US Army Corps
of Engineers
Los Angeles District

MATILIJA ECOSYSTEM RESTORATION

MEINERS OAK AND LIVE OAK LEVEES

Ventura County, California

*** DRAFT ***

Construction Solicitation and Specifications

Unrestricted

December 2008

PROJECT TABLE OF CONTENTS

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SECTION 00010

BID SCHEDULE

PART 1 GENERAL

The numerical sequences of the bid items is not meant to determine for the Contractor the sequencing of the work.

1.1 Bid Items

Item	Description	Quantity	Unit	Unit Price	Amount
0001	DIVERSION AND CONTROL OF WATER (MEINERS OAKS)	1.00	Job	LS	$_____.___
0002	CLEAR SITE AND REMOVE OBSTRUCTIONS (MEINERS OAKS)	1.00	Job	LS	$_____.___
0003	EXCAVATION (MEINERS OAKS)	54,700	CY	$__.__	$_____.___
0004	COMPACTED FILL, LEVEES (MEINERS OAKS)	10,900	CY	$__.__	$_____.___
0005	COMPACTED FILL, ACCESS RAMP (MEINERS OAKS)	265	CY	$__.__	$_____.___
0006	MISCELLANEOUS FILL (MEINERS OAKS)	55,500	CY	$__.__	$_____.___
0007	BORROW MATERIAL (MEINERS OAKS)	66,400	CY	$__.__	$_____.___
0008	HYDROSEEDING (MEINERS OAKS)	20	Acre	$__.__	$_____.___
0009	CEMENT (MEINERS OAKS)	6,625	Ton	$__.__	$_____.___
0010	SOIL CEMENT LINING (MEINERS OAKS)	26,500	CY	$__.__	$_____.___
0011	STONE PROTECTION - 24" RIPRAP (MEINERS OAKS)	450	Ton	$__.__	$_____.___
0012	SAND BEDDING MATERIAL (MEINERS OAKS)	X,XXX	Ton	$__.__	$_____.___
0013	GEOTEXTILE FOR STONE PROTECTION (MEINERS OAKS)	XX,XXX	SY	$__.__	$_____.___
0014	RECREATION TRAIL RAMP (MEINERS OAKS)	1.00	Job	LS	$_____.___

Bid Items - Continued

Item	Description	Quantity	Unit	Unit Price	Amount
0015	SIDE DRAIN, STA 25+00 (MEINERS OAKS)	1.00	Job	LS	$_____.___
0016	SIDE DRAIN, STA 17+40 (MEINERS OAKS)	1.00	Job	LS	$_____.___
0017	ACCESS ROAD SURFACING (MEINERS OAKS)	1.00	Ton	$__.__	$_____.___
0018	... DELETED ... (MEINERS OAKS)	1.00	Job	LS	$_____.___
0019	DIVERSION AND CONTROL OF WATER (LIVE OAK)	1.00	Job	LS	$_____.___
0020	CLEAR SITE AND REMOVE OBSTRUCTIONS (LIVE OAK)	1.00	Job	LS	$_____.___
0021	EXCAVATION (LIVE OAK)	30,600	CY	$__.__	$_____.___
0022	COMPACTED FILL, LEVEE (LIVE OAK)	1,305	CY	$__.__	$_____.___
0023	MISCELLANEOUS FILL (LIVE OAK)	47,710	CY	$__.__	$_____.___
0024	SALVAGE EXISTING RIPRAP (LIVE OAK)	1.00	Job	LS	$_____.___
0025	STONE PROTECTION - 48" RIPRAP (LIVE OAK)	29,440	Ton	$__.__	$_____.___
0026	STONE PROTECTION - 24" GROUTED RIPRAP(LIVE OAK)	9,315	Ton	$__.__	$_____.___
0027	GROUTING PROTECTION (LIVE OAK)	5,820	CY	$__.__	$_____.___
0028	SAND BEDDING MATERIAL (LIVE OAK)	X,XXX	Ton	$__.__	$_____.___
0029	GEOTEXTILE FOR STONE PROTECTION (LIVE OAK)	XX,XXX	SY	$__.__	$_____.___
0030	RIGHT OF WAY FENCING - 5' HIGH CHAIN LINK (LIVE OAK)	3,655	LF	$__.__	$_____.___
0031	GATES (LIVE OAK)	2.00	EA	$__.__	$_____.___

0032	ACCESS ROAD SURFACING (LIVE OAK)	1.00	Ton	$__.__$_____.___

TOTAL ESTIMATED AMOUNT OF BID: $_____._____
(Line Items 0001 through 0032)

Abbreviations:

Ft	=	foot	ton	=	english ton (1000 lbs)
Ft^2	=	square foot	LS	=	lump sum
Ft^3	=	cubic feet	LF	=	linear foot
CY	=	cubic yards			
EA	=	each	R-4DB	=	R-4 Detention Basin

SECTION 00010 - SOLICITATION CONTRACT FORM

CLAUSES INCORPORATED BY FULL TEXT

1. All extensions of the unit prices shown will be subject to verification by the Government. In case of variation between the unit price and the extension, the unit price will be considered to be the bid.

2. If a modification to a bid based on unit prices is submitted which provides for a lump sum adjustment to the total estimated amount, the application of the lump sum adjustment to each unit price in the Price Schedule must be stated. If it is not stated, the bidder agrees that the lump sum adjustment shall be applied on a pro rata basis to every unit price in the Price Schedule.

3. Prices must be submitted on all individual items of the Price Schedule, otherwise the bid will be considered non-responsive and will be rejected.

4. For the purpose of initial evaluation of bids, the following will be utilized in resolving arithmetic discrepancies found on the face of the Price Schedule as submitted by the bidder:

a. Obviously misplaced decimal points will be corrected;
b. In case of discrepancy between the unit price and the extended price, the unit price will govern;
c. Apparent errors in extensions of unit prices will be corrected;
d. Apparent errors in addition of lump sum and extended prices will be corrected.

5. For the purpose of bid evaluation, the Government will proceed on the assumption that the bidder intends the bid to be evaluated on the basis of unit prices the totals arrived at by the resolution of arithmetic discrepancies as provided above and the bid will be so reflected on the abstract of bids.

6. The lump sum "LS" line items in the Price Schedule are not "Estimated Quantity" line items and are not subject to the "Variation in Estimated Quantity" contract clause.

7. The Contract Clause 52.232-27, "Prompt Payment for Construction Contracts" requires that the name and address of the contractor official, to whom payment is to be sent, be the same as that in the contract or in a proper Notice of Assignment.

8. Principal Contracting Officer. The Contracting Officer who signs this contract will be the Principal Contracting Officer for this contract. However, any Contracting Officer assigned to the Los Angeles District, contracting within his authority, may take formal action on this contract when the Principal Contracting Officer is unavailable and the action needs to be taken.

9. Amounts and prices shall be indicated in either words or figures, NOT BOTH.

10. Payment of Electronic Funds Transfer (EFT) is the mandatory method of payment. The Contractors attention is directed to Contract Clause NO. 52.232-33 "Mandatory Information for Electronic Funds Transfer" located in Section 00800.

11. The bidder shall distribute his indirect costs (overhead, profit, bond, etc.,) over all items in the Price Schedule. The Government will review all submitted Price Schedules for any unbalancing of the items. Any submitted Price Schedule determined to be unbalanced may be considered nonresponsive and cause the bidder to be ineligible for contract award.

12. The bidder shall furnish all plant, labor, material, equipment, etc., necessary to perform all work in strict accordance with the terms and conditions set forth in the contract in include all attachments thereto.

13. Some quantities are ESTIMATED, the bidders prices MUST BE FIRM.

14. Bidder is cautioned to check his Price Schedule carefully prior to submission. If the Price Schedule contains unit prices, they should be round off to the second decimal point only NOT EXTENDED FUTHER.

15. Contractor is required to fill in Cage code (Reference Section 00600, entitled "Required Central Contractor Registration" Mar 1998) and DUNS Number (Reference Section 00600, entitled, "Data Universal Numbering System (DUNS) Number" Jun1999) in Block No. 15 on Standard Form 1442, Name and Address Block (Cage Code under Code and DUNS No. under Facility Code respectively).

16. The Government contemplates award on one contract to the responsive, responsible bidder who submits the low bid for the total of all the items in the Bid Schedule.

IFB NO.: W912PL-07-D-0019
CONTRACT NO.:

CERTIFICATE OF CORPORATE PRINCIPAL

1) IF THE OFFEROR IS A JOINT VENTURE, COMPLETE THE FOLLOWING:

_____	_____	_____
(Company Name)	(Signature)	(Title)
_____	_____	_____
(Company Name)	(Signature)	(Title)
_____	_____	_____
(Company Name)	(Signature)	(Title)

2) IF THE OFFEROR IS PARTNERSHIP, LIST FULL NAME OF ALL PARTNERS:

_____	_____	_____
(Company Name)	(Signature)	(Title)
_____	_____	_____
(Company Name)	(Signature)	(Title)
_____	_____	_____
(Company Name)	(Signature)	(Title)

3) IF THE OFFEROR IS A CORPORATION, THE FOLLOWING CERTIFICATION SHOULD BE COMPLETED:

CERTIFICATION AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the Secretary of the corporation named as principal in the

within contract; that _____, who signed the said contract on behalf of the principal, was the

_____ of the corporation; that I know his signature and that his signature is genuine; and that said contract was duly signed, sealed and attested for in behalf of said corporation by authority of its governing body.

_____
CORPORATE PRINCIPAL

CORPORATE SEAL

_____
SECRETARY

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

-- End of Section --

SECTION 01200

GENERAL REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES

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

ENGINEERING MANUALS (EM)

EM 385-1-1	(1996) U.S. Army Corps of Engineers Safety and Health Requirements Manual

FEDERAL SPECIFICATIONS (FS)

FS FF-B-575	(Rev C) Bolts, Hexagon and Square
FS FF-N-105	(Rev B; Am 3 Int Am 4) Nails, Brads, Staples and Spikes: Wire, Cut and Wrought
FS FF-N-836	(Rev B; Am 2) Nut: Square, Hexagon, Cap, Slotted, Castle, Knurled, Welding and Single Ball Seat
FS MM-L-751	(Rev H) Lumber; Softwood
FS TT-E-529	(Rev D) Enamel, Alkyd, Semi-Gloss
FS TT-P-25	(Rev E; Am 2) Primer Coating, Exterior (Undercoat for Wood, Ready-Mixed, White and Tints)

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST PS 1	(1983) Construction and Industrial Plywood

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Location of Contractor's Office

SD-02 Shop Drawings

Temporary Access and Haul Roads; G.

1.3 CONSTRUCTION SIGNS

The Contractor shall construct and/or erect the following signs. The signs shall be erected as soon as possible and within 15 days after commencement of work under this contract.

1.3.1 Construction Signs Shall Meet The Following Material Requirements

a. Lumber shall conform to FS MM-L-751, and shall be seasoned Douglas Fir, S4S, Grade D or better except that posts, braces and spacers shall be construction Grade (WCLB).

b. Plywood shall conform to NIST PS 1, grade A-C, Group 1, exterior type.

c. Bolts, Nuts and Nails. Bolts shall conform to FS FF-B-575, nuts shall conform to FS FF-N-836, and nails shall conform to FS FF-N-105.

d. Paints and Oils. Paints shall conform to FS TT-P-25 for primer and FS TT-E-529 for finish paint and lettering.

1.3.2 The Following Construction Signs Shall Be Constructed

a. One project sign at location designated by the Contracting Officer. The project sign shall be constructed as detailed in Figure 1 and Figure 2.

b. Eight hard hat signs at locations directed. Hard hat signs shall be constructed as detailed in Figure 3. Decals and safety signs will be furnished by the Contracting Officer.

c. Warning Signs facing approaching traffic on all haul roads crossing under overhead power transmission lines.

d. Warning Signs shall be constructed of plywood not less than ½ inch thick and shall be securely bolted to the supports with the bottom of the sign face 3 feet above the ground. The sign face shall be 2 x 4 feet and all letters shall be 4 inches in height. The text of the "Powerline" warning signs shall be "WARNING: OVERHEAD TRANSMISSION LINES".

e. Warning signs shall be placed indicating that explosives are being used in the area at locations designated by the Contracting Officer. The text of the "Explosives" warning signs shall be "WARNING: EXPLOSIVES BEING USED IN AREA".

1.3.3 Painting

All exposed surfaces and edges of plywood shall be given one coat of linseed oil and be wiped prior to applying primer. All exposed surfaces of signs and supports shall be given one coat of primer and 2 finish coats of white paint. Except as otherwise indicated, lettering on all signs shall be black and sized as indicated.

1.3.4 Bulletin Board at the Contractor's Office

A weatherproof bulletin board, approximately 36 inches wide and 30 inches high, with hinged glass door shall be provided adjacent to or mounted on the Contractor's project office. If adjacent to the office, the bulletin board shall be securely mounted on no less than 2 posts. Bulletin board and posts shall be painted or have other approved factory finish. The bulletin board shall be easily accessible at all times and shall contain wage rates, equal opportunity notice, and such other items required to be posted

1.4 LOCATION OF CONTRACTOR'S OFFICE

Location of the Contractor's Office shall be approved by the Contracting Officer. The Contractor's job site office shall be located so that people visiting, such as salespersons or personnel seeking employment, will not have to enter the work area to get to the office. No parking of private vehicles shall be permitted in the working areas except as otherwise approved. At approved locations, adequate parking areas shall be constructed for the Contractor's and subcontractor's employees. The office site and parking areas shall be adequately drained and have suitable access.

1.5 MAINTENANCE OF PROJECT FACILITIES

The Contractor shall maintain project facilities in good condition throughout the life of the project. Upon completion of work under this contract, facilities covered under this section will remain the property of the Government.

1.6 PROTECTION OF EXISTING WORK

Before beginning any cutting or removal work, the Contractor shall carefully survey the existing work and examine the drawings and specifications to determine the extent of the work. The Contractor shall take all necessary precautions to insure against damage to existing work to remain in place, to be reused, or to remain the property of the Government, and any damage to such work shall be repaired or replaced as approved by the Contracting Officer at no additional cost to the Government. The Contractor shall carefully coordinate the work of this section with all other work and construct and maintain shoring, bracing and supports, as required. The Contractor shall insure that structural elements are not overloaded and be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under any part of this Contract.

1.7 PUBLIC UTILITIES, NOTICES, AND RESTRICTIONS

1.7.1 General

The approximate location of all pipe lines, power and communication lines, and other utilities known to exist within the limits of the work are indicated on the drawings. The sizes, locations, and names of owners of such utilities are given from available information, but their accuracy is not guaranteed. Except as otherwise indicated on the drawings, all existing utilities will be left in place and the Contractor shall conduct his operations in such a manner that the utilities will be protected from damage at all times, or arrangements shall be made by the Contractor for their relocation at the Contractor's own expense. The Contractor shall be responsible for any damage to utilities known to exist and shall reimburse

the owners for such damage caused by his operations.

1.7.2 Relocation or Removal

Utilities to be relocated or removed not as part of this contract are designated "To be Relocated by Others" or "To be Removed by Others", respectively. Utilities shown on the plans and not so designated will be left in place and be subject to the provisions of the CONTRACT CLAUSE: PROTECTION OF EXISTING VEGETATION, STRUCTURES, UTILITIES, AND IMPROVEMENTS. The Contractor may make arrangements with the owner for the temporary relocation and restoration of utilities not designated to be relocated, or for additional work in excess of the work needed to relocate utilities designated for relocation at no additional cost to the Government.

1.7.3 Utilities Not Shown

If the Contractor encounters, within the construction limits of the entire project, utilities not shown on the plans and not visible as of the date of this contract and if such utilities will interfere with construction operations, he shall immediately notify the Contracting Officer in writing to enable a determination by the Contracting Officer as to the necessity for removal or relocation. If such utilities are left in place, removed or relocated, as directed by the Contracting Officer, the Contractor shall be entitled to an equitable adjustment for any additional work or delay.

1.7.4 Coordination

The Contractor shall consult and cooperate with the owner of utilities that are to be relocated or removed by others to establish a mutual performance schedule and to enable coordination of such work with the construction work. These consultations shall be held as soon as possible after award of the contract or sufficiently in advance of anticipated interference with construction operations to provide required time for the removal or relocation of affected utilities.

The Contractor shall be responsible for coordinating their activities with other contractors performing work in the area.

1.7.5 Notices

1.7.5.1 Utilities to be Relocated or Protected

The Contractor shall notify the Contracting Officer, in writing, 14 calendar days prior to starting work on any utility to be relocated or protected. On each relocation, notification shall include dates on which the Contractor plans excavation, by-pass work, removal work and/or installation work, as applicable. The Contractor shall also notify the following representatives of utility owners not less than 30 days, unless otherwise specified, prior to start of work in the vicinity of their respective utilities:

1.7.5.2 Existing Bench Marks and R/W Markers

The Contractor shall notify the Contracting Officer, in writing, 7 days in advance of the time he proposes to remove any bench mark or right-of-way marker.

1.7.5.3 Spill Reporting

The Contractor shall notify the Contracting Officer immediately after all spills, regardless of quantity, including all personnel exposures. The Contractor shall submit a written notification not later than 7 calendar days after the initial notification. The written notification shall include the following:

a. Item spilled, leaked or releases in an unauthorized manner (Identification,Quantity and Manifest Numbers).

b. Whether the amount spilled, leaked or released in an unauthorized manner is EPA reportable and, if reported, a copy of the report.

c Exact location of the spill, leak or unauthorized release.

d. Nature of exposure to personnel.

e. Containment procedures initiated.

f. Anticipated cleanup and disposal procedures.

g. Disposal location of spill, leak or unauthorized release residue.

1.7.6 Restrictions

1.7.6.1 Representatives of Other Agencies

Personnel representing owners and agencies may be present for various portions of the work. However, the Contractor will be responsible only to the Contracting Officer.

1.7.6.2 Working Hours

The Contractor shall restrict all construction activities, including warming equipment, to the following schedule:

Monday through Friday	7 a.m. to 7 p.m.
Saturday	9 a.m. to 6 p.m.

Access to the job site will be allowed 30 minutes prior to starting time unless otherwise approved by the Contracting Officer. No work will be permitted on Sundays or Federal Holidays.

1.7.6.3 Water for Construction

Reference is made to the clause of the contract entitled "Permits and Responsibilities," which obligates the Contractor to obtain all required licenses and permits for construction, including water for construction. The Contractor shall be responsible for obtaining and paying all costs and fees associated with the acquisition of water for construction.

1.8 ROADS AND CULVERTS

1.8.1 Existing Roads

The work shall be planned in such a manner that traffic on the existing roads outside the actual construction areas shall be maintained at all times. Maintenance shall be as specified in paragraph: Maintenance of

Roads. The work area shall be examined carefully relative to the order and scope of work to be performed, with respect to the limiting provisions of the plans and specifications. Additional work on the existing roads may be done by others during the life of this contract.

1.8.2 Temporary Access and Haul Roads

Plans shall be submitted for approval on all proposed access and haul roads and all deviations, whether within or outside the limits of the construction area, at least fifteen (15) calendar days prior to construction of such roads. The plans shall indicate width of road, direction of traffic, road markings, type of guardrail, curves, grades, runouts, and other information in sufficient detail for studying safety of the proposed roads. The plans shall include details for removal and obliteration of haul roads and temporary access roads and restoration of the area as specified in paragraph: Post-Construction Cleanup and Obliteration.

1.8.2.1 Haul Road Design References

Design of haul roads shall meet or exceed the requirements of the Corps of Engineers Safety and Health Requirement Manual, Section 30.D (EM 385-1-1).

1.8.3 Public and Private Access Roads

When it is necessary for heavy equipment to operate on or to cross project roads or arterial roads, flaggers, signs, lights, and/or other necessary safeguards shall be furnished to safely control and direct the flow of traffic. When it is necessary to operate on existing roads outside the construction area, all necessary permits shall be obtained from the appropriate private or public authority. Work shall be conducted in such manner so as to obstruct and inconvenience traffic on existing roads outside the construction limits as little as possible. Spillage of earth, dusty materials, boulders, and mud on project roads or other roads shall not be permitted. If spillage cannot be prevented, the spillage shall be immediately removed and such areas shall be kept clear throughout the workday. At the conclusion of each workday, such traveled areas shall be cleared of spillage, boulders, and mud.

1.8.4 Maintenance of Roads

All roads shall be maintained regularly to provide vehicular access for the Government's vehicles and the Contractor's vehicles and equipment during the contract performance period. Road maintenance shall include: clearing and disposal of rock/mud slides on the roads and drainage ditches, repair of washouts, repair of potholes and ruts, regrading, and any incident which would restrict vehicular/equipment access. Prior to any alterations of any road alignment the Contractor shall receive approval from the Contracting Officer. Road maintenance and alterations shall be performed by the Contractor at no additional cost to the Government.

1.8.5 Temporary Culverts

Culverts shall be provided as required for road drainage. Culverts shall be corrugated metal pipe of adequate diameter. Dump stone or other energy dissipating structures shall be provided at all outlets of culverts to prevent undermining of pipe. Exact locations of the culverts shall be subject to approval by the Contracting Officer.

1.8.5.1 Culvert Maintenance

All culverts within the construction area, including the borrow areas, shall be maintained to provide unrestricted flow through the culverts. Culvert maintenance shall include debris cleaning, repair of failures, and extension of culverts due to road alterations. Culvert maintenance shall be performed by the Contractor at no additional cost to the Government.

1.9 TRAFFIC SAFETY

1.9.1 Warning Devices

In accordance with Contract Clause ACCIDENT PREVENTION, signs, barricades, and warning devices shall be provided, installed, and maintained as are required for protection of vehicular traffic at any location where operations interfere with public or private roads. Signs, barricades, lights, and signals shall be in conformance with Part VI of the U.S. Department of Transportation Manual on Uniform Traffic Control Devices for Streets and Highways.

1.9.2 Rock and Gravel

Rock and gravel for use on haul roads and other facilities may be obtained from any source within the excavation limits or stockpiles within the project boundaries not designated for other use. The use of any such source shall be subject to approval by the Contracting Officer.

1.10 WATER CONTAMINATION

In order to prevent contamination of water along waterways, all refuse, oil, greases, and other petroleum products; all toxic materials; all cement or concrete; or water containing such materials shall be disposed of in a manner to prevent their entry into the water along waterways.

1.11 SCRAP MATERIAL

Materials indicated to be removed and not indicated to be salvaged, stored or reinstalled are designated as scrap and shall become the property of the Contractor and be removed from the site of work. The Contractor by signing this contract hereby acknowledges that he made due allowance for value, if any, of such scrap in the contract price.

1.12 ARCHAEOLOGICAL FINDINGS DURING CONSTRUCTION

Should the Contractor or any of his employees in the performance of this contract find or uncover any archaeological remains, he shall notify the Project Engineer immediately. Such notification will be a brief statement in writing giving the location and nature of the findings. Should the discovery site require archaeological studies resulting in delays and/or additional work, the Contractor will be compensated by an equitable adjustment under the General Provisions of the contract.

1.13 POST-CONSTRUCTION CLEANUP AND OBLITERATION

The Contractor shall obliterate all signs of temporary construction facilities such as haul roads, access roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other vestiges of construction as directed by the Contracting Officer. Excavation, filling, regrading and plowing of

roadways and other construction areas will require the areas to be restored to near natural conditions, which will permit the growth of vegetation thereon. The disturbed areas shall be graded and filled as required, and the areas scarified prior to placement of soil covering for hydroseeding.

1.14 PERMITS

1.14.1 General

Reference is made to the clause of the contract entitled "Permits and Responsibilities," which obligates the Contractor to obtain all required licenses and permits, including, but not necessarily limited to the following specified hereinbelow.

1.14.1.1 National Pollutant Discharge Elimination System (NPDES) Permit

The project requires an NPDES permit from the California State Water Resources Control Board, Division of Water Quality. The general permit requires development and implementation of Storm Water Pollution Prevention Plan (SWPPP) , which shall be maintained on-site throughout the construction period. A copy of a plan will be furnished to the Contractor by the Government. The Contractor shall maintain a current copy of the plan on-site, and shall comply with all provisions of the plan. Modifications to the plan as necessary to reflect Contractor's construction methods shall be submitted by the Contractor to the Government for approval.

1.15 REQUIRED INSURANCE

1.15.1 General

The Contractor shall maintain insurance in full force and effect throughout the term of this contract. The policy or policies of insurance maintained by the Contractor shall provide the limits and coverages as set forth herein below.

1.15.2 Insurance

Insurance shall be in force the first day of the term of this contract.

1.15.3 Insurance Policy

Each insurance policy required by this contract shall contain the following three clauses:

a. "This insurance shall not be canceled, limited in scope of coverage or non-renewed until after 30 days written notice has been given to (1) Ventura County Flood Control and Water Conservation District, Attn: [_____]

b. "All rights of subrogation are hereby waived against the County of Ventura and the members of the Board of Supervisors and elective or appointive officers or employees, when acting within the scope of their employment or appointment".

c. "As respects operation of the named insured performed on behalf of the Government, the following are added as additional insureds:

1. The [_____].

d. "It is agreed that any insurance maintained by [_____] will apply in excess of, and not contribute with, insurance provided by this policy.

LIABILITY INSURANCE

COVERAGE	MINIMUM LIMITS
Comprehensive General Liability single limit including Completed Operation and a Broad Form Property Endorsement and Comprehensive Automobile Liability	$10,000,000 combined per occurrence.
Worker's Compensation	Statutory

1.15.4 Liability Insurance

Any liability insurance required by this contract shall not contain exclusions or endorsements which eliminate or limit coverage for the following:

a. Claims of liability for bodily injury or property damage caused by, resulting from, attributable or contributed to, or aggravated by the subsidence or other movement of soils or land as a result of landslide, consolidation, expansion, creep, shifting, sinking, or mud flow;

b. Claims of liability for bodily injury or property damage caused by, resulting from, attributable or contributed to, or aggravated by the actual, alleged, or threatened discharge, dispersal, release or escape of any pollutants;

c. Completed Operations coverage;

d. Products coverage;

e. Broad Form Property Damage coverage;

f. Blanket Contractual coverage.

1.15.5 Fire and Extended Coverage

The Contractor shall purchase a course of construction property insurance policy to cover structures (excluding reinforced concrete structures) being built under the terms of this contract to at least 90 percent of their replacement cost. As a minimum, coverage shall be provided for replacement cost and for fire and the extended coverage perils.

1.15.6 Worker's Compensation

Each liability and worker's compensation insurance policy required by this contract shall contain clause numbers 12.3 (a.) and 12.3 (c.) above,and the following clause: "It is agreed that any insurance maintained by the County of Ventura will apply in excess of, and not contribute with, insurance provided by this policy."

1.15.6.1 Procuring of Required Policy

The procuring of such required policy or policies of insurance shall not be construed to limit Contractor's liability hereunder not to fulfill the indemnification provisions and requirements of this contract.

1.15.6.2 Contractor Agrees to Indemnify

Contractor agrees to indemnify and save harmless agency, its officers, employees, agents and volunteers from and against any and all claims, actions, losses, damages and/or liability arising out of this contract from any cause whatsoever, including the acts, errors or omissions of any person, except where such indemnification is prohibited by law.

PART 2 PRODUCTS (NOT APPPLICABLE)

PART 3 EXECUTION (NOT APPPLICABLE)

-- End of Section --

SECTION 01270

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 DIVERSION AND CONTROL OF WATER (Bid Items 0001 and 0019)

Payment for Diversion and Control of Water will be made at the applicable contract price, which payment shall constitute full compensation for maintaining the work areas in a dry condition during construction; and providing and maintaining all other means of seepage control, including dewatering wells.

1.2 CLEAR SITE AND REMOVE OBSTRUCTIONS (Bid Items 0002 and 0020)

1.2.1 Payment for Clear Site and Remove Obstructions, Levee Foundation, Ramps and Borrow Areas

Payment for Clear Site and Remove Obstructions, Levee foundation, Ramps, and Borrow Areas will be made for clearing and grubbing and removal of all obstructions within the areas for the levee foundation, ramps, borrow areas, stockpiling of material and the offsite disposal of construction debris, trash and refuse. Except as otherwise specified, payment includes all applicable earthwork; removal of debris including miscellaneous structures, fences, waterlines, asphalt roads, and vegetation, protection of existing utilities, disposal of all materials, and maintenance of these cleared areas once initial clearing is accomplished.

1.3 EXCAVATION (Bid Item 0003 and 0021)

1.3.1 Measurement

Unless specified or approved otherwise, excavation items will be measured for payment by computing the volume in cubic yards, using plotted surveyed cross sections and the average end area method. Excavated materials will measured for payment from its original position. Paylines for excavation will be as shown on the plans. No measurement for payment will be made for over excavation, nor for construction, removal of haul roads, dressing, drainage and road surfacing materials, or for the disposal of the excavated materials from over excavation and construction and maintenance of access haul roads.

1.3.2 Payment for Excavation, Stripping

Payment for Excavation, Stripping will be made at the applicable contract price, which payment shall constitute full compensation for excavation, hauling, and disposition of the stripped material from the levee abutments.

1.3.3 Payment for Excavation, Toe

Payment for Excavation, Toe will be made at the applicable contract price, which payment shall constitute full compensation for excavation along the toe of the levee to the lines and grades as shown on the plans, hauling and disposition of the excavated material.

1.3.4 Excavation Stockpile Areas

No separate payments will be made for excavation of stockpile areas. All costs therefore shall be included in the applicable embankment fill items.

1.3.5 Stockpiling

No separate payment will be made for stockpiling material. Therefore, all costs shall be included in the applicable contract prices for the items to which the work applies.

1.3.6 Disposal

No separate payment will be made for disposal of excavated material. Therefore, all costs shall be included in the applicable contract prices for the items to which the work applies.

1.4 FILLS AND SUBGRADE PREPARATION

1.4.1 Measurement

Measurement for Payment for Fills and Subgrade Preparation will be made between the required excavation and structure lines and the fill limit lines, or between the ground lines and fill lines, as indicated or staked in the field. Quantities will be computed in cubic yards by the average end area method and the planimeter will be considered a precise instrument for measuring plotted cross sections. No measurement for payment will be made for backfill of any over excavation for temporary access and haul roads for the Contractor's convenience.

1.4.2 Payment for Compacted Fill, Levee (Bid Items 0004 and 0022)

Payment for Compacted Fill, Levee will be made at the applicable contract price, which payment shall constitute full compensation for obtaining any necessary borrow material, placing, spreading and compacting the fill, complete.

1.4.3 Payment for Compacted Fill, Access Ramp (Bid Item 0005)

Payment for Compacted Fill, Access Ramp will be made at the applicable contract price, which payment shall constitute full compensation for obtaining any necessary borrow material, placing, spreading and compacting the fill, complete.

1.4.4 Miscellaneous Fill (Bid Items 0006 and 0023)

Payment for Miscellaneous Fill will be made at the applicable contract price, which payment shall constitute full compensation for obtaining any necessary borrow material, placing, spreading and compacting the fill, complete.

1.5 Payment for Excavation, Borrow Areas (Bid Item 0007)

Payment for Excavation, Borrow Areas will be made at the applicable contract price, which payment shall constitute full compensation for excavation, hauling, and disposition in the stockpile area of the excavated Zone II material from the designated borrow areas.

1.6 Payment for Clear Site and Remove Obstructions, Borrow Area

Payment for Clear Site and Remove Obstructions, Borrow Area, will be made at the applicable contract price, which payment shall constitute full compensation, for clearing and grubbing, and removal of all obstructions within the actual areas used for the borrow operation. Except as otherwise specified, payment includes all applicable earthwork; removal of existing structures and other indicated obstructions; removal of trash and debris, concrete irrigation pipes, and vegetation; removal of topsoil for salvage; protection of existing utilities; replacement or restoration of utilities; disposal of all materials, and maintenance of these areas throughout the duration of the contract. Final grading and spreading of stockpiled organic material in borrow areas shall be included in this bid item.

1.7 HYDROSEEDING (Bid Item 0008)

1.7.1 Measurement and Payment for Hydroseeding

Measurement and Payment for Hydroseeding will be made at the applicable contract unit price per acre, which payment shall constitute full compensation for hydroseeding, complete, including soil preparation, soil admixtures, and maintenance.

1.7.2 Plant Establishment Period

Payment for "Plant Establishment Period" will be made at the contract lump sum price, shall include all maintenance watering and reseeding to establish 80 percent growth of hydroseed areas.

1.8 PORTLAND CEMENT (Bid Item 0009)

1.8.1 Measurement

Quantity of portland cement for soil cement to be paid for will be the number of metric tonnes (1,000 kilograms) of portland cement used for soil cement unless specifically excepted, wasted or used in the soil cement test section or for all soil cement mix designs or used for the convenience of the Contractor. The quantity to be paid for will be determined by multiplying the approved weight of portland cement in kilograms per cubic meter of soil cement by the number of accepted cubic meters or soil cement placed within the lines and grades indicated on the drawings and dividing by 1,000.

1.8.2 Payment

Payments for portland cement for soil cement will be made at the applicable contract price, which payment shall constitute full compensation for furnishing the portland cement ready for use in the work, complete. No payment will be made for portland cement used for structures for which separate payment is provided.

1.9 SOIL CEMENT LINING (Bid Item 0010)

1.9.1 Measurement

Measurement of soil cement will be made on the basis of actual cubic yards of soil cement placed within the lines and grades indicated on the drawings and specifications, excluding the quantity placed in the test section.

1.9.2 Payment

Payment for soil cement will be made at the applicable contract price, which payment shall constitute full compensation for the soil cement including all materials (except portland cement and pozzolan for which separate payments are provided), costs for test section, cost to develop all soil cement mix designs, formwork, batching, hauling, placing, compacting, finishing, curing and all equipment and tools to complete the soil cement in place. Embedded items shall be included in the cost of the soil cement except when other payment is specifically provided.

1.10 STONE PROTECTION - 24" RIPRAP (Bid Item 0011)

1.10.1 Measurement

The Unit measurement for the aggregate base course will be the ton (2,000 pounds). The Contractor shall weight each load on a certified platform scale and furnish the Contracting Officer with duplicate Weigh Master's Certificates showing the actual net weights. One ticket shall be furnished to the plant inspector and one ticket to the inspector at the construction site.

1.10.2 Payment for Stone Protection

Payment for Stone Protection will be made at the applicable contract unit prices per ton, which shall constitute full compensation for obtaining transporting, stockpiling (if applicable),and placing the stone, providing the 3 inch sand buffer and geotextile, complete.

1.11 SAND BEDDING MATERIAL (Bid Items 0012 and 0028)

1.11.1 Measurement for Sand Bedding Material

The unit measurement will be the ton (2,000 pounds). The Contractor shall weigh each load on a certified platform scale and furnish the Contracting Officer with duplicate Weigh Master's Certificates showing the actual net weights. One ticket shall be furnished to the plant inspector and one ticket to the inspector at the construction site.

1.11.2 Payment for Sand Bedding Material

Payment will be made at the applicable contract unit prices per ton, which shall constitute full compensation for placement of the stone in accordance with the lines and grades indicated on the drawings and specification section 02600 "STONE PROTECTION" including subgrade preparation, obtaining, transporting, stockpiling, and placing the stone, complete.

1.12 GEOTEXTILE FOR STONE PROTECTION (Bid Items 0013, and 0029)

1.12.1 Measurement

Installed geotextiles will be measured for payment in place to the nearest square yard of protected area as delineated in the drawings. Overlaps of geotextile shall not be counted in measurements and all geotextile used for the Santa Ana River Trail are paid for separately.

1.12.2 Payment

Payment for Geotextile will be made at the contract unit price, which price

shall constitute full compensation for providing all labor, materials, equipment,laps, seams, or extra length, securing pins, trenching and burying the ends as indicated complete. No payment will be made for geotextiles replaced because of waste, contamination, damage, repair, or due to contractor fault or negligence.

1.13 RECREATION TRAIL RAMPS (Bid Item 0014)

Payment for the Recration Trail Ramps will be made at the applicable contract price, which payment shall constitute full compensation for installation of the access ramps near Stations 45+00 and 16+00 of the Meiners Oaks levee. Ramps are to be constructed and maintained in accordance with the lines and grades indicated on the drawings which payment shall constitute full compensation for obtaining any necessary borrow material, placing, spreading and compacting the fill, complete. In addition, this bid item includes the installation of the road delineators for the ramp at Sta. 24+44.16, complete in place.

1.14 SIDE DRAIN, STA 25+00 (Bid Item 0015)

1.14.1 Payment for Side Drain, Sta 25+00

Payment for the Side Drain at Sta 25+00 will be made at the applicable contract lump sum price, which payment shall constitute full compensation for labor, materials including RCP, concrete encasement, inlet and outlet, riprap, excavation, backfill, formwork, concrete, portland cement, steel reinforcement, flap gate and for all equipment and tools required to complete the work.

1.15 SIDE DRAIN, STA 17+40 (Bid Item 0016)

1.15.1 Payment for Side Drain, Sta 17+40

Payment for the Side Drain at Sta 17+40 will be made at the applicable contract lump sum price, which payment shall constitute full compensation for labor, materials including RCP, concrete encasement, inlet and outlet, riprap, excavation, backfill, formwork, concrete, portland cement, steel reinforcement, flap gate and for all equipment and tools required to complete the work.

1.16 ACCESS ROAD SURFACING (Bid Items 0017 and 0032)

1.16.1 Measurement

The unit of measurement for the Access Road Surfacing will be the ton (2,000 pounds). The Contractor shall weigh each load on a certified platform scale and shall furnish the Contracting Officer with duplicate Weigh Master's Certificates showing the actual net weights. One delivery ticket shall be furnished to the plant inspector and one delivery ticket to the inspector at the construction site.

1.16.2 Payment for Acess Road Surfacing

Payment will be made at the applicable contract unit prices per ton, which shall constitute full compensation for placement of the road surfacing in accordance with the lines and grades indicated on the drawings and specification Section 02722 "AGGREGATE AND/OR GRADED-CRUSHED AGGREGATE BASE COURSE" which shall include subgrade preparation, obtaining, placing, and compacting aggregate base course.

1.17 SALVAGE EXISTING RIPRAP (Bid Item 0024)

1.4.8 Payment for Salvage Exiting Riprap

Payment for Excavation, Removal of Stone Protection will be made at the applicable contract price, which payment constitutes full compensation for excavating, hauling and stockpiling the quantity of salvaged stone that meets the gradation for stone to be used for the 48" riprap and 24" grouted riprap.

1.18 STONE PROTECTION - 48" RIPRAP (Bid Item 0025)

1.18.1 Measurement

The Unit measurement for the aggregate base course will be the ton (2,000 pounds). The Contractor shall weight each load on a certified platform scale and furnish the Contracting Officer with duplicate Weigh Master's Certificates showing the actual net weights. One ticket shall be furnished to the plant inspector and one ticket to the inspector at the construction site.

1.18.2 Payment for Stone Protection

Payment for Stone Protection will be made at the applicable contract unit prices per ton, which shall constitute full compensation for obtaining transporting, stockpiling (if applicable),and placing the stone, complete.

1.19 STONE PROTECTION - 24" GROUTED RIPRAP (Bid Item 0026)

1.19.1 Measurement

The Unit measurement for the aggregate base course will be the ton (2,000 pounds). The Contractor shall weight each load on a certified platform scale and furnish the Contracting Officer with duplicate Weigh Master's Certificates showing the actual net weights. One ticket shall be furnished to the plant inspector and one ticket to the inspector at the construction site.

1.19.2 Payment for Stone Protection

Payment for Stone Protection will be made at the applicable contract unit prices per ton, which shall constitute full compensation for obtaining transporting, stockpiling (if applicable),and placing the stone, complete.

1.20 GROUTING STONE PROTECTION (Bid Item 0027)

1.20.1 Measurement

The quantity of grout to be paid for will be measured to the nearest cubic yard by weighing all ingredients in trial batches of grout and converting each batch to absolute volume; the volume thus determined and the number of batches of grout of corresponding proportions acceptably placed in the work shall be used to determine the quantity of grout.

1.20.2 Payment for Grouting Stone Protection

Payment for Grouting Stone Protection will be made at the applicable contract price, which payment shall constitute full compensation for

materials including Portland Cement, mixing, transporting, placing, finishing, and curing grout used for grouting stone protection complete.

1.21 CHAIN LINK FENCE (Bid Item 0030)

1.21.1 Measurement

Measurement of Chain Link Fencing will be made to the nearest linear foot horizontally along the centerline from end-to -end of the fence in place.

1.21.2 Payment of Chain Link Fence

Payment for Chain Link Fencing will be made at the applicable contract unit price, which payment shall constitute full compensation for the fencing, complete in place including concrete foundations.

1.22 GATES (Bid Item 0031)

1.22.1 Measurement

Gates shall be measured per each based upon type.

1.22.2 Payment for Gates

Payment for Gates will be made at the applicable contract unit price, which payment shall constitute full compensation for materials and installation of the swing gates as indicated on the drawings, complete in place including concrete footings.

1.23 AS-BUILT DRAWINGS

No separate payment will be made for as-built drawings required under this contract, as specified in Section 01702, and all costs accrued in connection with such drawings shall be considered a subsidiary obligation of the Contractor.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 DEFINITIONS

1.1.1 Submittal

Contract Clauses "FAR 52.236-5, Material and Workmanship," paragraph (b) and "FAR 52.236-21, Specifications and Drawings for Construction," paragraphs (d), (e), and (f) apply to all "submittals."

1.1.2 Submittal Descriptions (SD)

Submittals requirements are specified in the technical sections. Submittals are identified by SD numbers and titles as follows.

SD-01 Preconstruction Submittals

Certificates of insurance.
Surety bonds.
List of proposed subcontractors.
List of proposed products.
Construction Progress Schedule.
Submittal register.
Schedule of prices.
Health and safety plan.
Work plan.
Quality control plan.
Environmental protection plan.

SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project.

Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated.

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

SD-04 Samples

Physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.

Field samples and mock-ups constructed on the project site establish standards by which the ensuring work can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.

SD-05 Design Data

Calculations, mix designs, analyses or other data pertaining to a part of work.

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. (Testing must have been within three years of date of contract award for the project.)

Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports.

Daily checklists.

Final acceptance test and operational test procedure.

SD-07 Certificates

Statements signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a supplier, installer or subcontractor through Contractor, the purpose of which is to further quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications.

Confined space entry permits.

SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

1.1.3 Approving Authority

Office authorized to approve submittal.

1.1.4 Work

As used in this section, on- and off-site construction required by contract documents, including labor necessary to produce submittals, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Submittal register; G

1.3 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.3.1 Government Approved

Government approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.3.2 Information Only

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

1.4 APPROVED SUBMITTALS

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

1.5 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause "Changes" shall be given promptly to the Contracting Officer.

1.6 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) System Manager and each item shall be stamped, signed, and dated by the CQC System Manager indicating action taken. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

3.2 SUBMITTAL REGISTER

At the end of this section is a submittal register showing items of equipment and materials for which submittals are required by the specifications; this list may not be all inclusive and additional submittals may be required. The Contractor shall track and maintain a complete list of all submittals, including completion of all data columns.

3.3 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 15 calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals.

3.4 TRANSMITTAL FORM (ENG FORM 4025)

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

3.5 SUBMITTAL PROCEDURES

Submittals shall be made as follows:

3.5.1 Procedures

Submittals shall be made as follows:

3.5.2 Deviations

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

3.6 CONTROL OF SUBMITTALS

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

3.7 GOVERNMENT APPROVED SUBMITTALS

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

3.8 INFORMATION ONLY SUBMITTALS

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

3.9 STAMPS

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

CONTRACTOR

(Firm Name)

_____ Approved

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

SIGNATURE: _____

TITLE: _____

DATE: _____

-- End of Section --

SECTION 01355A

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 REFERENCES

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

U.S. AIR FORCE (USAF)

AFI 32-1053	(1999) Pest Management Program

U.S. ARMY (DA)

DA AR 200-5	(1999) Pest Management

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2003) U.S. Army Corps of Engineers Safety and Health Requirements Manual
WETLAND MANUAL	Corps of Engineers Wetlands Delineation Manual Technical Report Y-87-1

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

33 CFR 328	Definitions of Waters of the United States
40 CFR 152 - 186	Pesticide Programs
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 279	Standards for the Management of Used Oil
40 CFR 302	Designation, Reportable Quantities, and Notification
40 CFR 355	Emergency Planning and Notification
40 CFR 68	Chemical Accident Prevention Provisions
49 CFR 171 - 178	Hazardous Materials Regulations

1.2 DEFINITIONS

1.2.1 Environmental Pollution and Damage

Environmental pollution and damage is 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 humankind; or degrade the environment aesthetically, culturally and/or historically.

1.2.2 Environmental Protection

Environmental protection is the prevention/control of pollution and habitat disruption that may occur to the environment during construction. The control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2.3 Contractor Generated Hazardous Waste

Contractor generated hazardous waste means materials that, if abandoned or disposed of, may meet the definition of a hazardous waste. These waste streams would typically consist of material brought on site by the Contractor to execute work, but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e. methyl ethyl ketone, toluene etc.), waste thinners,excess paints, excess solvents, waste solvents, and excess pesticides, and contaminated pesticide equipment rinse water.

1.2.4 Installation Pest Management Coordinator

Installation Pest Management Coordinator (IPMC) is the individual officially designated by the Installation Commander to oversee the Installation Pest Management Program and the Installation Pest Management Plan.

1.2.5 Project Pesticide Coordinator

The Project Pesticide Coordinator (PPC) is an individual that resides at a Civil Works Project office and that is responsible for oversight of pesticide application on Project grounds.

1.2.6 Land Application for Discharge Water

The term "Land Application" for discharge water implies that the Contractor shall discharge water at a rate which allows the water to percolate into the soil. No sheeting action, soil erosion, discharge into storm sewers, discharge into defined drainage areas, or discharge into the "waters of the United States" shall occur. Land Application shall be in compliance with all applicable Federal, State, and local laws and regulations.

1.2.7 Pesticide

Pesticide is defined as any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, or intended for use as a plant regulator, defoliant or desiccant.

1.2.8 Pests

The term "pests" means arthropods, birds, rodents, nematodes, fungi, bacteria, viruses, algae, snails, marine borers, snakes, weeds and other organisms (except for human or animal disease-causing organisms) that adversely affect readiness, military operations, or the well-being of personnel and animals; attack or damage real property, supplies, equipment, or vegetation; or are otherwise undesirable.

1.2.9 Surface Discharge

The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers,creeks, and/or "waters of the United States" and would require a permit to discharge water from the governing agency.

1.2.10 Waters of the United States

All waters which are under the jurisdiction of the Clean Water Act, as defined in 33 CFR 328.

1.2.11 Wetlands

Wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, and bogs. Official determination of whether or not an area is classified as a wetland must be done in accordance with WETLAND MANUAL.

1.3 GENERAL REQUIREMENTS

The Contractor shall minimize environmental pollution and damage that may occur as the result of construction operations. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of this contract. The Contractor shall comply with all applicable environmental Federal, State, and local laws and regulations. The Contractor shall be responsible for any delays resulting from failure to comply with environmental laws and regulations.

1.4 SUBCONTRACTORS

The Contractor shall ensure compliance with this section by subcontractors.

1.5 PAYMENT

No separate payment will be made for work covered under this section. The Contractor shall be responsible for payment of fees associated with environmental permits, application, and/or notices obtained by the Contractor. All costs associated with this section shall be included in the contract price. The Contractor shall be responsible for payment of all fines/fees for violation or non-compliance with Federal, State, Regional and local laws and regulations.

1.6 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for [Contractor Quality Control approval.] [information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Environmental Protection Plan[; G][; G, [_____]]

The environmental protection plan.

1.7 ENVIRONMENTAL PROTECTION PLAN

Prior to commencing construction activities or delivery of materials to the site, the Contractor shall submit an Environmental Protection Plan for review and approval by the Contracting Officer. The purpose of the Environmental Protection Plan is to present a comprehensive overview of known or potential environmental issues which the Contractor must address during construction. Issues of concern shall be defined within the Environmental Protection Plan as outlined in this section. The Contractor shall address each topic at a level of detail commensurate with the environmental issue and required construction task(s). Topics or issues which are not identified in this section, but which the Contractor considers necessary, shall be identified and discussed after those items formally identified in this section. Prior to submittal of the Environmental Protection Plan, the Contractor shall meet with the Contracting Officer for the purpose of discussing the implementation of the initial Environmental Protection Plan; possible subsequent additions and revisions to the plan including any reporting requirements; and methods for administration of the Contractor's Environmental Plans. The Environmental Protection Plan shall be current and maintained onsite by the Contractor.

1.7.1 Compliance

No requirement in this Section shall be construed as relieving the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During Construction, the Contractor shall be responsible for identifying, implementing, and submitting for approval any additional requirements to be included in the Environmental Protection Plan.

1.7.2 Contents

The environmental protection plan shall include, but shall not be limited to, the following:

a. Name(s) of person(s) within the Contractor's organization who is(are) responsible for ensuring adherence to the Environmental Protection Plan.

b. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site, if applicable.

c. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.

d. Description of the Contractor's environmental protection personnel training program.

e. An erosion and sediment control plan which identifies the type and location of the erosion and sediment controls to be provided. The plan shall include monitoring and reporting requirements to assure that the control measures are in compliance with the erosion and sediment control plan, Federal, State, and local laws and regulations. A Storm Water Pollution Prevention Plan (SWPPP) may be substituted for this plan.

f. Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on the site.

g. Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plan shall include measures to minimize the amount of mud transported onto paved public roads by vehicles or runoff.

h. 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 including methods for protection of features to be preserved within authorized work areas.

i. Drawing showing the location of borrow areas.

j. The Spill Control plan shall include the procedures, instructions, and reports to be used in the event of an unforeseen spill of a substance regulated by 40 CFR 68, 40 CFR 302, 40 CFR 355, and/or regulated under State or Local laws and regulations. The Spill Control Plan supplements the requirements of EM 385-1-1 [and the [_____]]. This plan shall include as a minimum:

1. The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual shall immediately notify the Contracting Officer and [the local Fire Department] [Facility Fire Department] [Facility Response Personnel] [Facility Environmental Office] in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity is released to the environment. The plan shall contain a list of the required reporting channels and telephone numbers.

2. The name and qualifications of the individual who will be responsible for implementing and supervising the containment and cleanup.

3. Training requirements for Contractor's personnel and methods of accomplishing the training.

4. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.

5. The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency.

6. The methods and procedures to be used for expeditious contaminant cleanup.

k. A non-hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris. The plan shall include schedules for disposal. The Contractor shall identify any subcontractors responsible for the transportation and disposal of solid waste. Licenses or permits shall be submitted for solid waste disposal sites that are not a commercial operating facility. Evidence of the disposal facility's acceptance of the solid waste shall be attached to this plan during the construction. The Contractor shall attach a copy of each of the Non-hazardous Solid Waste Diversion Reports to the disposal plan. The report shall be submitted on the first working day after the first quarter that non-hazardous solid waste has been disposed and/or diverted and shall be for the previous quarter (e.g. the first working day of January, April, July, and October). The report shall indicate the total amount of waste generated and total amount of waste diverted in cubic yards or tons along with the percent that was diverted.

l. A recycling and solid waste minimization plan with a list of measures to reduce consumption of energy and natural resources. The plan shall detail the Contractor's actions to comply with and to participate in Federal, State, Regional, and local government sponsored recycling programs to reduce the volume of solid waste at the source.

m. An air pollution control plan detailing provisions to assure that dust, debris, materials, trash, etc., do not become air borne and travel off the project site.

n. A contaminant prevention plan that: identifies potentially hazardous substances to be used on the job site; identifies the intended actions to prevent introduction of such materials into the air, water, or ground; and details provisions for compliance with Federal, State, and local laws and regulations for storage and handling of these materials. In accordance with EM 385-1-1, a copy of the Material Safety Data Sheets (MSDS) and the maximum quantity of each hazardous material to be on site at any given time shall be included in the contaminant prevention plan. As new hazardous materials are brought on site or removed from the site, the plan shall be updated.

o. A waste water management plan that identifies the methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines. If a settling/retention pond is required, the plan shall include the design of the pond including drawings, removal plan, and testing requirements for possible pollutants. If land application will be the method of disposal for the waste water, the plan shall include a sketch showing the location for land application along with a description of the pretreatment methods to be implemented. If surface discharge will be the method of disposal, a copy of the permit and associated documents shall be included as an attachment prior to discharging the waste

water. If disposal is to a sanitary sewer, the plan shall include documentation that the Waste Water Treatment Plant Operator has approved the flow rate, volume, and type of discharge.

p. A historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on the project site: and/or identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in the area are discovered during construction. The plan shall include methods to assure the protection of known or discovered resources and shall identify lines of communication between Contractor personnel and the Contracting Officer.

q. A pesticide treatment plan shall be included and updated, as information becomes available. The plan shall include: sequence of treatment, dates, times, locations, pesticide trade name, EPA registration numbers, authorized uses, chemical composition, formulation, original and applied concentration, application rates of active ingredient (i.e. pounds of active ingredient applied), equipment used for application and calibration of equipment. The Contractor is responsible for Federal, State, Regional and Local pest management record keeping and reporting requirements as well as any additional Installation Project Office specific requirements. The Contractor shall follow [DA AR 200-5 Pest Management, Chapter 2, Section III "Pest Management Records and Reports" for data required to be reported to the Installation] [AFI 32-1053 Sections 3.4.13 and 3.4.14 for data required to be reported to the Installation].

1.7.3 Appendix

Copies of all environmental permits, permit application packages, approvals to construct, notifications, certifications, reports, and termination documents shall be attached,as an appendix, to the Environmental Protection Plan.

1.8 PROTECTION FEATURES

This paragraph supplements the Contract Clause PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS. Prior to start of any onsite construction activities, the Contractor and the Contracting Officer shall make a joint condition survey. Immediately following the survey, the Contractor shall prepare a brief report including a plan describing the features requiring protection under the provisions of the Contract Clauses, which are not specifically identified on the drawings as environmental features requiring protection along with the condition of trees, shrubs and grassed areas immediately adjacent to the site of work and adjacent to the Contractor's assigned storage area and access route(s), as applicable. This survey report shall be signed by both the the Contractor and the Contracting Officer upon mutual agreement as to its accuracy and completeness. The Contractor shall protect those environmental features included in the survey report and any indicated on the drawings, regardless of interference which their preservation may cause to the Contractor's work under the contract.

1.9 SPECIAL ENVIRONMENTAL REQUIREMENTS

The Contractor shall comply with the special environmental requirements

listed here [_____] and included at the end of this section.

1.10 ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS

Any deviations, requested by the Contractor, from the drawings,plans and specifications which may have an environmental impact will be subject to approval by the Contracting Officer and may require an extended review, processing, and approval time. The Contracting Officer reserves the right to disapprove alternate methods, even if they are more cost effective, if the Contracting Officer determines that the proposed alternate method will have an adverse environmental impact.

1.11 NOTIFICATION

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with Federal, State or local environmental 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 the proposed corrective action and take such action when approved by the Contracting Officer. 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 equitable adjustments allowed to the Contractor for any such suspensions. This is in addition to any other actions the Contracting Officer may take under the contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 ENVIRONMENTAL PERMITS AND COMMITMENTS

[This paragraph supplements the Contractor's responsibility under the contract clause "PERMITS AND RESPONSIBILITIES" to the extent that the Government has obtained the [_____]. The Contractor shall comply with the terms and conditions of the attached [_____] at the end of this section.]

[The Contractor shall be responsible for obtaining and complying with all environmental permits and commitments required by Federal, State, Regional, and local environmental laws and regulations.]

3.2 LAND RESOURCES

The Contractor shall confine all activities to areas defined by the drawings and specifications. Prior to the beginning of any construction, the Contractor shall identify any land resources to be preserved within the work area. Except in areas indicated on the drawings or specified to be cleared, the Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without approval. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. The Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Stone, soil, or other materials displaced into uncleared areas shall be removed by the Contractor.

3.2.1 Work Area Limits

Prior to commencing construction activities, the Contractor shall mark the areas that need not be disturbed under this contract. Isolated areas within the general work area which are not to be disturbed shall be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, any markers shall be visible in the dark. The Contractor's personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

3.2.2 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. The Contractor shall restore landscape features damaged or destroyed during construction operations outside the limits of the approved work area.

3.2.3 Erosion and Sediment Controls

The Contractor shall be responsible for providing erosion and sediment control measures in accordance with Federal, State, and local laws and regulations. The erosion and sediment controls selected and maintained by the Contractor shall be such that water quality standards are not violated as a result of the Contractor's construction activities. The area of bare soil exposed at any one time by construction operations should be kept to a minimum. The Contractor shall construct or install temporary and permanent erosion and sediment control best management practices (BMPs) [as indicated on the drawings] [as specified in Section 01356A STORM WATER POLLUTION PREVENTION MEASURES]. BMPs may include, but not be limited to, vegetation cover, stream bank stabilization, slope stabilization, silt fences, construction of terraces, interceptor channels, sediment traps, inlet and outfall protection, diversion channels, and sedimentation basins. [The Contractor's best management practices shall also be in accordance with the [_____] National Pollutant Discharge Elimination System (NPDES) Storm Water Pollution Prevention Plan (SWPPP) which may be reviewed at the [_____] Environmental Office.] Any temporary measures shall be removed after the area has been stabilized.

3.2.4 Contractor Facilities and Work Areas

The Contractor's field offices, staging areas, stockpile storage, and temporary buildings shall be placed in areas designated on the drawings or as directed by the Contracting Officer. Temporary movement or relocation of Contractor facilities shall be made only when approved. Erosion and sediment controls shall be provided for on-site borrow and spoil areas to prevent sediment from entering nearby waters. Temporary excavation and embankments for plant and/or work areas shall be controlled to protect adjacent areas.

3.3 WATER RESOURCES

The Contractor shall monitor construction activities to prevent pollution of surface and ground waters. Toxic or hazardous chemicals shall not be applied to soil or vegetation unless otherwise indicated. All water areas affected by construction activities shall be monitored by the Contractor. For construction activities immediately adjacent to impaired surface

waters, the Contractor shall be capable of quantifying sediment or pollutant loading to that surface water when required by State or Federally issued Clean Water Act permits.

3.3.1 Cofferdams, Diversions, and Dewatering Operations

Construction operations for dewatering, removal of cofferdams shall be controlled at all times to maintain compliance with existing State water quality standards and designated uses of the surface water body. The Contractor shall comply with [the State of [_____] water quality standards and anti-degradation provisions] [and] [the Clean Water Act Section 404, Nation Wide Permit No. [_____]].

3.3.2 Stream Crossings

Stream crossings shall allow movement of materials or equipment without violating water pollution control standards of the Federal, State, and local governments. [Construction of stream crossing structures shall be in compliance with Clean Water Act Section 404, Nation Wide Permit No. [_____].]

3.3.3 Wetlands

The Contractor shall not enter, disturb, destroy, or allow discharge of contaminants into any wetlands[.] [except as authorized herein. The Contractor shall be responsible for the protection of wetlands shown on the drawings in accordance with paragraph ENVIRONMENTAL PERMITS, REVIEWS, AND APPROVALS. Authorization to enter specific wetlands identified shall not relieve the Contractor from any obligation to protect other wetlands within, adjacent to, or in the vicinity of the construction site and associated boundaries.]

3.4 AIR RESOURCES

Equipment operation, activities, or processes performed by the Contractor shall be in accordance with all Federal and State air emission and performance laws and standards.

3.4.1 Particulates

Dust particles; aerosols and gaseous by-products from construction activities; and 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. The Contractor shall maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the Federal, State, and local air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. The Contractor must have sufficient, competent equipment available to accomplish these tasks. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs. The Contractor shall comply with all State and local visibility regulations.

3.4.2 Odors

Odors from construction activities shall be controlled at all times. The odors shall not cause a health hazard and shall be in compliance with State regulations and/or local ordinances.

3.4.3 Sound Intrusions

The Contractor shall keep construction activities under surveillance and control to minimize environment damage by noise. The Contractor shall comply with the provisions of the State of [_____] rules.

3.4.4 Burning

Burning will not be allowed on the project site unless specified in other sections of the specifications or authorized in writing by the Contracting Officer. The specific time, location, and manner of burning shall be subject to approval.

3.5 HTRW AIR EMISSION CONTROL

The Contractor shall implement the following control(s) to meet or exceed performance levels identified in HTRW PERIMETER AIR MONITORING.

3.5.1 Air Emission Control to Meet Action Levels

[_____].

3.5.2 Excavation/Production/Processing Rate Reduction

[_____].

3.5.3 Exposed Surface Area Reduction

[_____].

3.6 CHEMICAL MATERIALS MANAGEMENT AND WASTE DISPOSAL

Disposal of wastes shall be as directed below, unless otherwise specified in other sections and/or shown on the drawings.

3.6.1 Solid Wastes

Solid wastes (excluding clearing debris) shall be placed in containers which are emptied on a regular schedule. Handling, storage, and disposal shall be conducted to prevent contamination. Segregation measures shall be employed so that no hazardous or toxic waste will become co-mingled with solid waste. [The Contractor shall transport solid waste off Government property and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal. A Subtitle D RCRA permitted landfill shall be the minimum acceptable off-site solid waste disposal option. The Contractor shall verify that the selected transporters and disposal facilities have the necessary permits and licenses to operate.] [Waste materials shall be hauled to the Government landfill site [shown on the drawings] [designated by the Contracting Officer].] [The Contractor shall comply with [site procedures] [Federal, State, and local laws and regulations] pertaining to the use of landfill areas.]

3.6.2 Chemicals and Chemical Wastes

Chemicals shall be dispensed ensuring no spillage to the ground or water. Periodic inspections of dispensing areas to identify leakage and initiate corrective action shall be performed and documented. This documentation will be periodically reviewed by the Government. Chemical waste shall be collected in corrosion resistant, compatible containers. Collection drums shall be monitored and removed to a staging or storage area when contents are within 6 inches of the top. Wastes shall be classified, managed, stored, and disposed of in accordance with Federal, State, and local laws and regulations.

3.6.3 Contractor Generated Hazardous Wastes/Excess Hazardous Materials

Hazardous wastes are defined in 40 CFR 261, or are as defined by applicable State and local regulations. Hazardous materials are defined in 49 CFR 171 - 178. The Contractor shall, at a minimum, manage and store hazardous waste in compliance with 40 CFR 262 [and shall manage and store hazardous waste in accordance with the [Installation] [Project Office] hazardous waste management plan]. The Contractor shall take sufficient measures to prevent spillage of hazardous and toxic materials during dispensing. The Contractor shall segregate hazardous waste from other materials and wastes, shall protect it from the weather by placing it in a safe covered location, and shall take precautionary measures such as berming or other appropriate measures against accidental spillage. The Contractor shall be responsible for storage, describing, packaging, labeling, marking, and placarding of hazardous waste and hazardous material in accordance with 49 CFR 171 - 178, State, and local laws and regulations. The Contractor shall transport Contractor generated hazardous waste off Government property within [60][_____] days in accordance with the Environmental Protection Agency and the Department of Transportation laws and regulations. The Contractor shall dispose of hazardous waste in compliance with Federal, State and local laws and regulations. Spills of hazardous or toxic materials shall be immediately reported to the Contracting Officer[and the Facility Environmental Office]. Cleanup and cleanup costs due to spills shall be the Contractor's responsibility. [The disposition of Contractor generated hazardous waste and excess hazardous materials are the Contractor's responsibility.] [The Contractor shall coordinate the disposition of hazardous waste with the [Facility's] [Project Office's] Hazardous Waste Manager and the Contracting Officer.]

3.6.4 Fuel and Lubricants

Storage, fueling and lubrication of equipment and motor vehicles shall be conducted in a manner that affords the maximum protection against spill and evaporation. Fuel, lubricants and oil shall be managed and stored in accordance with all Federal, State, Regional, and local laws and regulations. Used lubricants and used oil to be discarded shall be stored in marked corrosion-resistant containers and recycled or disposed in accordance with 40 CFR 279, State, and local laws and regulations. [There shall be no storage of fuel on the project site. Fuel must be brought to the project site each day that work is performed.] [Storage of fuel on the project site shall be accordance with all Federal, State, and local laws and regulations.]

3.6.5 Waste Water

Disposal of waste water shall be as specified below.

a. Waste water from construction activities, such as onsite material processing, concrete curing, foundation and concrete clean-up, water used in concrete trucks, forms, etc. shall not be allowed to enter water ways or to be discharged prior to being treated to remove pollutants. The Contractor shall dispose of the construction related waste water [off-Government property in accordance with all Federal, State, Regional and Local laws and regulations.] [or by collecting and placing it in a retention pond where suspended material can be settled out and/or the water can evaporate to separate pollutants from the water. The site for the retention pond shall be coordinated and approved with the Contracting Officer. The residue left in the pond prior to completion of the project shall be removed, tested, and disposed off-Government property in accordance with Federal, State, and local laws and regulations. The area shall be backfilled to the original grade, top-soiled and seeded/sodded. [The water in the retention pond shall be tested for [_____] and the results reviewed and approved by the Contracting Officer, prior to being discharged or disposed off-Government property].]

b. For discharge of ground water, the Contractor shall [obtain a State or Federal permit specific for pumping and discharging ground water prior to surface discharging.] [surface discharge in accordance with all Federal, State, and local laws and regulations.] [surface discharge in accordance with the requirements of the NPDES or State STORM WATER DISCHARGES FROM CONSTRUCTION SITES permit.] [land apply on the project site. Land application shall be in accordance with all Federal, State, Regional, and/or Local laws and regulations for pumping and land applying ground water.]

c. Water generated from the flushing of lines after [disinfection or disinfection in conjunction with hydrostatic testing] [hydrostatic testing] shall be [land applied in accordance with all Federal, State, and local laws and regulations for land application] [discharged into the sanitary sewer with prior approval and/or notification to the Waste Water Treatment Plant's Operator].

3.7 RECYCLING AND WASTE MINIMIZATION

The Contractor shall participate in State and local government sponsored recycling programs. [The Contractor is further encouraged to minimize solid waste generation throughout the duration of the project.] [The Contractor shall participate in the following recycling and waste minimization activities to divert non-hazardous solid waste:[_____]].

3.8 NON-HAZARDOUS SOLID WASTE DIVERSION REPORT

The Contractor shall maintain an inventory of non-hazardous solid waste diversion and disposal of construction and demolition debris. The Contractor shall submit a report to [_____] through the Contracting Officer on the first working day after each fiscal year quarter, starting the first quarter that non-hazardous solid waste has been generated. The following shall be included in the report:

a. Construction and Demolition (C&D) Debris Disposed = [_____] in cubic yards or tons, as appropriate.

b. Construction and Demolition (C&D) Debris Recycled = [_____] in

cubic yards or tons, as appropriate.

c. Total C&D Debris Generated = [_____] in cubic yards or tons, as appropriate.

d. Waste Sent to Waste-To-Energy Incineration Plant (This amount should not be included in the recycled amount) = [_____] in cubic yards or tons, as appropriate.

3.9 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

[Existing historical, archaeological, and cultural resources within the Contractor's work area are shown on the drawings. The Contractor shall protect these resources and shall be responsible for their preservation during the life of the Contract.]If during excavation or other construction activities any previously unidentified or unanticipated historical, archaeological, and cultural resources are discovered or found, all activities that may damage or alter such resources shall be temporarily suspended. Resources covered by this paragraph include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rock or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, the Contractor shall immediately notify the Contracting Officer so that the appropriate authorities may be notified and a determination made as to their significance and what, if any, special disposition of the finds should be made. The Contractor shall cease all activities that may result in impact to or the destruction of these resources. The Contractor shall secure the area and prevent employees or other persons from trespassing on, removing, or otherwise disturbing such resources.

3.10 BIOLOGICAL RESOURCES

The Contractor shall minimize interference with, disturbance to, and damage to fish, wildlife, and plants including their habitat. The Contractor shall be responsible for the protection of threatened and endangered animal and plant species including their habitat in accordance with Federal, State, Regional, and local laws and regulations.

3.11 INTEGRATED PEST MANAGEMENT

In order to minimize impacts to existing fauna and flora, the Contractor, through the Contracting Officer, shall coordinate with the Installation Pest Management Coordinator (IPMC) Project Pesticide Coordinator (PPC)at the earliest possible time prior to pesticide application. The Contractor shall discuss integrated pest management strategies with the [IPMC] [PPC] and receive concurrence from the [IPMC] [PPC] through the COR prior to the application of any pesticide associated with these specifications. Installation Project Office Pest Management personnel shall be given the opportunity to be present at all meetings concerning treatment measures for pest or disease control and during application of the pesticide. [For termiticide requirements see Section 02360 SOIL TREATMENT FOR SUBTERRANEAN TERMITE CONTROL.] The use and management of pesticides are regulated under 40 CFR 152 - 186.

3.11.1 Pesticide Delivery and Storage

Pesticides shall be delivered to the site in the original, unopened containers bearing legible labels indicating the EPA registration number

and the manufacturer's registered uses. Pesticides shall be stored according to manufacturer's instructions and under lock and key when unattended.

3.11.2 Qualifications

For the application of pesticides, the Contractor shall use the services of a subcontractor whose principal business is pest control. The subcontractor shall be licensed and certified in the state where the work is to be performed.

3.11.3 Pesticide Handling Requirements

The Contractor shall formulate, treat with, and dispose of pesticides and associated containers in accordance with label directions and shall use the clothing and personal protective equipment specified on the labeling for use during all phases of the application. Material Safety Data Sheets (MSDS)shall be available for all pesticide products.

3.11.4 Application

Pesticides shall be applied by a State Certified Pesticide Applicator in accordance with EPA label restrictions and recommendation. The Certified Applicator shall wear clothing and personal protective equipment as specified on the pesticide label. Water used for formulating shall only come from locations designated by the Contracting Officer. The Contractor shall not allow the equipment to overflow. Prior to application of pesticide, all equipment shall be inspected for leaks, clogging, wear, or damage and shall be repaired prior to being used.

3.12 PREVIOUSLY USED EQUIPMENT

The Contractor shall clean all previously used construction equipment prior to bringing it onto the project site. The Contractor shall ensure that the equipment is free from soil residuals, egg deposits from plant pests, noxious weeds, and plant seeds. The Contractor shall consult with the USDA jurisdictional office for additional cleaning requirements.

3.13 MAINTENANCE OF POLLUTION FACILITIES

The Contractor shall maintain permanent and temporary pollution control facilities and devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

3.14 MILITARY MUNITIONS

In the event the Contractor discovers or uncovers military munitions as defined in 40 CFR 260, the Contractor shall immediately stop work in that area and immediately inform the Contracting Officer.

3.15 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel shall be trained in all phases of environmental protection and pollution control. The Contractor shall conduct environmental protection/pollution control meetings for all Contractor personnel prior to commencing construction activities. Additional meetings shall be conducted for new personnel and when site conditions change. The training and meeting agenda shall include: methods of detecting and avoiding pollution; familiarization with statutory and contractual

pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, wetlands, and endangered species and their habitat that are known to be in the area.

3.16 CONTAMINATED MEDIA MANAGEMENT

Contaminated environmental media consisting of, but not limited to, ground water, soils, and sediments shall be managed in accordance with Section [_____].

3.17 POST CONSTRUCTION CLEANUP

The Contractor shall clean up all areas used for construction in accordance with Contract Clause: "Cleaning Up". The Contractor shall, unless otherwise instructed in writing by the Contracting Officer, obliterate all signs of temporary construction facilities such as haul roads, work area, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the work. The disturbed area shall be graded, filled and the entire area seeded unless otherwise indicated.

-- End of Section --

SECTION 01420

SOURCES FOR REFERENCE PUBLICATIONS

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NOTE: This guide specification provides a listing of organizations whose publications are referenced in other sections of the specifications.

Comments and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of technical proponents, including their organization designation and telephone number, is on the Internet.

Recommended changes to a UFGS should be submitted as a Criteria Change Request (CCR).

Use of electronic feedback is encouraged.
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NOTE: In accordance with FAR 11.201, identification of sources for obtaining documents referenced in the specificatioins must be provided in contract documents.
****

1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the standards producing organization, (e.g. ASTM B 564 Nickel Alloy Forgings). However, when the standards producing organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

1.2 ORDERING INFORMATION

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NOTE: Information regarding standards producing organizations was in agreement with information contained in the Unified Master Reference List (UMRL) as of date of this guide specification.

This paragraph is automatically edited by removal of those organizations not included in other sections of the project specifications when SpecsIntact (Reconcile Addresses item from the Print menu) is use for job processing. However, if publications of organizations in addition to those listed below are used in the project, such additional organizations must be added to this paragraph.
****

The addresses of the standards publishing organizations whose documents are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided. Documents listed in the specifications with numbers which were not assigned by the standards producing organization should be ordered from the source by title

rather than by number.

ACI INTERNATIONAL (ACI)
P.O. Box 9094
Farmington Hills, MI 48333-9094
Ph: 248-848-3700
Fax: 248-848-3701
E-mail: bkstore@concrete.org
Internet: http://www.aci-int.org

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
444 North Capital Street, NW, Suite 249
Washington, DC 20001
Ph: 202-624-5800
Fax: 202-624-5806
E-Mail: info@aashto.org
Internet: http://www.aashto.org

AMERICAN WELDING SOCIETY (AWS)
550 N.W. LeJeune Road
Miami, FL 33126
Ph: 800-443-9353 - 305-443-9353
Fax: 305-443-7559
E-mail: info@aws.org
Internet: http://www.aws.org

ASTM INTERNATIONAL (ASTM)
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959
Ph: 610-832-9500
Fax: 610-832-9555
E-mail: service@astm.org
Internet: http://www.astm.org

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)
100 Bureau Drive
Stop 3460
Gaithersburg, MD 20899-3460
Ph: 301-975-NIST
Internet: http://www.nist.gov
Order Publications From:
Superintendent of Documents
U.S. Government Printing Office (GPO)
732 North Capitol Street, NW
Washington, DC 20401
Ph: 888-293-6498 or 202-512-1530
Fax: 202-512-1262
E-mail: gpoaccess@gpo.gov
Internet: http://www.gpoaccess.gov
or
National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
Ph: 703-605-6585
Fax: 703-605-6900
E-mail: info@ntis.gov
Internet: http://www.ntis.gov

U.S. AIR FORCE (USAF)
Air Force Publishing Distribution Center
Ph: 410-687-3330
Fax: 410-436-4629
E-mail: afpdc-service@pentagon.af.mil
Internet: http://www.e-publishing.af.mil/

U.S. ARMY (DA)
U.S. Army Publishing Directorate
Internet: http://www.apd.army.mil
AOK: 5/04
LOK: 5/04

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-- End of Section --

SECTION 01451A

CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM D 3740	(2004) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E 329	(2003) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 PAYMENT

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

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The site project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the contract. The site project superintendent in this context shall be the highest level manager responsible for the overall construction activities at the site, including quality and production. The site project superintendent shall maintain a physical presence at the site at all times, except as otherwise acceptable to the Contracting Officer, and shall be responsible for all construction and construction related activities at the site.

3.2 QUALITY CONTROL PLAN

The Contractor shall furnish for review by the Government, not later than 30

days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. The Government will consider an interim plan for the first 15 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.1 Content of the CQC Plan

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

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

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

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

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

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

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

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

deficiencies have been corrected.

h. Reporting procedures, including proposed reporting formats.

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

3.2.2 Acceptance of Plan

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

3.2.3 Notification of Changes

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

3.3 COORDINATION MEETING

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

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 Personnel Requirements

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure safety and contract compliance. The Safety and Health Manager shall receive direction and authority from the CQC System Manager and shall serve as a member of the CQC staff. Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as part of the CQC organization. The Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility

to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer. The Contractor shall provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Complete records of all letters, material submittals, shop drawing submittals, schedules and all other project documentation shall be promptly furnished to the CQC organization by the Contractor. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a construction person with a minimum of 7 years in quality control. This CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor or approved laboratory. The CQC System Manager shall be assigned no other duties . An alternate for the CQC System Manager shall be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager.

3.4.3 CQC Personnel

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

Experience Matrix

	Area	Qualifications
a.	Civil	Graduate Civil Engineer with 2 years experience in the type of work being performed on this project or technician with 5 yrs related experience

3.4.4 Additional Requirement

In addition to the above experience and education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management For Contractors". For Materials technicians, acceptable certification is defined as the following. For concrete, technicians shall be certified to a minimum Level I Concrete Inspector as specified by the American Concrete Institute (ACI). For pavement and soils, technicians shall be currently certified by Caltrans for each test

to be performed

3.4.5 Organizational Changes

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

3.5 SUBMITTALS AND DELIVERABLES

Submittals, if needed, shall be made as specified in Section 01330 SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals and deliverables are in compliance with the contract requirements.

3.6 CONTROL

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

3.6.1 Preparatory Phase

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

a. A review of each paragraph of applicable specifications, reference codes, and standards. A copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field shall be made available by the Contractor at the preparatory inspection. These copies shall be maintained in the field and available for use by Government personnel until final acceptance of the work.

b. A review of the contract drawings.

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

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

e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

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

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

h. Discussion of procedures for controlling quality of the work

including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

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

j. Discussion of the initial control phase.

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

3.6.2 Initial Phase

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

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

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

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

d. Resolve all differences.

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

f. The Government shall be notified at least 72 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

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

3.6.3 Follow-up Phase

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

non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

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

3.7 TESTS

3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with contract requirements.

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

c. Check test instrument calibration data against certified standards.

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

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

3.7.2 Testing Laboratories

3.7.2.1 Capability Check

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

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of $5,000 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 Onsite Laboratory

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

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to state-licensed laboratory, approved by the Contracting Officer's Representative.

Coordination for each specific test, exact delivery location, and dates will be made through the Area Office.

3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

Near the end of the work, or any increment of the work established by a time stated in the SPECIAL CONTRACT REQUIREMENTS Clause, "Commencement, Prosecution, and Completion of Work", or by the specifications, the CQC Manager shall conduct an inspection of the work. A punch list of items which do not conform to the approved drawings and specifications shall be prepared and included in the CQC documentation, as required by paragraph DOCUMENTATION. The list of deficiencies shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2 Pre-Final Inspection

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

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the

superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at the final acceptance inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9 DOCUMENTATION

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

a. Contractor/subcontractor and their area of responsibility.

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

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

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

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

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

g. Offsite surveillance activities, including actions taken.

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

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

j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and

deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 24 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.10 NOTIFICATION OF NONCOMPLIANCE

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

-- End of Section --

SECTION 01702

AS-BUILT DRAWINGS

PART 1 GENERAL

1.1 REFERENCES

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

U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER (ERDC)

ERDC/ITL TR-01-6 (2001) A/E/C Cadd Standard

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-11 Closeout Submittals

Submittal of the As-Built Field Data; G

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 AS-BUILT FIELD DATA

3.1.1 General

The Contractor shall prepare and furnish the as-built drawings for the project. The as-built drawings shall be a record of the construction as installed and completed by the Contractor. They shall include all the information shown on the contract set of drawings and a record of all deviations, modifications, or changes from those drawings, however minor, which were incorporated in the work, all additional work not appearing on the contract drawings, and all changes which are made after final inspection of the contract work. In event the Contractor accomplishes additional work which changes the as-built conditions of the facility after submission of the as-built drawings, the Contractor shall furnish revised and/or additional drawings as required to depict as-built conditions. The requirements for these additional drawings will be the same as for the as-built drawings included in the original submission. The drawings shall show the following information, but not be limited thereto:

(a) The location and description of any utility lines or other installations of any kind or description known to exist within the construction area. The location includes dimensions to permanent

features.

(b) The location and dimensions of any changes within the building or structures.

(c) Correct grade or alignment of dam embankment, roads, channels, structures or utilities if any changes were made from contract plans.

(d) Correct elevations if changes were made in site grading or placement of materials in the dam embankment.

(e) Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, dimensions of equipment foundations, etc.

(f) The topography and grades of all drainage installed or affected as a part of the project construction.

(g) All changes or modifications which result from the final inspection.

(h) Where contract drawings or specifications allow options, only the option actually used in the construction shall be shown on the as-built drawings. The option not used shall be deleted.

3.1.2 Preliminary As-Built Drawings

The Contractor shall maintain one (1) set of full size, blueline prints marked up in red to show the as-built conditions. This set of as-built prints shall be kept current and available at the job site at all times. All changes from what is shown on the contract plans, whether it be from changes requested by the Contracting Officer or resulting from additional information which might be uncovered in the course of construction, shall be accurately and neatly recorded as they occur by means of details and notes. The marked-up as-built prints will be jointly inspected for accuracy and completeness by the Contracting Officer and Contractor prior to submission of each monthly pay estimate. Failure to keep the As-Built Field Data current shall be sufficient justification to withhold a retained percentage from the monthly pay estimate. Information to be included on these preliminary drawings shall conform to the requirements as stated above. Any and all as-built modifications shall be reflected on all sheets affected by the modifications.

3.1.2.1 Submittal of the As-Built Field Data

One (1) full size set of marked up drawings with the as-built field data shall be submitted to the Contracting Officer for review and approval a minimum of 20 calendar days prior to the date of final inspection. If review of the preliminary as-built drawings reveals errors and/or omissions, the drawings will be returned to the Contractor for corrections. The Contractor shall make all corrections and return the drawings to the Contracting Officer within 10 calendar days of receipt.

3.2 AS-BUILT ELECTRONIC FILE DRAWINGS

3.2.1 General

No later than 30 days after final acceptance a complete set of as-built drawings shall be submitted in Intergraph MicroStation electronic file format. The as-built drawings shall be done in a quality equal to that of the originals. Line work, line weights, and lettering, and use of symbols shall be the same as the original line work, line weights, and lettering, and symbols. If additional drawings are required they shall be prepared in electronic file format under the same guidance. When final revisions have been completed, each drawings shall be identified with the words "AS-BUILT" in block letters at least 3/8-inch high placed above the title block if space permits, or if not, below the title block between the border and the trim line. The date of completion and the words "REVISED AS-BUILT" shall be placed in the revision block above the latest revision notation.

3.2.2 Original Files

Upon Contractor's request the Government will provide the Contractor one set of Intergraph MicroStation electronic file format contract drawings, to be used for as-built drawings. The electronic file drawings will be available on CD-ROM media, 3-1/2 inch high density magnetic disks, or an 8-mm data cartridge (Contractor's choice).

3.2.3 Electronic File Submittal Requirements

3.2.3.1 File Submittals

The MicroStation electronic file(s) deliverable shall be in MicroStation version 5.0 'DGN' binary format. All support files required to display or plot the file(s) in the same manner as they were developed shall be delivered along with the files. These files include but are not limited to Font Libraries, Pen Tables, and Referenced files.

3.2.3.2 Drawing Format

Layering shall be performed in accordance with the Tri-Service CADD/GIS Technology Center's Architectural, Engineering and Construction (A/E/C) CADD Standards manual, ERDC/ITL TR-01-6, version 2.0. An explanatory list of which layer is used at which drawing and an explanatory list of all layers which do not conform to the guidelines shall be provided with each submittal.

3.2.3.3 Electronic File Deliverable Media

All electronic files shall be submitted on CD-ROM media. Two complete sets of disks shall be submitted along with one complete set of prints taken from the disks. The electronic files shall be delivered on ISO 9660 format CD-ROM media. Due to the limited ability to mark on CD-ROM media, only the Contractor's firm name, project name and location, submittal type (AS-BUILT) and date will be required. Each submittal shall be accompanied by a hard copy transmittal sheet that contains the above information along with a description of each file provided in the submittal.

3.3 FINAL AS-BUILT DRAWINGS

The final as-built record drawings shall be completed and returned together with the approved preliminary as-built drawings to the Contracting Officer

within 30 calendar days of final acceptance. The Contracting Officer will review all final as-built record drawings for accuracy and conformance to the drafting standards and other requirements contained in DIVISION 1 GENERAL REQUIREMENTS. The drawings shall be returned to the Contractor if corrections are necessary. The Contractor shall make all corrections and shall return the drawings to the Contracting Officer within 7 calendar days of receipt. Upon final approval, the Contractor shall furnish two (2) full size sets and two (2) half size sets of the final as-built plans on reproducible mylars, and the electronic as-built project files. All project files, whether revised or not, shall be provided to the Contracting Officer.

-- End of Section --

SECTION 02100

CLEAR SITE AND REMOVE OBSTRUCTIONS

PART 1 GENERAL

1.1 PROTECTION

1.1.1 Protection of Existing Features

Before beginning any clearing or removal of obstructions, the Contractor shall perform a topographic survey as defined in section 01200 "GENERAL REQUIREMENTS". During clearing operations, the Contractor shall take all necessary precautions to insure against damage to existing features to remain in place or to be reused, and any damage to such work shall be repaired or replaced as approved by the Contracting Officer at no additional cost to the Government. The Contractor shall carefully coordinate the work of this section with all other work and construct and maintain shoring, bracing and supports, as required. The Contractor shall insure that structural elements are not overloaded and be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under any part of this contract.

1.1.2 Environmental Protection

All work and Contractor operations shall comply with the requirements of SECTION 01355A: ENVIRONMENTAL PROTECTION.

1.2 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 CLEAR SITE AND REMOVE OBSTRUCTIONS

3.1.1 Areas for Clearing and Removal of Obstructions

Areas to be cleared are limited to haul roads, contractor's staging areas, actual excavation areas of the project, borrow site, and areas on which fills and/or structures are to be placed. Vegetated gullies adjacent to borrow sites shall not be impacted. The removal of trees, shrubs, turf, and other vegetation outside of these areas shall be held to a minimum and care shall be exercised not to damage any trees, shrubs, turf, or vegetation which can be left in place.

3.1.2 Clearing

Clearing shall consist of the removal of all trees, brush, rubbish, fences, debris, or any materials within the areas for clearing and removal of obstructions. Grubbing shall be done in all areas that are stripped and consist of removing all stumps, roots, logs, and any debris exposed from the stripping operations. Roots 1-1/2 inches or more in diameter, shall be removed to a depth of 18 inches below the stripped ground surface. Stumps shall be pulled, not cut off.

3.1.3 Remove Obstructions

The Contractor shall remove and dispose of all existing structures and obstructions for project construction, except as otherwise noted on the drawings.

3.2 DISPOSAL

All material removed, except material specified and/or indicated to be temporarily removed, salvaged, stockpiled, or indicated otherwise shall become the property of the Contractor, and shall be removed from the site and legally disposed of.

-- End of Section --

SECTION 02300

EARTHWORK

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only. Unless otherwise identified, the date of the standards referenced shall be the most recent published at www.ihs.com as of the solicitation issue date.

ASTM INTERNATIONAL (ASTM)

ASTM C 136	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM D 1556	Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3(2,700 kN-m/m3))
ASTM D 2216	Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D 2487	Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2003) U.S. Army Corps of Engineers Safety and Health Requirements Manual

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Excavation Plan; G,

Submit 30 days prior to starting work.

Utility Protection Plan; G,

Submit 30 days prior to starting excavation.

SD-06 Test Reports

Testing Log

Submit weekly.

1.3 DEFINITIONS

1.3.1 Satisfactory Materials

Satisfactory materials shall comprise any materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, SM, SW-SM, SC, SW-SC, SP-SM, SP-SC, CL, ML, CL-ML, . Satisfactory materials for grading shall be comprised of stones less than 12 inches, except for fill material for pavements which shall be comprised of stones less than 3 inches in any dimension.

1.3.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials include but are not limited to construction debris, trash, refuse, and material classified as satisfactory which contains root and other organic matter. Unsatisfactory materials also include materials too wet to support construction equipment. The Contracting Officer shall be notified of any contaminated materials.

1.3.3 Degree of Compaction

Degree of compaction required, is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557 abbreviated as a percent of laboratory maximum density.

PART 2 PRODUCTS

2.1 GENERAL

Except as designated below, the composition alone of any fill material determines where it may be used. Materials containing brush, roots, sod or other perishable materials will not be considered suitable. The suitability of the materials shall be subject to the approval of the Contracting Officer and their disposition in the levees shall be as approved by the Contracting Officer. All materials to be used as fill shall be blended during excavation.

2.2 COMPACTED FILL

Material for Compacted Fill shall be any satisfactory material but consisting of an unspecified gradation, except that the maximum stone size shall not exceed 12 inches.

2.3 MISCELLANEOUS FILL

Material for Miscellaneous Fill may consist of any or all types of material available from the required excavation or borrow. Material shall be placed

in the areas indicated on the drawings or as otherwise directed. Miscellaneous fill shall be dumped and spread in horizontal layers not to exceed 24 inches thick. No specific compaction will be required.

2.4 TOPSOIL

Topsoil shall consist of the upper 12 inches of material stripped from the surface of the borrow area and the dike foundations. Topsoil shall be stockpiled for later use in any areas requiring hydroseed. Excess topsoil not used for hydroseeding shall be placed in accordance with the contractor's approved excavtion plan.

PART 3 EXECUTION

3.1 STRIPPING AND PLACEMENT OF TOPSOIL

Where indicated or directed, topsoil shall be stripped to a depth of 12 inches. Topsoil may be used on any areas requiring hydroseed and shall be spread in one 8" lift on areas already graded and ready to receive topsoil for hydroseeding. Topsoil shall be transported and deposited in stockpiles convenient to areas that are to later receive application of the topsoil. Topsoil shall be kept separate from other excavated materials, brush, litter, objectionable weeds, roots, stones larger than 2 inches in diameter, and other materials that would interfere with planting and maintenance operations. Compaction of topsoil used for hydroseeding is not required. Any surplus of topsoil shall be placed and compacted in the approved disposal area in accordance with the contractor's approved excavation plan.

3.2 EXCAVATION, GENERAL

3.2.1 General

The Contractor shall perform excavation of every type of material encountered within the limits of the project to the lines, grades, and elevations indicated and as specified. Grading shall be in conformity with the typical sections shown and the tolerances specified in paragraph FINISHING. Surplus satisfactory excavated material not required for fill or embankment and unsatisfactory excavated material shall be disposed of in approved disposal areas in accordance with the contractor's approved excavation plan. Unsatisfactory excavated material shall be disposed of in designated waste or spoil areas. Construction debris, trash, and refuse shall be disposed of off site. During construction, excavation and fill shall be performed in a manner and sequence that will provide proper drainage at all times.

3.2.2 Preservation of Property

All excavation operations shall be conducted in such a manner that concrete structures, utilities, fences, or other facilities and improvements which are to remain in place permanently will not be subjected to settlement or horizontal movement. The Contractor shall furnish and install sheet piling, cribbing, bulkheads, shores, or whatever means may be necessary to adequately support material carrying such improvements or to support the improvements themselves and shall maintain such means in position until they are no longer needed. Temporary sheet piling, cribbing, bulkheads, shores, or other protective means shall remain the property of the Contractor and when no longer needed shall be removed from the site. The Contractor shall submit for approval shop drawings showing proposed method

of bracing which he intends to use. All shoring and bracing shall be designed so that it is effective to the bottom of the excavation, and shall be based upon calculation of pressures exerted by (and the condition and nature of) the materials to be retained, including surcharge imparted to the side of the trench by equipment and stored materials. Removal of shoring shall be performed in such manner as not to disturb or damage the finished concrete or other facility.

3.2.3 Excavation for Structures

Excavation within the vicinity of existing structures, utilities, roads, and pipes to remain in place shall be performed in a manner to prevent damage to the structure. Earth banks and facilities to remain in place shall be supported as necessary during excavation. Potential for damage resulting from severe vibration may limit the Contractor's operations or choice of equipment. In general, unless otherwise shown or specified, the actual side slopes shall be in accordance with COE EM 385-1-1.

3.2.4 Underground Utilities

Movement of construction machinery and equipment over pipes and utilities during construction shall be at the Contractor's risk. Excavation made with power-driven equipment is not permitted within two feet of known utility or subsurface construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, the contractor shall excavate by hand. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work affected by the contract excavation until approval for backfill is granted by the Contracting Officer. The Contractor shall report damage to utility lines or subsurface construction immediately to the Contracting Officer.

3.2.5 Drainage

The contractor shall provide for the collection and disposal of surface and subsurface water encountered during construction. The Contractor shall establish/construct storm drainage features (ponds/basins) at the earliest stages of site development, and throughout construction grade the construction area to provide positive surface water runoff away from the construction activity and/or provide temporary ditches, swales, and other drainage features and equipment as required to maintain dry soils. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, the contractor shall remove unsuitable material and provide new soil material as specified herein. It is the responsibility of the Contractor to assess the soil and groundwater conditions presented by the plans and specifications and to employ necessary measures to permit construction to proceed.

3.2.6 Blasting

Blasting will not be permitted.

3.2.7 Foundation Conditions

Foundation materials along the alignment of the Meiners Oaks Levee consist of gravel, cobbles and boulders in a sand to silty-sand matrix. Inspections of existing cuts adjacent to the active streambed indicate that less than 50 percent of the boulders are larger than 18 inches. It is

estimated that approximately 50 percent of the material from the required excavation may exceed 12 inches. Boulders in excess of 4 feet in diameter are present. Materials are not distinctly layered and it is unlikely that any extended, continuous strata of fine-grained or sandy material will be encountered at the site. Groundwater may be encountered at elevations at or below the existing thalweg of the river. Foundation materials along the alignment of the toe of the Live Oak levee are expected to consist of gravel and cobbles in a sand to silty-sand matrix. Groundwater should be anticipated at elevations at or below the existing thalweg of the river.

3.3 EXCAVATION, BORROW

3.3.1 General

Borrow shall be taken from the indicated borrow areas. Material at all three borrow areas adjacent to the Meiners Oaks Levee is coarser than the allowable fill and will require substantial processing to achieve the specified gradations. The excavation shall be conducted in such a manner that the excavated area will not pond water. Permanent excavated slopes in the borrow area shall not be steeper than 5H:1V, except as approved by the Contracting Officer. The borrow area shall be left in a neat condition, graded to drain and in accordance with the requirements specified in SECTION 01355A: ENVIRONMENTAL PROTECTION.

3.3.2 Excavation Plan

An excavation plan, including methods and equipment to be used in excavating each area or feature, locations of stockpiles, locations of temporary disposal areas, locations of permanent disposal areas, precautions to be taken to ensure that excavation operations do not go beyond the limits shown, haul roads into and out of excavations and location of proposed structures, shall be submitted to the Contracting Officer for approval thirty (30) calendar days prior to commencing excavation. The excavation plan shall also include the Contractor's grading plan proposal for closure of the borrow areas.

3.3.3 Erosion Control

Erosion due to wind or flowing water shall be controlled during borrow operations. Areas of surface water concentration shall be drained into silt ponds to remove sediment prior to water being discharged from the borrow site into existing drainages. Reclamation shall occur concurrently with excavation to the extent possible given operational constraints of the ongoing excavation.

3.3.4 Closure of Borrow Area

Upon completion of excavation from the borrow area, stockpiled topsoil from stripping operations shall be spread over the excavated surface or as directed by the Contracting Officer. The borrow area shall be revegetated according to the requirements of SECTION 02900: HYDROSEEDING.

3.4 Utility Protection Plan

The Contractor shall submit a utility protection plan to the Contracting Officer for approval twenty-one (21) calendar days prior to commencing foundation excavation. The plan shall include, as a minimum, the location and description of all utilities requiring protection, the equipment and design loading for each affected utility and the proposed protection

measures, including supporting calculations. Foundation excavation shall not begin until written approval is given by the Contracting Officer. The plan does not limit the Contractor's liability from repairing utilities damaged during construction. Repairs shall be coordinated with and made to the satisfaction of the utility owner.

3.5 REMOVAL OF UNSATISFACTORY SOILS

The removal of soils or materials which are unsatisfactory for the foundation of the levees or structures may be required in certain areas. S ubgrade materials that cannot be brought to 95 percent compaction after scarification shall be removed. The Contractor will be required to excavate any such areas to the depth directed and backfill the removal areas with compacted fill conforming to the requirements of Paragraph GENERAL REQUIREMENTS FOR COMPACTED FILLS AND BACKFILLS. No excavated material or waste of any kind shall be removed beyond the project limits under this contract without the express written authority of the Contracting Officer.

3.6 GENERAL REQUIREMENTS FOR COMPACTED FILLS AND BACKFILLS

3.6.1 Field and Laboratory Control

Testing shall be performed by an approved commercial testing laboratory. Moisture-density relations shall be established by the Contractor. The soil used for each maximum density test shall be classified in accordance with ASTM D 2487 and shall include a particle size analysis in accordance with ASTM C 136. At least one five point maximum density test shall be made for every 10 field density tests. All field density tests shall reference a specific Proctor test. Testing shall be performed by the Contractor at the frequency established in paragraph Field Control, and in such locations to insure that the specified products are being obtained. When test results indicate, as determined by the Contracting Officer, that compaction is not as specified, the material shall be re-worked as necessary to meet specification requirements. Tests on re-worked areas shall be performed. Inspections and test results shall be certified by a professional civil engineer registered in the State of California. These certifications shall state that the tests and observations were performed by or under the direct supervision of the engineer and that the results are representative of the materials or conditions being certified by the tests. Test results shall be reported on forms conforming to ASTM requirements. One copy of density data less dry weight determinations shall be provided on the day each test is taken. The completed field density test and gradation reports shall be provided with the Contractor Quality Control Report on the work day following the test. All data related to the treating of compacted fill materials shall be submitted to the Contracting Officer on approved forms within 24 hours of the completion of the tests.

3.6.1.1 Laboratory Control

One moisture-density relation shall be made for each classification, blend or change in classification of soil materials encountered. Approval of moisture-density relations shall be obtained prior to compacting or any material in the work. The moisture-density relations shall be determined in a laboratory in accordance with ASTM D 1557.

3.6.1.2 Field Control

Field in-place density shall be determined in accordance with ASTM D 1556. Where the contractor believes that material size makes this impractical, he is encouraged to use the submittal process to propose alternate methods to assess the field density. The field moisture content shall be determined in accordance with ASTM D 2216 for each density test sample. The soil sample obtained from each in-place density test shall be classified in accordance with ASTM D 2487 and shall include a particle size analysis in accordance with ASTM C 136. Determination of in-place densities using the nuclear method ASTM D 2922 may be used to supplement the ASTM D 1556 sand cone density tests. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted using only the sand cone method as described in ASTM D 1556. At least one adjacent sand cone test shall be performed for every ten nuclear density tests performed. If field density tests determined by the nuclear method vary by more than 3 pounds per cubic foot from comparison sand cone tests, and are consistently high or low, adjustment of the calibration curve is necessary.

3.6.1.3 Testing Log

The Contractor CQC shall maintain a log of all tests, which will be updated and submitted to the Contracting Officer on a weekly basis in both hard copy and digital formats. The test log shall include: Test number (if retest shall include retest number), date, feature of work, station and offset, elevation, moisture content, weight of dry soil, percent of compaction, optimum moisture content, maximum dry unit weight, referenced Proctor test number, soil classification, gradation (full set, uniform spacing), and in-place density test method used.

3.6.1.4 Testing Frequency

Unless otherwise specified, an in-place test shall consist of one gradation, moisture content, and in-place density test. One in-place test per 2000 cubic yards shall be made of each lift of fill or backfill areas compacted by other than hand-operated machines. At least one test shall be made in each 2 foot layer of compacted fill or backfill processed as a unit, and not less than one test shall be made in each area.

3.6.1.5 Testing Frequency for Hand Compacted Materials

One in-place test per 500 cubic yards, or fraction thereof, shall be made of each lift of fill or backfill areas compacted by hand-operated machines.

3.6.2 Settling of Fills or Backfills with Water

Settling of fills or backfills with water will not be permitted.

3.7 COMPACTED FILL

3.7.1 Foundation Preparation

After stripping topsoil over the entire dike footprint and excavation of the inspection trench, and after inspection and approval by the Contracting Officer, the foundation soils shall be alternately watered and scarified until the material is uniformly moistened throughout for a depth of not less than 10 inches. The foundation material shall then be compacted to a relative density equal to or greater than the contiguous dike fill material. No separate payment will be made for loosening and rolling the

foundation, but the entire cost thereof shall be included in the applicable contract price for contiguous fill.

3.7.2 Soil Cement-Compacted Fill Joint

Prior to placing fill at the Meiners Oaks Levee, the Contractor shall submit for Government approval the proposed method for joining the soil cement and compacted fill. The submittal shall include appropriate description, detail, and design.

3.7.3 Placement

3.7.3.1 General

No fill shall be placed on any part of the dike foundations until the foundation treatment has been completed and such areas have been inspected and approved by the Contracting Officer. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. Fill areas that are loosened, rutted or contaminated by construction equipment shall be reworked or removed to meet specification requirements.

3.7.3.2 Adjacent to Structures

Travel by heavy hauling and compacting equipment will be restricted to a distance greater than 3 feet horizontally and vertically from structures. Within restricted areas or areas where heavy compaction equipment cannot be used, the material shall be compacted by hand with power tampers or "walk behind" compaction units. Heavy equipment shall not be operated over pipes and buried structures until at least 2 feet of fill material have been placed and compacted over them. Material from the top of the pipe or buried structure to 2 feet above pipe or buried structure shall be compacted by mechanical tampers or other equipment approved by the Contracting Officer.

3.7.3.3 Spreading

After dumping, the materials shall be spread as hereinafter specified for each material type, except structural backfill, which shall be spread in accordance with requirements in paragraph: STRUCTURAL BACKFILL. Roots and debris shall be removed and disposed of in an approved manner. Compacted fill shall be placed with suitable equipment in horizontal layers which before compaction, shall not exceed 18 inches in depth for rubber-tired or vibratory rollers, 8 inches in depth for tamping rollers, and 4 inches in depth when mechanical tampers are used. The Contractor may vary the layer thickness within these limits for most efficient operations. Material containing stones shall be placed in a manner to prevent the stones from striking the concrete structures and to prevent the formation of voids.

3.7.4 Moisture Control

Material that is not within the specified limits after compaction shall be reworked regardless of density. The moisture content after compaction, as determined by ASTM D 2216, shall be within the limits of 2 percentage points above optimum and 2 percentage points below optimum. Optimum moisture content shall be determined in accordance with ASTM D 1557.

3.7.5 Compaction

Each lift of Compacted Fill shall be compacted to not less than 95 percent

of maximum density as determined by ASTM D 1557.

3.8 STRUCTURAL BACKFILL

3.8.1 Location

Backfill shall consist of all fill against and/or around structures.

3.8.2 Material

Backfill material shall be obtained from the required excavation as approved by the Contracting Officer. In general, the best material available will be designated as backfill and fill about structures. Backfill may consist of sand, gravelly sand, and silty sands. Organic material, silt, clay, broken concrete of pavement, boulders, and other unsatisfactory material shall not be used. Backfill for structures shall not contain any stones larger than 3 inches.

3.8.3 Placing

Backfill material shall not be placed against concrete which has not been in place at least 14 days or until the concrete has attained a strength of 3000 psi when tested in accordance with SECTION 03307A: CONCRETE FOR MINOR STRUCTURES.

3.8.4 Compaction

Compaction shall be not less than 95 percent of maximum density per ASTM D 1557 unless noted or shown otherwise.

3.9 FINISHING

The surface of excavations, embankments, and subgrades shall be finished to a smooth and compact surface in accordance with the lines, grades, and cross sections or elevations shown. The degree of finish for graded areas shall be within 0.1 foot of the grades and elevations indicated except as otherwise specified or directed. Gutters and ditches shall be finished in a manner that will result in effective drainage. The surface of areas to be turfed shall be finished to a smoothness suitable for the application of turfing materials. Settlement or washing that occurs in graded, topsoiled, or backfilled areas prior to acceptance of the work, shall be repaired and grades re-established to the required elevations and slopes.

-- End of Section --

SECTION 02378

GEOTEXTILES USED AS FILTERS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Unless otherwise identified, the date of the standards referenced shall be the most recent published at www.ihs.com as of the solicitation issue date.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 123	Standard Terminology Relating to Textiles
ASTM D 1683	Failure in Sewn Seams of Woven Fabrics
ASTM D 3786	Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics - Diaphragm Bursting Strength Tester Method
ASTM D 4354	Sampling of Geosynthetic for Testing
ASTM D 4355	Deterioration of Geotextile by Exposure to LIght, Moisture and Heat in aXenon-Arc Type Apparatus
ASTM D 4491	Water Permeability of Geotextiles By Permittivity
ASTM D 4533	Trapezoid Tearing Strength of Geotextile
ASTM D 4632	Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	Determining the Apparent Opening Size of a Geotextile
ASTM D 4833	Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D 4873	Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples
ASTM D 4884	Seam Strength of Sewn Geotextiles

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-04 Samples

Geotextile

If requested,submit geotextile samples for testing to determine compliance with the requirements in this specification. When required, submit samples a minimum of 30 days prior to the beginning of installation of the same textile. Upon delivery of the geotextile, submit duplicate copies of the written certificate of compliance signed by a legally authorized official of the manufacturer. The certificate shall state that the geotextile shipped to the site meets the chemical requirements and exceeds the minimum average roll value listed in TABLE 1, MINIMUM PHYSICAL REQUIREMENTS FOR DRAINAGE GEOTEXTILE. Upon request, supply quality control and quality assurance tests for the geotextile. All samples provided shall be from the same production lot as will be supplied for the contract, and shall be the full manufactured width of the geotextile by at least 10 feet long, except that samples for seam strength may be a full width sample folded over and the edges stitched for a length of at least 5 feet. Samples submitted for testing shall be identified by manufacturers lot designation. For needle punched geotextile, the manufacturer shall certify that the geotextile has been inspected using permanent on-line metal detectors and does not contain any needles.

SD-07 Certificates

Geotextile

All brands of geotextile and all seams to be used will be accepted on the basis of mill certificates or affidavits. Submit duplicate copies of the mill certificate or affidavit signed by a legally authorized official from the company manufacturing the geotextile. The mill certificate or affidavit shall attest that the geotextile meets the chemical, physical and manufacturing requirements stated in this specification.

1.3 SHIPMENT, HANDLING, AND STORAGE

1.3.1 Shipment and Storage

Only approved geotextile rolls shall be delivered to the project site. All geotextile shall be labeled, shipped, stored, and handled in accordance with ASTM D 4873. No hooks, tongs, or other sharp instruments shall be used for handling geotextile.
Text

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Geotextile

2.1.1.1 General

The geotextile shall be a non-woven pervious sheet of plastic yarn as defined by ASTM D 123. The geotextile shall equal or exceed the minimum average roll values listed in TABLE 1, MINIMUM PHYSICAL REQUIREMENTS FOR

DRAINAGE GEOTEXTILE. Strength values indicated in the table are for the weaker principal direction.

TABLE 1
MINIMUM PHYSICAL REQUIREMENTS FOR DRAINAGE GEOTEXTILE

PROPERTY	UNITS	ACCEPTABLE VALUES	TEST METHOD
GRAP STRENGTH	lb	180	ASTM D 4632
PUNCTURE	lb	80	ASTM D 4833
BURST STRENGTH	psi	290	ASTM D 3786
TRAPEZOID TEAR	lb	50	ASTM D 4533
PERMEABILITY	cm/sec	0.20	ASTM D 4491
APPARENT OPENING SIZE U.S. SIEVE	mm	0.180 to 0.300	ASTM D 4751
PERMITTIVITY	sec -1	1.1 to 1.8	ASTM D 4491
ULTRAVIOLET DEGRADATION	Percent	50 AT 500 Hrs	ASTM D 4355

2.1.1.2 Geotextile Fiber

Fibers used in the manufacturing of the geotextile shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of polyolefins, polyesters, or polamides. Stabilizers and/or inhibitors shall be added to the base polymer if necessary to make the filaments resistant to deterioration caused by ultraviolet light and heat exposure. Reclaimed or recycled fibers or polymer shall not be added to the formulation. Geotextile shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including the edges. The edges of the geotextile shall be finished to prevent the outer fiber from pulling away from the geotextile.

2.1.2 Seams

The seams of the geotextile shall be sewn with thread of a material meeting the chemical requirements given above for geotextile yarn or shall be bonded by cementing or by heat. Seams shall be tested in accordance with method ASTM D 1683. The strength of the seam shall be not less than 90 percent of the required grab tensile strength of the unaged geotextile in any principal direction.

2.1.3 Securing Pins

The geotextile shall be secured to the embankment or foundation soil by pins to prevent movement prior to placement of revetment materials. Other appropriate means to prevent movement such as staples, sand bags, and stone could also be used. Securing pins shall be inserted through both strips of overlapped geotextile along the line passing through midpoints of the overlap. Securing pins shall be removed as placement of revetment or gravel

drain materials are placed to prevent tearing of geotextile or enlarging holes. Maximum spacing between securing pins depends on the steepness of the embankment slope. The maximum pins spacing shall be equal to or less than the values listed in TABLE 2, MAXIMUM SPACING FOR SECURING PINS. When windy conditions prevail at the construction site, the number of pins should be increased upon the demand of the Contracting Officer. Terminal ends of the geotextile shall be anchored with key trench or apron at crest, toe of the slope and upstream and downstream limits of installation.

TABLE 2
MAXIMUM SPACING FOR SECURING PINS

EMBANKMENT	SPACING, feet
STEEPER THAN 1V ON 3H	2
1V ON 3H TO 1V ON 4H	3
FLATTER THAN 1V ON 4H	5

2.2 INSPECTIONS, VERIFICATIONS, AND TESTING

2.2.1 Manufacturing and Sampling

Geotextiles and factory seams shall meet the requirements specified in TABLE 1, MINIMUM PHYSICAL REQUIREMENTS FOR DRAINAGE GEOTEXTILE. Geotextiles shall be randomly sampled in accordance with ASTM D 4354 (Procedure Method A). Factory seams shall be sampled at the frequency specified in ASTM D 4884.

2.2.2 Site Verification and Testing

Samples shall be collected at approved locations upon delivery to the site at the request of the Contracting Officer the request of the Contracting Officer. Samples shall be tested to verify that the geotextile meets the requirements specified in TABLE 1, MINIMUM PHYSICAL REQUIREMENTS FOR DRAINAGE GEOTEXTILE. Samples shall be identified by manufacturers name, type of geotextile, lot number, roll number, and machine direction. Testing shall be performed at an approved laboratory. Test results from the lot under review shall be submitted and approved prior to deployment of that lot of geotextile. Rolls which are sampled shall be immediately rewrapped in their protective covering.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

Surface on which the geotextile will be placed shall be prepared, to a relatively smooth surface condition, in accordance with the applicable portion of this specification and SECTION 02300, Earthwork. Ground surface shall be free from obstruction, debris, depressions, erosion feature, or vegetation. Any irregularities will be removed so as to insure continuous, intimate contact of the geotextile with all the surface. Any loose material, soft or low density pockets of material, will be removed; erosion features such as rills, gullies etc. must be graded out of the surface

before geotextile placement.

3.2 INSTALLATION OF THE GEOTEXTILE

3.2.1 General

The geotextile shall be placed in the manner and at the locations shown. At the time of installation, the geotextile shall be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation or storage.

3.2.2 Placement

The geotextile shall be laid smooth and free of tension, stress, folds, wrinkles, or creases. The strips shall be placed to provide a minimum width of 15 inches of overlap for each joint. The Contractor shall adjust the actual length of the geotextile used based on initial installation experience. Temporary pinning of the geotextile to help hold it in place until the overlying material is placed shall be allowed. Temporary pins shall be removed.

3.3 PROTECTION

The geotextile shall be protected at all times during construction from contamination by surface runoff and any geotextile so contaminated shall be removed and replaced with uncontaminated geotextile. Any damage to the geotextile during its installation or during placement of overlying material shall be replaced by the Contractor at no cost to the Government. The work shall be scheduled so that the covering of the geotextile with a layer of the specified material is accomplished within 7 calendar days after placement of the geotextile. Failure to comply shall require replacement of geotextile. The geotextile shall be protected from damage prior to and during the placement of other materials. Before placement of riprap or other materials, the Contractor shall demonstrate that the placement technique will not cause damage to the geotextile. In no case shall any type of equipment be allowed on the unprotected geotextile.

3.4 PLACEMENT OF BEDDING MATERIAL AND GRAVEL DRAIN MATERIAL

Placing of bedding material and gravel drain material shall be performed in a manner to insure intimate contact of the geotextile with the prepared surface and with the bedding material or gravel drain material. The placement shall also be performed in a manner that shall not damage the geotextile including tear, puncture, or abrasion. On sloping surfaces the bedding material and gravel drain material shall be placed from the bottom of the slopes upward. During placement, the height of the drop of riprap or any other material shall not be greater than 18 inches. After the initial 12 inches of material has been placed this requirement is no longer applicable. Any geotextile damaged beneath the bedding material orgravel drain material or fill material shall be uncovered as necessary and replaced at no cost to the Government.

3.5 OVERLAPPING AND SEAMING

3.5.1 Overlapping

The overlap of geotextile rolls shall be 15 inches. Appropriate measures will be taken to insure required overlap exists after bedding material and gravel drain material placement.

-- End of Section --

SECTION 02520

SOIL CEMENT

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Unless otherwise identified, the date of the standards referenced shall be the most recent published at www.ihs.com as of the solicitation issue date.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 33	Concrete Aggregates
ASTM C 109	Compressive Strength of Hydraulic Cement Mortars (Using 2-in. Cube Specimens
ASTM C 136	Sieve Analysis of Fine and Coarse Aggregates
ASTM C 117	Materials Finer Than (No. 200) Sieve In Mineral Aggregates by Washing
ASTM C 150	Portland Cement
ASTM C 309	Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 618	Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland-Cement Concrete
ASTM C 1040	Density of Unhardened and Hardened Concrete in Place by Nuclear Methods
ASTM C 1064	Temperature of Freshly Mixed Portland Cement Concrete
ASTM D 75	Sampling Aggregates
ASTM D 558	Moisture-Density Relations of Soil Cement Mixtures
ASTM D 1557	Laboratory Compaction Characteristics of Soil Using Modified Effort (2700 kN-m/cm)
ASTM D 1633	Compressive Strength of Molded Soil Cement Cylinders
ASTM D 4318	Liquid Limit, Plastic Limit and Plasticity Index of Soils

ASTM E 329	Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

CORPS OF ENGINEERS (COE)

COE CRD-C 400	(1963) Requirements for Water for Use in Mixing or Curing Concrete

1.2 GOVERNMENT TESTING

1.2.1 General

The Contractor shall provide equipment and labor as may be necessary for procurement of representative samples for Government testing. In addition to those tests conducted by the Contractor, compression test specimens of soil cement will be made and tested by the Government. Density of the compacted soil cement will be checked by the Government as considered appropriate.

1.2.2 Aggregate Testing

Testing performed by the Government will not relieve the Contractor of his responsibility for testing under paragraph TESTS AND INSPECTIONS. During construction, aggregates will be sampled for acceptance testing for each specified aggregate stockpile to determine compliance with specification. The Contractor shall provide necessary equipment and labor for the ready procurement of representative samples under Government supervision.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Aggregate Source

Mixture Design

Bedding Mortar Mixture

Curing

Compaction Equipment

SD-07 Certificates

Nuclear Density Gauge Operators

1.4 AGGREGATE HANDLING

Aggregate shall be handled in a manner to prevent segregation or degradation. Vehicles used for stockpiling or moving aggregate shall be kept clean of foreign materials.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Aggregate Source

Proposed source(s) of aggregate to be used in the production of soil cement shall be submitted prior to stockpiling.

2.1.2 Cementitious Materials

2.1.2.1 Portland Cement

Portland cement shall conform to ASTM C 150, Type II, low alkali. Portland cement shall be furnished in bulk.

2.1.2.2 Pozzolan

Pozzolan shall conform to ASTM C 618, Class F, with loss on ignition limited to 6 percent. Pozzolan shall be furnished in bulk.

2.1.2.3 Temperature of Cementitious Materials

The temperature of the cementitious materials as delivered to the site shall not exceed 150 degrees F.

2.1.3 Water

Water for mixing and curing soil cement shall be free from injurious amounts of oil, acid, salt, alkali, organic matter, or other deleterious substances and shall comply with COE CRD-C 400.

2.1.4 Aggregate

The aggregate used in the soil cement mixture shall not contain any material retained on a 3-inch sieve, nor any deleterious material. Aggregate shall be stockpiled at the job site. Prior to using the aggregate stockpile, it shall be analyzed by laboratory tests in order to determine the job mix as set forth in paragraph MIXTURE DESIGN.

2.1.4.1 Aggregate Sources

Soil cement aggregates may be furnished from any source capable of meeting the grading requirements stated in paragraph GRADATION. Aggregates may be obtained from commercial sources or from borrow areas approved by the Contracting Officer. It is the responsibility of the Contractor to blend and/or process aggregates (if from borrow sources), or to import suitable materials from other sources approved by the Contracting Officer so that aggregate used in construction of soil cement conforms to the gradation requirement. The Contractor shall make all arrangements and secure all necessary permits for the procurement, furnishing, and transporting the soil cement aggregate.

2.1.4.2 Gradation

Aggregate for use in soil cement construction, when tested in accordance with ASTM C 136 and ASTM C 117, shall conform to the following gradation and be free of any deleterious material.

Standard Sieve Size	Percent Passing by Weight [1, 2]
3-inch	97 to 100
#4	60-90
#200	5-10

NOTE:

[1] The maximum plasticity index shall be limited to 3 when determined in accordance with ASTM D 4318.

[2] Clay and silt lumps larger than 1/2-inch shall be unacceptable, and screening will be required whenever this type of material is encountered.

2.1.5 MEMBRANE CURING COMPOUND

Curing compound shall conform to ASTM C 309, Type 1D with fugitive dye.

2.1.6 Curing

The curing media and methods to be used to keep soil cement surfaces continually moist until subsequent layers of soil cement are placed shall be submitted for review and approval to the Contracting Officer 5 days before soil cement placement begins for conformance with paragraph CURING AND PROTECTION.

2.2 MIXTURE PROPORTIONING

2.2.1 Composition

Soil cement shall be composed of cementitious materials, water, and aggregates. The cementitious material shall be portland cement, or portland cement in combination with pozzolan.

2.2.2 Mixture Design

The mix design to be used in the soil cement shall be submitted 10 days prior to construction of the test section. The subject submittal shall include all test results and certifications.

2.2.3 Required Strength

Soil cement shall have a minimum compressive strength of 750 psi at seven (7) days.

2.2.4 Testing and Certifications

The Contractor will perform laboratory trials of the aggregate stockpiled in order to determine the job-mix proportions. Aggregate samples shall be collected from the project stockpile in conformance to ASTM D 75 and shall be representative of the stockpile. A series of tests ,including sieve analyses and atterberg limits, and a mix design shall be conducted and submitted for each aggregate stockpile. The Contractor shall perform optimum moisture-maximum density relationships for four (4) different cement contents, in accordance with ASTM D 558, Method B. Following the determination of optimum moisture and maximum density, the Contractor shall prepare two (2) compressive strength test specimens for each of the cement contents specified at age of 7, and 28 days. Specimens shall be tested in accordance with ASTM D 1633, Method A. The compression test specimens

prepared for each of the cement percentages shall have approximately the following moisture contents: 4 percent below optimum, 2 percent below optimum, optimum moisture, and 2 percent above optimum. The Contractor shall provide a certificate of compliance for pozzolian and cement from the supplier(s). The Contractor shall be required to submit a new mix design any time there is a change in material, or proportioning of materials, from that given in the mix design.

2.2.5 Aggregate Stockpiles

Whether obtained from a borrow source or from off-site sources, aggregates shall not be transported directly to the mixing plant. The minimum volume of the stockpile from an approved borrow source shall be 500 cubic yard at the time of the gradations to be included in the mix design. Note that the minimum volume shall be maintained throughout the job except as waived by the Contracting Officer. The aggregates shall be stockpiled on firm ground drained and leveled, free of debris, trash, organic materials, and other objectionable or deleterious material. Ramps formed for the construction of stockpiles shall be of the same material as that being stockpiled, and will be considered a part of the stockpile. Soil aggregates taken from the stockpile shall be removed in such a manner that aggregate from several layers of the stockpile are combined in each layer and the gradation of the mixed-layer aggregate obtained is representative of that used in the mix design tests. The intent is to provide to the maximum extent possible a uniform gradation. The minimum volume of the stockpile from an approved borrow source shall be 500 cubic yard at the time of the gradations to be included in the mix design.

2.2.6 Bedding Mortar

Bedding mortar is to be used for achieving bond between soil cement lifts as indicated in paragraph JOINTS. No surfaces to receive a bedding mortar shall be covered with soil cement until the prepared surface has been approved and that acceptance has been recorded on an approved checkout form. In no case will the bedding mortar be allowed to dry from the sun
The bedding mortar mix design will be developed by the Contractor and will conform to the following general requirements. Aggregate for bedding mortar shall conform to the requirements of ASTM C 33, for washed concrete sand.

Parameter	
Slump	8 - 10 inches
Cement Content	400-500 lbs/cy^3
Minimum Compressive Strength	2000 psi (28 days)

The Contractor shall prepare two (2) cube specimens each to be tested for compressive strength at age of 1, 7, and 28 days. Specimens shall be tested in accordance with ASTM C 109. Materials to be used in the mortar mix design shall be representative of those proposed for the project.

2.2.7 Bedding Mortar Mixture

Bedding mortar mix design to be used in conformance with paragraph BEDDING MORTAR, including test results, shall be submitted 10 days prior to construction of the test section.

PART 3 EXECUTION

3.1 EQUIPMENT

The Contractor shall provide a mixing plant of sufficient capacity to meet the requirements of the job. The plant shall include a system in place to verify the mix components are in accordance with the submitted design. The mixing of soil aggregate, cement, pozzolan and water to be used for soil cement shall be accomplished in a stationary mixing plant. The mixer shall be an approved twin-pugmill type or a continuous-mixing type designed for either weight or volume proportioning. Also, the plant shall be equipped with screening, feeding and weighing metering or volumetric measuring devices that will add the soil aggregate, cementitious materials and water into the mixer in the quantities specified in the mix design. Placing soil cement by pulverizing and disking is unacceptable.

3.1.1 Compaction Equipment

The compaction equipment shall conform to the following requirements.

3.1.1.1 Primary Rollers

Self-propelled vibratory rollers shall be used for primary rolling and shall be double-drum. They shall transmit a dynamic impact to the surface through a tamping foot drum by means of revolving weights, eccentric shafts, or other equivalent methods. The compactor shall have a minimum gross weight of 21,000 pounds and shall produce a minimum dynamic force of 350 pounds per linear inch of drum width. The operating frequency shall be variable in the approximate range of 1,700 to 3,000 cycles per minute. The amplitude shall be adjustable between 0.015 to 0.04 inch. The roller shall be capable of full compaction in both forward and reverse directions. The Contracting Officer may direct or allow variations to the frequency and speed of operation which will result in maximum density at the fastest production rate.

3.1.1.2 Tampers (Rammers)

The tampers shall compact the soil cement to the required density and shall be so demonstrated during construction of the test section. When tampers are used, thickness of each soil cement layer that is to be compacted shall be reduced to not more than 6 inches uncompacted thickness to assure adequate compaction. Soil cement compaction shall also be accomplished by sheep foot vibratory compactors or other approved equipment well-suited to the material being compacted. The use of trucks, tractors or hauling equipment for compacting soil cement mixtures shall not be allowed.

3.1.2 Other Motorized Equipment

All other equipment necessary for the successful completion of soil cement production, but not previously discussed within these specifications (or determined to be necessary during the course of the work), shall be approved prior to actual use. Such equipment shall not result in any damage to the soil cement, shall be maintained in good operating condition, and shall be operated by skilled contractor-provided personnel.

3.1.3 Nuclear Density Gauge

Tests to determine the density of the compacted soil cement shall be made by the Contractor using a single-probe nuclear density gauge supplied by

the Contractor. The nuclear density gauge shall meet the applicable requirements of ASTM C 1040. The gauge shall be capable of taking readings along a horizontal path between the probes at 2-inch increments from 2-inch from the surface to 8 inches below the surface. The gauge and operator shall be made available to the Government until completion of all soil cement production at no additional cost. The Contractor shall obtain all permits and certifications for the equipment and the operators.

3.2 SUBGRADE PREPARATION

Previously constructed underlying material shall be conditioned as specified in Section 02300 EARTHWORK. The existing subgrade, other than specified fills, shall be scarified, conditioned to optimum moisture content, and compacted to at least 95 percent of maximum density in accordance with ASTM D 1557 for a depth of least 12 inches. In all cases prior to placing soil cement, deficiencies in the underlying material shall be corrected, and the surface shall be cleaned and moistened, as directed. The surface of the underlying material will be approved by the Contracting Officer. Soil cement shall not be placed on spongy or yielding underlying material.

3.3 PREPARATION FOR PLACING

3.3.1 Test Section

3.3.1.1 General

Prior to placement of any soil cement, the Contractor shall construct a test section. The test section shall be at least 3 lifts in height and be at least 50 feet long and 10 feet wide. The site of the test section shall be approved. The mixing plant shall be operated and calibrated prior to placing the test section. The Contractor shall use the same equipment, materials, and construction techniques on the test section as will be used in all subsequent work. Sub-grade preparation, soil-cement production, placing, compacting, curing, construction of joints, and all testing shall be in accordance with applicable provisions of this section of the specification. The test section shall demonstrate the Contractor's ability to attain the required density and strength with the proposed equipment, procedure and materials. The date of the test section construction shall be provided to the Contracting Officer at least 7 days in advance.

3.3.1.2 Evaluation of Test Section

The Contractor shall not begin soil cement operations for the main structure until testing and evaluations by the Government have been completed, and it has been demonstrated to the satisfaction of the Contracting Officer that all specification requirements were met. Following completion of test section construction, 7 calendar days shall be allowed for testing and evaluations. If the Contractor does not meet requirements as specified, an additional test section or sections shall be constructed at no additional cost to the Government. The Contractor shall provide eight (8) 4 inch diameter core- samples to the Government from points selected by the Government within 7 days of completion of the test section.

3.3.2 Weather

If unusual adverse weather, such as heavy rain, severe cold, high winds, etc., occurs or is forecast to occur during placement, the placement

operation shall be suspended until conditions improve.

3.3.2.1 Cold-Weather Placement

In cold-weather placement the soil cement shall not be placed when the ambient air temperature drops below 32 degrees F. If the ambient air temperature does drop below 32 degrees F, the surface of any recently placed (within the previous 72 hours) and exposed soil cement surface shall not remain exposed for more than 4 hours. Surfaces that will be exposed for longer times shall be protected as specified in paragraph COLD-WEATHER PROTECTION as a measure to maintain soil cement temperatures above 32 degrees F until after the ambient air temperature rises to above 32 degrees F and is expected to remain above 32 degrees F until the end of the curing and protection period, or until covered by another lift.

3.3.2.2 Placing During Rain

Soil cement shall not be placed during rainfall of 0.1 in/hr or more. During periods of lesser rainfall, placement of soil cement may continue if, in the opinion of the Contracting Officer, no damage to the soil cement is occurring. Work shall commence only after excess free surface water and contaminated paste or soil cement have been removed and the surface has gained sufficient strength (no less than 4 hours after the soil cement placement was suspended) to prevent rutting, pumping, intermixing of rainwater with the soil cement, or other damage to the soil cement. When the soil cement surface has been contaminated or damaged in any manner, the soil cement surface shall be washed to break up and remove laitance and/or mud-like coatings from the surface. All waste shall be removed and disposed of in an approved manner.

3.3.2.3 Hot-Weather Placement

In hot-weather placement the temperature of the soil cement shall be controlled so that it does not exceed 90 degrees F when placed. Placement shall be suspended as soon as the soil cement temperature exceeds 90 degrees F, unless preventative measures are taken.

3.3.3 Surface Preparation

Lift surfaces shall be cleaned prior to placing any additional soil cement thereon. Surface treatment shall be in accordance with the requirement of paragraph JOINTS. No surfaces to receive bedding mortar shall be covered with soil cement until the prepared surfaces have been accepted in writing and that acceptance has been recorded on an approved checkout form. All surfaces upon which soil cement or any bedding mortar is placed shall be moist (but contain no visible free water). Prior to placing soil cement, all surfaces shall be clean and free of loose, unkeyed, or deteriorated rock; all mud and silt accumulations; vegetation; laitance; puddles or ponds of free surface water; coatings; and any other detrimental materials. Suitable equipment, with the approval of the Contracting Officer, shall be at the site to clean all surfaces in conformance with these specifications without disrupting in any way the soil cement production as scheduled.

3.4 PLACING

3.4.1 Procedures

The soil-cement mixture shall be placed and distributed in such a manner as

to produce a reasonably smooth, uniform surface in layers of such uncompacted thickness that when compacted each layer shall not exceed 8 inches. Soil cement shall be placed in successive horizontal layers. The Contractor will be permitted to place the material in sloping layers to accommodate hauling and compacting equipment if such sloping layers are not steeper than 8H:1V. Below grade (toe-down) soil cement placement, the Contractor may place backfill material simultaneously with soil cement provided that the compacted backfill is at least 6 inches lower than the compacted soil cement. Placing of mixture shall be as nearly continuous as possible, with an absolute minimum of stops and starts; speed of placing shall be controlled, to permit proper rolling. Placing shall be discontinued during rain except for light mists which do not cause intermixing of cement and water slurry on the surface. Placing shall be done in a pattern so that curing water from previous placements will not pose a runoff problem on the fresh surface. The Contractor shall use care to minimize the production of cold joints.

3.4.2 Bedding Mortar

The bedding mortar shall be applied to the existing surface following any required cleanup. The bedding mortar shall be applied not more than 20 minutes ahead of soil cement placement, unless otherwise approved. The bedding mortar shall be used between soil cement lifts where cold joints occur and other horizontal and vertcal hardened contact surfaces. The bedding mortar shall have an average thickness after application of between 1/8 and 1/2 inch and shall cover 100 percent of the lift area.

3.4.3 Depositing, and Spreading

In no case shall the soil cement or bedding mortar be allowed to dry. Under no conditions shall a dozer or other tracked vehicle be operated on other than fresh uncompacted soil cement except at the start of each lift placement to facilitate startup operations, and then only by an approved procedure. No soil cement shall be placed on a previous lift which has not met specification. Unacceptable material shall be removed.

3.4.4 Compaction

Each layer shall be compacted to at least 98 percent maximum density and plus or minus 2 percent of optimum moisture content in accordance with ASTM D 558, Method B. The specified moisture content shall be maintained uniformly throughout the layer of material being compacted. At no time shall water be added during compaction operations to the uncompacted soil-cement mixture. If in the opinion of the Contracting Officer, the surface of a layer of soil-cement has been rutted or compacted unduly by hauling equipment so as to reduce the effectiveness of compaction by the specified rollers, the Contractor will be required to scarify such surfaces as directed prior to compacting with the specified rollers. At the start of compaction, the mixture shall be in a uniform, loose condition throughout its full depth. No section shall be left undisturbed for longer than thirty (30) minutes during compaction operations. Compaction of each layer shall be done in such a manner as to produce a dense surface.

3.4.5 Joints

Joints shall be perpendicular to the finished grade of the soil cement. Joints shall be straight and continuous from edge to edge. Transverse construction joints shall be made to ensure continuity in smoothness and grade between old and new sections of soil cement, as specified

hereinafter. All joints shall have the same texture, full-depth density, and smoothness. Regardless of age, contact surfaces of previously constructed lifts that have become coated with dust, sand, or other objectionable material shall be cleaned by brushing or cut back with approved power saw, as directed. It is the Contractor's responsibility to prevent damage and contamination of each lift surface, such as that caused by tracking vehicles or by rainfall, etc.

3.4.5.1 Lift Joint

The entire soil cement shall be placed with sufficient continuity so that it hardens and acts as one monolithic structure without discontinuous joints or potential planes of separation. All lift joints shall be kept clean, uncontaminated, free from ponded water, and continuously moist until placement of the succeeding soil cement. At the end of each day or whenever the contractor's operations are interrupted more than 4 hours such that the subsequent lift cannot be placed within 2-hours the surface shall be scarified to a depth of at least 4-inches. The cleaning shall be conducted using a high pressure water spray or other method approved by the Contracting Officer to completely free the surface of all loose material and ponded water prior to the placement.

3.4.5.2 Normal Conditions

If the subsequent lift can be placed in less than two hours, the surface must be kept wet. During periods of hot weather as defined in Paragraph: Placing During Hot Weather, the time period shall be reduced to 1-hour.

3.4.5.3 Delayed Placement

In those cases in which placement of the overlying lift does not occur within 4 hours the surface prior to placement shall be treated with a bedding mortar. During periods of hot weather as defined in Paragraph: Placing During Hot Weather, the time period shall be reduced to 2-hours.

3.4.5.4 Construction Joints

When a transverse construction joint is required (usually at the end of each day's work or whenever construction operations are interrupted for more than 2 hours), the roller shall pass over the end of the freshly placed soil-cement. In these cases, the previously placed materials shall be cut with a power concrete saw to full depth of the lift, as specified above, and the excess material removed. When necessary, the fresh mixture shall be hand finished at the joints. Additional rolling shall be used to assure that specified full-depth density and surface finish is attained.

3.5 CURING AND PROTECTION

3.5.1 Curing

Temporarily exposed surfaces of soil cement that will be in contact with succeeding layers of soil cement shall be kept continuously moist by moist curing method described hereinafter until placement of the subsequent layer. Curing of permanently exposed surfaces shall begin immediately after compaction and shall continue for at least 14 days. Soil cement shall be cured and protected from premature drying, extremes in temperature, rapid temperature change, freezing, mechanical damage and exposure to rain or flowing water. The Contractor shall have all equipment needed for adequate curing and protection on hand and ready to install

before actual placement begins. The curing medium and method, or the combination of mediums and methods used, shall be approved by the Contracting Officer. The soil cement shall be protected from the damaging effects of rain for 12 hours and flowing water for 14 days.

3.5.1.1 Moist Curing

Soil cement will be moist cured by maintaining all surfaces continuously, not periodically, wet for the duration of the entire curing period. Water for curing shall comply with the requirements of paragraph: WATER. If water is used which stains or discolors soil cement surfaces which are to be permanently exposed, the surfaces shall be cleaned to the satisfaction of the Contracting Officer. Horizontal surfaces may be cured by covering with a minimum uniform thickness of 6 inches of continuously saturated sand. Temporarily exposed surfaces may not be cured by saturated sand.

3.5.1.2 Truck Applications

Water trucks shall be used, as necessary, to keep surfaces moist at all times until wet burlap covering, or final curing method is implemented. The water truck shall be supplemented, as necessary, by mists from hand-held hoses. The truck operator shall be positioned so he is capable of seeing the spray at all times. The spray shall be capable of easy direction, either by attachment to the front of the truck so it can be directed by steering the truck or by other approved means. All spray nozzles both on the trucks and the hand held hoses shall be of a type that produces a true fog spray without any concentrated streams of water. The mist shall not be applied in a channelized or pressurized manner that in any way erodes the surface of the soil cement. It shall also be applied at a rate which does not cause ponding at the surface. Trucks shall not be allowed to drop visible oil or other contaminants on the surface. If trucks must leave the surface, the tires shall be washed free of dirt or other foreign material before returning to the surface. Water truck wheel loads shall not exceed 4,400 pounds and shall be such that no cracking or other damage to the soil cement is caused.

3.5.1.3 Curing Compound

A curing compound conforming to ASTM C 309 (including Type 1-D fugitive dye) may be used on permanently exposed surfaces which will not be in contact with succeeding layers of soil-cement. The curing compound shall be applied to surfaces as soon as final compaction has been completed. The curing compound shall be applied in a 2-coat continuous operation by approved motorized power-spraying equipment and pressure tank type equipment with provisions for continuous agitation. The compound shall be applied at a uniform coverage at a rate not to exceed 200 square feet per gallon for the combined coats. Soil-cement 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 surfaces on which the curing compound has been applied shall be adequately protected for the duration of the entire curing period from vehicular traffic and from any other cause which will disrupt the continuity of the curing membrane.

3.5.2 Protection from Rain or Water Flow

If, prior to completion of compaction, the soil-cement mixture is wetted by rain or flowing water such that average moisture content exceeds the optimum moisture content specified by the mix design, at the time of final

compaction, the entire layer affected, as determined by the Contracting Officer, shall be removed and shall be replaced in accordance with these specifications at the expense of the Contractor.

3.6 FINISHING

After compaction to the required lines and grades, the soil-cement surface shall be reasonably smooth. A smooth drum roller or blade may be utilized. Finishing of the soil-cement shall be conducted at the completion of each day's production.

3.7 DISPOSAL OF UNSATISFACTORY MATERIALS

Any soil cement that is removed for the required correction of defective areas, waste material, and debris shall be disposed of as directed.

3.8 TESTS AND INSPECTIONS

3.8.1 General

The Contractor shall perform the inspection and tests as described below, and based upon the results of these inspections and tests, he shall take the action required and submit reports as required. When, in the opinion of the Contracting Officer, the soil cement operation is out of control, soil cement placement shall cease. The laboratory performing the tests shall conform to ASTM E 329. Any test results requested by the Government for review shall be provided to the Government immediately, and all results of every test by the Contractor shall be furnished to the Government on a daily basis, not later than the day after the test or inspection is made.

3.8.2 Testing and Inspection Requirements

3.8.2.1 Nuclear Density Gauge Operators

Copies of permits and licenses for gauge operation; copies of certification of training for all operators shall be submitted for review and approval by the Contracting Officer.

3.8.2.2 Batched Aggregate

a. Grading - At least once during each shift in which the mixing plant is operating, there shall be a sieve analysis in accordance with ASTM C 136 and ASTM C 117 for the soil aggregate. At least once every other shift an Atterberg limits test shall be conducted as per ASTM D 4318. The location at which samples are taken may be selected by the Contractor as the most advantageous for production control. However, the Contractor shall be responsible for delivering the aggregate to the mixer within specification limits. When deficiencies are found, the rate of testing shall be increased as directed. When two consecutive tests show the soil aggregate to be deficient in grading, the mixing operation shall be stopped until acceptable material is furnished for delivery to the mixer. Each time the Contractor performs a moisture-density relation, an additional gradation analysis in conformance with ASTM C 136 and ASTM C 117 shall be performed, corresponding to the material used in the moisture-density relation.

3.8.2.3 Field Density

a. Testing and Checking - Density and moisture content shall be

determined for every 400 cubic yards of soil cement placed with a calibrated nuclear density gauge in accordance with ASTM C 1040. Densities shall be taken at incremental depths of 2 inches to the full depth of the compacted lift.

b. Action Required - Whenever the nuclear gauge indicates density less than the specified density, a retest shall be made. If the retest indicates unacceptable density, the Contracting Officer's Representative shall be notified, and additional rolling shall be immediately provided.

3.8.2.4 Inspection Before Placing

Construction joints and other horizontal surfaces shall be inspected by the Contractor in sufficient time prior to the next lift placement to certify to the Contracting Officer that they are ready to receive soil cement. The results of each inspection shall be reported in writing. The inspection of the lift surfaces of the soil cement will be a continuing activity and shall be accomplished in accordance with paragraphs SURFACE PREPARATION AND JOINTS.

3.8.2.5 Placing Inspection

a. Inspection - The Contractor shall provide full time supervision of all placing operations to insure that the correct quality of soil cement or bedding mortar are performed in accordance with the contract. During placing operations, the quality control staff shall measure and record soil cement temperatures in accordance with ASTM C 1064, ambient temperature hourly, record weather conditions, time of placement, yardage placed, and method of placement.

b. Corrective Action - The placing foreman shall not permit soil cement placing to begin until he has verified that necessary equipment are all in working order and with competent operators. Placing shall not be continued if any lift of soil cement is not fully compacted.

3.8.2.6 Compressive Strength Tests

At least two compressive strength tests shall be conducted daily. Should more than 1000 cubic yards of soil cement placed be placed in a given day, an additional two tests will be required for each 1000 cubic yards. A "test" is defined as the average of two companion soil cement specimens. Samples shall be taken from the wet batched mix. Tests shall determine the one (1) day and seven (7) day compressive strengths in accordance with ASTM D 1633, Method A except that curing of specimens in the mold will be required only for the length of time necessary to satisfactorily remove the specimens from the mold without damage to the specimens. The one (1) day compressive strength test shall be used to monitor the daily output of the central mixing plant and shall be used to adjust soil cement mixture proportions. The seven (7) day compressive strength test shall be used for final acceptance of the soil cement.

3.8.2.7 Curing Inspection

a. Moist Curing Inspections - At least twice each shift, and twice per day on nonwork days an inspection shall be made of all areas subject to moist curing. The surface moisture condition shall be noted and recorded.

b. Moist Curing Corrective Action - When a daily inspection report lists an area of inadequate curing, immediate corrective action shall be

taken, and the required curing period for those areas shall be extended by one day.

3.8.2.8 Cold-Weather and Hot-Weather Protection

At least once each shift and once per day on nonwork days an inspection shall be made of all areas subject to cold-weather or hot-weather protection. Any deficiencies shall be noted, corrected, and reported.

3.8.2.9 Cold-Weather and Hot-Weather Protection Corrective Action

When a daily inspection report lists deficiencies, the deficiency shall be corrected immediately and the period of protection extended for one day.

3.8.3 Reports

All results of tests or inspections conducted shall be reported informally as they are completed and in writing daily. A weekly report shall be prepared for the updating of control charts covering the entire period from the start of the construction season through the current week. During periods of cold-weather protection, reports of pertinent temperatures shall be made daily. These requirements do not relieve the Contractor of the obligation to report certain failures immediately as required in preceding paragraphs. Such reports of failures and the action taken shall be confirmed in writing in the routine reports. The Contracting Officer has the right to examine all contractor quality control records.

-- End of Section --

SECTION 02600

STONE PROTECTION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Unless otherwise identified, the date of the standards referenced shall be the most recent published at www.ihs.com as of the solicitation issue date.

ASTM INTERNATIONAL (ASTM)

ASTM C 33	Concrete Aggregates
ASTM C 88	Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C 127	Specific Gravity and Absorption of Coarse Aggregate
ASTM C 295	Petrographic Examination of Aggregates for Concrete
ASTM C 535	Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM D 1141	Preparation of Substitute Ocean Water
ASTM D 5519	Particle Size Analysis of Natural and Man-Made Riprap Materials

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Stone Sources; G

Name and location of quarry and service history of stone from the quarry as applicable to paragraph: Source Authorization Criteria.

SD-05 Design Data

Method of placement; G

SD-0 The following test reports shall be submitted in accordance with Section 01330.

Stone Quality Testing
Gradation Sampling and Testing

Quality compliance and gradation test results performed in accordance with paragraph: Stone Quality 2.1.4 and paragraph: Gradation 2.1.5.

SD-07 Certificates

Waybills and Delivery Tickets

Copies of waybills and delivery tickets shall be submitted as stated in paragraph: Waybills and Delivery Tickets.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Definitions

2.1.1.1 Rounded Stone

Stone which is obtained from alluvial deposits and is nearly spherical and well rounded.

2.1.1.2 Angular Stone

Stone which is obtained from bedrock deposits and is angular in shape.

2.1.2 General

The Contractor shall make all arrangements, pay all royalties, and secure all permits for the procurement, furnishing, and transporting of stone. The Contractor shall vary the quarrying, processing, loading, and placing operations, to produce the sizes and quality of stone specified. If the stone being furnished by the Contractor does not fully meet all the requirements of these specifications , the Contractor shall furnish, at no additional cost to the Government, other stone meeting the requirements of these specifications.

2.1.3 Stone Sources

2.1.3.1 Stone from Project Excavation

Stone conforming to those portions of the specifications allowing the use of rounded stone may be processed and used from the required excavation(s) or borrow areas.

2.1.3.2 Salvaged Stone

Un-grouted riprap salvaged from existing levee slopes where specified may be used as stone for grouted riprap where it conforms to the gradation and shape requirements of this specification.

2.1.3.3 Off-site Source Authorization

Before any stone is produced from an off-site source for completion of the work under this contract, the source of stone must be submitted for approval and authorized by the Contracting Officer's Representative. The Contractor shall designate in writing the off-site source from which he proposes to furnish stone. Authorization of a stone source shall not be construed as a waiver of the right of the Government to require the Contractor to furnish stone which complies with these specifications. Materials produced from localized areas, intervals, or strata will be rejected, when such materials do not comply with the specifications. Before a proposed source or sources of stone will be considered for evaluation and approval, the Contractor must demonstrate that the source is capable of providing the quality, quantities and gradation needed and at the rate needed to maintain the scheduled progress of the work.

2.1.3.4 Source Authorization Criteria

Authorization of a proposed stone source will be based on test results, a quarry inspection, and/or service records. In general, current test results shall be required, as outlined in paragraph: Quality Compliance Sampling and Testing, below. In special cases, however, the Contracting Officer's Representative may elect to use either past Corps of Engineers test results, test results from other agencies or private laboratories, or service records. A service record is considered to be acceptable if stone from the proposed source has remained sound and functional after at least 10 years of exposure on a project similar to and in a similar weathering environment as the one to be constructed under these specifications.

2.1.3.5 Potential Off-site Stone Sources

On the basis of information and data available to the Government, the following sources located within 75 miles from the project have in the past produced stone meeting the quality requirements of these specifications:

Quarry Name	CA Mine ID No.	Nearest City	Last Tested
Bee Rock	91-42-0006	Santa Ynez	Jan '99
El Jaro	91-42-0021	Lompoc	Jan '99
Ojai	91-56-0025	Ojai	Jun '02
Soledad Cyn	91-19-0038	Canyon Country	Mar '90

Listing of a stone source is not to be construed as to current or future availability of the source, authorization of all materials from the source, nor as a waiver of inspection and testing of the source. Stone produced from any listed source must meet all the requirements set forth in these specifications. Listing of a stone source is also not to be construed as an indication that the source can produce the total quantity or size of stone required for the project. Stone may be furnished from other sources designated by the Contractor and authorized by the Contracting Officer's Representative, subject to the conditions stated herein.

2.1.4 Stone Quality

2.1.4.1 Quality Compliance Sampling and Testing

If the Contractor proposes to furnish stone from a source which has not been tested by a Corps of Engineers validated laboratory in 5 years, the

Contractor shall have evaluation tests performed on stone samples collected from the proposed source. Samples of stone from a proposed source shall be taken at the quarry by the Contracting Officer's Representative, the Superintendent of the quarry, the Contractor, and an engineering geologist from the Geotechnical Branch of the Los Angeles District. The samples shall consist of at least 300 pounds of representative stone. The quarry faces and the stockpiles to be used shall be examined and sampled. The Contractor will then ship the samples at the Contractor's expense to a laboratory validated by the Army Corps of Engineers to perform the specified tests. The tests to which the stone shall be subjected and the required results are discussed below. The results of the Stone Quality Tests shall be submitted for review to the Contracting Officer's Representative a minimum of 10 days in advance of the time when the stone will be required in the work.

2.1.4.2 Stone Quality Testing Requirements

Stone shall be subjected to such tests as are necessary to demonstrate to the satisfaction of the Contracting Officer's Representative that the materials are acceptable for use in the work. At a minimum, the stone shall meet the following test requirements:

Test	Test Method	Requirement
Specific Gravity (Bulk SSD)	ASTM C 127	2.45 minimum
Absorption	ASTM C 127	2.0% maximum
Wetting and Drying	SPD Test Procedure(1)	No fracturing(3)
Magnesium Sulfate Soundness	ASTM C 88(2)	10% max.loss(4)
Abrasion Loss	ASTM C 535	40% max. loss(4)

In addition to the above tests, the stone shall be subjected to a petrographic and X-ray diffraction analysis, in accordance with ASTM C 295(5). The stone must not contain any expansive clays. Stone for grouted riprap shall not contain excessive amounts of deleterious minerals, associated with alkali-silica or alkali-carbonate reactions, as described in ASTM C 33.

NOTE: (1): Test procedure for wetting and drying test. The entire sample is carefully examined, and representative test specimens are selected. The sample should be large enough to produce two cut slabs, each (1 inch) with a minimum surface area of 28.8 square inches on one side. Two chunks, approximately 3 inches by 4 inches, are also chosen. The slabs and chunks are carefully examined under a low-power microscope, and all visible surface features are noted and recorded. The specimens are then oven-dried at 60 degrees C., for eight hours, cooled, and weighed to the nearest one-tench of a gram. The test specimens are photographed, to show all surface features, before the test. The chunks and slabs are then subjected to fifteen cycles of wetting and drying. One slab and one chunk are soaked in fresh tap water, the other slab and chunk are soaked in salt water, prepared in accordance with ASTM D 1141. Each cycle consists of soaking for sixteen hours, at room temperature and then drying in an oven for eight hours, at 140 degrees F. After each cycle, the specimens are examined with the low-power microscope, to check for opening or movement of fractures, flaking along edges, swelling of clays, softening of rock surfaces, heaving of micaceous minerals, breakdown of matrix material, and any other evidence of weakness developing in the rock. The cycle in which any of these actions occurs is recorded. After fifteen cycles, the slabs and chunks are again carefully examined, and all changes in the rocks are noted and recorded. The test specimens, together with all particles broken-off

during the test, are oven-dried, weighed, and photographed.

NOTE: (2): The test shall be made on 50 particles, each weighing 0.22 lbs in lieu of the gradation given in ASTM C 88.

NOTE: (3): Weakening and loss of individual surface particles is permissible, unless bonding of the surface grains softens and causes general disintegration of the surface material.

NOTE: (4): Stone which has a loss greater than the specified limit will be accepted, if the Contractor demonstrates that the stone has a satisfactory service record as defined in paragraph: Source Authorization Criteria.

NOTE: (5): The test procedure for Petrographic and X-ray Diffraction is performed according to ASTM C 295, except for the following:

(a) A color, microscopic photograph shall be made of each stone type, and the individual minerals within the stone shall be identified by labels and arrows, upon the photograph.

(b) A very detailed macroscopic and microscopic description shall be made of the stone, to include all the mineral constituents, individual sizes, their approximate percentages, and mineralogical histories. A description of stone hardness, texture, weathering, and durability factors shall also be discussed.

(c) A written summary of the suitability of stone for use as stone protection, based on the Petrographic and X-ray tests and the results of ASTM C 535, shall be presented in the final laboratory report on stone quality.

2.1.4.3 Stone Acceptance Criteria

Prior to placement, all stone shall be subject to acceptance, by the Contracting Officer's Representative. Acceptance of any stone shall not constitute acceptance of all stone from a source. All accepted stone shall be as follows:

a. of the same lithology as the original stone from which test results or service records were taken as a basis for authorization of the source;

b. sound, durable, hard, and free of laminations, weak cleavages, undesirable weathering, or blasting or handling-induced fractures which subtend more than 1/3 of the total circumference of the stone along the plane of fracturing and which would tend to increase its deterioration from natural causes;

c. of such character that the stone will not disintegrate from the action of air, water, or the conditions of handling and placing;

d. clean and free from earth, clay, refuse, or adherent coatings.

e. Riprap: Riprap shall be angular quarried material, with a shape which assures interlocking with adjacent stone, and with the greatest dimension of each piece not greater than 3 times the least dimension.

f. Stone for Grouted Riprap: Stone for grouted riprap may be either rounded stone from required excavations or designated borrow areas, angular quarried material, or ungrouted riprap salvaged from existing levee slopes where specified with a shape which assures reasonable adhesion with cement grout, yet allows flow of grout throughout the layer, to ensure adequate bonding. The greatest dimension of each piece shall be not greater than 3 times the least dimension.

2.1.5 Gradation

2.1.5.1 General

Quality-Control gradation tests shall be conducted by the Contractor and all stone shall be within the specified gradations below. If the stone is delivered by the truckload, each truckload shall be representative of the gradation requirements. Specified grading of all material shall be met both at the source and as-delivered to the project. One gradation test for each stone size from each designated stone source is required for initial acceptance of the stone source. Subsequent gradation tests will be done on a frequency determined according to the total estimated quantity of stone. If test results show that stone does not meet the required grading, the hauling and placement operations will be stopped immediately and will not resume, until processing procedures are adjusted, and a passing gradation test is completed, showing that gradation requirements are met. All gradation tests shall be at the expense of the Contractor.

a. 48-inch Riprap: 48-inch riprap shall be quarried, non weathered angular stone, reasonably well-graded, within the limits specified below, when tested in accordance with ASTM D 5519, Test Method A.

Weight of Individual Pieces	Percent Smaller (by weight)
8000 pounds	100
3000 pounds	40-70
500 pounds	0-10

b. Stone for Grouted Riprap: Stone for grouted riprap shall be reasonably well-graded and within the limits specified below when tested in accordance with ASTM D 5519, Test Method A.

Size of Individual Pieces	Percent Smaller (by weight)
18 inch	100
15 inch	50-100
9 inch	0-5

c. 24-inch Riprap: 24-inch riprap shall be reasonably well-graded, within the limits specified below, when tested in accordance with ASTM D 5519, Test Method A.

Size of Individual Pieces	Percent Smaller (by weight)
24 inch	100
15 inch	50-100
9 inch	0-5

2.1.5.2 Gradation Sampling and Testing

Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government. Tests shall be performed by an approved testing laboratory, on samples selected in the presence of the Contracting Officer's Representative. Testing may be performed by the Contractor, subject to approval by the Contracting Officer's Representative. Testing shall be supervised by a registered Civil Engineer, experienced in rock gradation testing. The Government reserves the right to perform check-tests and to use the Contractor's sampling and testing facilities to make the tests. One gradation test shall be required at the beginning of production, prior to delivery of stone from the source to the project site. A minimum of one additional test shall be required for each 3000 tons of stone placed. Each sample shall be selected at random from the production run for the first test or from stone placed on grade or stockpiled on-site for required additional tests. All sampling and gradation tests performed by the Contractor shall be in the presence of the Contracting Officer's Representative. The minimum sample sizes for each test shall be as follows:

Stone Class	Minimum sample weight
48-inch Riprap	30 tons
Stone for Grouted Riprap	4 tons
24-inch Riprap	9 tons

2.1.6 Rejected Stone

Stone of unsuitable quality and/or size distribution, as required by these specifications, shall be rejected. Any rejected stone shall be promptly removed from the project, at no expense to the Government. Any portions of the work covered by these specifications containing rejected stone will be considered incomplete.

PART 3 EXECUTION

3.1 FOUNDATION PREPARATION

3.1.1 General

Subgrade preparation for material placement shall conform to the provisions of SECTION 02300 EARTHWORK. Areas on which stone is to be placed shall be trimmed and dressed to conform to cross-sections, indicated or directed, within an allowable tolerance of plus or minus 1 inch from the theoretical slope-lines and grades. Where such areas are below the allowable minus tolerance limit, they shall be brought to grade by filling with earth, similar to the adjacent material and well-compacted, or by filling with approved material, and no additional payment will be made for any material thus required. Immediately prior to placing the stone, the prepared base

shall be inspected by the Contracting Officer's Representative, and no material shall be placed thereon, until that area has been approved.

3.2 PLACEMENT

3.2.1 General

Except as otherwise specified, the limits of stone in place shall follow, with reasonable variation, the indicated lines and slopes, without continuous under- or overbuilding. Templates shall be placed at adequate intervals, as determined by the Contracting Officer's Representative, to accurately delineate the surface of the work being placed. For all stonework, the Contractor shall submit the method of placement to the Contracting Officer's Representative for approval, before placement begins.

3.2.2 Un-grouted Riprap Stone Protection

Un-grouted riprap stone protection shall be placed in a manner to produce a reasonably well-graded mass, with the minimum practicable percentage of voids, and shall be constructed to the lines and grades indicated or directed. Stone shall be placed to its full course thickness, in one operation, from the bottom of the slope or lowest portion requiring placement, to the top of the slope and in a manner to avoid displacing the underlying material. Material shall not be dropped from a height of more than 18 inches. Method of placement shall be submitted to the Contracting Officer's Representative, for approval, prior to commencement of placement operations. The Contractor shall maintain the stone protection until accepted, and any material displaced by any cause, shall be replaced, at owner's expense, to the lines and grades shown on the drawings. Self-propelled equipment shall not be used over placed stone. Hand-placing, barring, or placing by crane will be required only to the extent necessary, to secure the results specified. Placing stone by dumping into chutes or by similar methods, likely to cause segregation, will not permitted. A tolerance of minus 2 to plus 2 inches from the indicated slope-lines and grades will be allowed in the finished surface, except that either extreme of such tolerance shall not be continuous over an area greater than 200 square feet.

3.2.3 Stone for Grouted Riprap

Stone for grouted riprap shall be placed in such a manner to produce a reasonably well-graded mass and to insure that all individual stones can be satisfactorily embedded in grout. Method of placement shall be submitted to Contracting Officer's Representative, for approval, prior to commencement of placement operations. Stone shall be placed to its full course thickness, in one operation, and in such a manner to avoid displacing the underlying material. Material shall not be dropped from a height of more than 18 inches. The Contractor shall maintain the stone protection until accepted, and any material displaced by any cause shall be replaced at owner's expense, to the lines and grades indicated. Self-propelled equipment shall not be used over placed stone. Hand-placing, barring, or placing by crane will be required only to the extent necessary, to secure the results specified. Placing stone by dumping into chutes or by similar methods, likely to cause segregation will not be permitted. A tolerance of minus 2 to plus 2 inches, from the indicated slope-lines and grades will be allowed in the finished surface, except that either extreme of such tolerance shall not be continuous over an area greater than 200 square feet. Use of thin, flat stones will not be permitted.

3.3 DEMONSTRATION SECTION

3.3.1 General

Prior to placement the Contractor shall construct a section of 48-inch riprap and grouted riprap, to demonstrate his proposed operations for production placement. The sections shall demonstrate procedure and capability of grading and placing stone protection within the tolerances specified. Each demonstration section shall be 50 feet wide and extend to the full height of the slope, and shall conform to all applicable specifications.

3.3.1.1 Methods and Equipment

Methods and equipment employed for placement shall demonstrate the adequacy for use in placement of riprap and shall conform with the requirements specified herein. The quantities of all materials placed within the section shall be accurately tabulated and provided immediately to the Contracting Officer's Representative, for comparison with the computed quantities.

3.3.2 Demonstration Section Evaluation

The Contractor shall not proceed in placing stonework, prior to the approval of the demonstration section. Within a period of 7 days after completion of the section, the Contracting Officer's Representative shall determine the adequacy of the section to function as part of the permanent construction. The Contractor shall be notified as to the acceptability of the section and may be directed to modify methods of construction, and remove the section, if necessary.

3.3.3 Removal of Demonstration Section

If removal of the demonstration section is required, it shall be conducted in such a manner as to maintain the integrity of the underlying subgrade. The Contractor shall make his own arrangements for disposal in areas not located on the site.

3.4 DELIVERY

All stone delivered by truck shall be weighed, and the scale tickets shall be certified, by authorized weighers. All trucks used for delivering stone shall be plainly numbered.

3.4.1 Scales

Scales used for measurement shall, at the option of the Contractor, be either public scales or approved scales, provided by the Contractor. Weighing shall be at the point nearest the work at which the public scale is available or at which it is practicable for the Contractor to provide a scale. Scales shall be standard truck scales of the beam type. The scales shall be of sufficient size and capacity to accommodate all trucks used in hauling the material. Scales shall be tested, approved, and sealed by an inspector of the State Inspection Bureau, charged with scales inspection, within the state in which the project is located. Scales shall be calibrated and resealed as often as necessary, to insure continuous accuracy. The necessary number of standard weights for testing the scales shall be on hand at all times, and, if an official inspection bureau of the

state is not available, the scales will be tested by the Contracting Officer's Representative.

3.4.2 Waybills and Delivery Tickets

Copies of waybills or delivery tickets shall be submitted to the Contracting Officer's Representative, during the progress of the work. The Contractor shall furnish the Contracting Officer's Representative scale tickets for each load of material weighed; these tickets shall include tare weight, identification mark of each vehicle weighed, plus date, time, and location of the loading. Tickets shall be furnished at the point and time individual loads arrive at the work site. A master log of all vehicle loading shall be furnished for each day of loading operation. The Contractor shall file with the Contracting Officer's Representative the master log of loadings, certified waybills and/or certified tickets, within 24 hours of material delivery. Prior to the final payment, the Contractor shall furnish written certification that the material recorded on the submitted waybills and/or certified tickets was actually used in the construction covered by the contract.

-- End of Section --

SECTION 02630A

STORM DRAINAGE

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 198	(1998) Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets

ASTM INTERNATIONAL (ASTM)

ASTM C 76	(2002) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C 270	(2002) Mortar for Unit Masonry
ASTM C 443	(2002) Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM C 655	(2002) Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Pipe Installation Work Plan; G

SD-03 Product Data

Compaction Equipment

Placing Pipe

Printed copies of the manufacturer's recommendations for installation procedures of the material being placed, prior to installation.

SD-06 Test Reports

Field Density Tests
Testing of Backfill Materials

Copies of all laboratory and field test reports within 24 hours of the completion of the test.

SD-07 Certificates

Nuclear Density Gauge Operators
Determination of Density
Frame and Cover for Gratings

Certified copies of test reports demonstrating conformance to applicable pipe specifications, before pipe is installed. Certification on the ability of frame and cover or gratings to carry the imposed live load.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery and Storage

Materials delivered to site shall be inspected for damage, unloaded, and stored safely

1.3.2 Handling

Materials shall be handled in a manner that ensures delivery to the trench in sound, undamaged condition. Pipe shall be carried to the trench, not dragged.

PART 2 PRODUCTS

2.1 PIPE FOR CULVERTS AND STORM DRAINS

Pipe for culverts and storm drains shall be of the sizes indicated and shall conform to the requirements specified.

2.1.1 Concrete Pipe

ASTM C 76, Class as shown on the plans, or ASTM C 655, D-Load as shown on the plans.

2.2 MISCELLANEOUS MATERIALS

2.2.1 Concrete

Unless otherwise specified, concrete and reinforced concrete shall conform to the requirements under Section 03307A CONCRETE FOR MINOR STRUCTURES.

2.2.2 Mortar

Mortar for pipe joints, connections to other drainage structures, and brick or block construction shall conform to ASTM C 270, Type M, except that the maximum placement time shall be 1 hour. The quantity of water in the mixture shall be sufficient to produce a stiff workable mortar. Water shall be clean and free of harmful acids, alkalies, and organic impurities. The mortar shall be used within 30 minutes after the ingredients are mixed with water. The inside of the joint shall be wiped

clean and finished smooth. The mortar head on the outside shall be protected from air and sun with a proper covering until satisfactorily cured.

2.2.3 Flexible Watertight Joints

a. Materials: Flexible watertight joints shall be confined rubber O-ring type for concrete pipe. The design of joints and the physical requirements for rubber-type gaskets shall conform to ASTM C 443. Gaskets shall have not more than one factory-fabricated splice.

2.2.4 Flexible Watertight, Gasketed Joints

a. Gaskets: Rubber gaskets shall be confined rubber O-ring type joints, 13/16 inch in diameter for pipe diameters of 36 inches or smaller and 7/8 inch in diameter for larger pipe having 1/2 inch deep end corrugation. Rubber O-ring gaskets shall be 1-3/8 inches in diameter for pipe having 1 inch deep end corrugations. O-rings shall meet the requirements of AASHTO M 198 or ASTM C 443.

PART 3 EXECUTION

3.1 EXCAVATION FOR PIPE CULVERTS, STORM DRAINS, AND DRAINAGE STRUCTURES

Excavation of trenches, and for appurtenances and backfilling for culverts and storm drains, shall be in accordance with the applicable portions of Section 02300 EARTHWORK and the requirements specified below.

3.1.1 Trenching

The width of trenches at any point below the top of the pipe shall be not greater than the outside diameter of the pipe plus 24 inches to permit satisfactory jointing and thorough tamping of the bedding material under and around the pipe unless indicated otherwise on the drawings. Sheeting and bracing, where required, shall be placed within the trench width.

3.1.2 Removal of Rock

Rock in either ledge or boulder formation shall be replaced with suitable materials to provide a compacted earth cushion having a thickness between unremoved rock and the pipe of at least 8 inches or 1/2 inch for each foot of fill over the top of the pipe, whichever is greater, but not more than three-fourths the nominal diameter of the pipe.

3.1.3 Removal of Unstable Material

Where unstable soil incapable of properly supporting the pipe, as determined by the Contracting Officer, is unexpectedly encountered in the bottom of a trench, such material shall be removed to the depth required and replaced to the proper grade with compacted fill zone 1 in accordance with specification section 02300 Earthwork.

3.2 BEDDING

The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe. Pipe bedding shall be as

shown on the plans unless otherwise specified in Section 02600 STONE PROTECTION.

3.3 PLACING PIPE

Each pipe shall be thoroughly examined before being laid; defective or damaged pipe shall not be used. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Pipe shall not be laid in water, and pipe shall not 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. Laying shall proceed upgrade with the tongue ends of tongue-and-groove pipe pointing in the direction of the flow and the spigot ends of bell-and spigot pointing in the direction of the flow.

3.4 JOINTING

3.4.1 Flexible Watertight Joints

Gaskets ans jointing materials shall be as recommended by the particular manufacturer in regard to use of lubricants, cements, adhesives, and other special installation requirements. Surfaces to receive lubricants, cements, or adhesives shall be clean and dry. Gaskets and jointing material shall be afixed to the pipe not more than 24 hours prior to the installation of the pipe and shall be protected from the sun, blowing dust, and other deleterious agents at all times. Gaskets and jointing material shall be inspected before installing the pipe. Any loose or improperly afixed gaskets and jointing materials shall be removed and replaced. Pipe spacers of 1/2 " shall be installed within the joint prior to the pipe being pushed home. Installation procedures shall be per the manufacturer's recommendations. Spacers shall placed so that they do not interfere with watertight performance once pipes are installed. Spacers shall be of a compressible material to allow for compression due to pipe settlement at the joints.

3.5 DRAINAGE STRUCTURES

3.5.1 Inlet and outlet structures

Construction shall be as indicated on the plans and in accordance with specification Section 03307A CONCRETE FOR MINOR STRUCTURES.

3.6 BACKFILLING

Material for backfill placement shall conform to the provisions of Sections 02300 EARTHWORK and 02600 STONE PROTECTION.

3.6.1 Backfilling Pipe in Trenches

After the pipe has been properly bedded, selected material, as designated on the drawings, shall be placed along both sides of pipe in layers not exceeding 6 inches in compacted depth. The backfill shall be brought up evenly on both sides of pipe for the full length of pipe. The fill shall be thoroughly compacted under the haunches of the pipe. To achieve adequate compaction and bonding, deviations from the specified optimum moisture content range may be directed by the Contracting Officer. Each layer shall be thoroughly compacted with mechanical tampers or rammers. This method of filling and compacting shall continue until the fill has

reached an elevation of at least 12 inches above the top of the pipe. The remainder of the trench may be backfilled and compacted by spreading and rolling or compacted by mechanical rammers or tampers in layers not exceeding 8 inches. However, it is the responsibility of the contractor to ensure that the pipe is protected at all time and not damaged during backfilling and compaction. Tests for density shall be made as necessary to ensure conformance to the compaction requirements specified below. Where it is necessary, in the opinion of the Contracting Officer, that sheeting or portions of bracing used be left in place, the contract will be adjusted accordingly. Untreated sheeting shall not be left in place beneath structures or pavements.

3.6.2 Backfilling Pipe in Fill Sections

For pipe placed in fill sections, backfill material and the placement and compaction procedures shall be as specified in section 02300 EARTHWORK and fill material shall be as indicated on the drawings.

3.6.3 Movement of Construction Machinery

When compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert or storm drain at any stage of construction shall be at the Contractor's risk. Any damaged pipe shall be repaired or replaced.

3.6.4 Compaction

3.6.5 Determination of Density

Testing shall conform with Section 02300 EARTHWORK.

-- End of Section --

SECTION 02650

GROUTING STONE PROTECTION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Unless otherwise identified, the date of the standards referenced shall be the most recent published at www.ihs.com as of the solicitation issue date.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 33	Concrete Aggregates
ASTM C 143	Slump of Hydraulic Cement Concrete
ASTM C 150	Portland Cement
ASTM C 309	Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 494	Chemical Admixtures for Concrete

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-05 Design Data

Grout Mix Design; G

Fifteen days prior to placement of grout, the contractor shall submit to the Contracting Officer the detailed mixture proportions for the specified grout.

SD-06 Test Reports

Aggregates; G

Thirty days prior to placement of grout, the contractor shall submit to the Contracting Officer the reports of aggregate quality tests.

SD-07 Certificates

Portland Cement; G

Certificates of compliance attesting that the concrete materials meet the requirements of the specifications shall be submitted in accordance with the Special Clause, CERTIFICATE OF COMPLIANCE. Cement will be accepted on the basis of a manufacturer's certificate of compliance, accompanied by mill test reports that the material meets the requirements of the specifications under which it is furnished.

Curing Compound; G

Certificates of compliance attesting that the curing materials meet the requirements of the specifications shall be submitted in accordance with the Special Clause, CERTIFICATE OF COMPLIANCE. Curing materials will be accepted on the basis of a manufacturer's certificate of compliance.

Waybills and Delivery Tickets; G.

Waybills and delivery tickets, during progress of the work.

1.3 PROTECTION OF COMPLETED WORK

After completion of any panel, no workman or other load shall be permitted on the grouted surface for a period of 24 hours. The grouted surface shall be protected from injurious action of the sun; shall be protected from rain, flowing water, and mechanical injury and shall be moist cured or membrane cured at the Contractor's option.

1.4 DELIVERY, STORAGE, AND HANDLING OF MATERIALS

1.4.1 Aggregates

Aggregates shall be delivered to the site of the grout batching and mixing plant and stockpiled in such manner as to preclude intermingling of different materials or the inclusion of foreign materials in the stockpiles or batching operations. Sufficient aggregates shall be maintained at the site at all times to permit continuous placement and completion of any lift or section of grout started.

1.4.2 Portland Cement

Cement may be supplied in bulk . When transported in a bulk form the carriers and systems for distribution of the cement will be accomplished in adequately designed weather-tight trucks, conveyors, or other means that will protect the material from exposure to moisture. All storage facilities shall permit easy access for inspection and identification. Sufficient materials shall be in storage to complete any lift or placement of grout started.

1.5 ACCESS TO PLANT AND EQUIPMENT

The Contracting Officer shall have access at all times to all parts of the placing operation and grout production plant for checking the adequacy of the equipment in use; inspecting operation of the plant; verifying weights, proportions, and character of materials; and installation of the grout and application of curing materials.

1.6 WAYBILLS AND DELIVERY TICKETS

Before the final statement is allowed, the Contractor shall file with the Contracting Officer certified waybills and certified delivery tickets for all cement and grout actually used in the construction.

PART 2 PRODUCTS

2.1 GROUT

2.1.1 Aggregates

Aggregates shall meet the quality requirements of ASTM C 33. Aggregates shall conform to the gradation requirements of ASTM C 33 for Fine Aggregate.

2.1.2 Portland Cement

Portland cement shall conform to the requirements of ASTM C 150, Type II, low alkali.

2.2 CURING COMPOUND

Membrane curing compound shall conform to ASTM C 309 Type 1D. Non pigmented compound shall contain a fugitive dye. The loss of water for both pigmented and non-pigmented curing compound when tested shall be not more than 0.03 pounds per square foot in 24 hours nor more than 0.09 pounds per square foot in 72 hours. In hot weather, grout cured with non-pigmented curing compound shall be shaded from the direct rays of the sun for the first 3 days of the curing period.

2.3 GROUT MIX DESIGN

The grout shall be composed of cement, sand, and water mixed in the proportions as directed. The estimated cement content requirement per cubic yard of grout shall be 7-1/2 sacks. The water content of the mix shall not exceed 8-1/2 gallons per sack of cement. In calculating total water content of the mix, the amount of moisture carried on the surfaces of aggregate particles shall be included.

PART 3 EXECUTION

3.1 CONDITIONING OF UNDERLYING MATERIALS

Prior to grouting, the stone shall be thoroughly washed with water to wash down the fines and to prevent absorption of water from the grout. The stone shall be kept moist just ahead for the actual placing of grout. Stone shall be cleaned of soil, trash and debris prior to washing.

3.2 PREPARATION OF GROUT

The consistency of the grout shall be such as to permit gravity flow into the interstices of the stones with the help of spading, rodding, and brooming. Grout batches in the same course shall be uniform in mix, size, and consistency. Slump of grout mix shall be between 9 and 10 inches for the first course and between 7 and 8 inches for the second course or where one course is placed.

3.3 PLACING

3.3.1 Mixing Time

The grout shall be mixed in a concrete mixer in the manner specified for concrete, except that time of mixing shall be as long as is required to produce a satisfactory mixture, and the grout shall be used in the work within a period of 30 minutes after mixing. Retempering of grout will not be permitted.

3.3.2 Weather Limitations

3.3.2.1 Hot Weather Placing

The temperature of the grout when deposited in the proper location shall not exceed 85 degrees F except as directed by the Contracting Officer.

3.3.2.2 Cold Weather Placing

No grout shall be prepared except when the air temperature is at least 40 degrees F. in the shade and rising. Materials entering the mixer shall be free from ice, snow, and frozen lumps. A non-chloride based accelerating admixture, conforming to the requirements of ASTM C 494, may be used when approved in advance, by the Contracting Officer.

3.3.3 Deposition of Grout

The grout shall be placed in two courses. Each course shall be placed fully, starting at the toe of the slope and working upward to top of the slope. In conditions where the stone is not placed on the slope in a continuous operation due to slope length, the grout shall be placed in two operations. The first operation shall begin at the toe and continue to approximately two feet above the placed stone section. The second operation shall continue from the end of the first to the top of the slope. Grout placing at each operation shall be a continuous process. The grout shall be brought to the place of final deposit by approved means and discharged directly on the stone by using a concrete pump. The use of a concrete shoot in placing grout will not be allowed. A splash plate of metal or wood shall be used where necessary to prevent displacement of stone directly under discharge. The flow of grout shall be directed with brooms or other approved baffles to cover the entire area and to assure that all crevices are filled. Sufficient barring shall be done to loosen tight pockets of stone and otherwise aid the penetration of grout. The first course shall fully penetrate the stone blanket. The second course shall be placed as soon as the first course has sufficiently stiffened so that it will not flow when additional grout is added. On slopes, all brooming shall be uphill.

3.4 FINISHING

Placement and brooming of the grouted surface shall be such that the outer layer of rock projects 1/3 to 1/4 their diameter above the grouted surface except where otherwise indicated on the drawings. Finished surfaces shall not deviate from the testing edge of a 10 foot straightedge more than 1/2 inch in any direction. After the top course has stiffened the entire surface shall be re-broomed to eliminate runs in the top course and to fill voids caused by sloughing of the layers of grout.

3.5 CURING AND PROTECTION

Curing of the grouted surface shall be accomplished by one of the following methods.

3.5.1 Moist Curing

Moist curing shall consist of covering the grout with a uniform thickness of 6 inches of sand which shall be kept continuously saturated for a period of 14 days.

3.5.2 Curing Compound

Curing compounds shall be applied as soon as the free water disappears and shall be applied in a 2-coat continuous operation by approved power-spraying equipment at a rate not to exceed 200 square feet per gallon for the combined coats. The second coat shall be applied to overlap the first coat in a direction approximately at right angle to the direction of the first application.

3.6 CONTRACTOR QUALITY CONTROL

3.6.1 General

The individuals who sample and test grout as required in this specification shall have demonstrated a knowledge and ability to perform the necessary test procedures equivalent to the ACI minimum guidelines for certification of Concrete Field Testing Technicians, Grade I.

3.6.2 Inspection Details and Frequency of Testing

3.6.2.1 Preparations for Placing

Stone, foundation, forms, and embedded items shall be inspected in sufficient time prior to each grout placement by the Contractor to certify to the Contracting Officer that is ready to receive grout.

3.6.2.2 Slump

Slump shall be checked once during each shift that grout is produced. Samples shall be obtained in accordance with ASTM C 172 and tested in accordance with ASTM C 143.

3.6.2.3 Consolidation and Protection

The Contractor shall ensure that the grout is properly installed, finished, protected, and cured.

3.6.3 Action Required

3.6.3.1 Placing

The placing foreman shall not permit placing to begin until he has verified that there is an adequate number of men with appropriate bars and other such tools are available for the necessary barring and adjustment of stone as required above.

3.6.3.2 Slump

Whenever a test is outside the specification limits, the results of the test shall be reported to the Contracting Officer and another test shall be immediately taken. If the results of the subsequent test indicates that the slump is not being met. The placement will cease and the contractor will readjust the mix design to achieve the proper slump. The adjusted mix will continue to meet the requirements specified above.

3.6.4 Reports

The results of all tests and inspections conducted at the project site shall be reported informally at the end of each shift and in writing weekly and shall be delivered to the Contracting Officer within 3 days after the end of each weekly reporting period. See Section 01451A CONTRACTOR QUALITY CONTROL.

3.7 Demonstration Section

The Contractor shall provide a demonstration section of the stonework as indicated in Section: STONE PROTECTION prior to the grouted stone production. In addition, the Contractor shall provide a section of similar size and location to demonstrate his grouting stone procedures.

-- End of Section --

SECTION 02722

AGGREGATE AND/OR GRADED-CRUSHED AGGREGATE BASE COURSE

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM C 117	(1995) Materials Finer Than 75 micrometer (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 131	(1996) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(2001) Sieve Analysis of Fine and Coarse Aggregates
ASTM D 75	(1987; R 1997) Sampling Aggregates
ASTM D 1556	(2000) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(2000) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu. m.))
ASTM D 2167	(1994) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2487	(2000) Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 4318	(2000) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM E 11	(1995) Wire Cloth Sieves for Testing Purposes

1.2 DEFINITIONS

For the purposes of this specification, the following definitions apply.

1.2.1 Aggregate Base Course

Aggregate base course (ABC) is well graded, durable aggregate uniformly moistened and mechanically stabilized by compaction.

1.2.2 Degree of Compaction

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557.

1.2.2.1 UNIT PRICE

Unit prices shall meet specification as in Section 01270

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Plant, Equipment, and Tools

List of proposed equipment to be used in performance of construction work, including descriptive data.

Waybills and Delivery Tickets

Copies of waybills and delivery tickets during the progress of the work.

SD-06 Test Reports

Sampling and testing; G
Density Tests; G

Calibration curves and related test results prior to using the device or equipment being calibrated. Copies of field test results within 24 hours after the tests are performed. Certified copies of test results for approval not less than 15 days before material is required for the work.

1.4 SAMPLING AND TESTING

Sampling and testing shall be the responsibility of the Contractor. Sampling and testing shall be performed by a testing laboratory approved in accordance with Section 01451A CONTRACTOR QUALITY CONTROL. Work requiring testing will not be permitted until the testing laboratory has been inspected and approved. The materials shall be tested to establish compliance with the specified requirements; testing shall be performed at the specified frequency. The Contracting Officer may specify the time and location of the tests. Copies of test results shall be furnished to the Contracting Officer within 24 hours of completion of the tests.

1.4.1 Sampling

Samples for laboratory testing shall be taken in conformance with ASTM D 75. When deemed necessary, the sampling will be observed by the Contracting

Officer.

1.4.2 Tests

The following tests shall be performed in conformance with the applicable standards listed.

1.4.2.1 Sieve Analysis

Sieve analysis shall be made in conformance with ASTM C 117 and ASTM C 136. Sieves shall conform to ASTM E 11.

1.4.2.2 Liquid Limit and Plasticity Index

Liquid limit and plasticity index shall be determined in accordance with ASTM D 4318.

1.4.2.3 Moisture-Density Determinations

The maximum density and optimum moisture content shall be determined in accordance with ASTM D 1557.

1.4.2.4 Field Density Tests

Density shall be field measured in accordance with ASTM D 1556 or ASTM D 2167. For the method presented in ASTM D 1556 the base plate as shown in the drawing shall be used.

1.4.2.5 Wear Test

Wear tests shall be in conformance with ASTM C 131.

1.4.2.6 R-Value

R-Value shall be in accordance with CAL-301.

1.4.2.7 Sand Equivalent

The Sand Equivalent shall be in conformance with CAL-217.

1.4.3 Testing Frequency

1.4.3.1 Initial Tests

One of each of the following tests shall be performed on the proposed material prior to commencing construction to demonstrate that the proposed material meets all specified requirements when furnished. If materials from more than one source are going to be utilized, this testing shall be completed for each source.

a. Sieve Analysis.

b. Liquid limit and plasticity index.

c. R-Value.

d. Sand Equivalent.

e. Wear.

1.4.3.2 In Place Tests

One of each of the following tests shall be performed on samples taken from the placed and compacted ABC. Samples shall be taken and tested at the rates indicated.

a. Density tests shall be performed on every lift of material placed and at a frequency of one set of tests for every 250 square yards, or portion thereof, of completed area.

b. Sieve Analysis shall be performed for every 500 tons, or portion thereof, of material placed.

c. Liquid limit and plasticity index tests shall be performed at the same frequency as the sieve analysis.

1.4.4 Approval of Material

The source of the material shall be selected 30 days prior to the time the material will be required in the work. Tentative approval of material will be based on initial test results. Final approval of the materials will be based on sieve analysis compaction requiremetns on samples taken from the completed and fully compacted ABC.

1.5 WEATHER LIMITATIONS

Construction shall be done when the atmospheric temperature is above 35 degrees F and rising. When the temperature falls below 35 degrees F, the Contractor shall protect all completed areas by approved methods against detrimental effects of freezing. Completed areas damaged by freezing, rainfall, or other weather conditions shall be corrected to meet specified requirements at no cost to the government.

1.6 PLANT, EQUIPMENT, AND TOOLS

All plant, equipment, and tools used in the performance of the work will be subject to approval before the work is started and shall be maintained in satisfactory working condition at all times. The equipment shall be adequate and shall have the capability of producing the required compaction, meeting grade controls, thickness control, and smoothness requirements as set forth herein.

1.7 WAYBILLS AND DELIVERY TICKETS

Before the final statement is allowed, the Contractor shall file with the Contracting Officer certified waybills and certified delivery tickets for all aggregate materials actually used in construction.

PART 2 PRODUCTS

2.1 AGGREGATE PROPERTIES

The ABC shall consist of clean, sound, durable particles of gravel, stone, crushed stone, crushed gravel, angular sand, or other approved material. ABC shall be free of lumps of clay, organic matter, and other objectionable materials or coatings. The portion retained on the No. 4 sieve shall be known as coarse aggregate; that portion passing the No. 4 sieve shall be known as fine aggregate. Aggregates shall be of uniform density. Fifty

percent of the material retained on the 3/8-inch screen shall have three or more freshly fractured faces. No more than five percent of the material retained on the 3/8-inch screen shall show no such faces resulting from crushing. The amount of flat and elongated particles shall not exceed 30 percent. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3. Additionally, the aggregates when tested will conform to the following requirements.

Test Name	Ref Standard	Test Requirement	
R-Value	CAL-301		80 min
Sand Equivalent	CAL-217		50 min
Percentage Wear	ASTM C-131		-
		100 Revs	15 max
		500 Revs	45 max
Specific Gravity	ASTM C-127		2.58 min

2.2 GRADATION REQUIREMENTS

The specified gradation requirements shall apply to the completed base course. The aggregates shall have a maximum size of 1-1/2 inches and shall be continuously well graded within the limits specified in the table below. Sieves shall conform to ASTM E 11.

GRADATION OF AGGREGATES

Sieve Designation	Percentage by Weight Passing Square-Mesh Sieve
1-1/2 inch	100
3/4 inch	90-100
3/8 inch	50-80
No. 4	35-55
No. 30	10-30
No. 200	2-9

NOTE 1: Particles having diameters less than 0.0008 inch shall not be in excess of 3 percent by weight of the total sample tested.

NOTE 2: The values are based on aggregates of uniform specific gravity. If materials from different sources are used for the coarse and fine aggregates, they shall be tested in accordance with ASTM C 127 and ASTM C 128 to determine their specific gravities and absorptions. If the specific gravities vary by more than 10 percent, the percentages passing the various sieves shall be corrected as directed by the Contracting Officer.

2.3 LIQUID LIMIT AND PLASTICITY INDEX

Liquid limit and plasticity index requirements shall apply to the completed course and shall also apply to any component that is blended to meet the required gradation. The portion of any component or of the completed course passing the No. 40 sieve shall be either nonplastic or have a liquid limit not greater than 25 and a plasticity index not greater than 5.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

When the ABC is constructed in more than one layer, the previously constructed layer shall be cleaned of loose and foreign matter by sweeping with power sweepers or power brooms, except that hand brooms may be used in areas where power cleaning is not practicable. Adequate drainage shall be provided during the entire period of construction to prevent water from collecting or standing on the working area. Line and grade stakes shall be provided as necessary for control. Grade stakes shall be in lines parallel to the centerline of the area under construction and suitably spaced for string lining.

3.2 OPERATION OF AGGREGATE SOURCES

Aggregates shall be obtained from offsite sources.

3.3 STOCKPILING MATERIAL

Prior to stockpiling of material, storage sites shall be cleared and leveled by the Contractor. Aggregates shall be stockpiled on the cleared and leveled areas designated by the Contracting Officer to prevent segregation. Materials obtained from different sources shall be stockpiled separately.

3.4 PREPARATION OF UNDERLYING COURSE

Prior to constructing the ABC, the underlying subgrade shall be cleaned of all foreign substances. At the time of construction of the ABC, the underlying course shall contain no frozen material. The surface of the subgrade shall meet specified compaction and surface tolerances. The subgrade shall conform to Section 02300 EARTHWORK as applicable. Ruts or soft yielding spots in the subgrade, areas having inadequate compaction, and deviations of the surface from the requirements set forth herein shall be corrected by loosening and removing soft or unsatisfactory material and by adding approved material, reshaping to line and grade, and recompacting to specified density requirements. For cohesionless subgrades containing sands or gravels, as defined in ASTM D 2487, the surface shall be stabilized prior to placement of the ABC. Stabilization shall be accomplished by mixing ABC into the subgrade and compacting by approved methods. The stabilized material shall be considered as part of the subgrade and shall meet all requirements of the underlying course. The finished underlying course shall not be disturbed by traffic or other operations and shall be maintained by the Contractor in a satisfactory condition until the ABC is placed.

3.5 INSTALLATION

3.5.1 Mixing the Materials

The coarse and fine aggregates shall be mixed in a stationary plant. The Contractor shall make adjustments in mixing procedures or in equipment as directed to obtain true grades, to minimize segregation or degradation, to obtain the required water content, and to insure a satisfactory ABC meeting all requirements of this specification.

3.5.2 Placing

The mixed material shall be placed on the prepared subgrade or subbase in layers of uniform thickness. When a compacted layer 6 inches or less in thickness is required, the material shall be placed in a single layer. When a compacted layer in excess of 6 inches is required, the material shall be placed in layers of equal thickness. No layer shall exceed 6 inches or be less than 3 inches when compacted. The layers shall be so placed that when compacted they will be true to the grades or levels required with the least possible surface disturbance. Where the ABC is placed in more than one layer, the previously constructed layers shall be cleaned of loose and foreign matter by sweeping with power sweepers, power brooms, or hand brooms, as directed. Such adjustments in placing procedures or equipment shall be made as may be directed to obtain true grades, to minimize segregation and degradation, to adjust the water content, and to insure an acceptable ABC.

3.5.3 Grade Control

The finished and completed ABC shall conform to the lines, grades, and cross sections shown. Underlying material(s) shall be excavated and prepared at sufficient depth for the required ABC thickness so that the finished ABC with the subsequent surface course will meet the designated grades.

3.5.4 Edges of Base Course

Approved fill material shall be placed along the outer edges of ABC in sufficient quantities to compact to the thickness of the course being constructed, or to the thickness of each layer in a multiple layer course, allowing in each operation at least a 2 foot width of this material to be rolled and compacted simultaneously with rolling and compacting of each layer of ABC. If this base course material is to be placed adjacent to another pavement section, then the layers for both of these sections shall be placed and compacted along this edge at the same time.

3.5.5 Compaction

Each layer of the ABC shall be compacted as specified with approved compaction equipment. Water content shall be maintained during the compaction procedure to within plus or minus two percent of the optimum water content determined from laboratory tests as specified in paragraph: SAMPLING AND TESTING. Rolling shall begin at the outside edge of the surface and proceed to the center, overlapping on successive trips at least one-half the width of the roller. Alternate trips of the roller shall be slightly different lengths. Speed of the roller shall be such that displacement of the aggregate does not occur. In all places not accessible to the rollers, the mixture shall be compacted with hand-operated power tampers. Compaction shall continue until each layer has a degree of compaction that is at least 98 percent of laboratory maximum density through the full depth of the layer. The Contractor shall make such adjustments in compacting or finishing procedures as may be directed to obtain true grades, to minimize segregation and degradation, to reduce or increase water content, and to ensure a satisfactory ABC. Any materials that are found to be unsatisfactory shall be removed and replaced with satisfactory material or reworked, as directed, to meet the requirements of this specification.

3.5.6 Thickness

Compacted thickness of the aggregate course shall be as indicated on the drawings. No individual layer shall exceed 8 inches nor be less than 3 inches in compacted thickness. The total compacted thickness of the ABC course shall be within 1/4 inch of the thickness indicated. Where the measured thickness is more than 1/4 inch deficient, such areas shall be corrected by scarifying, adding new material of proper gradation, reblading, and recompacting as directed. Where the measured thickness is more than 1/4 inch thicker than indicated, the course shall be considered as conforming to the specified thickness requirements. Average job thickness shall be the average of all thickness measurements taken for the job, but shall be within 1/4 inch of the thickness indicated. The total thickness of the ABC course shall be measured at intervals in such a manner as to ensure one measurement for each 500 square yards of base course. Measurements shall be made in 3 inch diameter test holes penetrating the base course.

3.5.7 Finishing

The surface of the top layer of ABC shall be finished after final compaction by cutting any overbuild to grade and rolling with a steel-wheeled roller. Thin layers of material shall not be added to the top layer of base course to meet grade. If the elevation of the top layer of ABC is ½ inch or more below grade, then the top layer should be scarified to a depth of at least 3 inches and new material shall be blended in and compacted to bring to grade. Adjustments to rolling and finishing procedures shall be made as directed to minimize segregation and degradation, obtain grades, maintain moisture content, and insure an acceptable base course. Should the surface become rough, corrugated, uneven in texture, or traffic marked prior to completion, the unsatisfactory portion shall be scarified, reworked and recompacted or it shall be replaced as directed.

3.5.8 Smoothness

The surface of the top layer shall show no deviations in excess of 3/8 inch when tested with a 10 foot straightedge. Measurements shall be taken in successive positions parallel to the centerline of the area to be paved. Measurements shall also be taken perpendicular to the centerline at 50 foot intervals. Deviations exceeding this amount shall be corrected by removing material and replacing with new material, or by reworking existing material and compacting it to meet these specifications.

3.6 TRAFFIC

Traffic shall not be allowed on the completed ABC course.

3.7 MAINTENANCE

The ABC shall be maintained in a satisfactory condition until the full pavement section is completed and accepted. Maintenance shall include immediate repairs to any defects and shall be repeated as often as necessary to keep the area intact. Any ABC that is not paved over prior to the onset of winter, shall be retested to verify that it still complies with the requirements of this specification. Any area of ABC that is damaged shall be reworked or replaced as necessary to comply with this specification.

3.8 DISPOSAL OF UNSATISFACTORY MATERIALS

Any unsuitable materials that must be removed shall be disposed of waste disposal areas indicated. No additional payments will be made for materials wasted or that must be replaced.

-- End of Section --

SECTION 02821

FENCING

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM A 153/A 153M	(2001) Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 392	(1996) Zinc-Coated Steel Chain-Link Fence Fabric
ASTM A 491	(1996) Aluminum-Coated Steel Chain-Link Fence Fabric
ASTM A 780	(2000) Repair of Damaged and Uncoated Areas of Hot-Dipped Galvanized Coatings
ASTM A 824	(1995) Metallic-Coated Steel Marcelled Tension Wire for Use With Chain Link Fence
ASTM C 94/C 94M	(2000e2) Ready-Mixed Concrete
ASTM F 1043	(2000) Strength and Protective Coatings on Metal Industrial Chain-Link Fence Framework
ASTM F 1083	(1997) Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
ASTM F 1184	(1994) Industrial and Commercial Horizontal Slide Gates
ASTM F 668	(1999a) Poly(Vinyl Chloride) (PVC)-Coated Steel Chain-Link Fence Fabric
ASTM F 883	(1997) Padlocks
ASTM F 900	(1994) Industrial and Commercial Swing Gates

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Chain Link Metal Fence and Gates.

Swing Gates.

Detail drawings indicating material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Detail drawings for the following items: chain link metal fences and swing gates.

SD-07 Certificates

Chain Link Fence and Swing Gates;

Statement, signed by an official authorized to certify on behalf of the manufacturer, attesting that the chain link fence, Split rail Fence, Swing Gates, and guard cable fence component materials meet the specified requirements.

PART 2 PRODUCTS

2.1 CHAIN LINK FENCE FABRIC

ASTM A 392, Class 1 , zinc-coated steel wire with minimum coating weight of 1.2 ounces of zinc per square foot of coated surface, or ASTM A 491, Type I, aluminum-coated steel wire. Class 2b polyvinyl chloride-coated steel fabric with 0.3 ounces of zinc coating per square foot in accordance with ASTM F 668. Fabric shall be fabricated of 9 gauge wire woven in 2 inch mesh. Fabric height shall be as shown. Fabric shall be twisted and barbed on the top selvage and knuckled on the bottom selvage.

2.2 GATES

ASTM F 900 and/or ASTM F 1184. Gate shall be the type and swing shown. Gate frames shall conform to strength and coating requirements of ASTM F 1083 for Group IA, steel pipe, with external coating Type A, nominal pipe size (NPS) 1-1/2. Gate frames shall conform to strength and coating requirements of ASTM F 1043, for Group IC, steel pipe with external coating Type A or Type B, nominal pipe size (NPS) 1-1/2. Gate fabric shall be as specified for chain link fabric. Gate leaves more than 8 feet wide shall have either intermediate members and diagonal truss rods or shall have tubular members as necessary to provide rigid construction, free from sag or twist. Gate leaves less than 8 feet wide shall have truss rods or intermediate braces. Intermediate braces shall be provided on all gate frames with an electro-mechanical lock. Gate fabric shall be attached to the gate frame by method standard with the manufacturer except that welding will not be permitted. Latches, hinges, stops, keepers, rollers, and other hardware items shall be furnished as required for the operation of the gate. Latches shall be arranged for padlocking so that the padlock will be accessible from both sides of the gate. Stops shall be provided for holding the gates in the open position.

2.3 POSTS

2.3.1 Metal Posts for Chain Link Fence

ASTM F 1083, zinc-coated. Group IA, with external coating Type A steel pipe. Group IC steel pipe, zinc-coated with external coating Type A or Type B and Group II , roll-formed steel sections, shall meet the strength and coating requirements of ASTM F 1043. Group III, ASTM F 1043 steel H-section may be used for line posts in lieu of line post shapes specified for the other classes. Sizes shall be as shown on the drawings. Line posts and terminal (corner, gate, and pull) posts selected shall be of the same designation throughout the fence. Gate post shall be for the gate type specified subject to the limitation specified in ASTM F 900 and/or ASTM F 1184.

2.4 RAILS FOR CHAIN LINK FENCE

ASTM F 1083, zinc-coated, Group IA, steel pipe, size NPS 1-1/4. Group IC steel pipe, zinc-coated, shall meet the strength and coating requirements of ASTM F 1043. Group II, formed steel sections, size 1-21/32 inch, conforming to ASTM F 1043, may be used as rails if Group II line posts are furnished.

2.5 TENSION WIRE

Tension wire shall be Type I or Type II, Class 2 coating, in accordance with ASTM A 824.

2.6 ACCESSORIES

ASTM F 626. Ferrous accessories shall be zinc or aluminum coated. Truss rods shall be furnished for each terminal post. Truss rods shall be provided with turnbuckles or other equivalent provisions for adjustment. Tie wire for attaching fabric to rails, braces, and posts shall be 9 gauge steel wire and match the coating of the fence fabric. Miscellaneous hardware coatings shall conform to ASTM A 153/A 153M unless modified.

2.7 CONCRETE

ASTM C 94/C 94M, using 3/4 inch maximum size aggregate, and having minimum compressive strength of 3000 psi at 28 days. Grout shall consist of one part portland cement to three parts clean, well-graded sand and the minimum amount of water to produce a workable mix.

2.8 PADLOCKS

Padlocks shall conform to ASTM F 883, Type EPB, Size 1-3/4 inch. Padlocks shall be keyed alike and each lock shall be furnished with two keys.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION

Chain Link Fence and Gates shall be installed to the lines and grades indicated on the drawings. Line posts shall be spaced equidistant at intervals per the drawings. Terminal (corner, gate, and pull) posts shall be set at abrupt changes in vertical and horizontal alignment. Fabric shall be continuous between terminal posts; however, runs between terminal posts shall not exceed 500 feet. Any damage to galvanized surfaces,

including welding, shall be repaired with paint containing zinc dust in accordance with ASTM A 780.

3.2 EXCAVATION

Post holes shall be cleared of loose material. The ground surface irregularities along the fence line shall be eliminated to the extent necessary to maintain a 2 inch clearance between the bottom of the fabric and finish grade. Excavated material shall be spread evenly no greater than 1/2" depth.

3.3 POSTS

Posts shall be set plumb and in alignment. Except where solid rock is encountered, posts shall be set in concrete to the depth indicated on the drawings. Where solid rock is encountered with no overburden, posts shall be set to a minimum depth of 18 inches in rock. Where solid rock is covered with an overburden of soil or loose rock, posts shall be set to the minimum depth indicated on the drawing unless a penetration of 18 inches in solid rock is achieved before reaching the indicated depth, in which case depth of penetration shall terminate. All portions of posts set in rock shall be grouted. Portions of posts not set in rock shall be set in concrete from the rock to ground level. Posts set in concrete shall be set in holes not less than the diameter shown on the drawings. Diameters of holes in solid rock shall be at least 1 inch greater than the largest cross section of the post. Concrete and grout shall be thoroughly consolidated around each post, shall be free of voids and finished to form a dome. Concrete and grout shall be allowed to cure for 72 hours prior to attachment of any item to the posts. Group II line posts may be mechanically driven, for temporary fence construction only, if rock is not encountered. Driven posts shall be set to a minimum depth of 3 feet and shall be protected with drive caps when being set.

3.4 RAILS

Rails shall be supported at each post to form a continuous brace between terminal posts.

3.5 TENSION WIRES

Tension wires shall be installed along the top and bottom of the fence line and attached to the terminal posts of each stretch of the fence. Top tension wires shall be installed within the top 4 inches of the installed fabric. Bottom tension wire shall be installed within the bottom 6 inches of the installed fabric. Tension wire shall be pulled taut and shall be free of sag.

3.6 CHAIN LINK FABRIC

Chain link fabric shall be installed on the side of the post indicated. Fabric shall be attached to terminal posts with stretcher bars and tension bands. Bands shall be spaced at approximately 15 inch intervals. The fabric shall be installed and pulled taut to provide a smooth and uniform appearance free from sag, without permanently distorting the fabric diamond or reducing the fabric height. Fabric shall be fastened to line posts at approximately 15 inch intervals and fastened to all rails and tension wires at approximately 24 inch intervals. Fabric shall be cut by untwisting and removing pickets. Splicing shall be accomplished by weaving a single picket into the ends of the rolls to be joined. The bottom of the

installed fabric shall be 2 plus or minus 1/2 inch above the ground.

3.7 GATES

Gates shall be installed at the locations shown. Hinged gates shall be mounted to swing as indicated. Latches, stops, and keepers shall be installed as required. gates shall be installed as recommended by the manufacturer. Padlocks shall be attached to gates or gate posts with chains. Hinge pins, and hardware shall be welded or otherwise secured to prevent removal.

3.8 GROUNDING

Fences crossed by powerlines of 600 volts or more shall be grounded at or near the point of crossing and at distances not exceeding 150 feet on each side of crossing. Ground conductor shall consist of No. 8 AWG solid copper wire. Grounding electrodes shall be 3/4 inch by 10 foot long copper-clad steel rod. Electrodes shall be driven into the earth so that the top of the electrode is at least 6 inches below the grade. Where driving is impracticable, electrodes shall be buried a minimum of 12 inches deep and radially from the fence. The top of the electrode shall be not less than 2 feet or more than 8 feet from the fence. Ground conductor shall be clamped to the fence and electrodes with bronze grounding clamps to create electrical continuity between fence posts, fence fabric, and ground rods. After installation the total resistance of fence to ground shall not be greater than 25 ohms.

-- End of Section --

SECTION 02900

HYDROSEEDING

PART 1 GENERAL

1.1 REFERENCES

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

U.S. DEPARTMENT OF AGRICULTURE (USDA)

AMS Seed Act	(1995) Federal Seed Act Regulations Part 201

ASTM INTERNATIONAL (ASTM)

ASTM D 4972	(1995a) pH of Soils
ASTM D 5268	(1992; R 1996) Topsoil Used for Landscaping Purposes

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Equipment

Manufacturer's literature including physical characteristics, application and installation instructions for equipment, surface erosion control material and chemical treatment material.

A listing of equipment to be used for the seeding operation.

Delivery

Delivery schedule.

Topsoil; G

Topsoil from the stripping and stock piling operation.

Quantity Check; G

Bag count or bulk weight measurements of material used compared with area covered to determine the application rate and quantity installed.

Seed Establishment Period; G

Calendar time period for the seed establishment period. When there is more than one seed establishment period, the boundaries of the seeded area covered for each period shall be described.

Maintenance Record; G

Maintenance work performed, area repaired or reinstalled, diagnosis for unsatisfactory stand of seeded plants.

Maintenance Plan; G

Plant watering and maintenance plan indicating the Contractor's method(s) to establish a healthy stand of native plants. Provide a temporary irrigation system layout plan and or indicate method(s) of water application and maintenance required to meet specification. The watering and maintenance plan shall cover one year of plant establishment and shall include a watering and maintenance schedule.

Application of Pesticide; G

Pesticide treatment plan with sequence of treatment work with dates and times. The pesticide trade name, EPA registration number, chemical composition, formulation, concentration of original and diluted material, application rate of active ingredients, method of application, area treated, amount applied; and the name and state license number of the state certified applicator shall be included.

Wood cellulose fiber mulch and organic soil stabilizerr; G

Application instructions recommended by the manufacturer.

SD-04 Samples

Delivered Topsoil; G

Samples taken from several locations at the source.

Soil Amendments; G

A 5 pound sample.

Mulch; G

A 5 pound sample.

SD-06 Test Reports

Equipment Calibration; G

Certification of calibration tests conducted on the equipment used in the seeding operation.

Soil Test; G

Certified reports of inspections and laboratory tests, prepared

by an independent testing agency, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

SD-07 Certificates

Seed; G
Topsoil; G
pH Adjuster
Organic Material
Soil Conditioner
Mulch
Pesticide; G
Endomycorrhizal Inoculant
Organic soil stabilizer

Prior to the delivery of materials, certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include the following:

a. Seed. Classification, botanical name, common name, percent pure live seed, minimum percent germination and hard seed, total germination content, maximum percent weed seed content, and date tested.

b. Topsoil. Particle size, pH, organic matter content, textural class, soluble salts, chemical, mechanical and plant growth analyses.

c. pH Adjuster. Calcium carbonate equivalent and sieve analysis.

e. Organic Material: Composition and source.

f. Soil Conditioner: Composition and source.

g. Mulch: Composition and source.

h. Pesticide. EPA registration number and registered uses.

i. Endomycorrhizal Inoculant. Composition and source.

j. Organic soil stabilizer. Composition and source.

1.3 SOURCE INSPECTION

The source of delivered topsoil shall be subject to inspection.

1.4 DELIVERY, INSPECTION, STORAGE, AND HANDLING

1.4.1 Delivery

A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery.

1.4.1.1 Delivered Topsoil

Prior to the delivery of any topsoil, its availability shall be verified in

paragraph TOPSOIL. A soil test shall be provided for topsoil delivered to the site.

1.4.1.2 Soil Amendments

Soil amendments shall be delivered to the site in the original, unopened containers bearing the manufacturer's chemical analysis. In lieu of containers, soil amendments may be furnished in bulk. A chemical analysis shall be provided for bulk deliveries.

1.4.1.3 Pesticides

Pesticide material shall be delivered to the site in the original, unopened containers bearing legible labels indicating the EPA registration number and the manufacturer's registered uses.

1.4.2 Inspection

Seed shall be inspected upon arrival at the job site for conformity to species and quality. Seed that is wet, moldy, or bears a test date five months or older, shall be rejected. Other materials shall be inspected for compliance with specified requirements. The following shall be rejected: open soil amendment containers or wet soil amendments; topsoil that contains slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over a minimum 1-1/2 inch diameter; and topsoil that contains viable plants and plant parts. Unacceptable materials shall be removed from the job site.

1.4.3 Storage

Materials shall be stored in designated areas. Seed shall be stored in cool, dry locations away from contaminants. Chemical treatment material shall be stored according to manufacturer's instructions and not with seeding operation materials.

1.4.4 Handling

Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

1.4.5 Time Limitation

Hydroseeding time limitation for holding seed in the slurry shall be a maximum 6 hours. Application shall commence within one hour after seed, mulch, additives and water mixture has been added to the tank.

PART 2 PRODUCTS

2.1 SEED

2.1.1 Seed Classification

State-certified seed (of Southern California origin) of the latest season's crop shall be provided in original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Labels shall be in conformance with AMS Seed Act and applicable state seed laws.

2.1.2 Native Seed Species and Mixtures

Native seed species and mixtures for Borrow Site and National Housing Track Dike Construction Site shall be as follows:

Common Name	Botanical Name	Pure Live Seed (PLS) lbs Per Acre
[_____]		

2.1.3 Quality

Weed seed shall be a maximum 1 percent by weight of the total mixture.

2.1.4 Seed Mixing

The mixing of seed may be done by the seed supplier prior to delivery, or on site as verified by the Contracting Officer.

2.1.5 Substitutions

Substitutions will not be allowed without written request and approval from the Contracting Officer. The Contractor shall make all arrangements with the seed vendor(s)to hold the required amount of seeds needed for the project. The Contractor shall verify and secure from the seed vendor(s)the required native seed species and quantity no later than 160 days or sooner prior to seeding operations.

2.2 TOPSOIL

Topsoil shall be as defined in ASTM D 5268. The topsoil shall be the top 12inch of existing surface soil stripped and stockpiled onsite in accordance with Section 02300 EARTHWORK. Stockpiled topsoil shall be fenced and protected from contamination, trash, and debris. All weed growth shall be eradicated prior to placement. Contaminated topsoil shall be rejected and replace with additional topsoil as specified. When additional topsoil is required beyond the available topsoil from the stripping operation, topsoil shall be delivered and amended as recommended by the soil test(s) for the seed specified. The Contractor shall pay for all soils tests as directed by the Contracting Officer. Topsoil shall be free from slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over a minimum 2 inches in diameter. All topsoil shall be free from viable plants and plant parts.

2.3 SOIL AMENDMENTS

Soil amendments shall consist of pH adjuster, organic material and soil conditioners meeting the following requirements. Vermiculite shall not be used.

2.3.1 pH Adjuster

The pH adjuster shall not be less than 99 percent elemental sulfur. The pH adjuster shall be used to create a favorable soil pH for the plant material specified.

2.3.2 Organic Material

Organic material shall consist of rotted manure and decomposed wood derivatives.

2.3.2.1 Rotted Manure

Rotted manure shall be unleached manure containing a maximum 25 percent by volume of sawdust, or other bedding materials. It shall contain no chemicals or ingredients harmful to plants. The manure shall be heat treated to kill weed seeds and be free of stones, sticks, and soil.

2.3.2.2 Decomposed Wood Derivatives

Decomposed wood derivatives shall be rotted sawdust that is free of stones, sticks, soil, and toxic substances harmful to plants, and is fully composted. Rotted sawdust shall be stabilized with 7.5 pounds of nitrogen added uniformly to each cubic yard of material.

2.3.3 Wood Cellulose Fiber

Wood cellulose fiber shall not contain any growth or germination-inhibiting factors and shall be dyed an appropriate color to facilitate placement during application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 4.5 to 6.0

2.4 Watering Plan

The contractor shall submit for approval a watering plan prior to start of work. The plan shall include a temporary irrigation system using sprinkler heads, pvc lines, valves on timers and all incidentals, complete, including all necessary permits that the contractor is responsible to obtain. The contractor shall pay all fees and water cost. The system shall be installed per manufacturer's recommendation and meet all code regulations. If water connectons are not available as verfied by the contractor officer the contractor shall use temporary watering tanks or approved watering trucks.

2.5 WATER

Water for native seeding and plant establishment shall be the responsibility of the Contractor, unless otherwise noted. The Contractor shall pay all water cost. Water shall not contain elements toxic to plant life.

2.6 PESTICIDE

Pesticide shall be insecticide, herbicide, fungicide, nematocide, rodenticide or miticide. For the purpose of this specification, a soil fumigant shall have the same requirements as a pesticide. The pesticide material shall be EPA registered and approved.

2.7 Endomycorrhizal Inoculant

Endomycorrhizal inoculant use as a soil amendment shall consists of a 3 (three) species blend of spores of arbuscular mycorrhizal fungi as manufactured by Mycorrhizal Applications Inc. (541) 476-3985 or of equal product.

PART 3 EXECUTION

3.1 INSTALLING SEED TIME AND CONDITIONS

3.1.1 Seeding Time

Seed shall be installed prior to the end of the construction contract period.

3.1.2 Seeding Conditions

Seeding operations shall be performed after temporary irrigation is installed and working. The contractor shall provide protection measures to ensure adverse weather conditions do not impact seed growth and will be responsible for reseeding as necessary.

3.1.3 Equipment Calibration

Immediately prior to the commencement of seeding operations, calibration tests shall be conducted on the equipment to be used. These tests shall confirm that the equipment is operating within the manufacturer's specifications and will meet the specified criteria. The equipment shall be calibrated a minimum of once every day during the operation. The calibration test results shall be provided within 1 week of testing.

3.1.4 Soil Test

Delivered topsoil, existing soil in smooth graded areas, and stockpiled topsoil shall be tested in accordance with ASTM D 5268 and ASTM D 4972 for determining the particle size, pH, organic matter content, textural class, chemical analysis, soluble salts analysis, mechanical and plant growth analysis. Sample collections on site shall be random over the entire site. Sample collections for stockpiled topsoil shall be at different levels in the stockpile. Six (6) samples shall be tested and the locations shall be determined by the Contracting Officer. The planting soil shall be free from debris, noxious weeds, toxic substances, or other materials harmful to plant growth. The test of stockpiled topsoil shall determine if addition quantities of soil amendments and soil conditioners are required to meet local growing conditions for the seed species specified.

3.2 SITE PREPARATION

3.2.1 Finished Grade and Topsoil

The Contractor shall verify that finished grades are as indicated on drawings, and the placing of topsoil, smooth grading, and compaction requirements have been completed in accordance with Section 02300 EARTHWORK prior to the commencement of the seeding operation.

3.2.2 Application of Soil Amendments

3.2.2.1 Applying pH Adjuster

The pH adjuster shall not be less than 99 percent elemental sulfur applied at the rate of 15 lbs per 1,000 square feet. The pH adjuster shall be incorporated into the soil to a maximum 6 inch depth as part of the tillage operation.

3.2.2.2 Rotted Manure

The application rate shall be 200 lbs per 1,000 square feet. The soil conditioner shall be spread uniformly over the soil and thoroughly incorporated by tillage into the soil to a maximum 6 inch depth.

3.2.2.3 Applying Endomycorrhizal Inoculant

Endomycorrhizal inoculant shall be applied at the rates recommended by the manufacturer's written instructions for its intended use. Endomycorrhizal inoculant shall be incorporated into the soil to a depth of at least the top 4 inches, as applicable, and may be incorporated as part of the tillage operation. However, the inoculant shall not be incorporated into the ground more than three weeks prior to seeding operations and shall not be placed on top of the ground for more than three hours prior to incorporation into the soil.

3.2.3 Tillage

Soil on slopes up to a maximum 2-horizontal-to-1-vertical shall be tilled to a minimum 6 inch depth. On slopes between 2-horizontal-to-1-vertical and 1-horizontal-to-1 vertical, the soil shall be tilled to a minimum 2 inch depth by scarifying with heavy rakes, or other approved methods. On slopes between 2-horizontal-to-1-vertical and 1-horizontal-to-1 vertical, soil amendments and soil conditioners shall be reduced by one-half. Rototillers shall be used where soil conditions and length of slope permit. Drainage patterns shall be maintained as indicated on drawings. Areas compacted by construction operations shall be completely pulverized by tillage. Soil used for repair of surface erosion or grade deficiencies shall conform to topsoil requirements. The pH adjuster and soil conditioner may be applied during this procedure.

3.2.4 Prepared Surface

3.2.4.1 Preparation

The prepared surface shall be a maximum 2 inch below the adjoining grade of any surfaced area. New surfaces shall be blended to existing areas. The prepared surface shall be completed with a light raking to remove debris.

3.2.4.2 Debris

Debris over a minimum 3 inch in any dimension shall be removed from the surface. Native rocks and stones may remain in the surface soil at the discretion of the Contracting Officer.

3.2.4.3 Protection

Areas with the prepared surface shall be protected from compaction or damage by vehicular or pedestrian traffic and surface erosion.

3.2.4.4 Weed Abatement

Tempory rrigation system installation, tillage operations, and finish grade shall be completed and approved prior to weed abatement operations. Contractor shall then perform a two (2) step procedure as follows:

a. Contractor shall operate the irrigation system to keep hydroseed

areas uniformly moist for a period of three (3) weeks. At the end of the three (3) week period, Contractor shall spray all visible weeds with a contact herbicide. Application method shall be as recommended by manufacturer. After spraying, areas shall remain unwatered for a minimum of forty-eight (48) hours. Contractor shall then remove the weeds from the project.

b. Contractor shall water seven (7) additional consecutive calendar days from the first application of herbicide, and apply a contact herbicide. After the second spraying, water shall not be applied for an additional forty-eight (48) hour period. Contractor shall then remove the weeds from the project and commence hydroseeding operations.

3.3 INSTALLATION

Prior to installing seed, and after the preliminary weeding operations, any previously prepared surface compacted or damaged shall be reworked to meet the requirements of paragraph SITE PREPARATION. Seeding operations shall not take place when the wind velocity will prevent uniform seed distribution or when temperature exceed 90 degree.

3.3.1 Installing Seed

Seeding method shall be by Hydroseeding. Seeding procedure shall ensure even coverage.

3.3.1 Broadcast Seeding

Broadcast Seeding shall be for seed re-establishment. Seed shall be uniformly broadcast at the rate indicated in paragraph 2.1.2 using broadcast seeders. Half the total rate of seed application shall be broadcast in 1 direction, with the remainder of the seed rate broadcast at 90 degrees from the first direction. Seed shall be covered a maximum 1-1/2 inch by raking, or other approved device. After the seed have been covered the area shall be mulch with 2 inch of decomposed wood derivatives.

3.3.2 Hydroseeding

Prior to the commencement of seeding operations or change of seed mix, the seeding equipment shall be sanitized and cleaned of any pest organisms, insect and/or animal eggs, spores, weed seeds or propagules remaining from previous seeding operations.

Seed shall be mixed to ensure broadcast at the rate indicated in paragraph 2.1.2. The contractor shall follow a two step hydroseeding process:

a. Seed mixture, Grolife used as a soil conditioner or approved equal and one-third (1/3) of the wood cellulose fiber shall be added to the appropriate amount of water, thoroughly mixed to produce a homogeneous slurry, and be applied to designated areas.

b. After the initial spraying, the Contractor shall then mix the remaining two-thirds (2/3) of the wood cellulose fiber, Ecology Control used as a organic soil stabilizer or approved equel with the appropriate amount of water, thoroughly mixed to produce a homogeneous slurry, and applied to designated areas.

The hydroseeded area shall not be rolled.

3.3.2 Wood cellulose fiber mulch and organic soil stabilizer

Wood cellulose fiber mulch, soil conditioner and organic soil stabilizer shall be applied as part of the hydroseeding operation. The Grolife shall be mixed in accordance with the approved manufacturer's rate recommendations. Unless otherwise approved by the Contracting Officer, the wood cellulose fiber and organic soil stabilizer shall be applied at the following rates:

	wood cellulose fiber	organic soil stabilizer
Slopes 3:1 and flatter	1,000 lbs/acre	160 lbs/acre
Slopes between 3:1 and 1:1	1,000 lbs/acre	170 lbs/acre
Slopes 1:1 and steeper	1,000 lbs/acre	180 lbs/acre

3.3.3 Watering Seed

The temporay irrigation system shall be started immediately after completing the seeding of an area. Water shall be applied to supplement rainfall at a rate sufficient to ensure moist soil conditions to a minimum 1-1/2 inch depth. Run-off and puddling shall be prevented. Watering trucks (where water connections are not available) shall not be driven over seeded areas, unless otherwise approved by the Contracting Officer. Truck route shall be as shown on the maintenance plan. Watering of other adjacent areas or plant material shall be prevented.

3.4 QUANTITY CHECK

For materials provided in bags, the empty bags shall be retained for recording the amount used. For materials provided in bulk, the weight certificates shall be retained as a record of the amount used. The amount of material used shall be compared with the total area covered to determine the rate of application used. Differences between the quantity applied and the quantity specified shall be adjusted as directed.

3.5 APPLICATION OF PESTICIDE

When application of a pesticide becomes necessary to remove a pest or disease, a pesticide treatment plan shall be submitted to the Contracting Officer

3.5.1 Application

A state certified applicator shall apply required pesticides in accordance with EPA label restrictions and recommendations. Clothing and personal protective equipment shall be used as specified on the pesticide label. Water for formulating shall only come from filling hoses fitted with a backflow preventer meeting local plumbing codes or standards. Overflow shall be prevented during the filling operation. Prior to each day of use, the equipment used for applying pesticide shall be inspected for leaks, clogging, wear, or damage. Any repairs are to be performed immediately.

3.6 RESTORATION AND CLEAN UP

3.6.1 Restoration

Seeded areas, pavements, and facilities that have been damaged from the

seeding operation shall be restored to original condition at Contractor's expense.

3.6.2 Clean Up

Excess and waste material shall be removed from the seeded areas and shall be disposed offsite on a daily basis. Adjacent paved areas shall be cleaned

3.7 PROTECTION OF INSTALLED AREAS

Immediately upon completion of the seeding operation in an area, the area shall be protected against traffic or other use by erecting barricades and providing signage as required, or as directed. Signage shall be in accordance with this specifications.

3.8 SEED ESTABLISHMENT PERIOD

3.8.1 Commencement

The plant establishment period to obtain a healthy stand of plants shall begin after seeding operation have been completed and approved by the Contracting Officer. The seed establishment period shall be 6 months from the date of Contracting Officer's approval. Written calendar time period shall be furnished for the seed establishment period. When there is more than 1 seed establishment period, the boundaries of the seeded area covered for each period shall be described. The seed establishment period shall be modified for inclement weather, shut down periods, or for separate completion dates of areas.

3.8.2 Proper Stand of Hydroseed

The seeded area shall have a solid soil surface growth ground covering with bare spots no larger than 4 inches square and with bare areas not to exceed 2 percent of the total seeded area.

3.8.3 Maintenance During Establishment Period

Maintenance of the seeded areas shall include eradicating weeds, insects and diseases; protecting seeded areas from surface erosion; maintaining slopes to design conditions; protecting installed areas from traffic; trash removal; watering; and post-fertilization. Weeds shall be removed as soon as possible and as directed by the Contracting Officer. The Contractor shall provide sufficient work force to remove all weeds from all seeded areas within a 2-week period.

3.8.3.1 Maintenance Plan

The Contractor shall submit a plan, subject to approval by the Contracting Officer, for watering and maintenance requirements to establish a healthy stand of native plants. The plan shall include watering layouts, procedures and schedules, including but not limited to the temporary irrigation system plan with irrigation lines, valves and equipment layout, maintenance procedures and labor. Other method(s) of water application shall be submitted to the Contracting Officer for approval. Watering trucks shall not be driven over seeded areas, unless an approved route is establish with the least amount of disturbance to the planted areas. The Contractor shall not vary from the plan route once approved by the Contracting Officer. After the plant establish period is over the Contractor shall seed the area disturbed by the watering truck in

accordance with paragraph BROADCAST SEEDING.

3.8.3.2 Pesticide Treatment

Treatment for disease or pest shall be in accordance with paragraph: APPLICATION OF PESTICIDE.

3.8.3.3 Repair or Reinstall

Unsatisfactory stand of grass plants and mulch shall be repaired or reinstalled, and eroded areas shall be repaired in accordance with paragraph: SITE PREPARATION.

3.8.3.4 Maintenance Record

A written record shall be furnished to the Contracting Officer describing the maintenance work performed; day and amount of water applied, areas weeded, areas repaired or reinstalled; and diagnosis for unsatisfactory stand of grass plants.

3.9 FINAL ACCEPTANCE

3.9.1 Preliminary Inspection

Prior to the completion of the establish period, a preliminary inspection shall be held by the Contracting Officer. Time for the inspection shall be establish in writing. The acceptability of the seeded areas in accordance with the specification shall be determined. An unacceptable stand of hydroseeded area shall be replanted in accordance with paragraph BROADCAST SEEDING and as directed by the Contracting Officer as soon as seeding conditions permit.

3.9.2 Final Inspection

A final inspection shall be held by the Contracting Officer to determined that the deficiencies noted in the preliminary inspection have been corrected. Time for the final inspection shall be in writing.

-- End of Section --

SECTION 03307AA

CONCRETE FOR MINOR STRUCTURES

PART 1 GENERAL

1.1 REFERENCES

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

ACI INTERNATIONAL (ACI)

ACI 308	(1992; R 1997) Standard Practice for Curing Concrete
ACI 318/318R	(1999) Building Code Requirements for Structural Concrete and Commentary
ACI 347R	(1994; R 1999) Guide to Formwork for Concrete

ASTM INTERNATIONAL (ASTM)

ASTM A 615/A 615M	(2000) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM C 31/C 31M	(2000e1) Making and Curing Concrete Test Specimens in the Field
ASTM C 33	(1999ae1) Concrete Aggregates
ASTM C 39/C 39M	(2001) Compressive Strength of Cylindrical Concrete Specimens
ASTM C 143/C 143M	(2000) Slump of Hydraulic Cement Concrete
ASTM C 150	(2004) Portland Cement
ASTM C 171	(1997a) Sheet Materials for Curing Concrete
ASTM C 172	(2004) Sampling Freshly Mixed Concrete
ASTM C 231	(1997el) Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	(2000) Air-Entraining Admixtures for Concrete
ASTM C 309	(1998a) Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 494/C 494M	(1999ae1) Chemical Admixtures for Concrete
ASTM C 618	(2000) Coal Fly Ash and Raw or Calcined

	Natural Pozzolan for Use as a Mineral Admixture in Concrete
ASTM C 685	(2000) Concrete Made by Volumetric Batching and Continuous Mixing
ASTM C 920	(1998) Elastomeric Joint Sealants
ASTM C 94/C 94M	(2000e2) Ready-Mixed Concrete
ASTM D 75	(1987; R 1997) Sampling Aggregates
ASTM D 1752	(1984; R 1996el) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 400	(1963) Requirements for Water for Use in Mixing or Curing Concrete
COE CRD-C 572	(1974) Corps of Engineers Specifications for Polyvinylchloride Waterstop

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Waterstops; G

SD-03 Product Data

Air-Entraining Admixture;
Accelerating Admixture;
Water-Reducing or Retarding Admixture;
Curing Materials;
Reinforcing Steel;
Expansion Joint Filler Strips, Premolded;
Joint Sealants - Field Molded Sealants;

Waterstops

Manufacturer's literature, including safety data sheets, for preformed fillers and the lubricants used in their installation; field-molded sealants and primers (when required by sealant manufacturer); preformed compression seals; and waterstops. Manufacturer's recommended instructions for installing preformed fillers, field-molded sealants; preformed compression seals; and waterstops; and for splicing non-metallic waterstops.

Manufacturer's literature is available from suppliers which demonstrates compliance with applicable specifications for the above materials.

Batching and Mixing Equipment;

Batching and mixing equipment will be accepted on the basis of manufacturer's data which demonstrates compliance with the applicable specifications.

Conveying and Placing Concrete;

The methods and equipment for transporting, handling, depositing, and consolidating the concrete shall be submitted prior to the first concrete placement.

Formwork;

Formwork design shall be submitted prior to the first concrete placement.

SD-04 Samples

Non-metallic Materials

Specimens identified to indicate manufacturer, type of material, size, quantity of material, and shipment or lot represented. Each sample shall be a piece not less than 12 inch long cut from each 200 ft of finished waterstop furnished, but not less than a total of 4 ft of each type, size, and lot furnished. 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. 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 shall be not less than 12 inches long.

SD-06 Test Reports

Aggregates;

Aggregates will be accepted on the basis of certificates of compliance and test reports that show the material(s) meets the quality and grading requirements of the specifications under which it is furnished.

Concrete Mixture Proportions;

Ten days prior to placement of concrete, the contractor shall submit the mixture proportions that will produce concrete of the quality required. Applicable test reports shall be submitted to verify that the concrete mixture proportions selected will produce concrete of the quality specified.

SD-07 Certificates

Waterstops

Certificates of compliance stating that the joint filler and sealant materials and waterstops conform to the requirements specified.

Cementitious Materials;

Certificates of compliance attesting that the concrete materials meet the requirements of the specifications shall be submitted in accordance with the Special Clause "CERTIFICATES OF COMPLIANCE". Cementitious material will be accepted on the basis of a manufacturer's certificate of compliance, accompanied by mill test reports that the material(s) meet the requirements of the specification under which it is furnished.

Aggregates;

Aggregates will be accepted on the basis of certificates of compliance and tests reports that show the material(s) meet the quality and grading requirements of the specifications under which it is furnished.

1.2.1 DELIVERY AND STORAGE

Material delivered and placed in storage shall be stored off the ground and protected from moisture, dirt, and other contaminants. Sealants shall be delivered in the manufacturer's original unopened containers. Sealants whose shelf life has expired shall be removed from the site.

1.3 DESIGN AND PERFORMANCE REQUIREMENTS

The Government will maintain the option to sample and test joint sealer, joint filler material, waterstop, aggregates and concrete to determine compliance with the specifications. The Contractor shall provide facilities and labor as may be necessary to assist the Government in procurement of representative test samples. Samples of aggregates will be obtained at the point of batching in accordance with ASTM D 75. Concrete will be sampled in accordance with ASTM C 172. Slump and air content will be determined in accordance with ASTM C 143/C 143M and ASTM C 231, respectively, when cylinders are molded. Compression test specimens will be made, cured, and transported in accordance with ASTM C 31/C 31M. Compression test specimens will be tested in accordance with ASTM C 39/C 39M. Samples for strength tests will be taken not less than once each shift in which concrete is produced from each class of concrete required. A minimum of three specimens will be made from each sample; two will be tested at 28 days (90 days if pozzolan is used) for acceptance, and one will be tested at 7 days for information.

1.3.1 Strength

Acceptance test results will be the average strengths of two specimens tested at 28 days (90 days if pozzolan is used). The strength of the concrete will be considered satisfactory so long as the average of three consecutive acceptance test results equal or exceed the specified compressive strength, f'c, and no individual acceptance test result falls below f'c by more than 500 psi.

1.3.2 Construction Tolerances

A Class "C" finish shall apply to all surfaces except those specified to receive a Class "D" finish. A Class "D" finish shall apply to all surfaces which will be permanently concealed after construction. The surface requirements for the classes of finish required shall be as specified in ACI 347R.

1.3.3 Concrete Mixture Proportions

Concrete mixture proportions shall be the responsibility of the Contractor. Mixture proportions shall include the dry weights of cementitious material(s); the nominal maximum size of the coarse aggregate; the specific gravities, absorptions, and saturated surface-dry weights of fine and coarse aggregates; the quantities, types, and names of admixtures; and quantity of water per cubic yard of concrete. All materials included in the mixture proportions shall be of the same type and from the same source as will be used on the project. Specified compressive strength f'c shall be 3,000 psi at 28 days (90 days if pozzolan is used). The maximum nominal size coarse aggregate shall be for invert and 25 mm 3/4 inch for walls, in accordance with ACI 318/318R. The air content shall be between 4 and 6 percent. The slump shall be between 2 and 5 inches. The maximum water cement ratio shall be 0.50.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Cementitious Materials

Cementitious materials shall conform to the appropriate specifications listed:

2.1.1.1 Portland Cement

ASTM C 150, Type II, low alkali.

2.1.1.2 Pozzolan

Pozzolan shall conform to ASTM C 618, Class or F, including requirements of Tables 1A and 2A.

2.1.2 Aggregates

Aggregates shall meet the quality and grading requirements of ASTM C 33 Class Designations 4M or better.

2.1.3 Admixtures

Admixtures to be used, when required or approved, shall comply with the appropriate specification listed. Chemical admixtures that have been in storage at the project site for longer than 6 months or that have been subjected to freezing shall be retested at the expense of the contractor at the request of the Contracting Officer and shall be rejected if test results are not satisfactory.

2.1.3.1 Air-Entraining Admixture

Air-entraining admixture shall meet the requirements of ASTM C 260.

2.1.3.2 Accelerating Admixture

Accelerators shall meet the requirements of ASTM C 494/C 494M, Type C or E.

2.1.3.3 Water-Reducing or Retarding Admixture

Water-reducing or retarding admixture shall meet the requirements of

ASTM C 494/C 494M, Type A, B, or D.

2.1.4 Water

Water for mixing and curing shall be fresh, clean, potable, and free from injurious amounts of oil, acid, salt, or alkali, except that unpotable water may be used if it meets the requirements of COE CRD-C 400.

2.1.5 Reinforcing Steel

Reinforcing steel bar shall conform to the requirements of ASTM A 615/A 615M, Grade 60. Details of reinforcement not shown shall be in accordance with ACI 318/318R, Chapters 7 and 12.

2.1.6 Expansion Joint Filler Strips, Premolded

Expansion joint filler strips, premolded shall be sponge rubber conforming to ASTM D 1752, Type I.

2.1.7 Joint Sealants - Field Molded Sealants

Joint sealants - field molded sealants shall conform to ASTM C 920, Type M, Grade NS, Class 25, use NT for vertical joints and Type M, Grade P, Class 25, use T for horizontal joints. Bond-breaker material shall be polyethylene tape, coated paper, metal foil, or similar type materials. The backup material shall be compressible, nonshrink, nonreactive with the sealant, and a nonabsorptive material such as extruded butyl or polychloroprene foam rubber. Immediately prior to installation of field-molded sealants, the joint shall be cleaned of all debris and further cleaned using water, chemical solvents, or other means as recommended by the sealant manufacturer or directed.

2.1.8 Formwork

The design and engineering of the formwork as well as its construction, shall be the responsibility of the Contractor.

2.1.9 Form Coatings

Forms for exposed surfaces shall be coated with a nonstaining form oil, which shall be applied shortly before concrete is placed.

2.1.10 Curing Materials

Curing materials shall conform to the following requirements.

2.1.10.1 Impervious Sheet Materials

Impervious sheet materials, ASTM C 171, type optional, except polyethylene film, if used, shall be white opaque.

2.1.10.2 Membrane-Forming Curing Compound

ASTM C 309, Type 1-D with fugitive dye, and Type 2 white pigmented.

2.2 WATERSTOPS

Intersection and change of direction waterstops shall be shop fabricated.

2.2.1 Flexible Metal

Copper waterstops shall conform to ASTM B 152/B 152M and ASTM B 370, O60 soft anneal temper and 20 oz mass per sq ft sheet thickness. Stainless steel waterstops shall conform to ASTM A 167 and ASTM A 480/A 480M, UNS S30453 (Type 304L), and 20 gauge thick strip.

2.2.2 Rigid Metal

Flat steel waterstops shall conform to ASTM A 109/A 109M, No. 2 (half hard) temper, No. 2 edge, No. 1 (matte or dull) finish or ASTM A 1011/A 1011M, Grade 40.

2.2.3 Non-Metallic Materials

Non-metallic waterstops shall be manufactured from a prime virgin resin; reclaimed material is not acceptable. The compound shall contain plasticizers, stabilizers, and other additives to meet specified requirements. Rubber waterstops shall conform to COE CRD-C 513. Polyvinylchloride waterstops shall conform to COE CRD-C 572. Thermoplastic elastomeric rubber waterstops shall conform to ASTM D 471.

2.2.4 Non-Metallic Hydrophilic

Swellable strip type compound of polymer modified chloroprene rubber that swells upon contact with water shall conform to ASTM D 412 as follows: Tensile strength 420 psi minimum; ultimate elongation 600 percent minimum. Hardness shall be 50 minimum on the type A durometer and the volumetric expansion ratio in distilled water at 70 degrees F shall be 3 to 1 minimum.

2.2.5 Preformed Elastic Adhesive

Preformed plastic adhesive waterstops shall be produced from blends of refined hydrocarbon resins and plasticizing compounds reinforced with inert mineral filler, and shall contain no solvents, asbestos, irritating fumes or obnoxious odors. The compound shall not depend on oxidizing, evaporating, or chemical action for its adhesive or cohesive strength.

2.2.5.1 Chemical Composition

The chemical composition of the sealing compound shall meet the requirements shown below:

PERCENT BY WEIGHT

COMPONENT	MIN.	MAX.	TEST
Bitumen (Hydrocarbon plastic)	50	70	ASTM D 4
Inert Mineral Filler	30	50	AASHTO T 111
Volatile Matter		2	ASTM D 6

2.2.5.2 Adhesion Under Hydrostatic Pressure

The sealing compound shall not leak at the joints for a period of 24 hours under a vertical 6 foot head pressure. In a separate test, the sealing compound shall not leak under a horizontal pressure of 10 psi which is reached by slowly applying increments of 2 psi every minute.

2.2.5.3 Sag of Flow Resistance

Sagging shall not be detected when tested as follows: Fill a wooden form 1 inch wide and 6 inches long flush with sealing compound and place in an oven at 135 degrees F in a vertical position for 5 days.

2.2.5.4 Chemical Resistance

The sealing compound when immersed separately in a 5% solution of caustic potash, a 5% solution of hydrochloric acid, 5% solution of sulfuric acid and a saturated hydrogen sulfide solution for 30 days at ambient room temperature shall show no visible deterioration.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 General

Construction joints shall be prepared to expose minimum size of 1/2-inch coarse aggregate surface textures, and the surface shall be clean, damp, and free of laitance. Ramps and walkways, as necessary, shall be constructed to allow safe and expeditious access for concrete and workmen. Snow, ice, standing or flowing water, loose particles, debris, and foreign matter shall have been removed. Earth foundations shall be satisfactorily compacted with no spongy or yielding spots. Spare vibrators shall be available. The entire preparation shall be accepted by the Government prior to placing.

3.1.2 Embedded Items

Reinforcement shall be secured in place; joints, anchors, and other embedded items shall have been positioned. Internal ties shall be arranged so that when the forms are removed the metal part of the tie will be not

less than 2 inches from concrete surfaces permanently exposed to view or exposed to water on the finished structures. Embedded items shall be free of oil and other foreign matters such as loose coatings or rust, paint, and scale. The embedding of wood in concrete will be permitted only when specifically authorized or directed. All equipment needed to place, consolidate, protect, and cure the concrete shall be at the placement site and in good operating condition.

3.1.3 Formwork Installation

Forms shall be properly aligned, adequately supported, braced, and mortar-tight. The form surfaces shall be smooth and free from irregularities, dents, sags, or holes when used for permanently exposed faces. All exposed joints and edges shall be chamfered, unless otherwise indicated.

3.1.4 Production of Concrete

3.1.4.1 Ready-Mixed Concrete

Ready-mixed concrete shall conform to ASTM C 94/C 94M except as otherwise specified.

3.1.4.2 Concrete Made by Volumetric Batching and Continuous Mixing

Concrete made by volumetric batching and continuous mixing shall conform to ASTM C 685.

3.1.4.3 Batching and Mixing Equipment

The contractor shall have the option of using an on-site batching and mixing facility. The facility shall provide sufficient batching and mixing equipment capacity to prevent cold joints. The method of measuring materials, batching operation, and mixer shall be submitted for review. On-site plant shall conform to the requirements of either ASTM C 94/C 94M or ASTM C 685.

3.2 CONVEYING AND PLACING CONCRETE

Conveying and placing concrete shall conform to the following requirements.

3.2.1 General

Concrete placement shall not be permitted when weather conditions prevent proper placement and consolidation without approval. When concrete is mixed and/or transported by a truck mixer, the concrete shall be delivered to the site of the work and discharge shall be completed within 1-1/2 hours or 45 minutes when the placing temperature is 85 degrees F or greater unless a retarding admixture is used. Concrete shall be conveyed from the mixer to the forms as rapidly as practicable by methods which prevent segregation or loss of ingredients. Concrete shall be in place and consolidated within 15 minutes after discharge from the mixer. Concrete shall be deposited as close as possible to its final position in the forms and be so regulated that it may be effectively consolidated in horizontal layers 18 inches or less in thickness with a minimum of lateral movement. The placement shall be carried on at such a rate that the formation of cold joints will be prevented.

3.2.2 Consolidation

Each layer of concrete shall be consolidated by internal vibrating equipment. Internal vibration shall be systematically accomplished by inserting the vibrator through the fresh concrete in the layer below at a uniform spacing over the entire area of placement. Vibrators shall not be used to transport concrete within the forms. The distance between insertions shall be approximately 1.5 times the radius of action of the vibrator. The vibrator shall penetrate rapidly to the bottom of the layer and at least6 inches into the layer below, if such a layer exists. It shall be held stationary until the concrete is consolidated and then withdrawn slowly at the rate of about 3 inches per second.

3.2.3 Cold-Weather Requirements

No concrete placement shall be made when the ambient temperature is below 35 degrees F or if the ambient temperature is below 40 degrees F and falling. Suitable covering and other means as approved shall be provided for maintaining the concrete at a temperature of at least 50 degrees F for not less than 72 hours after placing and at a temperature above freezing for the remainder of the curing period. Salt, chemicals, or other foreign materials shall not be mixed with the concrete to prevent freezing. Any concrete damaged by freezing shall be removed and replaced at the expense of the contractor.

3.2.4 Hot-Weather Requirements

When the rate of evaporation of surface moisture, as determined by use of Figure 1 of ACI 308, is expected to exceed 0.2 pound per square foot per hour, provisions for windbreaks, shading, fog spraying, or covering with a light-colored material shall be made in advance of placement, and such protective measures shall be taken as quickly as finishing operations will allow.

3.3 FORM REMOVAL

Forms shall not be removed before the expiration of 24 hours after concrete placement except where otherwise specifically authorized. Supporting forms and shoring shall not be removed until the concrete has cured for at least 5 days. When conditions on the work are such as to justify the requirement, forms will be required to remain in place for longer periods.

3.4 FINISHING

3.4.1 General

No finishing or repair will be done when either the concrete or the ambient temperature is below 50 degrees F.

3.4.2 Finishing Formed Surfaces

All fins and loose materials shall be removed, and surface defects including tie holes shall be filled. All honeycomb areas and other defects shall be repaired. All unsound concrete shall be removed from areas to be repaired. Surface defects greater than 1/2 inch in diameter and holes left by removal of tie rods in all surfaces not to receive additional concrete shall be reamed or chipped and filled with dry-pack mortar. The prepared area shall be brush-coated with an approved epoxy resin or latex bonding compound or with a neat cement grout after dampening and filled with mortar

or concrete. The cement used in mortar or concrete for repairs to all surfaces permanently exposed to view shall be a blend of portland cement and white cement so that the final color when cured will be the same as adjacent concrete.

3.4.3 Finishing Unformed Surfaces

All unformed surfaces that are not to be covered by additional concrete or backfill shall be float finished to elevations shown, unless otherwise specified. Surfaces to receive additional concrete or backfill shall be brought to the elevations shown and left as a true and regular surface. Exterior surfaces shall be sloped for drainage unless otherwise shown. Joints shall be carefully made with a jointing tool. Unformed surfaces shall be finished to a tolerance of 3/8 inch for a float finish and 5/16 inch for a trowel finish as determined by a 10 foot straightedge placed on surfaces shown on the plans to be level or having a constant slope. Finishing shall not be performed while there is excess moisture or bleeding water on the surface. No water or cement shall be added to the surface during finishing.

3.4.3.1 Float Finish

Surfaces to be float finished shall be screeded and darbied or bullfloated to eliminate the ridges and to fill in the voids left by the screed. In addition, the darby or bullfloat shall fill all surface voids and only slightly embed the coarse aggregate below the surface of the fresh concrete. When the water sheen disappears and the concrete will support a person's weight without deep imprint, floating should be completed. Floating should embed large aggregates just beneath the surface, remove slight imperfections, humps, and voids to produce a plane surface, compact the concrete, and consolidate mortar at the surface.

3.4.3.2 Trowel Finish

A trowel finish shall be applied to floor of the junction structure. Trowelling shall be done immediately following floating to provide a smooth, even, dense finish free from blemishes including trowel marks. Finished surfaces shall be protected from damage during the construction period.

3.5 CURING AND PROTECTION

Beginning immediately after placement and continuing for at least 7 days, all concrete shall be cured and protected from premature drying, extremes in temperature, rapid temperature change, freezing, mechanical damage, and exposure to rain or flowing water. All materials and equipment needed for adequate curing and protection shall be available and at the site of the placement prior to the start of concrete placement. Preservation of moisture for concrete surfaces not in contact with forms shall be accomplished by one of the following methods:

a. Continuous sprinkling or ponding.

b. Application of absorptive mats or fabrics kept continuously wet.

c. Application of sand kept continuously wet.

d. Application of impervious sheet material conforming to ASTM C 171.

e. Application of membrane-forming curing compound conforming to ASTM C 309, Type 1-D, on surfaces permanently exposed to view and Type 2 on other surfaces shall be accomplished in accordance with manufacturer's instructions.

The preservation of moisture for concrete surfaces placed against wooden forms shall be accomplished by keeping the forms continuously wet for 7 days . If forms are removed prior to end of the required curing period, other curing methods shall be used for the balance of the curing period. During the period of protection removal, the temperature of the air in contact with the concrete shall not be allowed to drop more than 25 degrees F within a 24 hour period.

3.6 TESTS AND INSPECTIONS

3.6.1 General

The individuals who sample and test concrete as required in this specification shall have demonstrated a knowledge and ability to perform the necessary test procedures equivalent to the ACI minimum guidelines for certification of Concrete Field Testing Technicians, Grade I.

3.6.2 Inspection Details and Frequency of Testing

3.6.2.1 Preparations for Placing

Foundation or construction joints, forms, and embedded items shall be inspected in sufficient time prior to each concrete placement by the Contractor to certify that it is ready to receive concrete.

3.6.2.2 Air Content

Air content shall be checked at least once during each shift that concrete is placed for each class of concrete required. Samples shall be obtained in accordance with ASTM C 172 and tested in accordance with ASTM C 231.

3.6.2.3 Slump

Slump shall be checked once during each shift that concrete is produced for each class of concrete required. Samples shall be obtained in accordance with ASTM C 172 and tested in accordance with ASTM C 143/C 143M.

3.6.2.4 Consolidation and Protection

The Contractor shall ensure that the concrete is properly consolidated, finished, protected, and cured.

3.6.3 Action Required

3.6.3.1 Placing

The placing foreman shall not permit placing to begin until he has verified that an adequate number of acceptable vibrators, which are in working order and have competent operators, are available. Placing shall not be continued if any pile is inadequately consolidated.

3.6.3.2 Air Content

Whenever a test result is outside the specification limits, the concrete

shall not be delivered to the forms and an adjustment shall be made to the dosage of the air-entrainment admixture.

3.6.3.3 Slump

Whenever a test result is outside the specification limits, the concrete shall not be delivered to the forms and an adjustment should be made in the batch weights of water and fine aggregate. The adjustments are to be made so that the water-cement ratio does not exceed that specified in the submitted concrete mixture proportion.

3.6.4 Reports

The results of all tests and inspections conducted at the project site shall be reported informally at the end of each shift and in writing weekly and shall be delivered within 3 days after the end of each weekly reporting period. See Section 01451A CONTRACTOR QUALITY CONTROL.

3.7 WATERSTOPS, INSTALLATION AND SPLICES

Waterstops shall be installed at the locations shown to form a continuous water-tight diaphragm. Adequate provision shall be made to support and completely protect the waterstops during the progress of the work. Any waterstop punctured or damaged shall be repaired or replaced. Exposed waterstops shall be protected during application of form release agents to avoid being coated. Suitable guards shall be provided to protect exposed projecting edges and ends of partially embedded waterstops from damage when concrete placement has been discontinued. Splices shall be made by certified trained personnel using approved equipment and procedures.

3.7.1 Copper And Stainless Steel

Splices in copper waterstops shall be lap joints made by brazing. Splices in stainless steel waterstops shall be welded using a TIG or MIG process utilizing a weld rod to match the stainless. All welds shall not be annealed to maintain physical properties. Carbon flame shall not be used in the annealing process. Damaged waterstops shall be repaired by removing damaged portions and patching. Patches shall overlap a minimum of 1 inch onto undamaged portion of the waterstop.

3.7.2 Flat Steel

Splices in flat steel waterstops shall be properly aligned, butt welded, and cleaned of excessive material.

3.7.3 Non-Metallic

Fittings shall be shop made using a machine specifically designed to mechanically weld the waterstop. A miter guide, proper fixturing (profile dependant), and portable power saw shall be used to miter cut the ends to be joined to ensure good alignment and contact between joined surfaces. The splicing of straight lengths shall be done by squaring the ends to be joined. Continuity of the characteristic features of the cross section of the waterstop (ribs, tabular center axis, protrusions, etc.) shall be maintained across the splice.

3.7.3.1 Rubber Waterstop

Splices shall be vulcanized or shall be made using cold bond adhesive as recommended by the manufacturer. Splices for TPE-R shall be as specified for PVC.

3.7.3.2 Polyvinyl Chloride Waterstop

Splices shall be made by heat sealing the adjacent waterstop edges together using a thermoplastic splicing iron utilizing a non-stick surface specifically designed for waterstop welding. The correct temperature shall be used to sufficiently melt without charring the plastic. The spliced area, when cooled, shall show no signs of separation, holes, or other imperfections when bent by hand in as sharp an angle as possible.

3.7.3.3 Quality Assurance

Edge welding will not be permitted. Centerbulbs shall be compressed or closed when welding to non-centerbulb type. Waterstop splicing defects which are unacceptable include, but are not limited to the following: 1) Tensile strength less than 80 percent of parent section. 2) Free lap joints. 3) Misalignment of centerbulb, ribs, and end bulbs greater than 1/16 inch. 4) Misalignment which reduces waterstop cross section more than 15 percent. 5) Bond failure at joint deeper than 1/16 inch or 15 percent of material thickness. 6) Misalignment of waterstop splice resulting in misalignment of waterstop in excess of 1/2 inch in 10 feet. 7) Visible porosity in the weld area, including pin holes. 8) Charred or burnt material. 9) Bubbles or inadequate bonding. 10) Visible signs of splice separation when cooled splice is bent by hand at a sharp angle.

3.7.4 Non-Metallic Hydrophilic Waterstop Installation

Ends to be joined shall be miter cut with sharp knife or shears. The ends shall be adhered with cyanacryiate (super glue) adhesive. When joining hydrophilic type waterstop to PVC waterstop, the hydrophilic waterstop shall be positioned as shown on the drawings. A liberal amount of a single component hydrophilic sealant shall be applied to the junction to complete the transition.

3.7.5 Preformed Plastic Adhesive Installation

The installation of preformed plastic adhesive waterstops shall be a prime, peel, place and pour procedure. Joint surfaces shall be clean and dry before priming and just prior to placing the sealing strips. The end of each strip shall be spliced to the next strip with a 1 inch overlap; the overlap shall be pressed firmly to release trapped air. During damp or cold conditions the joint surface shall be flashed with a safe, direct flame to warm and dry the surface adequately; the sealing strips shall be dipped in warm water to soften the material to achieve maximum bond to the concrete surface.

-- End of Section --

SECTION 05502

MISCELLANEOUS METAL

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D	(2002) Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

ASTM A 36	(2003a) Carbon Structural Steel
ASTM A 53	(2002) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 123	(2002) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 320	(2003) Alloy/Steel Bolting Materials for Low-Temperature Service
ASTM A 500	(2003) Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 653	(2003) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 865	(2003) Threaded Couplings, Steel, Black or Zinc-Coated (Galvanized) Welded or Seamless, for Use in Steel Pipe Joints
ASTM A 924	(1999) General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
ASTM B 32	(2003) Solder Metal
ASTM F 844	(2000) Washers, Steel, Plain (Flat), Unhardened for General Use

1.2 SUBMITTALS

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

that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Miscellaneous Metal Items.

Detail drawings indicating material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Detail drawings for the following items: Swing Gates, Flap Gates, and Trash racks.

SD-11 Closeout Submittals

Satisfactory Installation.

A statement signed by the principal officer of the contracting firm stating that the installation is satisfactory and in accordance with the contract drawings and specifications, and the manufacturer's prescribed procedures and techniques, upon completion of the project and before final acceptance.

1.3 GENERAL REQUIREMENTS

The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Welding to or on structural steel shall be in accordance with AWS D1.1/D. All metal material used for Swing Gates, Flap Gates and Trash Racks shall be galvanized and shall be hot-dip galvanized after fabrication. Galvanizing shall be in accordance with ASTM A 123, ASTM A 653, or ASTM A 924, as applicable. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Joints exposed to the weather shall be formed to exclude water.

1.4 DISSIMILAR MATERIALS

Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces shall be protected with a coat of bituminous paint or asphalt varnish.

1.5 WORKMANSHIP

Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth finish, and unless otherwise approved, exposed riveting shall be flush. Where tight fits are required, joints shall be milled. Corner joints shall be coped or mitered, well formed, and in true alignment. Work shall be accurately set to established lines and elevations and securely fastened in place. Installation shall be in accordance with manufacturer's

installation instructions and approved drawings, cuts, and details.

1.6 ANCHORAGE

Anchorage shall be provided where necessary for fastening miscellaneous metal items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; and lag bolts and screws for wood.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 General

Materials indicated on the drawings or required in the work and not covered elsewhere by detailed requirements shall conform to the requirements of this section. In all cases not specifically covered in these specifications, the Contractor shall furnish approved highest grade commercial materials or products which are suitable for the intended use of the item.

2.1.2 Structural Shapes and Plates

Steel bars, shapes and plates shall conform to ASTM A 36. Galvanized coatings where required, shall conform to ASTM A 123.

2.1.3 Steel Pipes

Steel pipe shall be zinc-coated steel pipe conforming to the requirements of ASTM A 53, Standard Weight, Schedule 40, nominal size unless noted otherwise.

2.1.4 Swing Gates and Appurtenances

Swing Gates and appurtenances shall be fabricated as shown on the drawings. Swing Gates shall be fabricated in the shop from standard weight steel pipe conforming to ASTM A 53 or structural tubing conforming to ASTM A 500, Grade A or B of equivalent strength. Swing gates shall be 1-1/2 inch nominal size and all pipe access gate components (including nuts and washers) shall be hot-dip galvanized after fabrication. Welded, cut, damaged, and deformed areas of galvanizing metal shall be neatly coated with Grade 50B solder conforming to ASTM B 32. Pipe collars shall be hot-dip galvanized steel.

2.1.5 Pipe Caps

Pipe caps shall conform to commercially available heavy duty pipe caps.

2.1.6 Pipe, Steel, Fittings

steel, fittings, shall conform to ASTM A 865 as necessary.

2.1.7 Corrosion-Resisting Steel Bolts and Anchor Bolts

Corrosion-resisting steel bolts and anchor bolts shall conform to the applicable requirements of ASTM A 320, Grade B8.

2.1.8 Bolts

Bolts and anchor bolts shall conform to the applicable requirements of ASTM A 320, Grade B8.

2.1.9 Nuts

Nuts shall be galvanized and confirm to the applicable requirements of ASTM A 320, Grade 8. Nuts shall be galvanized.

2.1.10 Concrete, Mortar and Grout

Concrete, motar and grout shall conform to the requirements of Section 03307A CONCRETE FOR MINOR STRUCTURES.

2.1.11 Washers

Washers shall confirm to ASTM F 844. Washers shall be galvanized.

2.2 MISCELLANEOUS

Miscellaneous plates and shapes for items that do not form a part of the structural steel framework, such as lintels, sill angles, miscellaneous mountings, and frames, shall be provided to complete the work.

2.3 DELETED

PART 3 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

All items shall be installed at the locations shown and according to the manufacturer's recommendations. Items listed below require additional procedures as specified. Contractor shall submit detailed drawings of miscellaneous metal items. Detail drawings shall indicate material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Detail drawings for the following items: Swing Gates, Flap Gates, Trash Racks.

3.2 WORKMANSHIP

Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Steel with welds will not be accepted, except where welding is definitely specified or called for on the drawings. All bolts, nuts, and screws shall be tight. Work shall be accurately set to established lines and elevations and securely fastened in place. Anchorage shall be provided where necessary for fastening miscellaneous metal and wood items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when approved for concrete; machine and carriage bolts for steel; and lag bolts and screws for wood.

3.3 FINISHING

In general, tolerances for machine-finished surfaces designated by nondecimal dimensions shall be within 0.016 inch. Sufficient machining stock shall be allowed on placing pads to insure true surfaces of solid material. Finished contacts of bearing surfaces shall be true and exact to secure full contact. All drilled holes for bolts shall be accurately located and drilled from templates.

3.4 ZINC COATING (GALVANIZING)

Zinc coatings shall be applied in a manner and of a thickness and quality conforming to ASTM A 123. All exposed ferrous metalwork, except cast-iron and corrosion resistant steel and items to be completely embedded in concrete, shall be galvanized unless other protective coatings are specified. Metalwork shall be galvanized after fabrication. In the event that any portion of galvanized metalwork is abraded or otherwise damaged to the extent that the base metal is exposed, such damaged or abraded portions shall be neatly covered with Grade 50B solder conforming to the requirements of ASTM B 32.

3.5 WELDING

Welding shall conform to the provisions of AWS D1.1/D. Welders who have not been certified within two years of the date of commencement of work under this contract will not be allowed to perform the work.

3.6 BOLTED CONNECTIONS

Bolt holes shall be reamed normal to the member and shall be truly cylindrical throughout. Unless otherwise specified, holes for bolts shall not be more than 0.063 inch larger than the diameter of the bolt. Cutting bolt holes with a torch will not be permitted without the prior written approval of the Contracting Officer. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable.

3.7 CLEANUP

Upon completion of the installation of pipe sleeves and appurtenances, all debris and surplus materials resulting from the work shall be removed.

3.8 SATISFACTORY INSTALLATION

The contractor shall submit a Satisfactory Installation statement signed by the principal officer of the contracting firm stating that the installation of the pipe sleeves is satisfactory and in accordance with the contract drawings and specifications, and the manufacturer's prescribed procedures and techniques, upon completion of the project and before final acceptance.

-- End of Section --