product Standards PS-1 exterior type, grade B-B plyform, tempered concrete form hardboard, or steel. Steel lining on wood sheathing will not be permitted.

5.1.3 Class "D" Finish. This class of finish shall apply to surfaces which will be backfilled. The sheathing may be of wood or steel.

5.1.4 Class "F" Finish. This class of finish shall apply to surfaces as indicated on the contract drawings. It shall be obtained by use of form liners of formed plastic sheet, wood, sheet metal or other approved material that will produce the desired texture. The desired texture shall be obtained by use of form liners similar or approved equal to Flex-Liner, "Standard Fractured Fin" as manufactured by the Scott System, Denver, Colorado or Architectural Form Liners, "Fractured Fin" as manufactured by Symons Corporation. Textured finish shall not extend below finish grade line.

5.2 Form 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 end 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.

5.3 Form Coating. Form coating shall be a commercial formulation of satisfactory and proven performance that will not bond with, stain or adversely affect concrete surfaces and will not impair subsequent treatment of concrete surfaces depending upon bond or adhesion nor impede the wetting or surfaces to be cured with water or curing compounds.

6. INSTALLATION. Forms shall be mortar tight, properly aligned and adequately supported to produce concrete surfaces meeting the surface requirements of Section 3D, paragraph 4.3, and conforming to construction tolerance of Section 3D, paragraph 4.2. 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 or mortar. Forms shall not be re-used if there is any efidence of surface wear or 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.

7. CHAMFERING. All exposed joints, edges and external corners shall be chanfered by molding placed in the forms unless the drawings specifically state that chamfering is to be omitted or as otherwise specified. Chamfered joints shall not be permitted where earth or rockfill is placed in contact with concrete surfaces. Chamfered joints shall be terminated a sufficient distance outside the limit of the earth or rockfill so that the end of the joints will be clearly visible.

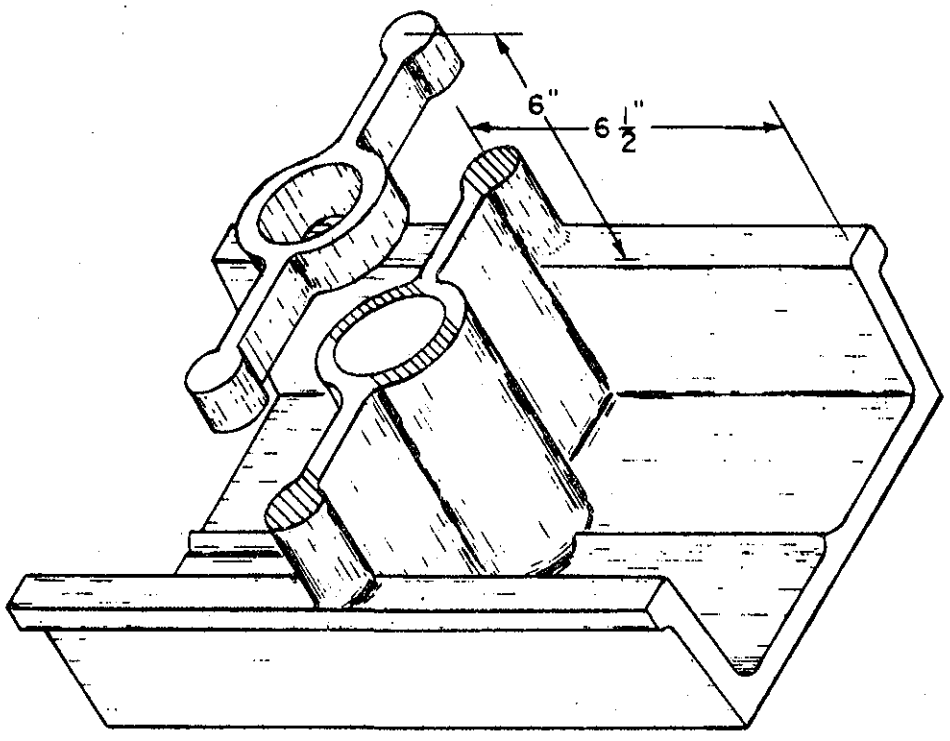
8. COATING. Forms for exposed or painted surfaces shall be coated with form oil or a form-release agent before the form or reinforcement is placed in final position. The coating shall be used as recommended in the manufacturer's printed or written instructions. Forms for unexposed surfaces may be wet with water in lieu of coating immediately before placing concrete, except that in cold weather the probable freezing temperatures coating shall be mandatory. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be removed before placing concrete.

9. REMOVAL. Forms shall not be removed without approval and all removal shall be accomplished in a manner which will prevent injury to the concrete. Forms shall not be removed before the expiration of the minimum time indicated below, except as otherwise directed or specifically authorized. When conditions of the work are such as to justify the requirement, forms will be required to remain in place for a longer period.

9.1 Unsupported Concrete. Formwork for walls, gravity structures and other vertical type forms not supporting the weight of concrete shall not be removed in less than 24 hours. The time depends on temperature, lift heights and type and amount of cementitious material in the concrete.

10. FIELD QUALITY CONTROL. 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.

11. PAYMENT. No separate payment will be made for formwork and all costs in connection therewith shall be included in the contract unit or lump sum prices for the items of work to which the work is incidental.



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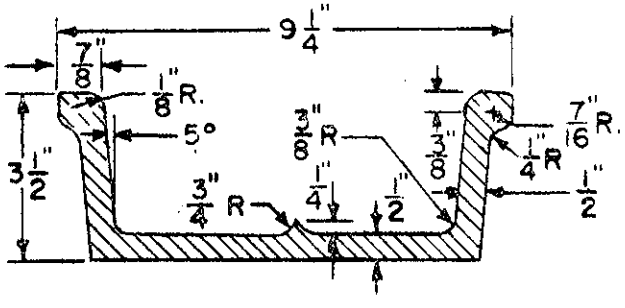

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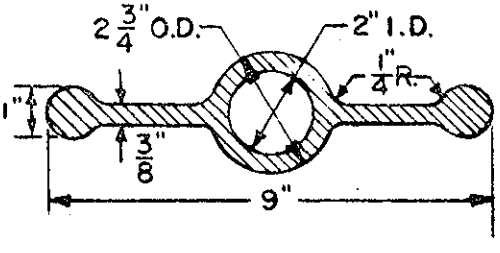

3 BULB STOP

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SCALE: 3"=1'-0"

WATERSTOPS

STANDARD DETAILS

DWG. NO. 40-02-03 DATE: MAY 1963

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SECTION 3B - JOINTS IN CONCRETE

1. SCOPE. This section covers the materials, techniques and workmanship requirements for forming expansion, contraction and construction joints in concrete structures.

2. RELATED WORK SPECIFIED ELSEWHERE. Major requirements for concrete work are specified in Section 3D, CAST-IN-PLACE CONCRETE.

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 references thereto:

3.1. American Society for Testing and Materials (ASTM) Standards. (With corresponding U.S. Army Corps of Engineers Handbook for Concrete and Cement (CRD) Specifications where indicated.)

D 1751-73 (CRD-C 508)	Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bitumious Types)
D 1752-67 (CRD-C 509)	Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction

3.2 Federal Specifications (Fed. Spec.).
(With corresponding CRD Standards where indicated)

TT-S-227E (CRD-C 506)	Sealing Compound, Elastomeric Type, Multi-component (For Caulking, Sealing,and Glazing in Building and Other Structures)

3.3 U.S. Army Corps of Engineers Handbook for Concrete and Cement (CRD) Specifications.

CRD-C 513-74	Rubber Waterstops
CRD-C 572-74	Polyvinylchloride Waterstops

4. QUALITY ASSURANCE.

4.1 Materials Tests.

4.1.1 Field-Molded Sealants. Samples of sealant and primer, when use of primer is recommended by the manufacturer, as required in 5.2.1 below shall be tested by and at the expense of the Government

for compliance with Fed. Spec. TT-S-227. If the sample fails to meet specification requirements, new samples shall be provided and the cost of retesting will be deducted from payments due the Contractor at a rate of $300.00 per sample.

4.1.2 Non-Metallic Waterstops. Samples of materials and splices as required in 5.2.2 below 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. 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 $550.00 per material sample retested and $85.00 per splice sample retested.

4.2 Procedure and Performance Qualifications for Splicing Waterstops shall be demonstrated in the presence of the Contracting Officer.

4.2.1 Non-Metallic Waterstops. Procedure and performance qualifications for splicing non-metallic waterstops shall be demonstrated by the manufacture at the factory and the Contractor at the job site by each making three splice samples of each size and type of finished waterstop.

5. SUBMITTALS.

5.1 Test Reports. Certified manufacturer's test reports shall be provided for premolded expansion-joint filler strips, to verify compliance with the applicable specification.

5.2 Samples.

5.2.1 Field-Molded Sealant and Primer. One gallon of field-molded sealant and one quart of primer (when use of primer is recommended by the sealant manufacturer) shall be provided for testing.

5.2.2 Waterstops. 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 materials sample shall be a piece not less than 12 inches long cut from each 200 feet of finished waterstop furnished. For spliced segments of waterstops to be installed in the work, one splice 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 splice 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 splice sample shall be not less than 12 inches long.

6. MATERIALS.

6.1 Expansion Joint Filler Strips, Premolded shall conform ASTM D 1751 or ASTM D 1752, Type I or resin impregnated fiberboard conforming to the physical requirements of ASTM D 1752.

6.2 Joint Sealants and Seals.

6.2.1 Field-Molded Sealants shall conform to Fed. Spec. TT-S-227, Type II for vertical joints and Type I for horizontal joints, Class A. Bond breaker material shall be polyethylene tape, coated paper, metal foil or similar type materials. The back-up material shall be compressible, nonshrink, nonreactive with sealant, and nonabsorptive material type such as extruded butyl or polychloroprene foam rubber.

6.3 Waterstops.

6.3.1 Non-metallic. Rubber waterstops shall conform to CRD-C 513. Polyvinylchloride waterstops shall conform to CRD-C 572.

7. INSTALLATION. Joint locations and details, including materials and methods of installation of joint fillers and waterstops, shall be as specified, shown on the drawings and as directed. In no case shall any fixed metal be continuous through an expansion or contraction joint.

7.1 Expansion Joints. Premolded filler strips shall have oiled wood strips secured to the top thereof and shall be accurately positioned and secured against displacement to clean, smooth concrete surfaces. The wood strips shall be slightly tapered, dressed and of the size required to install filler strips at the desired level below the finished concrete surface and to form the groove for the joint sealant or seals to the size shown on the drawings. Material used to secure premolded fillers and wood strips to concrete shall not harm the concrete and shall be compatible with the joint sealant or seals. The wood strips shall not be removed until after the concrete curing period. The groove shall be thoroughly cleaned of all laitence, curing compound, foreign materials, protrusions of hardened concrete and any dust which shall be blown out of the groove with oil-free compressed air.

7.1.1 Joints With Field-Molded Sealant. Joints shall not be sealed when the sealant, air or concrete temperature is less than 40°F. Bond breaker and back-up material shall be installed where required. Joints shall be primed and filled flush with joint sealant in accordance with the manufacturer's recommendations.

7.2 Contraction Joints. Joints requiring a bond breaker shall be coated with curing compound or with bituminous paint. Waterstops shall be protected during application of bond breaking material to prevent them from being coated.

7.3 Waterstops shall be carefully and correctly positioned during installation to eliminate faulty installation that may result in joint leakage. The dimensions of rubber or polyvinylchloride waterstops shall conform to Drawing No. 40-02-03, attached at the end of this section. The bottom of each waterstop shall be embedded a minimum of 6 inches in firm rock or sealed to other cut-off systems. All waterstops shall be installed so as to form a continuous watertight diaphragm in each joint. Adequate provision shall be made to support and protect the waterstops during the progress of the 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.

7.3.1 Splices. Joints in waterstops shall be spliced together by qualified splicers using the approved splicing procedures to form a continuous watertight diaphragm.

7.3.1.1 Non-Metallic Waterstops. All splices shall be made on a bench in a temporary shop provided at the site of the installation or at the manufacturer's plant. A miter guide and portable power saw shall be used to cut the ends to be joined to insure good alignment and contact between joined surfaces. The continuity of the characteristic features of the cross section of the waterstop shall be maintained across the splice.

7.3.1.1.1 Rubber Waterstops. Splices shall be vulcanized in accordance with the approved procedure.

7.3.1.1.2 Polyvinylchloride Waterstops. Splices shall be made by heat sealing the adjacent surfaces in accordance with the approved procedure. A thermostatically controlled electric source of heat 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.

8. PAYMENT.

8.1 Expansion and Contraction Joints and Waterstops. No separate payment will be made for expansion and contraction joints and waterstops, and all costs in connection therewith shall be included in the contract unit or lump sum prices for the items of work to which the work is incidental.

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SECTION 3C - CONCRETE REINFORCEMENT

1. SCOPE. The work covered by this section consist of furnishing all equipment, materials, techniques and labor for providing and placing steel bars, welded wire fabric and accessories for concrete reinforcement.

2. RELATED WORK SPECIFIED ELSEWHERE.

2.1 Formwork. Section 3A, FORMWORK FOR CONCRETE.

2.2 Joints. Section 3B, JOINTS IN CONCRETE.

2.3 Concrete. Section 3D, CAST-IN-PLACE CONCRETE.

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 references thereto:

3.1 American Concrete Institute (ACI) Standards.

ACI 315-74	Manual of Standard Practice for Detailing Reinforced Concrete Structures
ACI 318-71	Building Code Requirements for Reinforced Concrete

3.2 American Society for Testing and Materials (ASTM) Standards.

A 184-74	Fabricated Deformed Steel Bar Mats for Concrete Reinforcement
A 185-73	Welded Steel Wire Fabric for Concrete Reinforcement
A 497-72	Welded Deformed Steel Wire Fabric for Concrete Reinforcement
A 615-76a	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
A 706-76	Low-Alloy Steel Defored Bars for Concrete Reinforcement
E 8-77a	Tension Testing of Metallic Materials

4. QUALITY ASSURANCE.

4.1 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.

5. SUBMITTALS.

5.1 Shop Drawings. 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 following:

(1) Reinforcement steel schedules complete with the quantity, shape and size, dimensions, weight per foot and total weights, and bending details.

(2) Details of bar supports including types, sizes, spacing and sequence.

5.2 Test Reports. Certified tests reports of reinforcement steel showing that the steel comply with the applicable specifications shall be submitted to the Contracting Officer by the Contractor. Reports shall be furnished for each steel shipment and shall be identified with specific lots prior to the use of steel in the work.

5.2.1 Chemical Composition of Reinforcement Steel. The Contractor shall provide the Contracting Officer three copies of the ladle analysis of each lot of reinforcement steel. The ladle analysis shall be obtained from the manufacturer and the Contractor shall certify that the steel furnished conform to the ladle analysis. The ladle analysis shall state the percentage of carbon, phosphorous, manganese and sulfur present in the steel.

5.3 Disposition Records. A system of identification which shows the disposition of specific lots of approved test materials in the work shall be established and submitted to the Contracting Officer before completion of the contract.

6. MATERIALS.

6.1 Steel Bars.

6.1.1 Billet-Steel Bars. Billet-steel bars shall conform to ASTM A 615, Grade 40.

(1) If Grade 40 bars are unavailable, the Contractor may substitute Grade 60 bars of the same size and spacing as indicated for Grade 40 bars when authorized by the Contracting Officer.

(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	3-1/2 bar diameters
#6, #7 and #8	5 bar diameters
#9, #10 and #11 (Grade 40)	5 bar diameters
#9, #10 and #11 (Grade 60)	7 bar diameters

6.1.2 Low-Alloy Bars. Low-alloy bars shall conform ASTM A 706.

6.1.3 Fabricated Bar Mats. Fabricated bar mats shall conform to ASTM A 184, clipped or welded mats of ASTM A 615 steel, Grade 40, 50, or 60, bar size and spacing as indicated on the drawings.

6.2 Welded Wire Fabric. Welded wire fabric shall conform to ASTM A 185, gages, spacing and arrangement of wires as indicated on the drawings or ASTM A 497, sizes, spacing, deformations and dimensions as indicated on the drawings.

6.3 Accessories.

6.3.1 Bar supports. Bar supports shall conform to ACI 315. Bar supports for formed surfaces exposed to view or to be painted shall be plastic protected wire, stainless steel or precast concrete supports. Precast concrete bar supports shall be wedge-shaped, not larger than 3-1/2 x 3-1/2-inchs, of thickness equal to that indicated for concrete cover and shall have an embedded hooked tie wire for anchorage. If formed surface is exposed to view, the precast concrete bar support shall be the same quality, texture and color as the finish surface.

6.3.2 Wire Ties. Wire ties shall be 16-gage or heavier black annealed wire.

7. INSTALLATION. Reinforcement steel and accessories shall be installed or placed as specified and as shown on contract and approved shop drawings. Placement details of reinforcement and accessories not specified or shown on the drawings shall be in accordance with ACI 315 or ACI 318. 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 reinforcement 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.

7.1 Hooks and Bends. Reinforcement bars may be mill or field bent. All bars shall be bent cold unless otherwise authorized. No 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.

7.2 Placing Tolerances.

7.2.1 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 may not vary from the indicated position by more than one bar diameter nor more than one inch.

7.2.2 *Concrete Cover. The minimum concrete cover of main reinforcement steel shall be as indicated on the drawings. The tolerances shall be as follows:*

MINIMUM COVER	VARIATION
6"	+ 1/2"
4"	+ 3/8"
3"	+ 3/8"

7.3 Splicing. Splices in reinforcement steel shall be as specified, shown on the drawings or as directed by the Contacting 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.

7.3.1 Lapped Splices. Lapped splices shall be used. Bar laps may be placed in contact and securely tied or may be 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 or welded wire fabric shall conform to the requirements of ACI 318, except when otherwise shown on the drawings.

8. PAYMENT. No separate measurement or unit price payment will be made for the work or materials as specified in this section. All costs in connection with this work shall be included in the applicable contract bid prices to which the work pertains.

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SECTION 3D - CAST-IN-PLACE CONCRETE

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SECTION 3D - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

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1.2 Concrete Reinforcement - Section 3C

1.3 Formwork for Concrete - Section 3A

1.4 Pointing Cut Stone Masonry - Section 4A

2. REFERENCE STANDARDS.

2.1 American Concrete Institute (ACI) Standards.

ACI 211.1-74 (CRD-C99)	Recommended Practice for Selecting Proportions for Normal Weight and Heavyweight Concrete
ACI 214-65	Recommended Practice for Evaluation of Compression Test Results of Field Concrete
ACI 305	Hot Weather Concreting - Committee Report, 1977 - Title No. 74-33
ACI 309-72	Recommended Practice for Consolidation of Concrete

2.2. American Society for Testing and Materials (ASTM) with Corresponding CRD Standard Indicated Where Available.

C 31-69 (CRD-C 11)	Making and Curing Concrete Test Specimens in the Field
C 33-77 (CRD-C133)	Concrete Aggregates
C 39-72 (CRD-C14)	Compressive Strength of Cylindrical Concrete Specimens
C 70-73 (CRD-C 111)	Surface Moisture of Fine Aggregate
C 94-74a (CRD-C 31)	Ready-Mixed Concrete
C 125-76 (CRD-C 43)	Terms Relating to Concrete and Concrete Aggregates

C 136-76 (CRD-C 103)	Sieve or Screen Analysis of Fine and Coarse Aggregates
C 143-74 (CRD-C 5)	Slump of Portland Cement Concrete
C 171-69 (CRD-C 310)	Sheet Materials for Curing Concrete
C 172-71 (CRD-C 4)	Sampling Fresh Concrete
C 192-76 (CRD-C 10)	Making and Curing Concrete Test Specimens in the Laboratory
C 231-75 (CRD-C 41)	Air Content of Freshly Mixed Concrete by the Pressure Method
C 494-77 (CRD-C 87)	Chemical Admixtures for Concrete
C 566-67 (CRD-C 113)	Total Moisture Content of Aggregate by Drying
D 75-71 (CRD-C 155)	Sampling Aggregates
D 98-77 (CRD-C 505)	Calcium Chloride
E 329-72 (CRD-C 500)	Inspection and Testing Agencies for Concrete, Steel and Bituminous Materials as Used in Construction.

2.3 Concrete Plant Manufacturer's Bureau (CPMB).

Mar. 1, 1973 Edition (CRD-C 95) Concrete Plant Standards

2.4 Federal Specifications (Fed. Specs.) with Corresponding CRD Standards.

SS-C-1960/3 (CRD-C 200) Cement, Portland

2.5 National Bureau of Standards (NBS) Handbook.

44 Specifications, Tolerance and Other Technical Requirements for Commercial Weighing and Measuring Devices (4th Edition 1971 with Replacement Sheets)

2.6 U.S. Army Corps of Engineers Handbook for Cement and Concrete (CRD).

CRD-C 13-66	Air Entraining Admixture for Concrete
CRD-C 55-73	Concrete Mixer Performance

CRD-C 100-75	Concrete Aggregates and Aggregate Sources and Selection of Material for Testing
CRD-C 112-69	Surface Moisture in Aggregate by Water Displacement
CRD-C 300-72	Membrane-Forming Compounds for Curing Concrete
CRD-C 400-63	Water for Use in Mixing or Curing Concrete

3. QUALITY ASSURANCE

3.1 Preconstruction Testing

3.1.1 Aggregates. If the Contractor proposes to furnish aggregates from a source not listed in SP-21, samples consisting of not less than 7500 pounds of each size coarse aggregate and 1500 pounds of fine aggregate taken under the supervision of the Contracting Officer in accordance with CRD-C 100 shall be delivered to New England Division, Corps of Engineers, Division Laboratory, 424 Trapelo Road, Waltham, MA 02154 within 15 days after notice to proceed. Sampling and shipping of samples shall be at the Contractor's expense. A maximum of 60 days will be required to complete evaluation of the aggregates. Testing by and at the expense of the Government will be in accordance with the applicable CRD or ASTM test methods. Tests to which aggregate may be subjected are specified gravity, absorption, Los Angeles abrasion, soundness in magnesium sulfate, petrographic analysis, freezing-and-thawing in concrete, alkali-aggregate reaction, organic impurities and other tests that are necessary to demonstrate that the aggregate is of a quality which is at least equivalent to those listed in SP 21.

3.2 Construction Testing By Government. The Government will sample and test agregates and concrete to determine compliance with the specifications. The Contractor shall provide facilities and labor as may be necessary for procurement of representative test samples. When the Contractor proposes to reduce concrete mixing time, uniformity test at reduced mixing time will be made by the Government at the Contractor's expense. Samples of aggregates will be obtained at the point of batching. Concrete will be sampled in accordance with ASTM C 172. Slump and air content will be determined in accordance with ASTM C 143 and ASTM C 231, respectively. Compression test specimens will be made and cured in accordance with ASTM C 31 and compression test specimens tested in accordance with ASTM C 39. Samples for strength test of each class of concrete placed each day will be taken not less than once each day, not less than once for each 150 cu. yd. of concrete, nor less than once for each 5,000 sq.

ft. of surface area of one side of slabs or walls. Three specimens will be made from each sample, two will be tested at 28 days for acceptance and one will be tested at 7 days for information. The acceptance test results will be the average of the strengths of the two specimens tested at 28 days.

4. EVALUATION AND ACCEPTANCE.

4.1 Concrete. The strength of the concrete will be considered satisfactory so long as the average of all sets of three consecutive test results equal or exceed the required specified strength f'_c and no individual test result falls below the specified strength f'_c by more than 500 pounds per square inch. Structural analysis or additional testing may be required at the Contractor's expense when the strength of the concrete in the structure is considered potentially deficient. Concrete work judged inadequate by structural analysis or by results of tests shall be reinforced with additional construction as directed by the Contracting Officer or shall be replaced at the Contractor's expense.

4.2 Construction Tolerances. Variation in alignment, grade and dimensions of the structures from the established alignment, grade and dimensions shown on the drawing shall be within the tolerances specified in the following table:

TABLE I

(1)	Departure from established alignment		. . . . . 1-inch
(2)	Departure from established grades		. . . . . 1-inch
(3)	Variation from the plumb or the specified batter in the lines and surfaces of walls.	Exposed, in 10 feet . . .	1/2-inch
		Backfilled, in 10 feet. .	1-inch
(4)	Variation from the level or from the grades indicated on the drawings in slabs, horizontal grooves, and railing offsets	Exposed, in 10 feet . . .	1/2-inch
		Backfilled, in 10 feet . .	1-inch
(5)	Variation in cross-sectional dimensions of slabs, walls, and similar parts	Minus	1/4-inch
		Plus	1/2-inch
(6)	Variation in thickness of bridge slabs	Minus	1/8-inch
		Plus	1/4-inch

(7) Footings:

a.	Variation of dimensions in plan	Minus . . . . . 1/2-inch Plus . . . . . 2-inch when formed or plus 3-inches when placed against unformed excavation.
b.	Misplacement of eccentricity	2 percent of the footing width in direction of misplacement but not more than . . . 2-inches
c.	Reduction in thickness	Minus . . . . . 5 percent of specified thickness

(8) Variation in the sizes and locations of slab and wall openings. 1/2-inch

4.3 Surface Requirements. The surface requirements for the classes of finishes required by Section 3A, paragraph 5.1 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	
	Abrupt, inches	Gradual, inches
A	1/8	1/4
B	1/4	1/2
D	1	1
F	1/8	1/4

4.4 Appearance. All surfaces which are permanently exposed shall be cleaned stained or otherwise discolored, by a method which does not harm the concrete and which is approved by the Contrating Officer.

5. SUBMITTALS.

5.1 Test Reports.

5.1.1 Concrete mixture proportions shall be submitted for approval. The proportions of all ingredients and nominal maximum coarse aggregate size that will be used in the manufacture of each

quality of concrete shall be stated. Proportions shall indicate weight of cement and water and weights of aggregates in a saturated surface-dry condition. The submission shall be accompanied by test reports from a laboratoy complying with ASTM E 329 attesting that proportions thus selected will produce concrete of the qualities indicated. No substitution shall be made in the source or type of material used in the work without additional test to show that the new materials and quality of concrete are satisfactory.

5.1.2 Cement will be accepted on the basis of manufacturer's certification of compliance, accompanied by mill test reports that materials meet the requirements of the specification under which it is furnished. Certification and mill test reports shall identify the particular lot furnished. No cement shall be used until notice of acceptance has been given by the Contracting Officer. Cement will be subject to check testing from samples obtained at the mill, 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.

5.2 Manufacturers' Certificate.

5.2.1 Accelerating Admixture shall be certified for compliance with all specification requirements.

5.2.2 Impervious sheet curing materials shall be certified for compliance with all specification requirements.

5.2.3 Air-entraining admixture shall be certified for compliance with all specification requirements.

5.2.4 Water-reducing admixture shall be certified for compliance with all specification requirements.

5.2.5 Curing compound shall be certified for compliance with all specification requirements.

5.3 Review of Plant, Equipment and Methods.

5.3.1 Batch Plant. Details of the data on concrete plant shall be submitted for review by the Contracting Officer for conformance with 3D-8.2.

5.3.2 Mixers. The make type and capacity of concrete mixers proposed for mixing concrete shall be submitted for review by the Contracting Officer for conformance with 3D-8.3.

5.3.3 Conveying Equipment. The methods and equipment for transporting, handling, and depositing the concrete shall be submitted for review by the Contracting Officer for conformance with 3D-10.

5.3.4 Placing. All placing equipment and methods shall be submitted for review by the Contracting Officer for conformance with 3D-11.

5.3.5 Joint Clean-up. The method and equipment proposed for joint clean-up shall be submitted for review by the Contracting Officer for conformance with 3D-9.1. Method of waste disposal for any method proposed for joint clean-up shall be approved by the Contracting Officer.

5.3.6 Curing. The curing medium and methods to be used shall be submitted for review by the Contracting Officer for conformance with 3D-14.

5.3.7 Cold-weather Requirements. If concrete is proposed to be placed under cold weather conditions the materials, methods and protection proposed to accomplish it in accordance with the requirements of 3D-11.3 and 3D-14.5 shall be approved by the Contracting Officer.

5.3.8 Hot-weather Requirements. If concrete is proposed to be placed under hot weather conditions the materials and methods proposed to accomplish it in accordance with the requirements of 3D-11.4 and 3D-14.6 shall be approved by the Contracting Officer.

PART II - PRODUCTS

6. MATERIALS.

6.1 Cement shall be portland cement and shall conform to the appropriate specifications listed below:

6.1.1 Portland Cement. Fed. Spec. SS-C-1960/3, Type I or Type II dark (including false set requirements)

6.2 Aggregates shall be produced from the sources in SP-71 or from another source when approved in accordance with SP-21 and 3D-3.1.5. Fine aggregate will conform to the grading requirements of ASTM C-33 and coarse aggregates will conform to the grading requirements of ASTM C-33 size (4) and (67) or (467). The nominal maximum size shall be as listed in 3D-7.2.

6.3 Admixtures to be used, when required or permitted shall conform to the appropriate specification listed below:

6.3.1 Air-entraining admixture. CRD-C 13.

6.3.2 Accelerating admixture. Calcium chloride conforming to ASTM D 98.

6.3.3 Water-reducing or retarding admixtures ASTM C 494, Type A, B or D.

6.4 Curing Materials.

6.4.1 Impervious sheet materials ASTM C 171, type optional except polyethylene film, if used, shall be white opaque.

6.4.2 Membrane-forming curing compound CRD-C 300, non-pigmented, or chlorinated rubber base as required in 3D14.3. Non-pigmented compound shall contain a fugitive dye.

6.5 Water for mixing shall be fresh, clean and drinkable, except that undrinkable water may be used if it meets the requirements of CRD-C 400. Water for curing shall not contain any substance that is injurious to the concrete.

6.6 Grout for "Grouted Hand-Placed Stone Protection" shall be proportioned and installed as specified in Section, STONE PROTECTION. Sand and cement materials for making grout shall conform to the requirements as specified in this section.

6.7 Patching Material for Resurfacing of Eroded Strecher Members at Area "M" shall be similar or approved equal to "Sikadur Hi Mod" as manufactured by Sika Chemical Company, Lindhurst, N.J. The resurfacing procedure shall be in accordance with the recommendations of the patching material manufacturer.

6.8 Materials for Forming Weep Holes. Material for forming weep holes in concrete structures shall be lengths of PVC pipe or other approved non-ferrous material of the proper diameter and length for each application as shown.

7. PROPORTIONING.

7.1 Quality and Location. Concrete of various qualitites indicated and as required under other sections shall be proportioned for use in various structures or portions of structures as follows:

7.1.1 Strength. Specified compressive strength f'_c shall be as follows:

Compressive Strength @ 28 days, psi	Structure or Portion of Structure
3000	all concrete structures

7.1.2 Maximum Water - Cement Ratio. Maximum water cement ratio shall be as follows:

Water-Cement Ratio, by wt	Structure or Portion of Structure
0.58	all concrete structures

7.2 Nominal Maximum size coarse aggregate shall be (1-1/2) inches 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 4-1/2 inches or when the minimum clear spacing between reinforcing is less than 2 inches.

7.3 Air Content as determined by ASTM C 231 shall be 5.0 ± 1.5 percent except that when the nominal maximum size coarse aggregate is 3/4-inch it shall be 6.0 ± 1.5 percent.

7.4 Slump. The slump shall be determined in accordance with ASTM C 143 and shall not depart more than 1-1/2-inches from that stipulated below:

Structural Element	Slump; inches
Massive or lightly reinforced sections, and all slabs	1-1/2
Other constuction	2-1/2

7.5 Concrete Porportioning. Trial design batches and testing requirements for various qualities of concrete specified shall be the responsibility of the Contractor. 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 specified requirements. Trial mixtures having proportions, consistencies and air content suitable for the work shall be made based on ACI Standard 211.1, using at least three different water-cement ratio which will produce a range of strength encompassing those required for the work. Trial mixtures shall be designed for maximum permitted slump and air content. The temperature of concrete in each trial batch shall be reported. For each water-cement 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 at 7 and 28 days in accordance with ASTM C 39. From these test results a curve shall be plotted showing the relationship between water-cement ratio and strength.

7.6 Average Strength. For each portion of the structure, proportions shall be selected so that the maximum permitted water-cement ratio is not exceeded and so as to produce an average strength f_{cr} exceeding the specified strength f_c by the amount indicated below. Where the production facility has a standard deviation record determined in accordance with ACI 214, based on 30 consecutive strength tests of similar mixture proportions as proposed, obtained within one year of the time when concrete placing is expected, it shall be used in selecting average strength. The average strength used as the basis for selecting proportions shall exceed the specified strength f'_c by at least

350 psi if standard deviation is less than 300 psi
550 psi if standard deviation is 300 to 450 psi
750 psi if standard deviation is 450 to 600 psi
900 psi if standard deviation is 600 to 750 psi

If the standard deviation exceeds 750 psi or if a standard deviation record is not available, proportions shall be selected to produce an average strength at least 1,000 psi greater than the specified strength.

7.7 Colored Concrete. In areas designated on the drawings to have a color matching adjacent cut stone walls, emulsified carbon black shall be added to concrete to obtain the desired color. The carbon black shall be added and thoroughly mixed with dry cement prior to addition of the water. Amount of carbon black used shall be in the range of 2 to 10% by weight of the cement. Sample slabs 12"x 12"x 3" shall be prepared using varying percentages and submitted to the Contracting Officer for approval. The approved percentage shall be used in one of the approved sample panels required in Section 3A paragraph 3.3. The carbon black shall be used in accordance with manufacturers written instructions and shall be compatible for use with concrete produced for the project.

PART III- EXECUTION

8. PRODUCTION OF CONCRETE.

8.1 Capacity. The batching and mixing equipment shall have a capacity of at least 40 cubic yards per hour.

8.2 Batching Plant shall conform to the requirements of the concrete Plant Standards of CPMB and as specified; however, rating plates attached to batch plant equipment are not required.

8.2.1 Equipment. The batching controls shall be partially automatic. Separate bins or compartments shall be provided for each size group of aggregate and cement. Aggregate shall not be weighed in the same batcher with cement. If measured by weight, 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. Where use of truck mixers make this requirement impracticable, the admixture dispensers shall be interlocked with the sand batcher. Admixtures will not be combined prior to introduction in water or sand. 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 or aggregates from each bin or compartment.

8.2.2 Scales. The weighing equipment shall conform to the applicable requirements of NBS Handbok 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. The tests shall be made at the frequency required in 3D-17.2.4 and in the presence of a Government inspector.

8.2.3 Batching Tolerances.

8.2.3.1 Weighing Tolerances. Whichever of the following tolerances is greater shall apply, based on required scale reading.

Material	Percent of Required Weight	Percent of Scale Capacity
Cement	±1	±0.3

Aggregate	±2	±0.3
Water	±1	±0.3
Admixture	±3	±0.3

8.2.3.2 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
Admixtures: Plus or minus 3 percent.

8.2.4 Moisture Control. The plant shall be capable of ready adjustment to compensate for the varying moisture contents of the aggregates, and to change the weights of the materials being batched.

8.3 Mixers.

8.3.1 General. The 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 on the manufacturer's data plate. The mixers shall be maintained in satisfactory operating condition, and the mixer drums shall be kept free from hardened concrete. Should any mixer at any time produce unsatisfactory results, its use shall be promply discontinued until it is repaired.

8.3.2 Concrete plant mixers shall be tilting, non-tilting, horiizontal shaft or vetical-shaft type and shall be provided with an acceptable device to lock the discharge mechanism until the required mixing time has elasped. The mixing time and uniformity shall conform to 3D-8.3.2.1.

8.3.2.1 Mixing Time and Uniformity. In the absence of uniformity data for concrete mixers, the mixing time for each batch after all solid materials are in the mixer shall be one minute for mixers having a capacity of one cubic yard, provided that all the mixing water is introduced before one-fourth of the mixing time has elapsed. For mixers of greater capacity, this minimum time shall be increased 15 seconds for each additional cubic yard or fraction thereof. These mixing times are predicated on operation at designated speed and proper intoduction of materials into the mixer. The mixing time will be increased to secure the required uniformity when the average variability index for the tests peformed in accordance with 3D-17.2.12.1 is less than any of the following uniformity requirements:

Test	Average Variability Index
Water content, % by wt.	91.5
Coarse aggregate content, % by wt.	90.5
Unit - weight of air-free mortar, % by wt.	98.5
Cement content of dried motar, % wt.	82.5

The mixing time may be reduced, when requested by the Contractor, to the minimum time required to meet all the uniformity requirements. Mixer performance tests in accordance with CRD-C 55 at reduced mixing times will be performed by the Government at the Contractor's expense.

8.3.3 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. Truck mixers shall not be used to mix or to agitate concrete with greater than 1-1/2 inch nominal maximum size aggregate.

9. PREPARATION FOR PLACING.

9.1 Construction Joints. Concrete surfaces to which other concrete is to be bonded shall be prepared for receiving the next lift or adjacent concrete by cleaning with either wet sandblasting, high pressure water jet, or other approved method; however, approved wet sandblasting equipment shall be provided.

9.1.1 High-Pressure Water Jet. A stream of water under a pressure of not less than 3000 psi may be used for cleaning. Its use shall be delayed until the concrete is sufficiently hard so that only the surface skin or mortar is removed and there is no undercutting of coarse aggregate particles. Where the cleaning occurs more than two days prior to placing the next lift or where the work in the area subsequent to the cleaning causes dirt or debris to be deposited on the surface, the surface shall be cleaned again as the last operation prior to placing the next lift. If the water jet is incapable of a satisfactory cleaning, the surface shall be cleaned by wet sandblasting..

9.1.2 Wet sandblasting. When employed in the preparation of construction joints, wet sandblasting shall be performed as the final operation completed before placing the following lift. The operation shall be continued until all accumulated laitance, coatings, stains, debris, and other foreign materials are removed. The surfaces of the concrete shall then be washed thoroughly to remove all loose material. The surface shall again be washed just prior to placing the succeeding lift.

9.1.3 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. Method of disposal shall be subject to approval.

9.2 Embedded Items. Before placing 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 the voids.

10. CONVEYING.

10.1 General. Concrete shall be conveyed from mixer to forms as rapidly as practicable and within the time interval in 3D-11.2 by methods which will prevent segregation or loss of ingredients. Any concrete transferred from one conveying device to another shall be passed through a hopper which 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. Telephonic or other satisfactory means of rapid communication between the mixing plant and the forms in which concrete is being placed shall be provided and available for use by Government inspectors.

10.2 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 5 times the nominal maximum size aggregate and the area of the gate opening shall be not less than two-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 for 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.

10.3 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. Non-agitating equipment may be used for transporting plant mixed concrete over a smooth road when hauling time is less than 15 minutes. Bodies of non-agitating equipment shall be smooth, watertight, metal containers equipped with gates that will permit the discharge of the concrete. Covers shall be provided for protection against the weather.

10.4 Chutes. When concrete can be placed directly from a truck mixer, agitator or non-agitating equipment, the chutes attached to this equipment 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.

10.5 Belt Conveyors. Belt conveyors may be used when approved. Such conveyors shall be designed and operated to assure 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.

10.6 Pump Placement. 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. The maximum size coarse aggregate will 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.

11. PLACING.

11.1 General. 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 postion 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 1-1/2 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. The surface of construction joints shall be kept continuously wet for the first twelve hours during the twenty-four hour period prior to placing concrete. Free water shall be removed prior to placement of concrete. Sufficient placing capacity shall be provided so that concrete placement can be kept plastic and free of cold joints while concrete is being placed.

11.2 Time Interval Between Mixing and Placing. Concrete shall be placed within thirty minutes after it has been mixed except when conveyed by agitating equipment. When concrete is truck mixed or when a truck mixer or agitator is used for transportating concrete mixed by a concrete plant mixer, the concrete shall be delivered to the site of the work and discharge shall be completed with 1-1/2 hours after introduction of the cement to the aggregates. Concrete shall be placed within 15 minutes after it has been discharged.

11.3 Cold-Weather Placing. Concrete shall not be placed without a procedure approved in accordance with 3D-5.3.7 when the concrete is likely to be sujected to freezing temperatures before the expiration of the curing period. The ambient temperature of the space adjacent to the concrete placement and surfaces to receive concrete shall be maintained at not less than 40°F. The placing temperature of the concrete having a minimum dimension less than 12 inches shall be between 60° and 75°F. The placing temperature of the concrete having a minimum dimension greater than 12 inches shall be between 50° and 75°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, except that calcium chloride may be used as an accelerator. The amount of calcium chloride in the concrete shall not exceed 2 percent by weight of cement being used, and it shall be introduced into the concrete in solution.

11.4 Hot-Weather Placing. Concrete shall be properly placed and finished with approved procedures in accordance with 3D-5.3.8. The concrete placing temperature shall not exceed 85°F. Cooling of the mixing water and/or aggregates will be required to obtain an adequate placing temperature. An approved retarder may be used to facilitate placing and finishing. Steel forms and reinforcement shall be cooled prior to concrete placement when steel temperatures are greater than 120°F. Conveying and placing equipment shall be cooled if necessary to maintain proper concrete placing temperature.

11.5 Concrete on Earth Foundations. Earth surfaces upon which concrete is to be placed shall be clean, damp, and free from frost, ice, and standing or runnning water. Prior to placing concrete the earth foundation shall have been satisfactorily compacted in accordance with the provisions of Sections EXCAVATION GENERAL and EARTHEN FILLS.

11.6 Concrete on Rock Foundations. Earth surfaces upon which concrete is to be placed or shall be clean, free from oil, standing or running water, ice, mud, drummy rock, coatings, debris and loose, semi-detached or unsound fragments. Faults or seams shall be cleaned to a satisfactory depth and to firm rock on the sides. Immediately

before concrete is placed, all rock surfaces shall be cleaned thoroughly by the use of air-water jets, wet sandblasting or other approved methods. All devices necessary to produce a foundation free of running or standing water shall be installed by the Contractor and securely fastened in place so as to prevent their being jarred loose by concrete placement. All rock surface shall be kept continuously wet for at least 24 hours immediately prior to placing concrete thereon. All approximately horizontal surfaces shall be covered, immediately before the concrete is placed, with a layer of mortar of the composition directed.

11.7 Consolidation. Immediately after placing, each layer of concrete shall be consolidated by internal vibrating equipment. Vibrators will not be used to transport concrete within the forms. Hand spading may be required if necessary with internal vibration along formed surfaces permanently exposed to view. The vibrating equipment shall at all times be adequate in number of units and power of each unit 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. 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 (inches)	Frequency VPM	Amplitude (in.)
Thin walls	1-1/4 - 2-1/2	9000 - 13500	0.02 - 0.04
General construction	2 - 3-1/2	8000 - 12000	0.025 - 0.05

The frequency and amplitude shall be within the range indicated in the table above when determined in accordance with 3D-17.2.9. 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 layer if such exists. It shall be held stationary until the concrete is consolidated and then withdrawn slowly.

12. REPAIR OF SURFACE DEFECTS. Within 24 hours after form removal, all fins and loose materials shall be removed and surface defects including tie holes shall be remedied. All honeycombed and other defective concrete shall be repaired. All unsound concrete shall be removed from defective areas. Defective areas larger than 36 square inches and deeper than steel or 4 inches shall be delineated in rectangular shape by a saw cut a minimum depth of 1-inch and repaired with concrete replacement. Minor honeycomb and holes left by the removal of tie rods in all surfaces not to receive

additional concrete shall be reamed or chipped and filled with dry pack mortar. If chipping is necessary the edges shall be perpendicular to the surface or slightly undercut. As determined by trial mixtures, the cement used in the mortar or concrete for all surfaces permanently exposed to view shall be a blend of portland cement and white cement properly proportioned so that the final color when cured will be the same as adjacent concrete. Temperature of the concrete, ambient air, replacement concrete or mortar during remedial work including curing shall be above 50°F. The prepared area shall be dampened, brush-coated with a neat cement grout or with an approved epoxy resin, and filled with mortar or concrete. The mortar shall consist of 1 part cement to 2-1/2 parts fine aggregate. The quantity of mixing water shall be the minimum necessary to obtain a uniform mixture. The mortar shall be remixed without addition of water until it obtains the stiffest consistence that will permit placing. Mortar shall be thoroughly compacted in place and struck off to adjacent concrete. Replacement concrete shall be drier than the ususal mixture and thoroughly tamped into place and finished. Forms shall be used if required. Metal tools shall not be used to finish permanently exposed surfaces. The patched areas shall be cured for seven days.

13. FINISHING UNFORMED SURFACES.

13.1 General. The ambient temperature of spaces adjacent to surfaces being finished shall be not less than 50°F. All unformed surfaces that are not to be covered by additional concrete or backfill shall be finished to the elevation shown on the drawings. Surfaces to receive additional concrete or backfill shall be brought to elevation shown on the drawings and left true and regular. Exterior surfaces shall be sloped for drainage unless otherwise shown on the drawings or as directed. Joints shall be carefully made with a jointing tool. The finished surfaces shall be protected from stains or abrasions. Surfaces or edges likely to be injured during the construction period shall be protected from damage. Tolerance for a screeded finish shall be true planes within 3/8-inch in 10 feet as determined by a 10-foot straightedge placed anywhere on the slab in any direction. Tolerance for a floated finish shall be true planes within 1/4-inch in 10-feet as determined by a 10-foot straightedge placed anywhere on the slab in any direction.

13.2 Float Finish. All unformed surfaces of concrete that are not to be covered by additional concrete or backfill, shall have a 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 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 deep imprint, shall be floated to a true and even plane. Floating may be performed by use of hand or power driven equipment. Hand floats shall be made of magnesium or aluminum.

14. CURING AND PROTECTION.

14.1 General. All concrete shall be cured by an approved method for the period of time given below:

Type I, portland cement	7 Days
Type II, portland cement	14 Days

Immediately after placement, concrete shall be protected from premature drying, extremes in temperatures, rapid temperature change, mechanical injury and injury from rain and flowing water. All materials and equipment needed for adequate curing and protection shall be available and at the placement site prior to start of concrete placement. Concrete shall be protected from the damaging effects of rain for 12 hours, flowing water for 14 days. All concrete shall be adequately protected from damage. No fire or excesive heat shall be permitted near or in direct contact with concrete at any time.

14.2 Moist Curing. Concrete moist curing shall be maintained continuously (not periodically) wet for the entire curing period. If water or curing materials used stain or discolor concrete surfaces which are to be permanently exposed, they shall be cleaned as required in 3D-4.4. When wooden form sheathing is left in place during curing, the sheathing shall be kept wet at all times. Horizontal surfaces shall be cured by ponding, by covering with a minimum uniform thickness of 2 inches continuously saturated sand, or by covering with saturated non-staining burlap or cotton mats or sealed impervious sheet materials. The following exceptions are permitted:

(1) Horizontal construction joints may be allowed to dry for twelve hours immediately prior to placing of the following lift.

(2) Where insulation is approved for cold weather protection, all joints in the insulation shall be sealed to prevent moisture loss and maintained sealed throughout curing period.

14.3 Membrane Curing. Concrete may be cured with an approved curing compound in lieu of moist curing except that membrance curing will not be permitted on any surface to which sack rubbed finish is to be applied, or on any surface containing protruding steel reinforcement.

14.3.1 A non-pigmented type curing compound, containing a fugitive dye, conforming to CRD-C 300 with the reflective requirements waived may be used on surfaces which will be exposed to view

when the project is completed. In hot weather, concrete cured with the non-pigmented type shall be shaded from the direct rays of the sun for the first 3 days of the curing period.

14.3.2 The curing coumpounds 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. The curing compound shall be applied in a 2-coat continuous operation by approved motorized power spraying equipment and at a uniform coverage of not more than 400 sq. ft. per gallon for each coat. Concrete surfaces which have been subjected to rainfall within 3 hours after curing compound has been applied shall be resprayed by the method and at the coverage herein 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 which will disrupt the continuity of the curing membrane.

14.4 Impervious-sheet Curing. The following concrete surfaces may be cured using impervious sheets: Horizontal concrete surfaces. All surfaces shall be thoroughly wetted and be completely covered with waterproof paper, polyethylene film or with polythylene-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 appears during the curing period.

14.5 Cold Weather. When the mean daily outdoor temperature is less than 40°F, the temperature of the concrete shall be maintained between 50°F and 70°F for the required curing period. In addition, during the period of protection removal, the air temperature adjacent during the period of protection removal, the air temperature adjacent to the concrete surfaces shall be controlled so that concrete near the surfaces will not be subjected to a temperature differential of more than 25°F as determined by observation of ambient and concrete temperatures. Curing compounds shall not be used on concrete surfaces which are maintained at curing temperature by use of free steam.

14.6 Hot Weather. When the rate of evaporation of surface moisture, as determined by use of Fig. 2.1.5 of ACI 305, may

reasonably be expected to exceed 0.2 lb per sq. ft. 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 operation will allow.

15. FINISHING FORMED SURFACES.

15.1 General. Surfaces, unless other type of finish is specified, shall be left with the texture imparted by the forms except defective surfaces shall be repaired in accordance with 3D-12. Uniform color shall be maintained by use of only one mixture design without changes in materials or proportions for any structure or portion of structure which 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 architectural features. The finished surface shall duplicate the approved sample panels, Section 3A, paragraph 3.3. Forms shall not be reused if there is any evidence of surface wear or defects which would impair the quality of the surface.

16. OMITTED.

17. CONTRACTOR QUALITY CONTROL.

17.1 General. The Contractor shall perform the inspection and test described in 3D-17.2, and based upon the results of these inspections and tests he shall take the action required in 3D-17.3. Reports shall be submitted as required in 3D-17.3 and 3D-17.4. The laboratory performing the tests shall confrom to ASTM E 329.

17.2 Inspection Details and Frequency of Testing.

17.2.1 Fine Aggregates

17.2.1.1 Grading. At least once during each shift in which concrete is being delivered, there shall be one sieve analysis and fineness modulus determination in accordance with ASTM C 136 and C 125, respectively, for the fine aggregate. 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.

17.2.1.2 Moisture Content. There shall be at least four tests for moisture content in accordance with either ASTM C 70, C 566, or CRD-C 112 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.

17.2.2 Coarse Agregate.

17.2.2.1 Grading. At least once during each shift concrete is being delivered, there shall be a sieve analysis in accordance with ASTM C 136 for each size group of coarse aggregate. The location at which samples are taken may be selected by te Contractor as the most advantageous for production control. However, the Contractor is responsible for delivering the aggregate to the mixer within specifications limits. A test record of samples of aggregate taken shall show the results of the 5 most recent tests including the current test. The Contractor may adopt limits for control coarser than the specification limits for samples taken other than at the batch plant bins to allow for degradation during handling.

17.2.2.2 Moisture Content. A test for moisture content of each size of coarse aggregate shall be made at least once a shift. 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 for fine aggregate in 3D-17.2.1.2.

17.2.3 Deleterious Substances. When in the opinion of the Contracting Officer, a problem exists in connection with deleterious substances in fine or coarse aggregates, tests shall be made in accordance with ASTM C 33. Testing frequency shall be not less than one per week.

17.2.4 Scales.

17.2.4.1 Weighing Accuracy. The accuracy of the scales shall be checked by test weights at least once a month for conformance with the applicable requirement of 3D-8.2.2. Such tests shall also be made whenever there are variations in properties of the fresh concrete which could result from batching errors.

17.2.4.2 Batching Accuracy. One a week the accuracy of each batching device shall be checked during a weighing operation by noting and recording the required weight, and the actual weight batched.

17.2.5 Batch-Plant Control. When the concrete plant is operating the measurement of all constituent material including cement, each size of aggregate, water and admixtures shall be continuously controlled. The aggregate weights and amounts of added water to compensate for free moisture in the aggregates shall be adjusted as necessary. The amount of air-entraining admixture shall be adjusted to control air content within specified limits. A report shall be prepared indicating type and source of cement 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 batched aggregate and water weights per cubic yard for each class of concrete batched during plant operation.

17.2.6 Concrete.

17.2.6.1 Air Content. At least two tests for air content shall be made on randomly selected batches of each class of concrete 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 inspector. Tests shall be made in accordance with ASTM C 231. The average of each set of two tests shall be plotted on a control chart on which the average is set at 5.0 percent and the upper and lower control limits at 6.0 and 4.0 percent respectively. The range shall be plotted on a control chart on which the upper control limits is 2.0 percent. For concrete having a nominal maximum aggregate size of 3/4-inch, the average shall be set at 6.0 percent and the lower and upper control limits at 5.0 and 7.0 percent respectively.

17.2.6.2 Slump. At least two slump tests shall be made on randomly selected batches of each mixture of concrete during each day's concrete production in accordance with ASTM C 143. Additional tests shall be made when excessive variation in workability is reported by the placing foreman or Government inspector. The average of each set of two tests shall be plotted on a control chart on which the average is that stipulated in 3D-7.4 and the upper and lower limits are set 1.0 inch above and below the average. The range shall be plotted on a control chart on which the upper control limit is 2.0 inches.

17.2.7 Preparation for Placing. Foundation or construction joints, 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 it is ready to receive concrete. The results of each inspection shall be reported in writing.

17.2.8 Placing. 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 by the Contracting Officer and shall be responsible for measuring and recording concrete temperatures, ambient temperature, weather conditions, time of placement, yardage placed, and method of placement.

17.2.9 Vibrators. The frequency and amplitude of each vibrator shall be determined prior to initial use and at least once a month when concrete is being placed. Additional tests shall be made when a vibrator does not appear to be adequately consolidating the concrete. A vibrating reed tachometer or resonant reed tachometer shall be used for checking frequency. The frequency shall be determined while the vibrator is operating in concrete holding the tachometer against the upper end of the vibrator while almost submerged and just before the vibrator is withdrawn from the concrete. The amplitude shall be determined with the head vibrating in air. For flexible shaft electric and air vibrators, two measurements shall be taken, one near the tip

and another near the upper end of the vibrator head, and these results averaged. For other types of internal vibrators, measurements shall be taken in accordance with ACI 309. A visual effect scales (optical wedge), as shown on in ACI 309 or obtained from the vibrator manufacturer, shall be attached to the vibrator where required with the "V" parallel to the axis of the vibrator. The make model, type and size of the vibrator and frequency and amplitude results shall be reported in writing.

17.2.10 Curing.

17.2.10.1 Moist Curing. At least once each shift inspection shall be made of all areas subjected to moist curing. The surface moisture condition shall be noted and recorded.

17.2.10.2 Curing Compound. No curing compound shall be applied until it has been verified that the compound is properly mixed and ready for spraying. At the end of each operation the quantity of compound used and the area of concrete surface covered shall be reported and the rate of coverage in square feet per gallon shall be computed. The report shall state whether coverage is uniform.

17.2.10.3 Impervious Sheet Curing. At least once each shift an inspection shall be made of all areas being cured using impervious sheets. The condition of the covering and the tightness of the laps and tapes shall be noted and recorded.

17.2.11 Protection. At least once each shift an inspection shall be made of all areas subject to cold weather protection. Deficiencies shall be noted. During removal of protection, measurement of concrete and ambient temperature shall be made at least hourly.

17.2.12 Mixer Uniformity.

17.2.12.1 Concrete Plant Mixer. At the start of concrete placing, and at least once every three months when concrete is being placed, uniformity of concrete shall be determined. The initial and every fourth test shall be perfomed in accordance with abbreviated tests of CRD-C 55. Whenever adjustments in mixer or increase mixing times are necessary because of failure of any mixer to comply, the mixer shall be retested after adjustment. For complete testing three different batches of concrete shall be tested. For abbreviated tests one batch shall be tested. Results of tests shall be reported in writing.

17.2.12.2 Truck Mixers. At the start of concrete placing and at least once every three 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 peformance is found in one truck mixer, the performance

of mixers of substantially the same design and condition of blades may be regarded as satisfactory. Results of tests shall be reported in writing.

17.3 Action Required.

17.3.1 Fine Aggregate.

17.3.1.1. Grading. When the amount passing any sieve is outside the specification limits, the fine aggregate shall immediately be resampled and retested. If there is another failure of any sieve, the fact shall immediately be reported to the Contracting Officer, and immediate steps shall be taken to rectify the situation.

17.3.1.2 Moisture Content. Whenever the moisture concrete 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.

17.3.2 Coarse Aggregate.

17.3.2.1 Grading. When the amount passing any sieve is outside the specified limits, the coarse aggregate shall immediately be resampled and retested. If the second sample fails on any sieve, that fact shall be reported to the Contracting Officer. When two consecutive averages of 5 tests are outside of specification limits, the fact shall be reported to the Contracting Officer and immediate steps shall be taken to correct the grading.

17.3.2.2 Moisture Content. Whenever the moisture content of the smallest size of coarse aggregate changes by 0.5 percent or more, the scale settings for the aggregate batcher and water batcher shall be adjusted.

17.3.3 Deleterious Substances. When the results for a deleterious substance is outside the specification limits, the aggregate shall be resampled and retest for the deleterious subtance 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 specification limit, immediate steps, such as washing or other corrective actions, shall be initiated.

17.3.4 Scales. Whenever either the weighing accuracy or batching accuracy is found not to comply with specification requirements, the plant shall not be operated until necessary adjustments or repairs have been made. Descrepancies in recording accuracies shall be corrected immediately.

17.3.5 Concrete.

17.3.5.1 Air Content. Whenever points on the control chart approach the upper or lower control limits an adjustment should be made in the amount of air-entraining admixture batched. If a single

test result is outside the specification limit such adjustment is mandatory. As soon as practical after each adjustment another test shall be made to verify the correctness of the adjustment. Whenever a point falls above the upper control limit for range, the dispenser shall be calibrated to insure that it is operating correctly and with good reproducibility. Whenever two consecutive points either for average or range are outside the control limits, the Contracting Officer shall be notified. Whenever the air content departs from the specified range, the concrete shall not be delivered to the forms.

17.3.5.2 Slump. Whenever points on the control chart approach the upper or lower control limits an adjustment should be made in the batch weights of water and fine aggregate. When a single slum is outside the control limits such adjustment is mandatory. As soon as practical after each adjustment another test shall be made to verify the correctness of the adjustment. Whenever the slump departs from that stipulated in 3D-7.4 more than 1-1/2 inches the concrete shall not be delivered to the forms. 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 above the upper control limit, the slump shall be considered to be out of control and the additional testing for aggregate moisture content required in 3D-17.2.1.2 shall be undertaken.

17.3.6 Placing. The placing foreman shall not permit placing to begin until he has verified that an adequate number of acceptable vibrators in working order and with competent operators are available Placing shall not be continued if any pile is inadequately consolidated. If any batch of concrete fails to meet the temperature requirements, immediate steps shall be taken to improve temperature controls.

17.3.7 Curing.

17.3.7.1 Moist Curing. When a daily inspection report lists an area of inadequate curing, the required curing period for that area shall be extended by one day.

17.3.7.2 Curing Compound. When the coverage rate of curing compound is less than that specified or when the coverage is not uniform, the entire surface shall be sprayed again.

17.3.7.3 Impervious Sheet Curing. When a daily inspecion report lists any tears, holes or laps of joints that are not completely closed, the tear and hole shall promply be repaired or the sheets replaced, the joints closed, and the required curing period for those areas shall be extended by one day.

17.3.8 Protection. Whenever any concrete temperature during the period of protection or protection removal fails to comply with the specifications, that fact shall be reported to the Contracting Officer and immediate steps should be taken to correct the situation.

17.3.9 Mixer Uniformity. When a mixer fails to meet mixer uniformity requirements, either the mixing time shall be increased or adjustments shall be made to the mixer until compliance is achieved.

17.4 Reports. All results of tests conducted at the project site shall be reported weekly and shall be delivered to a designated representative of the Contracting Officer within 3 days after the end of each weekly reporting period. Each weekly report shall include the updating of control charts covering the entire period from the start of the construction season through the current week. During period 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 failure 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 Contractor quality control records.

18. CONCRETE REPAIRS TO EXISTING STRUCTURES.

18.1 Wing Wall Repair - Area "G". Eroded concrete at the downstream wing wall of the south side of the Sheldon Street Bridge shall be removed by saw cutting to a depth not to exceed two inches to delineate the area and chipping away all unsound concrete at the location and as shown on the contract drawings. Concrete cutting shall be done using wet cut mansonry saws by masonry mechanics. The cut edges shall be clean true and sharp. All unsound concrete shall be removed from the defective area with light pneumatic equipment to a minimum depth of sound concrete. The prepared area shall then be formed to true lines, dampened, brush coated with neat cement grout and filled with concrete. Replacement concrete shall be drier than the usual mixture and thoroughly tamped into place. The repaired area shall be cured for a period of not less than 7 days.

18.2 Repair of Eroded Opening at Base of Masonry Wall - Area "K". The eroded opening at the base of the wall shall be prepared to receive concrete by removing all unsound rock and mortar with light pneumatic equipment to a minimum depth of sound rock and mortar. Form work shall be constructed, the damaged area brush coated with neat concrete grout and filled with concrete. Concrete for repair work shall be drier than the usual mixture and thoroughly tamped into place. The repaired area shall be cured for a period of not less than 7 days.

18.3 Resurfacing Eroded Concrete Crib Strecher Members - Area "M". This work shall include cleaning and preparing the members and application of patching material specified in Paragraph 6.7. Cleaning and preparation of the strecher members shall include removing debris and loose, semi-detached and unsound fragments down to firm concrete. Surfaces shall be hammer tapped to determine locations of unsound and drummy concrete, which shall also be removed and resulting hole filled

with patching material. Strecher members which are too badly deteriorated to be restored by simple patching shall be rebuilt by erecting forms in the desired configuration and placing concrete, or removing and replacing them with new Contractor furnished members as applicable.

19. PAYMENT.

19.1 Concrete. Measurement of concrete will be made on basis of the actual volume of concrete within the paylines of the structures as indicated on the drawings. Measurement of concrete placed against the sides of any excavation without the use of intervening forms will be made only within the pay lines of the structures. No deductions will be made for rounded or beveled edge or space occupied by metal work, electrical conduits or timber, nor for voids or embedded items which are either less than 5 cubic feet in volume or one square foot in cross section. Unless otherwise specified, payment for concrete will be made at the respective contract prices per cubic yard for the various items of the schedule, which price shall include the cost of all labor, materials, and the use of all equipment and tools required to complete the concrete work; including reinforcement and embedded parts which are specified in other section. No payment will be made for concrete and reinforcement, as such, which is placed in structures for which payment is made as a lump sum. Bidding schedule items for concrete under this contract as follows:

Item No. A10, "Concrete". This item includes all concrete placed in the retaining wall in Area "A" as indicated on the drawings. Payment therefore will be made at the contract unit price per cubic yard for Item No. A10, "Concrete".

Item No. F4, "Concrete". This item includes all concrete placed in the walls in Area "F" at Crib Sites Nos. 1 and 2 as indicated on the drawings. Payment therefore will be made at the contract unit price per cubic yard for Item No. F4, "Concrete".

Item No. K1, "Concrete Wall Repair". This item includes all concrete and other work for the repair of the existing concrete wall in Area "K" as indicated on the drawings. Payment therefore will be made at the contract lump sum price for Item No. K1, "Concrete Wall Repair".

Item No. M1, "Resurfacing Eroded Stretecher Members." This item includes all work and materials for the repair of the existing, concrete crib wall stretcher members at Crib Site No. 4. Payment therefore will be made at the contract lump sum price for Item No. M1, "Resurfacing Eroded Stretcher Members."

Item No. M2 "Concrete". This item includes all concrete placed in the curb in Area "M" at Crib Site No. 4 as indicated on the drawigns. Payment therefore will be made at the contract unit price per cubic yard for Item No. M2, "Concrete".

Item No. N1, "Concrete". This item includes all concrete placed in the retaining wall in Area "N" as indicated on the drawings. Payment therefore will be made at the contract unit price per cubic yard for Item No. N1 "Concrete".

Item No. O5, "Concrete". This item includes all concrete placed in gravity walls in Area "O" at Crib Sites Nos. 5 and 6 as indicated on the drawings. Payment therefore will be made at the contract unit price per cubic yard for Item No. O5, "Concrete".

Item No. P5, "Concrete". This item includes all concrete placed in the gravity wall in Area P5 as indicated on the drawings. payment therefore will be made at the contract unit price per cubic yard for Item No. P5, "Concrete".

Item No. Q2, "Concrete". This item includes all concrete placed in facing of Crib Site No. 7 in Area "Q" as indicated on the drawings. Payment therefore will be made at the contract unit price per cubic yard for Item No. Q2, "Concrete".

DIVISION 4 - MASONRY

SECTION 4A - STONE MASONRY INDEX

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DIVISION 4 - MASONRY

SECTION 4A - STONE MASONRY

1. SCOPE. The work of this section consists of furnishing all plant, labor, equipment, materials and performing all operations in connection with construction of new cut stone masonry walls, and resetting stones and repointing portions of existing cut stone walls. Locations where this work is to be done are described in Section, SUMMARY OF WORK, and are shown on the contract drawings.

2. 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.

2.1 American Society for Testing and Materials (ASTM) Standards.

C 141-67 (1972)	Hydraulic Hydrated Lime for Structural Purposes.
C 144-76	Aggregate for Masonry Mortar.
C 150-77	Portland Comment.

3. MATERIALS

3.1 General. Materials for constructing new granite stone walls and existing granite stone walls shall be approved materials furnished by the Contractor. Stone and other materials may be stockpiled in approved areas as close as practicable to the location of the work. Such approval will be given only for small stockpiles of materials which must by readily available in small quantities. All stockpile areas shall be cleared and graded as directed prior to placement of materials therein. The placement of stone materials in stockpiles and their hauling therefrom shall be done in a manner that will prevent breaking or chipping. The Contractor shall be responsible for furnishing, delivering to site and placing stone mortar and materials meeting all applicable requirements specified herein. Any stone, or mortar material placed in the permanent work which does not meet all applicable specified requirements shall be removed and replaced with acceptable material at no additional cost to the Government.

3.2 Approval of Quality.

3.2.1 Stone. The sources from which the Contractor proposes to obtain material for the construction of new stone walls and repair of

existing stone walls shall be selected well in advance of the time when these materials will be required in the work. Suitable samples of processed materials, as applicable, from sources shall be submitted to the Contracting Officer for approval of the soundness and durability of the rock. Quarried samples shall be representative of the whole quarry and include materials from distinctive strata and beds suitably identified by numbers and quarry name. Submission of the quarried samples shall designate each sample and its location within the quarry and include available geologic descriptions, records and methods of testing and history of use in similar construction. Rock samples shall consists of one or more pieces, each piece weighing a minimum of 20 pounds. All samples shall be obtained by the Contractor and delivered at his expense at a time which will allow a period of 60 days for testing and investigations. Unless otherwise directed at time of sampling, each sample shall be delivered by the Contractor to the Governments laboratory at 424 Trapelo Road, Waltham, Massachusetts. Sampling of the materials shall be done at the source by Contractor at his own expense and in the presence of a representative of the Contracting Officer. The samples shall be subjected to such tests as are necessary to determine the quality of the material unless suitable test reports or service records are available that are satisfactory to the Contracting Officer. The Contracting Officer shall be the sole judge as to the acceptability of a material. Tests to determine the suitability of the rock may include, as applicable, petrographic analysis, specific gravity, abrasion, absorption, sulfate soundness, wetting and drying and freezing and thawing. All testing of the initially proposed source of material will be made by or under supervision of the Government and at its expense. Any retesting and all testing of subsequent sources due to the initially proposed source failing to meet the requirements of the specifications will be done by the Government at the Contractors expense. The approval of a material by the Government, based on test results, examination of the material exposed at the source and service records, shall not relieve the Contractor, in any way, of the responsibility of placing a material which meets the requirements specified herein. Approval of a sample of material for soundness and durability from a source shall not be construed as approval of all material from that source or that the stone material produced using material from that source will have satisfactory quality, shape characteristics and sizes after any or all portions and placement. The right is reserved to reject, at any time, any or all portions of the materials in a source or produced using the materials from that source when such materials are unsuitable in the opinion of the Contracting Officer.

3.2.2 Mortar Materials. Certificates shall be submitted in accordance with SPECIAL PROVISIONS prior to delivery of the certified material to the project site. The following shall be certified for compliance with all specification requirements: cement, sand, and lime.

3.3 Stone.

3.3.1 Existing Stone. In areas where repair work is indicated, existing stone material that has fallen into the river or has otherwise been displaced shall be salvaged and reused to the greatest extent practicable so that repair work will match the color and texture of adjacent undamaged stone work. On site cut stone materials may also be salvaged for use in the construction of new or replacement stone walls provided the finished wall is uniform in strength, color and texture.

3.3.2 New Stone. The Contractor shall furnish and install all new cut stone from off site sources as required to complete the repair of existing walls and the construction of new stone walls. All stone for the repair of granite stonework shall be granite and all new stone walls shall be constructed of granite.

3.3.2.1 Masonry granite shall be of standard grade, free of cracks, seams or starts which may impair its structural integrity or function. Each piece shall be shaped as nearly as practicable in the form of a right rectangular prism. All quarried stone shall be supplied from any approved source which will be able to provide sufficient stone of similar color and texture for the entire project. Inherent minor variations characteristic of the quarry from which it is obtained will be acceptable. Stone may vary in dimension and weight, as required, to be satisfactorily placed in the work. However, the majority of stones for the construction of all new stone walls shall be between 1-1/2 feet and 2 feet in thickness, weighing at least 2000 pounds. The least dimension of any stone piece shall not be less than one-third its greatest dimension.

3.4 Mortar for setting and pointing shall be composed of one part of a combination of air-entrained portland cement and hydrated lime and two and one-half parts of fine aggregate with sufficient water to create a workable plastic mass. The cement and lime combination shall be made up of ninety percent by volume of cement and ten percent by volume of lime. Mortar materials shall conform to the following requirements:

(1) Air-entraining cement shall conform to the requirements of ASTM C 150, Type IIA.

(2) Hydraulic hydrated lime shall conform to the requirements of ASTM C 141.

(3) Sand for use in mortar shall conform to the requirements of ASTM C 144.

(4) Water shall be clear, clean, free from oil, acid, alkali or vegetable substances and fit to drink.

3.5 Spalls shall be composed of durable fragments of quarried stone reasonably well graded between the sizes of 2 inches and 6 inches. Crushed stone of like size and at least equal in quality will be acceptable in lieu of spalls.

4. FOUNDATION PREPARATION FOR CONSTRUCTION OF NEW WALLS. Areas on which granite stone walls are to be constructed shall be trimmed and dressed to conform to the cross sections shown on the contract drawings within an allowable tolerance of plus or minus 2 inches from the theoretical slope lines and grades. Immediately prior to placing the spall bedding or crushed stone bedding material the prepared base will be inspected by the Contracting Officer and no material shall be placed thereon until that area has been approved.

4.1 Leveling Course. A leveling course composed of a 12-inch thickness of spalls or crushed stone shall be placed on the approved base within the limits shown on the contract drawings or as staked in the field. The leveling material shall conform to the requirements of paragraph 3.5. The material shall be spread uniformly on the prepared base, in a satisfactory manner, to the slope limits and grades as indicated or as directed. Placing material by methods which will tend to segregate particle sizes within the layer will not be permitted. Compaction of the leveling course will not be required but it shall be finished to present a reasonably even surface free from mounds or wind rows.

5. ERECTION OF NEW STONE WALLS AND RESETTING STONES IN EXISTING WALLS

5.1 General. New granite stone walls shall be constructed within the limits indicated on the contract drawings or as otherwise directed by the Contracting Officer. Stone shall conform to paragraph 3.3 as to quality and physical properties. Setting of stones shall conform to paragraph 5.2 below. Repair of existing stone walls by salvaging stones from the river bottom or other areas and resetting them shall be performed at the locations indicated on the contract drawings or as otherwise directed. Setting of stones for repair of walls shall conform to the applicable requirements of paragraph 5.2 below.

5.2 Setting Stones. The various sizes of stone shall be so distributed as to produce a uniform well graded mass. Adjacent stones shall be selected with reasonable care as to size and shape and placed in close contact, the smaller stones filling the spaces between the larger ones. "Through stones" shall be well distributed throughout the mass and the sum of their cross sections, parallel to the surface being protected, shall be not less than 70 percent of such area. A "through stone" is defined as a stone whose dimension normal to the surface being protected is not less than the full depth of the protection. The stones shall decrease in size from bottom to top of wall. Each stone to be set in mortar shall be cleaned

and thoroughly wetted before being set. They shall be set on full beds of mortar, and mortar joints shall be full and the stone settled in place before the mortar has set. The walls shall be compactly laid having all interior joints completely filled with suitable stones or spalls thoroughly bedded in mortar. A tolerance of plus or minus 2 inches from the slope lines and grades shown on the drawings will be allowed in the finished surface of the stonework except that extremes of such tolerance will not be allowed in the exposed surfaces of adjacent stones.

6. POINTING STONE WALLS.

6.1 General. Locations where existing stone walls are to be chinked and repointed are specified in Section, SUMMARY OF WORK. New stone work and repair work shall be performed as specified herein.

6.2 Joints. Each masonry joint to be pointed shall be thoroughly cleaned of all loose mortar and dirt for a depth in from the face of the stone to at least twice the width of the joint. After cleaning, all joints exceeding 2-inches in width and 4-inches in depth shall be chinked with granite spalls. The joints shall be filled with mortar well driven in and shall be finished with grooved joint so that the face of the mortar is one-half inch back from face of the masonry. After the pointing is completed, all mortar shall be cleaned from the face of the stones. On completion of the chinking, pointing and cleaning of the stones, the work shall be protected from the elements in a satisfactory manner for a period of three days. The Contractor, subject to approval, may be permitted to use a "grout" machine for application of mortar. Chinking and pointing of all the stonework shall be done in the dry so as to allow for maximum repair.

7. PAYMENT. No separate measurement or unit price payment will be made for the work or materials as specified in this section. All costs in connection therewith shall be included in the applicable lump sum bid prices for or under the designated "Area" to which the work pertains.

UNIT PRICE SCHEDULE

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
1	Tree Clearing	1	Job	L.S.	$_____
	AREA "A"				
A1	Relocation of Toluol Pipeline	1	Job	L.S.	_____
A2	Earth Support Systems	1	Job	L.S.	_____
A3	Permanent Steel Sheet Piling	860	S.F.	____	_____
A4	General Excavation	1700	C.Y.	____	_____
A5	Gabion Construction	500	C.Y.	____	_____
A6	Filter Stone	660	C.Y.	____	_____
A7	Gravel Bedding	220	C.Y.	____	_____
A8	Stone Bedding	220	C.Y.	____	_____
A9	Stone Protection	620	C.Y.	____	_____
A10	Concrete	25	C.Y.	____	_____
A11	Gravel Fill	60	C.Y.	____	_____
A12	Shoaling Excavation	30	C.Y.	____	_____
A13	Rock Excavation	70	C.Y.	____	_____
A14	Topsoiling, Seeding and Erosion Control	30	S.Y.	____	_____
	AREA "B"				
B	All Work Area "B"	1	Job	L.S.	_____
	AREA "C"				
C1	Repoint Stone Masonry	1	Job	L.S.	_____
C2	Shoaling Excavation	1200	C.Y.	____	_____

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
C3	Channel Bottom Grading	90	L.F.	____	$_____
C4	Planting	1	Job	L.S.	_____
	AREA "D"				
D1	Storm Water Outfall Repair	1	Job	L.S.	_____
D2	Shoaling Excavation	220	C.Y.	____	_____
	AREA "E"				
E1	Grouted Hand-Placed Stone Protection	100	C.Y.	____	_____
E2	Gravel Bedding	70	C.Y.	____	_____
E3	Shoaling Excavation	700	C.Y.	____	_____
	AREA "F"				
F1	Earth Support Systems	1	Job	L.S.	_____
F2	General Excavation	5450	C.Y.	____	_____
F3	Shoaling Excavation	1420	C.Y.	____	_____
F4	Concrete	575	C.Y.	____	_____
F5	Hand Railing	1	Job	L.S.	_____
F6	Random Fill	930	C.Y.	____	_____
F7	Gravel Fill	740	C.Y.	____	_____
F8	Pervious Fill	720	C.Y.	____	_____
F9	Stone Bedding	70	C.Y.	____	_____
F10	Gravel Bedding	110	C.Y.	____	_____
F11	Omitted				
F12	Hand-Placed Stone Protection	290	C.Y.	____	_____
F13	Channel Bottom Grading	150	L.F.	____	_____
F-14	Omitted				

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
F15	Planting	1	Job	L.S.	$_____
F16	Wood Posts and Rails	1	Job	L.S.	_____
F17	Topsoiling, Seeding and Erosion Control	100	S.Y.	____	_____
	AREA "G"				
G	All Work - Area "G"	1	Job	L.S.	_____
	AREA "H"				
H1	Shoaling Excavation	1820	C.Y.	____	_____
H2	Channel Bottom Grading	80	L.F.	____	_____
H3	Grouted Hand-Placed Stone Protection	60	C.Y.	____	_____
H4	Hand-Placed Stone Protection	80	C.Y.	____	_____
H5	Gravel Bedding	85	C.Y.	____	_____
	AREA "I"				
I	All Work - Area "I"	1	Job	L.S.	_____
	AREA "J"				
J1	General Excavation	450	C.Y.	____	_____
J2	Channel Bottom Grading	215	L.F.	____	_____
J3	Stone Protection	500	C.Y.	____	_____
J4	Shoaling Excavation	680	C.Y.	____	_____
J5	Planting	1	Job	L.S.	_____
J6	Topsoiling, Seeding and Erosion Control	50	S.Y.	____	_____
	AREA "K"				
K1	Stone Wall Repair	1	Job	L.S.	_____
K2	Channel Bottom Grading	200	L.F.	____	_____

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
	AREA "L"				
L	All Work - Area "L"	1	Job	L.S.	$_____
	AREA "M"				
M1	Resurfacing Eroded Stretcher Members	1	Job	L.S.	_____
M2	Concrete	40	C.Y.	____	_____
M3	Shoaling Excavation	140	C.Y.	____	_____
	AREA "N"				
N1	Concrete	100	C.Y.	____	_____
N2	Channel Bottom Grading	380	L.F.	____	_____
	AREA "O"				
O1	Earth Support System	1	Job	L.S.	_____
O2	Remove and Replace R.R. Spur Track	1	Job	L.S.	_____
O3	General Excavation	1600	C.Y.	____	_____
O4	Shoaling Excavation	570	C.Y.	____	_____
O5	Concrete	580	C.Y.	____	_____
O6	Random Fill	90	C.Y.	____	_____
O7	Pervious Fill	900	C.Y.	____	_____
O8	Hand-Placed Stone Protection	70	C.Y.	____	_____
O9	Gravel Bedding	50	C.Y.	____	_____
O10	Hand Railing	1	Job	L.S.	_____
O11	Topsoiling, Seeding and Mulching	100	S.Y.	____	_____

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
	AREA "P"				
P1	Earth Support System	1	Job	L.S.	$_____
P2	General Excavation	1500	C.Y.	_____	_____
P3	Shoaling Excavation	260	C.Y.	_____	_____
P4	New 12" CMP	1	Job	L.S.	_____
P5	Concrete	300	C.Y.	_____	_____
P6	Pervious Fill	200	C.Y.	_____	_____
P7	Omitted				
P8	Random Fill	40	C.Y.	_____	_____
P9	Hand-Placed Stone Protection	30	C.Y.	_____	_____
P10	Gravel Bedding	20	C.Y.	_____	_____
P11	Chain Link Fencing	1	Job	L.S.	_____
P12	Abrasive Blast Cleaning Concrete Wall	1	Job	L.S.	_____
P13	Bituminous Concrete Pavement	120	S.Y.	_____	_____
P14	Channel Bottom Grading	380	L.F.	_____	_____
P15	Topsoiling, Seeding and Erosion Control	100	S.Y.	_____	_____
	AREA "Q"				
Q1	General Excavation	210	C.Y.	_____	_____
Q2	Concrete	320	C.Y.	_____	_____
Q3	Random Fill	90	C.Y.	_____	_____
	AREA "S"				
S	All Work - Area "S"	1	Job	L.S.	_____

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
	AREA "T"				
T	All Work - Area "T"	1	Job	L.S.	$_____
	AREA "U"				
U	All Work - Area "U"	1	Job	L.S.	_____
	AREA "V"				
V1	General Excavation	9200	C.Y.	____	_____
V2	Stone Protection	5500	C.Y.	____	_____
V3	Stone Bedding	1960	C.Y.	____	_____
V4	Gravel Bedding	1800	C.Y.	____	_____
V5	Random Fill	2300	C.Y.	____	_____
V6	Omitted				
V7	Topsoiling, Seeding and Erosion Control	700	S.Y.	____	_____
	AREA "W"				
W1	Shoaling Excavation	4280	C.Y.	____	_____
		ESTIMATED TOTAL PRICE			$_____

STANDARD FORM 19-B
OCTOBER 1969 EDITION
GENERAL SERVICES ADMINISTRATION
FED. PROC. REG. (41 CFR) 1-16.401

REPRESENTATIONS AND CERTIFICATIONS

(Construction Contract)
(For use with SF 19 and 21)

REFERENCE (*Enter same No.(s) as on SF 19/21*)

NAME AND ADDRESS OF BIDDER (*No., Street, City, State, and ZIP Code*)

DATE OF BID

In negotiated procurements, "bid" and "bidder" shall be construed to mean "offer" and "offeror."

The bidder makes the following representations and certifications as a part of the bid identified above. *(Check appropriate boxes.)*

1. SMALL BUSINESS

He ☐ is, ☐ is not, a small business concern. *(For this purpose, a small business concern is a business concern, including its affiliates, which (a) is independently owned and operated, (b) is not dominant in the field of operation in which it is bidding on Government contracts, and (c)* can further qualify under the criteria set forth in regulations of the Small Business Administration (Code of Federal Regulations, Title 13, Section 121.3-8 and Revisions).

2. CONTINGENT FEE

(a) He ☐ has, ☐ has not, employed or retained any company or person (other than a full-time bona fide employee working solely for the bidder) to solicit or secure this contract, and *(b)* he ☐ has, ☐ has not, paid or agreed to pay any company or person (other than a full-time bona fide employee working solely for the bidder) any fee, commission, percentage or brokerage fee, contingent upon or resulting from the award of this contract; and agrees to furnish information relating to *(a)* and *(b)* above as requested by the Contracting Officer. *(For interpretation of the representation, including the term "bona fide employee," see Code of Federal Regulations, Title 41, Subpart 1-1.5.)* See paragraph 3 to Supplement to Invitation for Bids.

3. TYPE OF ORGANIZATION

He operates as an ☐ individual, ☐ partnership, ☐ joint venture, ☐ corporation, incorporated in State of .....

4. INDEPENDENT PRICE DETERMINATION

(a) By submission of this bid, each bidder certifies, and in the case of a joint bid each party thereto certifies as to his own organization, that in connection with this procurement:

(1) The prices in this bid have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;

(2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, in the case of a bid, or prior to award, in the case of a proposal, directly or indirectly to any other bidder or to any competitor; and

(3) No attempt has been made or will be made by the bidder to induce any other person or firm to submit or not to submit a bid for the purpose of restricting competition.

(b) Each person signing this bid certifies that:

(1) He is the person in the bidder's organization responsible within that organization for the decision as to the prices being bid herein and that he has not participated, and will not participate, in any action contrary to (*a*)(1) through (*a*)(3) above; or

(2) (i) He is not the person in the bidder's organization responsible within that organization for the decision as to the prices being bid herein but that he has been authorized in writing to act as agent for the persons responsible for such decision in certifying that such persons have not participated, and will not participate, in any action contrary to (*a*)(1) through (*a*) (3) above, and as their agent does hereby so certify; and (ii) he has not participated, and will not participate, in any action contrary to (*a*)(1) through (*a*)(3) above.

(c) This certification is not applicable to a foreign bidder submitting a bid for a contract which requires performance or delivery outside the United States, its possessions, and Puerto Rico.

(d) A bid will not be considered for award where (*a*)(1), (*a*)(3), or (*b*) above, has been deleted or modified. Where (*a*)(2) above, has been deleted or modified, the bid will not be considered for award unless the bidder furnishes with the bid a signed statement which sets forth in detail the circumstances of the disclosure and [redacted] unless it is determined that such disclosure was not made for the purpose of restricting competition.

THE FOLLOWING NEED BE CHECKED ONLY IF BID EXCEEDS $10,000 IN AMOUNT.

5. [redacted] COMPLIANCE REPORTS. The offeror represents that he [redacted] ☐ has, ☐ has not, participated in a previous contract or subcontract subject to the Equal Opportunity Clause herein, the clause originally contained in Section 301 of Executive Order No. 10925, or the clause contained in Section 201 of Executive Order No. 11114; he ☐ has, ☐ has not, filed all required compliance reports; and representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained prior to subcontract awards. *(The above representation need not be submitted in connection with contracts or subcontracts which are exempt from the clause.)*

NOTE.—Bids must set forth full, accurate, and complete information as required by this invitation for bids (including attachments). The penalty for making false statements in bids is prescribed in 18 U.S.C. 1001.

6. PARENT COMPANY AND EMPLOYER IDENTIFICATION NUMBER

Each bidder shall furnish the following information by filling in the appropriate blocks:

(*a*) Is the bidder owned or controlled by a parent company as described below? ☐ Yes ☐ No. *(For the purpose of this bid, a parent company is defined as one which either owns or controls the activities and basic business policies of the bidder. To own another company means the parent company must own at least a majority (more than 50 percent) of the voting rights in that company. To control another company, such ownership is not required; if another company is able to formulate, determine, or veto basic business policy decisions of the bidder, such other company is considered the parent company of the bidder. This control may be exercised through the use of dominant minority voting rights, use of proxy voting, contractual arrangements, or otherwise.)*

(*b*) If the answer to (*a*) above is "Yes," bidder shall insert in the space below the name and main office address of the parent company.

NAME OF PARENT COMPANY	MAIN OFFICE ADDRESS *(No., Street, City, State, and ZIP Code)*

(*c*) Bidder shall insert in the applicable space below, if he has no parent company, his own Employer's Identification Number (E.I. No.) *(Federal Social Security Number used on Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941)*, or, if he has a parent company, the E.I. No. of his parent company.

EMPLOYER IDENTIFICATION NUMBER OF ➤	PARENT COMPANY	BIDDER

7. CERTIFICATION OF NONSEGREGATED FACILITIES

(Applicable to (1) contracts, (2) subcontracts, and (3) agreements with applicants who are themselves performing federally assisted construction contracts, exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause.)

By the submission of this bid, the bidder, offeror, applicant, or subcontractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. He certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The bidder, offeror, applicant, or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. He further agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause; that he will retain such certifications in his files; and that he will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATIONS OF NONSEGREGATED FACILITIES

A Certification of Nonsegregated Facilities must be submitted prior to the award of a subcontract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

8. CLEAN AIR AND WATER CERTIFICATION(1977 Jun).(Applicable if the bid or offer exceeds $100,000, or the Contracting Officer has determined that orders under an indefinite quantity contract in any year will exceed $100,000, or a facility to be used has been the subject of a conviction under the Clean Air Act (42 U.S.C. 1857c-8(c)(1)) or the Federal Water Pollution Control Act (33 U.S.C. 1319(c)) and is listed by EPA, or is not otherwise exempt.)

The bidder or offeror certifies as follows:

(a) Any facility to be utilized in the performance of this proposed contract is ☐, is not ☐, listed on the Environmental Protection Agency List of Violating Facilities.

(b) He will promptly notify the Contracting Officer, prior to award, of the receipt of any communication from the Director, Office of Federal Activities, U.S. Environmental Protection Agency, indicating that any facility which he proposes to use for the performance of the contract is under consideration to be listed on the EPA List of Violating Facilities.

(c) He will include substantially this solicitation certification, including this paragraph (c), in every nonexempt subcontract.

U S GOVERNMENT PRINTING OFFICE 1969 OF—390-456 (13-K)

MINORITY BUSINESS ENTERPRISE (1976 OCT)

The offeror represents that he ( ) is, ( ) is not, a minority business enterprise. A minority business enterprise is defined as a "business, at least fifty percent (50%) of which is owned by minority group members or, in case of publicly owned businesses, at least fifty-one percent (51%) of the stock of which is owned by minority group members." For the purpose of this definition, minority group members are Negroes, Spanish-speaking American persons, American-Orientals, American Indians, American Eskimos, and American-Aleuts. (ASPR 7-2003.74)

HANDICAPPED ORGANIZATIONS (1978 FEB)

The offeror certifies that he is /___/ is not /___/ an organization eligible for assistance under section 7 (h) of the Small Business Act (15 USC 636). An offeror certifying in the affirmative is eligible to participate in any resultant contracts hereunder or any part thereof as if it were a small business concern as elsewhere defined in the solicitation. An organization to be eligible under section 7(h) of the Small Business Act must be one which is organized under the laws of the United States or any state, operated in the interest of handicapped individuals, the net income of which does not inure in whole or part to the benefit of any shareholder or other individual; which complies with any applicable occupational health and safety standard prescribed by the Secretary of Labor; which, during the fiscal year in which it bids upon a set-aside, employs handicapped individuals for not less than 75 percent of the manhours required for the production or provision of commodities or services, and can qualify under the additional criteria prescribed in Section 118.11, SBA Rules and Regulations, 13 CFR 118.11.

NOTE: A handicapped individual, to be eligible for assistance under section (7) (h) of the Small Business Act (15 USC 636) must remain a small business concern during the term of the ensuing contract. Such eligible handicapped individuals offering on this procurement need only certify under paragraph 1, SF 33.

(Section 502 of PL 95-89, Section 15 of the Small Business Act (15 USC 644))

EQUAL EMPLOYMENT COMPLIANCE (1978 SEP)

By submission of this offer, the offeror represents that, to the best of his knowledge and belief, except as noted below, up to the date of this offer no written notice such as a show cause letter, a letter indicating probable cause, or any other written notification citing specific deficiencies, has been received by the offeror from any Federal Government agency, or representative thereof that the offeror or any of its divisions or affiliates or known first-tier subcontractors is in violation of any of the provisions of Executive Order 11246 of September 24, 1965, as amended, or rules and regulations of the Secretary of Labor (41 CFR Chapter 60) and specifically as to not having an acceptable affirmative action compliance program or being in noncompliance with any other aspect of the Equal Employment Opportunity Program. It is further agreed that should there be any change (i) in the offeror's status or circumstances between this date and the date of expiration of this offer or any extension thereof, or (ii) during any contract or extension thereof, resulting from this solicitation, the Contracting Officer will be notified promptly.

DAR (ASPR) 7-2003.14(b)(3)