

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT			1. CONTRACT ID CODE N/A	PAGE OF PAGES 1 250
2. AMENDMENT/MODIFICATION NO. 0011	3. EFFECTIVE DATE 5 JUN 03	4. REQUISITION/PURCHASE REQ. NO. N/A		5. PROJECT NO. (If applicable) SPEC. NO. 1296
6. ISSUED BY CODE		7. ADMINISTERED BY (If other than Item 6) CODE		
DEPARTMENT OF THE ARMY CORPS OF ENGINEERS SACRAMENTO 1325 J STREET SACRAMENTO, CALIFORNIA				

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)		(√)	9A. AMENDMENT OF SOLICITATION NO. DACW05-03-B-0007
		×	9B. DATED (SEE ITEM 11) 21 APR 2003
			10A. MODIFICATION OF CONTRACTS/ORDER NO. N/A
			10B. DATED (SEE ITEM 13) N/A
CODE	FACILITY CODE		

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is extended, is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

(√)	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor is not, is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

SACRAMENTO RIVER FLOOD CONTROL SYSTEM PHASE 11 - MARYSVILLE/YUBA AREA SITE 7 EXTENSION
YUBA COUNTY, CALIFORNIA

NOTE: DELETE SECTION 01320A IN ITS ENTIRETY.

2 ENCLS 1) 1442, PS, 00700, 00800, TC, SUBMITTALS, 01451A, 01500, 01505, 02230A, 02300A, 02378A, 02525A, 02714A, 02821A, 02921A, 03307A & 15131A.

2) DRAWINGS G-2, G-3, L-1 THRU L-11, P-1 THRU P-9, RW-1, RW-2, PM-1, CX-11, CX-12, CX-23 THRU CX-25, M-59, SD-1, SD-2, & SD-5 THRU SD-8.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
_____ (Signature of person authorized to sign)		BY _____ (Signature of Contracting Officer)	

SOLICITATION, OFFER, AND AWARD

(Construction, Alteration, or Repair)

OFFER (Must be fully completed by offeror)

14. NAME AND ADDRESS OF OFFEROR (Include ZIP Code)	15. TELEPHONE NO. (Include area code)
	16. REMITTANCE ADDRESS (Include only if different than Item 14)
CODE	FACILITY CODE

17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within _____ calendar days after the date offers are due. (Insert any number equal to or greater than the minimum requirements stated in Item 13D. Failure to insert any number means the offeror accepts the minimum in Item 13D.)

AMOUNTS	SEE SCHEDULE OF PRICES
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18. The offeror agrees to furnish any required performance and payment bonds.

19. ACKNOWLEDGMENT OF AMENDMENTS

(The offeror acknowledges receipt of amendments to the solicitation -- give number and date of each)

AMENDMENT NO.	DATE								

20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or print)	20B. SIGNATURE	20C. OFFER DATE
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AWARD (To be completed by Government)

21. ITEMS ACCEPTED:

22. AMOUNT	23. ACCOUNTING AND APPROPRIATION DATA
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24. SUBMIT INVOICES TO ADDRESS SHOWN IN (4 copies unless otherwise specified)	ITEM	25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO <input type="checkbox"/> 10 U.S.C. 2304(c) <input type="checkbox"/> 41 U.S.C. 253(c)
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26. ADMINISTERED BY	CODE	27. PAYMENT WILL BE MADE BY:	CODE
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CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE

<input type="checkbox"/> 28. NEGOTIATED AGREEMENT (Contractor is required to sign this document and return _____ copies to issuing office.) Contractor agrees to furnish and deliver all items or perform all work, requisitions identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications or incorporated by reference in or attached to this contract.	<input type="checkbox"/> 29. AWARD (Contractor is not required to sign this document.) Your offer on this solicitation, is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.
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30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN (Type or print)	31A. NAME OF CONTRACTING OFFICER (Type or print)		
30B. SIGNATURE	30C. DATE	TEL:	EMAIL:
		31B. UNITED STATES OF AMERICA BY	31C. AWARD DATE

PRICING SCHEDULE

CONTRACTOR 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 TO INCLUDE ALL ATTACHMENTS THERETO.

SITE 7 EXTENSION

LINE ITEM NO.	DESCRIPTION	QUANTITY	UNIT OF MEASURE	UNIT PRICE	TOTAL PRICE
0001	PREPARATORY WORK AND SITE CLEANUP	1	LUMP SUM	LUMP SUM	\$ _____
0002	CLEARING AND GRUBBING	1	LUMP SUM	LUMP SUM	\$ _____
0003	EMBANKMENT FILL	157,100*	CY	\$ _____	\$ _____
0004	RELIEF WELL	19	EA	\$ _____	\$ _____
0004	GEOTEXTILE	131,500*	SY	\$ _____	\$ _____
0005AA	STABILITY BERM/ SEEPAGE BERM	47,700*	SY	\$ _____	\$ _____
0005AB	GEOTEXTILE	67,300*	SY	\$ _____	\$ _____
0005AC	GEOTEXTILE	16,500*	SY	\$ _____	\$ _____
0005	DRAIN ROCK	43,620*	TON	\$ _____	\$ _____
0006	EXCAVATION	4,000*	CY	\$ _____	\$ _____
0007	CONCRETE				
0007AA	DITCH LINER (4")	1,248*	TON	\$ _____	\$ _____
0007AB	HEADWALL	2*	CY	\$ _____	\$ _____
0008	FLAP GATE				
0008AA	FLAP GATE 8"	1	EA	\$ _____	\$ _____
0008AB	FLAP GATE 24"	1	EA	\$ _____	\$ _____
0009	ROCK RIPRAP	14*	TON	\$ _____	\$ _____
0010AA	24" DIA. DITCH BANK (2' THICKNESS)	8	TON	\$ _____	\$ _____
0010AB	8" DIA. DITCH BANK (1 1/2' THICKNESS)	6	TON	\$ _____	\$ _____
0010	TRASH RACK	1	LUMP SUM	LUMP SUM	\$ _____
0011	STORM DRAIN MANHOLE	1	EA	\$ _____	\$ _____
0012	8" DIA. STEEL PIPE	600*	LF	\$ _____	\$ _____
0012AA	24" DIA. STEEL PIPE	125*	LF	\$ _____	\$ _____

(c) If the Contractor cannot purchase high-speed copier paper, offset paper, forms bond, computer printout paper, carbonless paper, file folders, white wove envelopes, writing and office paper, book paper, cotton fiber paper, and cover stock meeting the 30 percent postconsumer material standard for use in submitting paper documents to the Government, it should use paper containing no less than 20 percent postconsumer material. This lesser standard should be used only when paper meeting the 30 percent postconsumer material standard is not obtainable at a reasonable price or does not meet reasonable performance standards.

(End of clause)

52.209-6 PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED, OR PROPOSED FOR DEBARMENT (JUL 1995)

(a) The Government suspends or debar Contractors to protect the Government's interests. The Contractor shall not enter into any subcontract in excess of the \$25,000 with a Contractor that is debarred, suspended, or proposed for debarment unless there is a compelling reason to do so.

(b) The Contractor shall require each proposed first-tier subcontractor, whose subcontract will exceed \$25,000, to disclose to the Contractor, in writing, whether as of the time of award of the subcontract, the subcontractor, or its principles, is or is not debarred, suspended, or proposed for debarment by the Federal Government.

(c) A corporate officer or a designee of the Contractor shall notify the Contracting Officer, in writing, before entering into a subcontract with a party that is debarred, suspended, or proposed for debarment (see FAR 9.404 for information on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs). The notice must include the following:

(1) The name of the subcontractor.

(2) The Contractor's knowledge of the reasons for the subcontractor being on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs.

(3) The compelling reason(s) for doing business with the subcontractor notwithstanding its inclusion on the List of Parties Excluded from Federal Procurement and Nonprocurement Programs.

(4) The systems and procedures the Contractor has established to ensure that it is fully protecting the Government's interests when dealing with such subcontractor in view of the specific basis for the party's debarment, suspension, or proposed debarment.

(End of clause)

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

The Contractor shall be required to (a) commence work under this contract within 10 calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than **180 calendar days** after receipt of notice to proceed. The time stated for completion shall include final cleanup of the

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

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

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

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

52.0211-4852 PERFORMANCE PERIOD (OCT 1992)

The Contractor shall complete the entire work ready for use not later than the number of calendar days after the date of receipt of Notice to Proceed as set out in the Completion Schedule below (calendar days are not to be added together):

Completion Schedule:

<u>Description</u>	<u>Calendar Days After Date of Receipt of Notice To Proceed</u>
(1) Complete all work except for installation of pumps, piping within pump structure, meter/main switchboard, motor control center, and testing associated with pump station.	120 days
(2) Complete all remaining work	180 days

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SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION		CONTRACTOR										REMARKS					
Marysville-Yuba City Area Levee Reconstruction-SITE 7 EXTENSION G		CONTRACTOR: SCHEDULE DATES	CONTRACTOR ACTION	DATE FWD TO APPR AUTH/	DATE FWD TO OTHER REVIEWER	DATE RCD FROM CONTR	DATE RCD TO APPR AUTH/	DATE FWD TO OTHER REVIEWER	DATE RCD FROM CONTR	APPROVING AUTHORITY		DATE RCD FROM APPR AUTH					
										SUBMIT BY (g)	APPROVAL NEEDED BY (h)		MATERIAL NEEDED BY (i)	DATE OF ACTION (k)	DATE FWD TO APPR AUTH/ (l)	DATE FWD TO OTHER REVIEWER (m)	DATE RCD FROM CONTR (n)
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	TRANSMISSION SPECIFICATION		DESCRIPTION	PARTS / DRAWINGS	VOLUME												
	02230a		SD-03 Product Data Materials Other Than Salable Timber														
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			Manufacturing Quality Control Manual Sampling and Testing														
			SD-04 Samples Quality Assurance Samples and Tests		3.1												
			SD-07 Certificates Geotextile		2.1.1												
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SECTION 01451A

CONTRACTOR QUALITY CONTROL
~~07/01~~

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3740	(2001) 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	(2000b) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

SACRAMENTO DISTRICT CONSTRUCTION CONTROL MANUAL

Latest edition published by the U.S. Army Engineer District-Sacramento, Sacramento, California. Copies of this publication are available upon request from the Sacramento District Office during the bidding period. In addition, two copies of the Manual and an initial supply of test forms will be furnished to the successful bidder upon award of this contract. This Manual specifies the minimum number of tests to be made and includes forms which shall be used to report data.

SPK FORM 437 - MATERIALS TEST SUMMARY

Published by U.S. Army Engineer District - Sacramento, Sacramento, California. One set of this form (6 pages), is included in the bid package issued by the Sacramento District Office. This form will be used to summarize the minimum number of materials testing to be made during construction. The successful bidder shall submit three copies of the form to the Contracting Officer's Representative during the preconstruction meeting. To complete the form, the use of the Construction Control Manual is mandatory.

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 15 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 60 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 construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

- a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project superintendent.
- b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.

- c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Government.
- d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01330 SUBMITTAL PROCEDURES.
- e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by the Contracting Officer.)
- f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.
- g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.
- h. Reporting procedures, including proposed reporting formats.
- i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

3.2.1.1 Design Quality Control Plan (DQCP)

The Contractor's DQC Plan shall provide and maintain an effective quality control program which will assure that all services required by this design-build contract are performed and provided in a manner that meets professional architectural and engineering quality standards. The Contractor's DQC Plan shall be prepared in accordance with CESPDR 1110-1-8, "Quality Management Plan", Appendix <http://www.spd.usace.army.mil/qmp.html>.

As a minimum, all documents shall be technically reviewed by competent, independent reviewers identified in the DQC Plan. Performance of the independent technical review (ITR) should not be accomplished by the same element that produced the product. In addition, the DQC Plan shall

incorporate the Lessons Learned Databases provided by the Government. Errors and deficiencies in the design documents shall be corrected prior to submitting them to the Government.

The Contractor shall include in the DQC plan a time-scaled bar chart or Critical Path Method (CPM) design schedule showing the sequence of events involved in carrying out the project tasks within the specific contract period. This should be at a detailed level of scheduling sufficient to identify all major tasks including those that control the flow of work. The bar chart or schedule shall include review and correction periods proper to submittal of each item. This should be a forward planning as well as a project monitoring tool. The bar chart or schedule reflects calendar days and not dates for each activity. If the schedule is changed, the Contractor shall submit a revised bar chart or schedule reflecting the change within seven calendar days. The Contractor shall include in the DQC Plan the discipline-specific checklists to be used during the design and quality control of each submittal. These completed checklists shall be submitted at each design phase as part of the project documentation. Example checklists can be found in ER 1110-1-12.

The DQC Plan shall be implemented by an assigned person with the Contractor's organization who has the responsibility of being present during the times work is in progress, and shall be cognizant of and assure that all documents on the project have been coordinated. This individual shall be a person who has verifiable engineering or architectural design experience and is a registered professional engineer or architect. The Contractor shall notify the Contracting Officer, in writing, of the name of the individual and the name of an alternate person assigned to the position.

The Contracting Officer will notify the Contractor, in writing, of the acceptance of the DQC Plan. After acceptance, any changes proposed by the Contractor are subject to the acceptance of the Contracting Officer.

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. The CQC Plan shall be submitted

for review a minimum of 14 calendar days prior to the Coordination Meeting.

During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures 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, show 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 his organization at the site of the work who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a graduate engineer, graduate architect, or a graduate of construction management, with a minimum of 3 years construction experience on construction similar to this contract. This CQC System Manager shall be on the site at all times during construction and will be employed by the prime Contractor. The CQC System Manager shall be assigned no other duties. An alternate for the CQC System Manager will be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate will be the same as for the designated CQC System Manager.

The Contractor shall identify as CQC System Manager an individual within his organization at the site of the work who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a construction person with a minimum of 5 years in related work. This CQC System Manager shall be on the site at all times during construction and will be employed by the prime Contractor. The CQC System Manager shall be assigned no other duties. An alternate for the CQC System Manager will be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate will be the same as for the designated CQC System Manager.

The Contractor shall identify as CQC System Manager an individual within his organization at the site of the work who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a construction person with a minimum of 5 years in related work. This CQC System Manager shall be on the site at all times during construction and will be employed by the prime Contractor. The CQC System Manager shall be assigned as System Manager but may have duties as project superintendent in addition to quality control. An alternate for the CQC System Manager will be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate will be the same as for the designated CQC System Manager.

3.4.3 CQC Personnel

In addition to CQC personnel specified elsewhere in the contract, the Contractor shall provide as part of the CQC organization specialized personnel to assist the CQC System Manager for the following areas: ~~+~~ electrical, ~~+~~ mechanical, ~~+~~ civil, ~~+~~ structural, ~~+~~ environmental, ~~+~~ architectural, ~~+~~ materials technician, ~~+~~ submittals clerk, ~~+~~ ~~occupied family housing coordinator~~. These individuals ~~+~~ shall be directly employed by the prime Contractor and may not be employed by a supplier or sub-contractor on this project ~~+~~ ~~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 ~~+~~ shall have no other duties other than quality control ~~+~~ ~~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

Experience Matrix

	Area	Qualifications
b.	Mechanical	Graduate Mechanical Engineer with 2 yrs experience or person with 5 yrs related experience
c.	Electrical	Graduate Electrical Engineer with 2 yrs related experience or person with 5 yrs related experience
d.	Structural	Graduate Structural Engineer with 2 yrs experience or person with 5 yrs related experience
e.	Architectural	Graduate Architect with 2 yrs experience or person with 5 yrs related experience
f.	Environmental	Graduate Environmental Engineer with 3 yrs experience
g.	Submittals	Submittal Clerk with 1 yr experience
h.	Occupied family housing	Person, customer relations type, coordinator experience
i.	Concrete, Pavements and Soils	Materials Technician with 2 yrs experience for the appropriate area
j.	Testing, Adjusting and Balancing (TAB) Personnel	Specialist must be a member of AABC or an experienced technician of the firm certified by the NEBB.

3.4.4 Additional Requirement

In addition to the above experience [and] [and/or] education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management For Contractors". This course is periodically offered by the Sacramento District, contact the Contracting Officer for more information.

In addition to the above experience [and] [and/or] education requirements the CQC System Manager shall have completed the course entitled

"Construction Quality Management For Contractors". This course is offered quarterly by the Los Angeles District, contact the Contracting Officer for more information.

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. When Section 15950A HEATING, VENTILATING AND AIR CONDITIONING (HVAC) CONTROL SYSTEMS; 15951A DIRECT DIGITAL CONTROL FOR HVAC; 15990A TESTING, ADJUSTING, AND BALANCING OF HVAC SYSTEMS; or 15995A COMMISSIONING OF HVAC SYSTEMS are included in the contract, the submittals required by those sections shall be coordinated with Section 01330 SUBMITTAL PROCEDURES to ensure adequate time is allowed for each type of submittal required.

3.6 CONTROL

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

3.6.1 Preparatory Phase

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

- a. A review of each paragraph of applicable specifications, 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 48 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.

The Contractor shall use an independent commercial laboratory that has been validated by abbreviated audit by the Corps of Engineers, Materials Testing Center (MTC), for the required test methods. To receive validation by abbreviated audit by the MTC, the laboratory shall complete the required form and submit copies of its AASHTO accreditation certificate, applicable AMRL and/or CCRL inspection reports, and responses to any deficiencies to the MTC no later than 7 days after the Notice to Proceed. The cost for the validation by the MTC shall be the responsibility of the Contractor.

Any on-site laboratory that is used by the Contractor will require a separate validation by this MTC. All costs associated with this validation will be the responsibility of the Contractor.

The above information shall also be submitted for Government Approval as part of the Contractor's Quality Control Plan. No materials testing shall be performed until the laboratory has been validated by the MTC and approved by the Resident Engineer. Further information regarding laboratory validation can be obtained by visiting <http://www.wes.army.mil/SL/MTC/LabValSteps.htm>. The inspection report(s) and the written response(s) to any noted deficiencies shall be included with the Contractor Quality Control Plan and will be subject to approval by the Resident Engineer.

3.7.2.2 Quality Assurance Check

The Government reserves the right to perform a quality assurance check of the laboratory equipment and procedures

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 will be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the QA laboratory designated by the Contracting Officer.

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 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 IMPLEMENTATION OF GOVERNMENT RESIDENT MANAGEMENT SYSTEM

The Contractor shall utilize a Government furnished CQC Daily Report Form. This form may be in addition to other Contractor desired reporting forms. However, all other such reporting forms shall be consolidated into this one Government furnished Daily CQC Report Form. The Contractor will also be required to complete Government-Furnished Input Forms which lists, but is not limited to, Prime Contractor staffing; letter codes; planned cumulative progress earnings; subcontractor information showing trade, name, address, and insurance expiration dates; definable features of work; pay activity and activity information; required Quality Control tests tied to individual activities; planned User Schooling tied to specific specification paragraphs and Contractor activities; and submittal information relating to specification section, description, activity number, review period and expected procurement period. The sum of all activity values shall equal the contract amount, and all Bid Items shall be separately identified, in accordance with the PRICING SCHEDULE. These forms shall be completed to the satisfaction of the Contracting Officer prior to any contract payment (except for Bonds, Insurance and/or Mobilization, as approved by the Contracting Officer) and shall be updated as required.

a. During the course of the contract, the Contractor will receive various Quality Assurance comments from the Government that will reflect corrections needed to Contractor activities or reflect outstanding or future items needing the attention of the Contractor. The Contractor will acknowledge receipt of these comments by specific number reference on his Daily CQC Report and will also reflect on his Daily CQC report when these items are specifically completed or corrected.

b. The Contractor's schedule system shall include, as specific and separate activities, all Preparatory Phase Meetings (inspections); all O&M Manuals; and all Test Plans of Electrical and Mechanical Equipment or Systems that require validation testing or instructions to Government Representatives.

3.11 IMPLEMENTATION OF GOVERNMENT RESIDENT MANAGEMENT SYSTEM FOR CONTRACTOR QUALITY CONTROL OF CONTRACT

The Contractor shall utilize a Government furnished CQC Programming Module (A computerized executable file which is DOS based and operates on a minimum of 80386 IBM compatible computers). The Module includes a Daily CQC Reporting System form which must also be used. This form may be in

addition to other Contractor desired reporting forms. However, all other such reporting forms shall be consolidated into this one Government specified Daily CQC Report Form. The Contractor will also be required to complete Government-Furnished Module elements which includes, but is not limited to, Prime Contractor staffing; letter codes; planned cumulative progress earnings; subcontractor information showing trade, name, address, point-of-contact, and insurance expiration dates; definable features of work; pay activity and activity information; required Quality Control tests tied to individual activities; planned User Schooling tied to specific specification paragraphs and contractor activities; Installed Property Listing, Transfer Property Listing and submittal information relating to specification section, description, activity number, review period and expected procurement period. The sum of all activity values shall equal the contract amount, and all Bid Items, Options and Additives shall be separately identified, in accordance with the "Pricing Schedule". Bid Items may include multiple Activities, but Activities may only be assigned to one such Bid Item. This Module shall be completed to the satisfaction of the Contracting Officer prior to any contract payment (except for Bonds, Insurance and/or Mobilization, as approved by the Contracting Officer) and shall be updated as required.

(1) During the course of the contract, the Contractor will receive various Quality Assurance comments from the Government that will reflect corrections needed to Contractor activities or reflect outstanding or future items needing the attention of the Contractor. The Contractor will acknowledge receipt of these comments by specific number reference on his Daily CQC Report, and will also reflect on his Daily CQC Report when these items are specifically completed or corrected to permit Government verification.

(2) The Contractor's schedule system shall include, as specific and separate activities, all Preparatory Phase Meetings (inspections); all O&M Manuals; and all Test Plans of Electrical and Mechanical Equipment or Systems that require validation testing or instructions to Government representatives.

3.12 SAMPLE FORMS

Sample forms enclosed at the end of this section.

1. Test Report Form
2. Daily Contractor Quality Control Form
3. Preparatory Inspection Report Form
4. SPK 437 - Materials Test Summary

3.13 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.

3.14 CONSTRUCTION CONTROL MANUAL

In addition to the requirements specified in the various Technical Specifications hereinafter, test procedures and minimum number of tests will be performed in accordance with SPK PAM 415-1-2, "Construction Control Manual". Neither the specified minimum number of tests nor the lack of them shall in any way limit or relieve the Contractor of his responsibility to perform adequate tests to assure compliance with the quality requirements of these specifications. The referenced standards listed in this Construction Control Manual shall be of the latest issue unless otherwise specified.

The "Construction Control Manual" may be examined in the following office locations, and will be furnished to the Contractor:

Corps of Engineers	Corps of Engineers
Los Angeles District	Arizona/Nevada Area Office
Construction Management Section	3636 N. Central Ave., Suite 760
911 Wilshire Blvd.	Phoenix, Arizona
Los Angeles, California	

The "Construction Control Manual" may be examined in the following office locations, and will be furnished to the Contractor:

Corps of Engineers	Corps of Engineers
Los Angeles District	High Desert Area Office
Construction Management Section	352 East Ave., K-4
911 Wilshire Blvd.	Lancaster, California
Los Angeles, California	

The "Construction Control Manual" may be examined in the following office locations, and will be furnished to the Contractor:

Corps of Engineers	Corps of Engineers
Los Angeles District	Southern California Area Office
Construction Management Section	1284 East 7th Street
911 Wilshire Blvd.	(Rear Trailer)
Los Angeles, California	Upland, California 91786

The "Construction Control Manual" may be examined in the following office locations, and will be furnished to the Contractor:

Corps of Engineers	Corps of Engineers
Los Angeles District	Vandenberg Resident Office,
Construction Management Section	Building M11452
911 Wilshire Blvd.	1174 Iceland Avenue
Los Angeles, California	Vandenberg AFB, California
Corps of Engineers	Corps of Engineers
Los Angeles District	Fort Irwin Resident Office

Construction Management Section
911 Wilshire Blvd.
Los Angeles, California

Corner of 5th Street and F Avenue
Fort Irwin, California

Corps of Engineers
Los Angeles District
Construction Management Section
911 Wilshire Blvd.
Los Angeles, California

U.S. Army Engineer Dist., Los Angeles
Nellis Resident Office
4551 Delvin Drive, Building 867
P.O. Box 9744
Nellis Air Force Base, NV 89191-0744

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SECTION 01500

TEMPORARY CONSTRUCTION FACILITIES

~~09/99~~

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.

DEPARTMENT OF COMMERCE (DOC)

DOC PS 1 (1993) Construction and Industrial Plywood

DOC PS 20 (1970) American Softwood Lumber Standard.

FEDERAL SPECIFICATIONS (FS)

FS TT-E-2784 (Rev A) Enamel (Acrylic-Emulsion, Exterior)

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z535.1 (1991) Safety Color Code

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM F 547 (1977; R 1990) Definitions of Terms
Relating to Nails for Use with Wood and
Wood-Base Materials

U.S. ARMY CORPS OF ENGINEERS

EM 385-1-1 Safety and Health Requirements Manual
(3 September 1996).

WEST COAST LUMBER INSPECTION BUREAU (WCLIB)

WCLIB 16 (1970; Rev 1983) Standard Grading and
Dressing Rules for Douglas Fir, Western
Hemlock, Western Red Cedar, White Fir,
Sitka Spruce Lumber

WESTERN WOOD PRODUCTS ASSOCIATION (WWPA)

WWPA-01 (1991; Supple No. 1) Western Lumber
Grading Rules 91

1.2 GENERAL REQUIREMENTS

1.2.1 Site Plan

The Contractor shall prepare a site plan indicating the proposed location and dimensions of any area to be fenced and used by the Contractor, the number of trailers to be used, avenues of ingress/egress to the fenced area and details of the fence installation. Any areas which may have to be graveled to prevent the tracking of mud shall also be identified. The Contractor shall also indicate if the use of a supplemental or other staging area is desired.

1.2.2 Identification of Employees

The Contractor shall be responsible for furnishing to each employee and for requiring each employee engaged on the work to display identification as approved and directed by the Contracting Officer. Prescribed identification shall immediately be delivered to the Contracting Officer for cancellation upon release of any employee. When required, the Contractor shall obtain and provide fingerprints of persons employed on the project. Contractor and subcontractor personnel shall wear identifying markings on hard hats clearly identifying the company for whom the employee works.

1.2.3 Employee Parking

Contractor employees shall park privately owned vehicles in an area designated by the Contracting Officer. This area will be within reasonable walking distance of the construction site. Contractor employee parking shall not interfere with existing and established parking requirements of the military installation.

1.2.4 Medical

After a contract has been awarded, the Contractor may request a briefing at the Occupational Health Center at Sierra Army Depot. The information provided at this briefing will include:

- a. How to access emergency care.
- b. Services available.
- c. Cost to use facility.
- d. Eligibility for care

1.3 AVAILABILITY AND USE OF UTILITY SERVICES

BEFORE YOU DIG;

Underground Telephone Facilities, Sierra Army Depot Call 4111 or 4112

Underground Telephone Facilities, Citizenstelecom of California, call 800-642-2444

Underground Cable TV Facilities, Premiere Cable Ltd. II, call 800-873-4900

1.3.1 Payment for Utility Services

~~The Government will make all reasonably required utilities available to the Contractor from existing outlets and supplies, as specified in the contract. The Contractor shall carefully conserve any utilities furnished without charge. The Contractor's attention is directed to Section 00800, Paragraph AVAILABILITY AND USE OF UTILITY SERVICES, AVAILABILITY OF UTILITIES SERVICES, or CONTRACTOR-PROVIDED UTILITIES. The Contractor shall make arrangements and pay all costs for utilities desired..~~

1.3.2 Sanitation

The Contractor shall provide and maintain within the construction area minimum field-type sanitary facilities approved by the Contracting Officer.

Government toilet facilities will not be available to Contractor's personnel.

1.3.3 Telephone

The Contractor shall make arrangements and pay all costs for telephone facilities desired.

~~1.3.4 Telephone~~

~~Citizenstelecom of California provides telephone services to Sierra Army Depot. The Depot does not provide telephone services to contractors. To receive service from Citizenstelecom call the business service office at (916) 251-4181. The Contractor shall make arrangements and pay all costs for telephone facilities desired.~~

~~1.3.5 Cellular Telephone~~

~~Contractor must contact the Communications Division at Sierra Army Depot, Building P-51, telephone number 4111 or 4112, for authorization to use cellular telephones on Depot.~~

~~1.3.6 Portable and Mobile Telephone Service~~

~~Service to Sierra Army Depot is provided by Airtouch Cellular of Reno, NV. Telephone number is (702) 829-1800.~~

~~1.3.7 Two Way Radios~~

~~Contractors must contract the Communications Division, Building P-51 for authorization to operate two way radios on the Depot.~~

~~1.3.8 Other Communication Questions or Assistance~~

~~Contractor should contact Communications Division, telephone number 4111 or 4112.~~

~~1.3.9 General~~

~~Furnish water, electricity, and telephone required during construction and extend temporary service lines to construction areas for use of all subcontractors.~~

~~1.3.10 Electric and Water~~

~~Electricity and Water: Reasonable quantities of electricity and water shall be furnished to the Contractor without charge, however, the Contractor shall be responsible for providing all materials and operations necessary to make connections and/or hook-ups.~~

~~1.3.11 Telephone~~

~~Provide and pay for telephone installation and service for field offices. Maintain service for duration of operations under this Contract.~~

~~1.3.12 Sanitary Facilities~~

~~Contractor shall provide his own toilet facilities for the duration of the Contract. Provide proper, adequate, sanitary toilet facilities for use of all workers employed on Project, in accordance with State and Local Health Departments.~~

1.4 SUBMITTALS1.4.1 Site Plan; GA

The Contractor shall prepare a site plan indicating the proposed location and dimensions of any area to be fenced and used by the Contractor, the number of trailers to be used, avenues of ingress/egress to the fenced area and details of the fence installation.

1.4 Housekeeping and Cleaning Plan; FIO

The Contractor shall submit a detailed Housekeeping and Cleaning Plan pursuant to the requirements of paragraph, CLEANING UP and PARAGRAPH ACCIDENT PREVENTION, OF THE CONTRACTOR CLAUSES, section 00700. The Plan will be presented as part of the pre-construction safety plan and will provide for keeping the total construction site, structures and accessways free of debris and obstructions at all times.

1.5 BULLETIN BOARD, PROJECT SIGN, AND PROJECT SAFETY SIGN

1.5.1 Bulletin Board

Immediately upon beginning of work, the Contractor shall provide a weatherproof glass-covered bulletin board not less than 915 by 1220 mm (36 by 48 inches) in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer. The bulletin board shall be located at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer. Legible copies of the aforementioned data shall be displayed until work is completed. Upon completion of work the bulletin board shall be removed by and remain the property of the Contractor.

1.5.2 Project and ~~Safety~~ Signs

(A) General:

The Contractor shall construct and erect one project sign, one safety sign and a minimum of [1] hard hat signs at locations designated by the Contracting Officer. The signs shall conform to the requirements of the drawings attached at the end of this section. The signs shall be erected as soon as possible and within 15 days after date of commencement of work under this contract. The data required by the safety sign shall be corrected daily.

1.5.3 Project and Safety Signs

(A) General:

The Contractor shall construct and erect one safety sign and a minimum of ~~{one}~~ hard hat signs at locations designated by the Contracting Officer. The signs shall conform to the requirements of the drawing attached at the end of this section. The signs shall be erected as soon as possible and within 15 days after date of commencement of work under this contract. The hat decal called for on the signs will be furnished by the Government.

(B) Maintenance and Disposal:

The Contractor shall maintain the signs in good condition throughout the life of the project. -Signs shall remain the property of the Contractor and upon completion of the project they shall be removed from the site.

(A) General:

The Contractor shall construct and erect one project sign and a minimum of [1] hard hat signs at locations designated by the Contracting Officer. The signs shall conform to the requirements of the drawings attached at the end of this section. The signs shall be erected as soon as possible and within 15 days after date of commencement of work under this contract.

(B) Materials:

(1) Lumber shall conform to DOC PS 20 and grading rules of applicable grading agencies, WCLIB or WWPA. Grade shall be "Standard" or better Douglas Fir, S4S and shall be stamped S-Dry.

(2) Plywood: Plywood shall conform to DOC PS 1, Grade AC, Group 1, Exterior.

(3) Bolts, Nuts and Nails: Bolts and nuts shall be galvanized, and type, and size best suited for intended for use. Nails shall conform to ASTM F 547.

(4) Paint: Type of paint for primer, finish coats, and lettering, shall be as indicated on the attached standard drawing, Project Sign,

paragraph PAINTING. The color of signs and lettering shall be as directed by the Contracting Officer. Safety signs shall be painted in the same colors as the project sign. Hard hat signs shall be painted as indicated on the attached drawing.

(5) Decals: Corps of Engineers castle decal and the hard hat decal called for on the signs will be furnished by the Government.

(C) Construction:

(1) Signs shall be constructed as detailed on attached drawings.

(2) 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 one finish coat as indicated. All lettering shall be sized as indicated. Width of letter stroke shall be 1/6 of the letter height, except as noted.

~~(D) Maintenance and Disposal:~~

~~The Contractor shall maintain the signs in good condition throughout the life of the project. Signs shall remain the property of the Contractor and upon completion of the project they shall be removed from the site.~~

~~1.4.2 Project and Safety Signs~~

~~(A) General:~~

~~The Contractor shall construct and erect project, safety, auxiliary, information, and hard hat signs at locations designated by the Contracting Officer. The signs shall conform to the requirements of the drawings attached at the end of this section. The signs shall be erected as soon as possible and within 15 days after date of commencement of work under this contract.~~

~~(B) Number of Signs:~~

~~The Contractor shall furnish the following signs:~~

~~Standard sign for Levee and Channel~~

Projects	_____
Hard Hat Signs	1 _____ at each site while construction is in progress
Auxiliary Sign	_____
Information Sign	_____
Safety Sign	_____

~~(C) Materials:~~

~~(1) Plywood: Exterior.~~

~~(2) Bolts, nuts, and nails shall be galvanized, and type, and size~~

~~best suited for intended for use.~~

~~(3) Paint: Exterior. Color of signs and lettering shall be as indicated on the attached drawing. Hard hat signs shall be painted as indicated on the attached drawing.~~

~~(4) Decals: Corps of Engineers castle decal and the hard hat decal called for on the signs will be furnished by the Government.~~

~~(D) Construction:~~

~~(1) Signs shall be constructed as detailed on attached drawings.~~

~~(2) All lettering shall be sized as indicated.~~

~~(E) Maintenance and Disposal:~~

~~The Contractor shall maintain the signs in good condition throughout the life of the project. Signs shall remain the property of the Contractor and upon completion of the project they shall be removed from the site.~~

~~1.5 BULLETIN BOARD AND HARD HAT SIGNS~~

~~1.5.1 Administrative Field Offices~~

~~Immediately upon beginning of work, the Contractor shall provide a weatherproof glass-covered bulletin board not less than 915 by 1220 mm (36 by 48 inches) in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer. The bulletin board shall be located at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer. Legible copies of the aforementioned data shall be displayed until work is completed. Upon completion of work the bulletin board shall be removed by and remain the property of the Contractor.~~

~~1.5.2 Hard Hat Signs~~

~~The Contractor shall construct and erect 2 hard hat signs at locations designated by the Contracting Officer. The signs shall conform to the requirements of the attached drawing. The signs shall be erected prior to beginning work.~~

~~1.5.3 Project and Safety Signs~~

~~(A) General:~~

~~The Contractor shall construct and erect one project sign, one safety sign and a minimum of [1] hard hat signs at locations designated by the Contracting Officer. The location is to have the concurrence of the Using Service. The signs shall conform to the requirements of the drawings attached at the end of this section. The signs shall be erected as soon as possible and within 15 days after date of commencement of work under this contract.~~

~~— (B) Materials:~~

~~— (1) Woodwork: Posts shall be construction grade Douglas Fir, S4S. Trim shall be clear Douglas Fir, thoroughly dry, Grade B or better.~~

~~— (2) Plywood: Plywood shall conform to DOC PS 1, Grade BC, medium density overlay both sides, 3/4" thick.~~

~~— (3) Metal: All bolts, washers, screws, nails, straps, anchors, etc. to be galvanized. Bolts and nuts shall be galvanized, and type, and size best suited for intended for use. Nails shall conform to ASTM F 547.~~

~~— (4) Paint: Primer and finish paints shall be specifically for exterior use and of a type best suited for the intended purpose. All finish paint to be flat (lusterless).~~

~~— (5) Concrete: Concrete shall be Class "B", 2500 psi, or better.~~

~~— (6) The safety sign and hard hat decal called for on the signs will be furnished by the Government.~~

~~— (C) Construction:~~

~~— (1) Signs shall be constructed as detailed on attached drawings. All exposed nails to be set and holes filled with putty. All components shall be cut and fitted accurately and then assembled and finished in a first class manner.~~

~~— (2) Painting: All woodwork shall receive a priming coat on all surfaces before assembly. All exposed surfaces of the sign and supports shall be given two coats of finish paint after assembly. The lettering to be in lines as shown in Elevations "A" and "B", for Stages 1 and 2, and of the sizes scheduled. Width of letter stroke shall be 1/6 of the letter height. Samples of the painted lettering shall be submitted for approval of the Contracting Officer.~~

~~— (3) Colors: The field of the sign shall be white; all lettering blue and the insignias outlined and painted as shown on the attached drawings.~~

~~— (D) Maintenance and Disposal:~~

~~— (1) The sign shown in Elevation "A" (Stage 1) will be for use during construction of the building and shall be maintained in good condition by the Contractor during this period.~~

~~— (2) After completion of construction the sign shall remain in place and be re-lettered in certain lines and the safety sign shall be removed as shown in Elevation "B" (Stage 2). The Corps of Engineers' insignia shall be replaced by that of Sixth US Army. The sign shall be repainted where necessary and presented in a condition acceptable to the Contracting Officer and for permanent use by the Reserve Center.~~

1.6 PROTECTION AND MAINTENANCE OF TRAFFIC

During construction the Contractor shall provide access and temporary relocated roads as necessary to maintain traffic. The Contractor shall maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment and the work, and the erection and maintenance of adequate warning, danger, and direction signs, shall be as required by the State and local authorities having jurisdiction. The traveling public shall be protected from damage to person and property. The Contractor's traffic on roads selected for hauling material to and from the site shall interfere as little as possible with public traffic. The Contractor shall investigate the adequacy of existing roads and the allowable load limit on these roads. The Contractor shall be responsible for the repair of any damage to roads caused by construction operations. The Contractor shall take positive and effective measures to secure the construction activities from access by the public at all times. These measures may include, but are not limited to, barricades, keep out signs, temporary fencing, and temporary coverings.

1.6.1 Haul Roads

The Contractor shall, at its own expense, construct access and haul roads necessary for proper prosecution of the work under this contract. Haul roads shall be constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided. The Contractor shall provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control, although optional, shall be adequate to ensure safe operation at all times. Any new haul roads must adhere to the avoidance and minimization measures described in the "Standard Avoidance and Minimization Measures During Construction Activities in Giant Garter Snake Habitat" and the various other terms and conditions of the 1997 Programmatic Consultation between the Corps and the U.S. Fish and Wildlife Service on project effects to giant garter snake, included at the end of Section 01355. Any new haul roads shall also remain outside of a 100-foot buffer around any elderberry plants in the project area. Location, grade, width, and alignment of construction and hauling roads shall be subject to approval by the Contracting Officer. Lighting shall be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations. Upon completion of the work, haul roads designated by the Contracting Officer shall be removed, and the site restored to pre-project condition as nearly as possible.

1.6.2 Barricades

The Contractor shall erect and maintain temporary barricades to limit public access to hazardous areas. Such barricades shall be required whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Barricades shall be securely placed, clearly visible with adequate illumination to

provide sufficient visual warning of the hazard during both day and night.

1.6.3 Dust Control

The Contractor shall maintain dust control for all haul roads and permanent access within or outside the project boundaries. They shall be free from dust which would cause damage to nearby crops, cause the local standards for air pollution to be exceeded or which would cause a hazard or nuisance to others. Approved temporary methods of stabilization consisting of sprinkling, chemical treatment, light bituminous treatment or similar methods will be permitted to control dust. Sprinkling, to be approved, must be repeated at such intervals as to keep all parts of the disturbed areas at least damp at all times, and the Contractor must have sufficient competent equipment on the job to accomplish this if sprinkling is used. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs. No separate or direct payment will be made for dust control and the cost thereof shall be considered incidental to and included in the contract prices for levee fill.

1.6.4 Access Roads

Any necessary blading or other improvements required to develop temporary access will be the Contractor's responsibility. All costs of preparation and maintenance including dust control and any obliterations of such roads will be at the Contractor's expense. Coordination may be required with adjacent landowners.

1.6.5 Levee Patrol Roads

If the Contractor uses existing levee patrol roads for access to the construction site(s) he/she shall maintain the roads in their pre-construction condition during the contract period. This work will include dust control as specified above, maintaining a smooth, all-weather surface and controlling the spread and movement of existing aggregate caused by construction activities by shaping, blading, or using methods approved by the Contracting Officer. Upon the completion of construction activities the Contractor shall restore the roads to pre-construction condition. All costs for maintaining the roads and restoring them to pre-construction condition shall be at the Contractor's expense.

1.7 CONTRACTOR'S TEMPORARY FACILITIES

1.7.1 Administrative Field Offices

The Contractor shall provide and maintain administrative field office facilities within the construction area at the designated site. Government office and warehouse facilities will not be available to the Contractor's personnel.

1.7.2 Storage Area

The Contractor shall construct a temporary 1.8 meter (6 foot) high chain link fence around trailers and materials. The fence shall include plastic

strip inserts, colored [green] [brown], so that visibility through the fence is obstructed. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Trailers, materials, or equipment shall not be placed or stored outside the fenced area unless such trailers, materials, or equipment are assigned a separate and distinct storage area by the Contracting Officer away from the vicinity of the construction site but within the military boundaries. Trailers, equipment, or materials shall not be open to public view with the exception of those items which are in support of ongoing work on any given day. Materials shall not be stockpiled outside the fence in preparation for the next day's work. At the end of each work day mobile equipment, such as tractors, wheeled lifting equipment, cranes, trucks, and like equipment, shall be parked within the fenced area.

1.7.3 Supplemental Storage Area

Upon Contractor's request, the Contracting Officer will designate another or supplemental area for the Contractor's use and storage of trailers, equipment, and materials. This area may not be in close proximity of the construction site but shall be within the military boundaries. Fencing of materials or equipment will not be required at this site; however, the Contractor shall be responsible for cleanliness and orderliness of the area used and for the security of any material or equipment stored in this area. Utilities will not be provided to this area by the Government.

1.7.4 Appearance of Trailers

Trailers utilized by the Contractor for administrative or material storage purposes shall present a clean and neat exterior appearance and shall be in a state of good repair. Trailers which, in the opinion of the Contracting Officer, require exterior painting or maintenance will not be allowed on the military property.

1.7.5 Maintenance of Storage Area

Fencing shall be kept in a state of good repair and proper alignment. Should the Contractor elect to traverse with construction equipment or other vehicles grassed or unpaved areas which are not established roadways, such areas shall be covered with a layer of gravel as necessary to prevent rutting and the tracking of mud onto paved or established roadways; gravel gradation shall be at the Contractor's discretion. Grass located within the boundaries of the construction site shall be mowed for the duration of the project. Grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers shall be edged or trimmed neatly.

~~1.7.6 New Building~~

~~In the event a new building is constructed for the temporary project field office, it shall be a minimum 3.6 meters (12 feet) in width, 4.9 meters (16 feet) in length and have a minimum of 2.1 meters (7 feet) headroom. It shall be equipped with approved electrical wiring, at least one double-convenience outlet and the required switches and fuses to provide 110-120-volt power. It shall be provided with a work table with stool, desk with~~

~~chair, two additional chairs, and one legal size file cabinet that can be locked. The building shall be waterproof, shall be supplied with heater, shall have a minimum of two doors, electric lights, a telephone, a battery operated smoke detector alarm, a sufficient number of adjustable windows for adequate light and ventilation, and a supply of approved drinking water. Approved sanitary facilities shall be furnished. The windows and doors shall be screened and the doors provided with dead bolt type locking devices or a padlock and heavy duty hasp bolted to the door. Door hinge pins shall be non-removable. The windows shall be arranged to open and to be securely fastened from the inside. Glass panels in windows shall be protected by bars or heavy mesh screens to prevent easy access to the building through these panels. In warm weather, air conditioning capable of maintaining the office at 50 percent relative humidity and a room temperature 11 degrees C (20 degrees F) below the outside temperature when the outside temperature is 35 degrees C, (95 degrees F,) shall be furnished. Any new building erected for a temporary field office shall be maintained by the Contractor during the life of the contract and upon completion and acceptance of the work shall become the property of the Contractor and shall be removed from the site. All charges for telephone service for the temporary field office shall be borne by the Contractor, including long distance charges up to a maximum of \$75.00 per month.~~

1.7.6 Security Provisions

Adequate outside security lighting shall be provided at the Contractor's temporary facilities. The Contractor shall be responsible for the security of its own equipment; in addition, the Contractor shall notify the appropriate law enforcement agency requesting periodic security checks of the temporary project field office.

1.7.7 Temporary Structures and Devices

Provide, maintain and remove upon completion of Work, all temporary barricades, lights and other protective structures or devices necessary for safety of workers and public property as required to complete all Work.

1.7.8 Protection

Protect all workers and equipment from power lines and maintain safe distances and protective devices as required by Industrial Safety Commission and CAL-OSHA.

1.7.9 Temporary Construction and Equipment

Conform to all regulations, ordinances, laws and other requirements of City, County, State and other authorities having jurisdiction, including insurance companies, with regards to safety precautions, operation and fire hazard.

1.7.10 Security

Provide security to protect the facility, material and equipment from vandalism and theft.

1.7.11 Storage

The storage of all materials and equipment must be kept within the area designated for storage and kept within the security fencing.

1.7.12 Parking

The Contractor shall make arrangements with the Contracting Officer and local authorities for workman parking and truck delivery.

1.7.13 Drainage

The Contractor shall maintain gutters and drain inlets, protecting them from damage and keeping them free of debris. The contractor shall insure that his work does not change existing drainage patterns that could cause flooding of the job site or adjacent properties.

1.7.14 Protection of Existing Facilities

Any damage to existing structures, equipment, roads, walks, landscaping or other items of the existing site or adjacent property from Work performed under the Contractor, shall be the responsibility of the Contractor. The Contractor shall repair, replace and make good all such damage to the satisfaction of the Contracting Officer.

1.7.15 Security Fencing

The Contractor shall install all required fencing and barricades prior to the start of construction.

1.7.16 Maintenance and Removal

Maintain all temporary facilities and controls as long as needed for safe and proper completion of Work; remove all such temporary facilities and controls as rapidly as progress of Work will permit.

1.7.17 Protection

Use all means necessary to maintain temporary facilities and controls in proper and safe condition throughout progress of Work.

1.7.18 Damage or Theft

Protect work and materials to be used on project from damage or loss due to elements, theft, vandalism, malicious mischief, or other causes. Provide temporary roofs, window and door coverings, boxing or other construction as required.

~~1.8 GOVERNMENT FIELD OFFICE~~

~~1.8.1 Resident Engineer's Office~~

~~The Contractor shall provide the Government Resident Engineer with an office, approximately 19 square meters (200 square feet) in floor area,~~

~~located where directed and providing space heat, electric light and power, and toilet facilities consisting of one lavatory and one water closet complete with connections to water and sewer mains. A mail slot in the door or a lockable mail box mounted on the surface of the door shall be provided. At completion of the project, the office shall remain the property of the Contractor and shall be removed from the site. Utilities shall be connected and disconnected in accordance with local codes and to the satisfaction of the Contracting Officer.~~

~~1.8.2 Trailer-Type Mobile Office~~

~~The Contractor may, at its option, furnish and maintain a trailer-type mobile office acceptable to the Contracting Officer and providing as a minimum the facilities specified above. The trailer shall be securely anchored to the ground at all four corners to guard against movement during high winds.~~

~~1.9 GOVERNMENT FIELD OFFICE~~

~~The Contractor shall provide a suitable modular unit approximately 12' by 50' divided into two rooms (12' by 12' and 12' by 38'). The unit shall be adequately heated, well lighted, suitably ventilated and air conditioned. Maintenance of the unit shall be the Contractor's responsibility. An adequate supply of cooled drinking water shall be furnished and maintained. The appropriate number of the following items shall be provided:~~

- ~~_____ 1 ea Telephone line, instrumentation and service~~
- ~~_____ 1 ea Desk, 3' by 5' dbl ped 6 drawer, lockable~~
- ~~_____ 1 ea File cabinet, 4 drawer, legal, lockable~~
- ~~_____ 1 ea Chair, desk, swivel, arms~~
- ~~_____ 2 ea Book case, 3' by 4', 3 shelves~~
- ~~_____ 1 ea Print Table, 4' by 6', attached to wall~~
- ~~_____ 1 ea Table, conference 4' by 8'~~
- ~~_____ 8 ea Chairs, conference~~

~~1.10 PLANT COMMUNICATION~~

~~Whenever the Contractor has the individual elements of its plant so located that operation by normal voice between these elements is not satisfactory, the Contractor shall install a satisfactory means of communication, such as telephone or other suitable devices. The devices shall be made available for use by Government personnel.~~

1.8 TEMPORARY PROJECT SAFETY FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, the Contractor shall furnish and erect temporary project safety fencing at the work site. The safety fencing shall be a high visibility orange colored, high density polyethylene grid or approved equal, a minimum of 1.07 meters (42 inches) high, supported and tightly secured to steel posts located on maximum 3 meters (10 foot) centers, constructed at the approved location. The safety fencing shall be maintained by the Contractor during the life of the contract and, upon completion and acceptance of the work, shall become the

property of the Contractor and shall be removed from the work site.

1.9 CLEANUP

Construction debris, waste materials, packaging material and the like shall be removed from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways shall be cleaned away. Materials resulting from demolition activities which are salvageable shall be stored within the fenced area described above or at the supplemental storage area. Stored material not in trailers, whether new or salvaged, shall be neatly stacked when stored.

1.10 HOUSEKEEPING AND CLEANUP

Pursuant to the requirements of paragraph, CLEANING UP, and paragraph, ACCIDENT PREVENTION, of the CONTRACT CLAUSES, Section 00700, the Contractor shall assign sufficient personnel to insure strict compliance. The Contractor shall keep the total construction area, structures and accessways free of debris and obstructions at all times. Work will not be allowed in those areas that have unsatisfactory cleanup and housekeeping as determined by the Government representative in charge. At least once each day all areas shall be checked by the Prime Contractor and, if necessary, corrected to comply with the above requirement. Housekeeping and cleanup shall be assigned by the Contractor to specific personnel. The name(s) of the cleanup personnel shall be available at the project site; each will be supplied with a distinctively marked hard hat, to be worn from the beginning to the end of the project.

~~1.14 HOUSEKEEPING AND CLEANUP~~

~~Pursuant to the requirements of paragraph, CLEANING UP and paragraph, ACCIDENT PREVENTION, of the CONTRACT CLAUSES, Section 00700, the Contractor shall assign sufficient personnel to insure strict compliance. The Contractor shall submit a detailed written plan for implementation of this requirement. The plan will be presented as part of the preconstruction safety plan and will provide for keeping the total construction site, structures and accessways free of debris and obstructions at all times. Work will not be allowed in those areas that, in the opinion of the Contracting Officer's representative, have unsatisfactory cleanup and housekeeping at the end of the preceding day's normal work shift. At least once each day all areas shall be checked by the Quality Control person of the Prime Contractor and the findings recorded on the Quality Control Daily Report. In addition, the Quality Control person will take immediate action to insure compliance with this requirement. Housekeeping and cleanup shall be assigned by the Contractor to specific personnel. The name(s) of the personnel shall be available at the project site; each person will be supplied with a distinctively marked hard hat, to be worn from the beginning to the end of the project.~~

1.11 RESTORATION OF STORAGE AREA

Upon completion of the project and after removal of trailers, materials,

and equipment from within the fenced area, the fence shall be removed and will become the property of the Contractor. Areas used by the Contractor for the storage of equipment or material, or other use, shall be restored to the original or better condition. Gravel used to traverse grassed areas shall be removed and the area restored to its original condition, including top soil and seeding as necessary.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

-- End of Section --

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01505

GENERAL REQUIREMENTS

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SECTION 01505

GENERAL REQUIREMENTS

~~09/99~~

PART 1 GENERAL

1.1 SCRAP MATERIAL

Materials specified to be removed and become the property of the Contractor are designated as scrap, and the Contractor, by signing this contract, hereby acknowledges that he has made due allowance for value, if any, of such scrap in the contract price.

All scrap, solid waste, or hazardous materials (to be reused by the contractors) shall be disposed of and removed, ~~off Sierra Army Depot's property in accordance with applicable laws and regulations at Contractor's expense, unless otherwise specified in the contract. Hazardous waste generated by contractors on Sierra Army Depot shall be disposed of in accordance with Depot Policy.~~ Contact the Environmental Office (916) 827-4769 for proper instructions. Government receptacles or containers shall not be used for disposal.

1.2 WRITTEN GUARANTEES AND GUARANTOR'S LOCAL REPRESENTATIVE

Prior to completion of the contract, the Contractor shall obtain and furnish to the Contracting Officer's representative written guarantees for all the equipment and/or appliances furnished under the contract. The Contractor shall furnish with each guarantee: The name, address, and telephone number of the guarantor's representative nearest to the location where the equipment and/or appliances are installed, who, upon request of the Using Service's representative, will honor the guarantee during the guaranty period and will provide the services prescribed by the terms of the guarantee.

1.3 PRICING OF CONTRACTOR-FURNISHED PROPERTY

~~At the request of the Contracting Officer, the Contractor shall promptly furnish and shall cause any subcontractors to furnish, in like manner, unit prices and descriptive data required by the Government for property record purposes of fixtures and equipment furnished and installed by the Contractor.~~

— The Contractor shall promptly furnish and shall cause any sub-contractor or supplier to furnish, in like manner, unit prices and descriptive data required by the Government for Property Record purposes of fixtures and equipment furnished and/or installed by the Contractor or sub-contractor, except prices do not need to be provided for Government-Furnished Property. This information shall be listed on RMS CQC Module furnished by the Government. ~~See example forms at the end of this~~

~~section.~~

1.4 TEMPORARY ELECTRIC WIRING

1.4.1 Temporary Power and Lighting

The Contractor shall provide construction power facilities in accordance with the safety requirements of the National Electrical Code NFPA No. 70 and the SAFETY AND HEALTH REQUIREMENTS MANUAL EM 385-1-1. The Contractor, or his delegated subcontractor, shall enforce all the safety requirements of electrical extensions for the work of all subcontractors. All work shall be accomplished by skilled electrical tradesmen in a workmanlike manner, as approved by the Contracting Officer.

1.4.2 Construction Equipment

In addition to the requirements of EM 385-1-1, SAFETY AND HEALTH REQUIREMENTS MANUAL, all temporary wiring conductors installed for operation of construction tools and equipment shall be either Type TW or THW contained in metal raceways, or may be multiconductor cord. Temporary wiring shall be secured above the ground or floor in a workmanlike manner and shall not present an obstacle to persons or equipment. Open wiring may only be used outside of buildings, and then only in strict accordance with the provisions of the National Electrical Code.

1.4.3 Circuit Protection

In addition to the present requirements in EM 385-1-1 and the National Electrical Code, all 15 and 20-ampere receptacle outlets used for obtaining power during construction shall have ground fault circuit interrupters (GFCI) for personnel protection. Block and brick saws shall also be equipped with GFCI. —The Contracting Officer may allow an exception to this requirement for circuits for concrete vibrators or circuits operating at other than 60 Hertz normal (in both cases an assured grounding program as described in the National Electrical Code, except utilizing the daily inspection frequency of the grounding means of such equipment, may be permitted). The assured grounding program will not be permitted as a substitute for usage of GFCI'S except as described above. All generator-powered 15- and 20-ampere, 60 Hertz receptacle outlets shall have GFCI'S, and shall be properly grounded. A testing means shall be provided which will impose a measured fault of 5 milliamperes, plus or minus 1 milliamperes, and result in tripping the GFCI unit.

1.5 UTILITIES

If the Contractor encounters, within the construction limits of the entire project, utilities not shown on the plans and not visible as to the date of this contract and 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 removed or relocated as directed by the Contracting Officer, the Contractor shall be entitled to equitable adjustment for any additional pertinent work or delay.

It is anticipated that pole lines, signs, pipelines and private improvements that would interfere with or are to be replaced by new construction will be removed to new locations by the owners (or by the State of California or its agents) in advance of construction operations. The Contractor shall notify the Contracting Officer at least 30 days in advance of the date on which work will be started requiring the removal of such utilities or private improvements. Care shall be taken to preserve and protect any such improvements from injury or damage during construction operations. The Contractor shall assume full responsibility for reimbursing the owners for any damage to their properties, utilities, or improvements, or interference with their services caused through his operations. Should such damage be found to have been caused without the Contractor's fault or negligence an equitable adjustment in the amount due under the contract will be made under the applicable CONTRACT CLAUSES, Section 00700.

1.6 GENERAL SAFETY REQUIREMENTS

1.6.1 General

The Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, (see Contract Clauses, Section 00700, ACCIDENT PREVENTION) and the Occupational Safety and Health Act (OSHA) Standards for Construction (Title 29, Code of Federal Regulations Part 1926 as revised from time to time); General Industry Standards (Title 29, Code of Federal Regulations Part 1910 as revised from time to time); and the National Fire Protection Association Codes are applicable to this contract. In case of conflict the most stringent requirement of the standards is applicable. For information regarding changes to EM 385-1-1 visit following website:
<http://www.hq.usace.army.mil/soh/changes.htm>.

~~(2) The Army Safety Program, AR 385-10; U.S. Army Explosive Safety Program (DRAFT), AR 385-64; U.S. Army Ammunition and Explosives Safety Standards, (DRAFT) DA PAM 385-64; Sierra Army Depot Safety Manual, SIAD Reg 385-1; Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, (see Contract Clauses, Section 00700, ACCIDENT PREVENTION) and the Occupational Safety and Health Act (OSHA) Standards for Construction are applicable to this contract. In case of conflict the most stringent requirement of all standards is applicable.~~

1.6.2 The Prime Contractor's Superintendent

The Prime Contractor's superintendent shall take an active role in enforcing the safety requirements by participation in safety conferences, hazard analysis (see below), tool box meetings, walk-through inspections, correction of violations, etc., and including that of the subcontractor's work.

~~1.6.3 Job Hazard Analysis~~

~~When the work to be performed by the contractor is located within the ammunition area, the Contractor must adhere to applicable U.S. Army Explosive Safety regulations as well as those specified under section 10(A). Operations must be conducted in a manner which exposes the minimum number of people to the smallest quantity of explosives for the shortest period of time consistent with the operation being conducted.. Personnel not needed for the operation will be prohibited from visiting the job sited. This does not prohibit official visits by depot safety, quality control (QC), management, or inspection personnel, up to established personnel limits. Close coordination must be kept between the Contractor and the designated point of contact for the District Corps of Engineers and the Engineering Plans and Service Division of Sierra Army Depot.~~

~~Based on the construction schedule, the Contractor shall submit a job hazard analysis of each major phase of work prior to entering that phase of activity. The analysis shall include major or high risk hazards, as well as commonly recurring deficiencies that might possibly be encountered for that operation, and shall identify proposed methods and techniques of accomplishing each phase in a safe manner. The Prime Contractor's superintendent shall take active participation in the Job Hazard Analysis, including the subcontractors' work. Prior to start of actual work a meeting shall be held with Prime Contractor, Government, and affected subcontractor to review the Job Hazard Analysis. In addition, job site meetings shall be held to indoctrinate foreman and workers on details of this analysis.~~

~~1.6.3.1 Explosive Ordnance~~

~~Explosive Ordnance: The project site has been cleared of explosive ordnance by the Army E.O.D. In the event that the Contractor encounters any explosive devices or objects of a suspicious nature, he shall immediately clear the site of all employees and notify the Contracting Officer's Representative. All employees are to be trained in familiarizing themselves with explosive ordnance and safety procedures. This training will be conducted by the Government. The job hazard analysis shall address this in specific detail.~~

1.6.3 Violations

If recurring violations and/or gross violation indicate that the safety performance is unsatisfactory, corrective action shall be taken as directed, and at the discretion of the Contracting Officer the retention or some part thereof will be withheld from the progress payment until corrective action has been completed.

~~1.6.5 Elevated Work Areas~~

~~Workers in elevated work areas in excess of 6 feet above an adjoining surface require special safety attention. In addition to the provisions of EM 385-1-1, the following safety measures are required to be submitted to the Contracting Officer's Representative. Prior to commencement of work in elevated work areas, the Contractor shall submit drawings depicting all provisions of his positive protection system including, but not limited to,~~

~~all details of guard rails.~~

~~1.6.5.1 Protection~~

~~Positive protection for workmen engaged in the installation of structural steel and steel joists shall be provided by safety nets, tie-off's, hydraulic man lifts, scaffolds, or other required means. Decking crews must be tied-off or work over nets or platforms not over 6 feet below the work area. Walking on beams and/or girders and the climbing of columns is prohibited without positive protection.~~

~~1.6.5.2 Guard Rails~~

~~Perimeter guard rails shall be installed at floor, roof, or wall openings more than 6 feet above an adjoining surface and on roof perimeters. Rails shall be designed to protect all phases of elevated work including, but not limited to, roofing operations and installation of gutters and flashing. Rails around roofs may not be removed until all work on the roof is complete and all traffic on or across the roof ceases. Rails shall be designed by a licensed engineer to provide adequate stability under any anticipated impact loading. As a minimum, the rails shall consist of a top rail at a height of 42 inches, a mid rail and a toe board. Use of tie-offs, hydraulic man lifts, scaffolds, or other means of roof edge protection methods may be utilized on small structures such as family housing, prefabricated metal buildings, etc.~~

1.6.4 Fire Prevention

~~Twenty-four hours notice shall be given to the Contracting Officer for coordination with the Facility Fire Department prior to conducting any fire hazardous operation.~~ Cutting or welding will be permitted only in areas that are or have been made fire safe. ~~Except in established shops, any open flame, brazing, welding and/or metal grinding will not be used until DA form 5383-R, Hot Work Permit and SIAD Form 1011 (1 Dec 96) have been completed. These can be obtained from your POC.~~ Where possible, all combustibles shall be located at least 35 feet horizontally from the work site. Where such location is impracticable, combustibles shall be protected with fire blankets and/or protective welding screens to prevent slag from running out of the work area. Edges of covers at the floor shall be tight to prevent sparks from going under them. This precaution is also important at overlaps where several covers are used to protect a large pile. ~~The Contractor shall not allow any welding/cutting or open flame operations in facilities that are protected by a wet pipe fire sprinkler or an automatic detection system, if the system is out of service. First priority of work will be to return the suppression/detection system to operational condition. Return the fire detection and/or suppression system back to an operational status (if possible) during periods that the facility is unoccupied, and at the end of the work day. The Contractor shall post a fire guard for a 24 hour period (or certify to the Fire Department that the facility is safe) after welding, cutting, and open flame operations in a facility when: (a) fire detection and suppression system can not be returned to service; (b) fire detection or suppression systems do not exist.~~ Other fire prevention precautions shall be in accordance with the latest National Fire Codes.

~~1.6.6.1 Permits~~

~~Permits for cutting and welding shall be obtained from the base Fire Department, Building 1223, (714) 655-2075, prior to commencement of work.~~

~~1.6.6.2 Certification~~

~~The Contractor shall obtain certification by calling the Base Fire Department Dispatch Center at ext. 6-5380 or 6-5971. Please give the following information:~~

~~_____ Facility Number
_____ Hot Work Permit Number
_____ Name of Person Calling
_____ Name of Contractor~~

~~1.6.6.3 Regulations~~

~~Contractor shall observe all safety and fire regulations as presently enforced at Vandenberg AFB. The construction shall be in accordance with the Corps of Engineers' Manual, General Safety Requirements EM 385-1-1, and Occupational Safety and Health Act (OSHA) Public Law 91-596. Comply with OSHA and Air Force Occupational Safety and Health (AFOSH) safety standards.~~

~~1.6.6.4 Inspections~~

~~All construction sites are subject to fire and safety inspections without notice. Any violation of fire and safety standards may result in a work stoppage at the expense of the Contractor.~~

~~1.6.7 Recordkeeping/Reporting Requirements~~

~~On all contract operations, the Prime Contractor shall be responsible for recording and reporting all accident exposure and experience incident work. (This includes exposure and experience of the prime contractor and his/her sub-contractor(s)). As a minimum these records shall include exposure work-hours and a log of occupational injuries and illnesses. (OSHA Form 200 or state equivalent as prescribed by 29 CFR 1904.5) Reference EM 385-1-1, 01.D.04.~~

1.6.5 Accident Reporting

In addition to the requirements for reporting accidents in accordance with EM 385-1-1, Section 1, the Prime Contractor will submit at the 50% point and 100% of project completion, a written summary of worker's compensation claims filed by workers on the project. The report will include all subcontractors. The main report covering the Prime Contractor claims will be certified as "correct and true" by the Contractor's compensation insurance carrier. The same certification will be required for subcontractor reports.

~~1.6.9 Fire Protection by Contractors~~

~~_____~~

~~Coordination and cooperation between construction personnel and operating forces is required. On a lump-sum contract the contractor has by the terms of his contract primary responsibility for the protection of his own work. The contractor is responsible for all damage to persons or property that occur as a result of his fault or negligence in connection with the prosecution of the work. All contractors shall ensure against these liabilities. The contractor has absolute responsibility with regard to his own work and must exercise reasonable care in the protection of other property.~~

~~The Contractor shall furnish the proper number and types of fire extinguishers required to perform the contract, in accordance with EM-385-1-1 Protection Criteria. Contractor shall also furnish fire protection blankets and equipment to provide wet-down for an area 35 feet around all operations which produce sparks. The wet-down operations shall be performed a minimum of once daily depending upon weather and ground cover conditions. Contractor personnel assigned fire-watch duties shall have the knowledge of all portable firefighting equipment relevant to the operation."~~

1.6.10 Evacuation Plan

~~Procedures for protection of ALL personnel in the ammunition area on approaching "Lightning/Thunderstorms"~~

~~SIERRA ARMY DEPOT STANDING OPERATING PROCEDURE #SI-000-M-008 FOR:
Suspending Operations During Lightning/Thunderstorm Activity~~

~~_____ Date: 01 SEPT 1970
_____ REVISION NUMBER: 5 Date: 31 MAY 1995~~

~~Building 520 is equipped with a model 520 Electrical Storm Identification Device (ESID). According to the reference SOP, upon hearing an alarm on the ESID the trained operator will inform ALL occupied buildings, loading docks, Directorate of Law Enforcement and Security (x4345), demolition grounds and personnel in the ammo area. When telephoning above locations the operator's response will be passed to the supervisor or leader. Security Division will notify ALL contractors known to be in the Ammunition area (see paragraph 1.18D). OPERATIONS WILL CEASE WHEN THE LIGHTNING ACTIVITY IS WITHIN 5 MILES.~~

~~When lightning has been determined to be within 5 miles from a location that is not equipped with an approved lightning protection system, personnel will be evacuated from the job site. This includes personnel working on loading docks, railroad trains, motor trucks containing explosives or within the magazine area.~~

~~When the ESID indicates no lightning events for the last 15 minutes for cloud lightning and all ranges, all areas notified above will be re-notified and given the all clear signal.~~

~~The work area for this contract is located adjacent to an explosive-hazardous/toxic facility when may emit harmful mists, fumes, gasses, and/or missiles into the surrounding atmosphere. Therefore the Contractor shall include an evacuation plan into his safety plan.~~

~~1.6.11 Public Convenience and Safety~~

~~All persons working in or visiting hard hat areas shall be provided with and required to wear protective headgear. Hard hat areas are areas where there is a potential for injury to the head from falling objects. Protective helmets designed to reduce electrical shock hazard shall be worn by each such affected employee when near exposed electrical conductors which could contact the head. In accordance with EM 385-1-1, all construction areas are considered hard hat areas. The identification and analysis of head hazards will be documented in a hazard analysis, accident prevention plan, or project safety and health programs as appropriate. Refer to 29 CFR 1910.135 OSHA guide to comply with the American National Standard Institute (ANSI) requirements for industrial head protection.~~

~~1.7 PLANNED UTILITY OUTAGES AND STREET CLOSURES~~

~~_____ All utility outages and street closures shall be of as short a duration as possible and shall be scheduled as far in advance as possible with the Contracting Officer, in no case less than [[7][14] [5-Vandenberg AFB]] days before the outage or closure. The Contractor shall obtain in writing from the Contracting Officer a statement or schedule giving the permissible times of outages or closures for particular installations and the maximum time allowed for each. The Contractor shall strictly observe such schedules and will be held responsible for any violations.~~

~~_____ (A) Street Closure:_____~~

~~_____ The Contractor shall obtain approval in writing from the Contracting Officer before he can close any street or parking lot access. The request for closure shall be submitted in writing to the Contracting Officer 7 working days prior to planned closing and shall include the section to be closed and length of time of closure.~~

~~_____ Power outages shall be restricted to off-duty hours and weekends. Other utilities may be connected and streets closed during normal working hours with the outage duration and street closure as short as possible. All outages and street closures shall be scheduled as far in advance as possible with the Contracting Officer and in no case less than *** days before the outage or closure. The Contractor shall obtain in writing from the Contracting Officer a statement or schedule giving the permissible times of utility outages or road closures for particular installations and the maximum time allowed for such outage. The Contractor shall strictly observe such schedules and will be held responsible for any violations.~~

~~_____ (A) Street Closure:_____~~

~~_____ The Contractor shall obtain approval in writing from the Contracting Officer before he can close any street or parking lot access. The request for closure shall be submitted in writing to the Contracting Officer 7 working days prior to planned closing and shall include the section to be closed and length of time of closure.~~

~~All utility outages and street closures shall be of as short a duration as possible and shall be scheduled as far in advance as possible with the Directorate of Public Works (DPW), Building 385, in no case less than 14 days before the outage or closure. The Contractor shall obtain in writing from the DPW a statement or schedule giving the permissible times of outages or closures for particular installations and the maximum time allowed for each. The Contractor shall strictly observe such schedules and will be held responsible for any violations. A copy of the schedule, provided by the DPW, will be provided to the Resident Engineer, prior to the outage.~~

~~Utility outages and street closures shall be restricted to off-duty hours and weekends, with the outage duration and street closure as short as possible. All outages and street closures shall be scheduled as far in advance as possible with the Contracting Officer and in no case less than 14 days before the outage or closure. The Contractor shall obtain in writing from the Contracting Officer a statement or schedule giving the permissible times of utility outages or road closures for particular installations and the maximum time allowed for such outage. The Contractor shall strictly observe such schedules and will be held responsible for any violations.~~

~~All utility outages, street closures, and parking lot closures shall be scheduled as far in advance as possible with the Contracting Officer and in no case less than 21 calendar days before the outage or closure. Requests for outages shall be in writing, spelling out the date, time and affected areas. During street closures, at least one lane in each direction will remain open at all times and all lanes in all directions will be open from 0630-0800 and 1500-1630 Monday through Friday. Exceptions to this may be granted if the Contracting Officer authorizes a detour in lieu of keeping a street open. Parking lot closures will be kept to a minimum and will be subject to restrictions noted on the drawings. All utility outages shall be restricted to weekends. For those utilities requiring the installation of thrust blocks, the outage may be extended two additional days with the permission of the Contracting Officer. The Contractor is responsible for providing alternate service if an outage ever exceeds these limits. For utility relocations, new utility service must be complete before interrupting existing utility service for tie-in.~~

~~All utility outages and street closures shall be of as short a duration as possible and shall be scheduled as far in advance as possible with the Contracting Officer, in no case less than 14 days before the outage or closure. The Contractor shall obtain in writing from the Contracting Officer a statement or schedule giving the permissible times of outages or closures for particular installations and the maximum time allowed for each. The Contractor shall strictly observe such schedules and will be held responsible for any violations. Before any outage or closure is scheduled, the Contractor will: 1) Have all approved materials necessary for the outage on hand, 2) Have completed, tested and been inspected by the Construction Quality Control Representative all preliminary work, 3) Prepare an accepted hazard analysis in accordance with section "ACCIDENT PREVENTION", 4) Have all permits and personnel qualifications on hand, 5) Have held a joint inspection with a representative of the Contracting Officer and the Construction Quality~~

~~Control Representative.~~

~~1.8 EXCAVATION PERMITS~~

~~All excavation permits will be issued to the Contractor from the Directorate of Engineering and Housing (DEH), through the Contracting Officer. The appropriate form, for this request, may be obtained from the Contracting Officer. Processing time required is 14 calendar days. Questions concerning the excavation permit should be directed to the Contracting Officer.~~

~~All excavation permits will be issued to the Contractor from the Base Civil Engineer (BCE) through the Contracting Officer. The appropriate form, for this request, may be obtained from the Contracting Officer. Processing time required by the BCE is 14 calendar days. Questions concerning the excavation permit should be directed to the Contracting Officer.~~

~~(A) Prior to being allowed to perform any excavation at Dugway Proving Ground, the Contractor shall obtain a permit for excavation. The permit shall be issued by Dugway Facilities and Services Directorate through the Corps of Engineers.~~

~~(B) The Contractor shall make application for the permit to the Resident Office by taking the following steps:~~

~~(1) Prepare duplicate site plans or prepared plans, indicating all areas of excavation and the depth and width of excavations.~~

~~(2) Prepare a schedule, or show on the site plans a schedule, indicating the planned dates of excavation.~~

~~(3) Staking, in the field, all areas indicated on the plans for excavation.~~

~~(C) The Contractor shall allow a minimum period of thirty calendar days for completion of the excavation permit process by Dugway. No excavation will be permitted until the excavation permit is issued.~~

~~(D) Dugway regulations require the presence of a Dugway Safety Officer representative at the site during all excavation operations. The Contractor will therefore be required to schedule excavations in advance; unscheduled excavation work will not be allowed.~~

~~All excavation permits will be issued directly to the Contractor from the Directorate of Public Works (DPW). The appropriate form, for this request, may be obtained from the DPW of the Resident Office. Processing time required by the DPW is 14 calendar days. Questions concerning the excavation permit should be directed to the Directorate of Public Works located in Building No. 385.~~

~~All excavation permits will be provided to the Contractor by the Contracting Officer. A minimum of 48 hours prior to any excavation, the Contractor shall notify the parties listed on the excavation permit.~~

~~All excavation permits, will be issued to the Contractor from the Base Civil Engineer (BCE) through the Contracting Officer. The appropriate form for this request, AF Form 103, may be obtained from the Contracting Officer. Processing time required by the BCE is 14 calendar days. Questions concerning the excavation permit should be directed to the Contracting Officer. Notify Contracting Officer five (5) working days prior to the anticipated start date for digging.~~

~~(A) Excavation Permit:~~

~~The Contractor will be required to obtain an excavation permit on AF Form 103 from the Base Civil Engineer prior to performing any required excavation under this contract. The form shall be accompanied by a sketch showing size, depth, location, and extent of all excavation and trenching included in the contract. The completed form shall be submitted to the Base Civil Engineer with a copy to the Resident Engineer at least 10 working days prior to intended date of excavation. During the 10-day period the Base Civil Engineer and Base Communications Officer will make known to the Contractor by drawings, staking, or both, the location of all known buried utilities and communication lines. In these identified areas, only hand excavation will be permitted.~~

~~(A) Welding Permit:~~

~~Where welding of any nature is to be performed on Nellis Air Force Base, the Contractor shall apply for a welding permit by calling the Fire Department, extension 652-9630. A permit will be issued within two working days with instructions for welding, fire prevention.~~

~~All excavation permits will be issued to the Contractor from the Directorate of Public Works (DPW), through the Contracting Officer. The appropriate form, for this request, may be obtained from the Contracting Officer. Processing time required is 14 calendar days prior to excavation. Excavation permits expire after 30 calendar days. If requested, a time extension may be granted at the discretion of the chief of Engineering Plans and Services. The Contractor is responsible for obtaining excavation permits from Citizenstelecom and Premiere Cable Ltd. II. The Government may assist in these situations. Questions concerning the excavation permit should be directed to the Contracting Officer.~~

~~(A) Excavation Permit:~~

~~(1) The Contractor shall obtain and process an AF Form 103, Civil Engineering Work Clearance Request, from the Contracts Management Section, Building 11433, 6-8093. The Contractor shall provide sketches showing the location, size, and depth of any excavation and trenching. The Contractor shall list proposed utility, fire, or security system outages. The AF Form 103 shall be processed through the appropriate government agencies for review and coordination. Government agencies will annotate the form with special instructions or requirements. The AF Form 103 with sketches, all in triplicate, shall be submitted a minimum of 5 work days prior to the proposed construction start date. Work shall not begin until the AF Form 103 is fully approved.~~

~~(2) When any digging is performed in the vicinity of utilities or communication cables, Civil Engineering Group (30 CEG) and/or Communications Squadron (30 CS) monitors, as required, will be present. No mechanical digging shall be performed within 4 feet of utilities or communication cables until they are physically exposed by hand digging. If a utility or communication cable is damaged, notify the Contracting Officer immediately. Twenty-four hours advance notice for CE monitors, 6-8093, and CS monitors, 6-4400, is required. Work shall not begin until the monitors are present.~~

~~(3) Seventy-two hours advance notice for environmental monitors, 6-1922, is required. Work shall not begin until the monitors are present.~~

~~(B) Welding Permit:~~

~~Welding or torching of any kind on Vandenberg AFB requires a welding permit. The Contractor shall obtain a welding permit from the Fire Protection Flight, Building 10660, 6-5380. A permit will be issued within 2 work days with instructions for welding fire prevention.~~

~~(A) General:~~

~~Reference is made to the article of the contract entitled "Permits and Responsibilities," which obligates the Contractor to obtain all required licenses and permits.~~

~~(B) Railroad:~~

~~Before entering upon the premises of the [____], hereinafter called the railroad, in connection with performance of the contract work, the Contractor will be required by the railroad to enter into an agreement. Such agreement will probably include provisions requiring the Contractor to (a) furnish public liability insurance or indemnification bonds in an amount designated by the railroad; (b) to indemnify the railroad for any claims which result from performance of the contract work on or use of railroad premises by the Contractor; (c) to pay for services of any inspectors, flagmen, or watchmen furnished by the railroad during performance of the contract work on or use of the premises of the railroad by the Contractor; and (d) conform with any other conditions relative to use and occupancy, and the performance of work on railroad premises. The Contractor shall submit to the Contracting Officer a true copy of any agreements entered into. No separate or additional payment will be made by the Government to the Contractor for costs incurred by the Contractor as a result of compliance with these provisions.~~

1.7 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

(A) This provision specifies the procedure for the determination of time extensions for unusually severe weather in accordance with the CONTRACT CLAUSE, Section 00700, entitled "DEFAULT (FIXED-PRICE CONSTRUCTION)". In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

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

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

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

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

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
()	()	()	()	()	()	()	()	()	()	()	()

~~STATE~~

-

~~CALIFORNIA~~

~~INSTALLATION/NOAA STATION~~

~~SIERRA AD/SUSANVILLE~~

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
(20)	(17)	(17)	(13)	(06)	(03)	(01)	(01)	(04)	(10)	(15)	(20)

~~BEALE AFB/MARYSVILLE~~

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
(07)	(06)	(05)	(04)	(01)	(00)	(00)	(00)	(01)	(02)	(05)	(07)

~~MCCLELLAN AFB/SACRAMENTO~~

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
(07)	(05)	(05)	(04)	(01)	(01)	(00)	(00)	(01)	(02)	(05)	(07)

~~OAKLAND AB/RICHMOND~~

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
(06)	(05)	(05)	(04)	(01)	(00)	(00)	(00)	(01)	(02)	(05)	(06)

~~LETTERMAN HOSPITAL/REDWOOD CITY~~

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
(06)	(05)	(05)	(04)	(01)	(00)	(00)	(00)	(01)	(02)	(05)	(05)

~~PRESIDIO OF SF/REDWOOD CITY~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(06) (05) (05) (04) (01) (00) (00) (00) (01) (02) (05) (05)~~

~~SHARPE AD/TRACY CARBONA~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(09) (05) (05) (03) (01) (00) (00) (00) (00) (01) (04) (08)~~

~~RIVERBANK ARMY AMMO PLANT/TRACY CARBONA~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(09) (05) (05) (03) (01) (00) (00) (00) (00) (01) (04) (08)~~

~~TRACY DEFENSE DEPOT/TRACY CARBONA~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(09) (05) (05) (03) (01) (00) (00) (00) (00) (01) (04) (08)~~

~~FORT ORD/MONTEREY~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(06) (05) (05) (04) (01) (00) (00) (00) (00) (01) (04) (05)~~

~~PRESIDIO OF MONTEREY/MONTEREY~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(06) (05) (05) (04) (01) (00) (00) (00) (00) (01) (04) (05)~~

~~FORT HUNTER-LEGGETT MIL RES/KING CITY~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(10) (07) (05) (03) (01) (00) (00) (00) (00) (02) (06) (11)~~

~~CAMP ROBERTS/KING CITY~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(10) (07) (05) (03) (01) (00) (00) (00) (00) (02) (06) (11)~~

~~NEVADA~~

~~HAWTHORNE ARMY AMMO PLANT/YERINGTON~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(21) (18) (18) (10) (05) (02) (01) (01) (04) (09) (19) (22)~~

~~UTAH~~

~~HILL AF RANGE/BEAR RIVER~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(22) (19) (15) (07) (04) (03) (01) (02) (02) (05) (15) (22)~~

~~OGDEN DEFENSE DEPOT/OGDEN~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(22) (17) (13) (08) (05) (03) (01) (02) (03) (05) (12) (22)~~

~~HILL AFB-FT DOUGLAS/OGDEN~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(22) (17) (13) (08) (05) (03) (01) (02) (03) (05) (12) (22)~~

~~TOOELE AD/TOOLE~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(20) (16) (14) (08) (05) (03) (02) (02) (02) (05) (13) (21)~~

~~DUGWAY PROVING GROUND/TOOELE~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(20) (16) (14) (08) (05) (03) (02) (02) (02) (05) (13) (21)~~

~~MEAN INCLEMENT DAYS PER MONTH~~

~~LOS ANGELES DISTRICT MILITARY INSTALLATIONS~~

~~STATE~~

~~-~~

~~CALIFORNIA~~

~~INSTALLATION/NOAA STATION~~

~~VANDENBERG AFB/LOMPOC~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(05) (05) (05) (03) (01) (00) (00) (00) (01) (01) (04) (05)~~

~~GEORGE AFB/VICTORVILLE~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(13) (12) (08) (03) (00) (00) (00) (01) (00) (02) (10) (15)~~

~~NORTON AFB/SAN BERNADINO~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(05) (05) (05) (03) (01) (00) (00) (00) (01) (01) (04) (05)~~

~~MARCH AFB/RIVERSIDE~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(05) (04) (04) (02) (01) (00) (00) (00) (00) (01) (03) (05)~~

~~NEVADA~~

~~NELLIS AFB/BOULDER CITY~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(05) (03) (03) (01) (01) (00) (01) (02) (01) (01) (02) (05)~~

~~ARIZONA~~

~~NAVAJO AD/CHINO VALLEY~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(21) (18) (17) (13) (04) (01) (04) (05) (02) (06) (17) (22)~~

~~LUKE AFB/TEMPE~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(09) (05) (03) (01) (00) (00) (02) (02) (01) (02) (03) (07)~~

~~WILLIAMS AFB/MESA~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(07) (05) (03) (01) (00) (00) (02) (02) (02) (02) (02) (05)~~

~~YUMA PROVING GROUNDS/IMPERIAL, CA~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(03) (02) (01) (00) (00) (00) (00) (01) (00) (00) (00) (02)~~

~~DAVIS MONTHAN AFB/TOMBSTONE~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(10) (07) (05) (02) (01) (01) (06) (05) (03) (02) (05) (08)~~

~~FORT HUACHUCA/TOMBSTONE~~

~~JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC~~
~~(10) (07) (05) (02) (01) (01) (06) (05) (03) (02) (05) (08)~~

(C) Upon acknowledgement of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day.
 (ER 415-1-15, 31 OCT 89)

~~(A) This provision specifies the procedure for the determination of time extensions for unusually severe weather in accordance with the CONTRACT CLAUSE, Section 00700, entitled "DEFAULT (FIXED-PRICE CONSTRUCTION)". In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:~~

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

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

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

- ~~Precipitation greater than or equal to .10 inch.~~
- ~~Minimum temperature less than or equal to 32 degrees F.~~
- ~~Maximum temperature greater than or equal to 100 degrees F.~~
- ~~Surface wind greater than or equal to 20 MPH.~~

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

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
(13)	(12)	(08)	(03)	(00)	(00)	(00)	(01)	(00)	(02)	(10)	(15)

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

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

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

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

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

ELEMENT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Precipitation												
over 0.10"	2	1	1	0	0	0	0	0	1	0	1	1
Temperature below												
32 degrees F	18	9	4	0	6	20						
Surface Wind over												
17 Knots (20MPH)	2	3	5	5	4	2	1	1	1	2	2	3

~~(C) Upon acknowledgement of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day.
(ER 415-1-15, 31 OCT 89)~~

~~1.10 EQUIPMENT DATA FORM~~

~~In conjunction with paragraph, EFARS 52.231-5000 EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE, in Section 00800, the Contractor shall furnish SPK Form 450 for all necessary equipment to perform work requiring adjustment of contract price and shall submit these forms with the modification proposals. A sample form is at the end of this section.~~

~~1.11 SPECIAL CONSTRUCTION PROCEDURES~~

~~(A) Construction coordination:~~

~~Construction coordination through the Contracting Officer will be required to reduce delays and conflicts with projects currently under construction and other future projects. Construction coordination shall be required throughout the life of this contract. The Contractor shall modify his scheduled sequence of work as required to avoid construction conflicts with ongoing construction contracts within his limits of work. Such modifications will be made monthly in a schedule review conference to be held with the Contracting Officer's Representative.~~

~~(B) Outage affecting existing facilities:~~

~~Outage affecting any existing facilities or operations will be limited and must be planned, requested and submitted to the Contracting Officer not later than the 10th of each month prior to the month during which the outage is to occur. Only approved outages will be permitted. The Contractor shall be provided with space for temporary storage of the new equipment within the job site facility, or other assigned location, in order to cut down on the installation time and possible outage time requirements.~~

~~_____ (C) The construction project area:_____~~

~~_____ The construction project area, PAVE PAWS site is under tight/restricted security. Precise procedures are required for entry and exit to and from the site and for the performance of work include the following:_____~~

~~_____ (1) Government constant surveillance and escort of Contractor's personnel is required while working at the job site._____~~

~~_____ (2) Contractor's personnel entry and exit security check to and from the job site will be required (15 - 20 minutes). The Contractor shall include in his bid a minimum of 20 minute delay for each entry and exit into the jobsite. Entry and exit will be restricted to the hours of 7:00 AM through 3:30 PM._____~~

~~_____ (3) Contractor's vehicles will be searched each time it enters or leaves the fenced area of the job site._____~~

~~_____ (4) Each Contractor's personnel must submit a letter to the Corps of Engineers Sacramento Resident Office at least three (3) days prior to scheduled access to the job site. The letter shall include the name, Social Security number, purpose for entering the project site, the date expected to enter the job site and the name of the Contractor._____~~

~~_____ (A) Work Schedule:_____~~

~~_____ Contractor will be required to perform the work required on this project within the normal hours of the workweek at Dugway Proving Ground. The workweek at Dugway Proving Ground is Monday through Thursday, with normal hours from 7:00 am to 5:30 pm. The Contractor is responsible for making an evaluation of this required four (4) day, forty (40) hour work week and include this requirement in the preparation of his bid. The Contractor's progress schedule shall reflect this requirement for a four (4) day, forty (40) hour work week. The Contractor will not be able to operate outside of normal working hours._____~~

~~_____ (B) The proposed construction location:_____~~

~~_____ The proposed construction is located at the Dugway Proving Grounds (Secure Area). Security procedures for access to the area may have a significant influence on the Contractor's method and schedule for work performance. Any or all of the following security procedures may apply to Contractor's personnel and materialmen seeking access to the project site:_____~~

- ~~_____ a. Initial and subsequent issue of access badge._____~~
- ~~_____ b. Vehicle passes and vehicle safety inspection by Army personnel._____~~
- ~~_____ c. Denial of access of certain personnel, including foreign nationals._____~~
- ~~_____ d. Attendance at safety briefings by Base prior to entering area._____~~
- ~~_____ e. Issue and maintenance of protective mask (personnel must be clean shaven to wear masks)._____~~
- ~~_____ f. Blood tests. (Red Blood Cell Acetylcholinesterase (RBC-Che)_____~~

~~tests~~

~~will be performed by the Health Clinic at a cost of \$10.00 per test, each employee shall have a minimum of 3 tests, two for a baseline and one upon exit. Contact the Chemical Surety Office for further information.)~~

- ~~g. Exchange badge procedure for access to secure area.~~
- ~~h. Inspection of vehicles and contents upon entering/departing area.~~
- ~~i. Restrictions on storage of material within secure area.~~
- ~~j. Required demobilization of construction equipment stored in secure area.~~
- ~~k. Escorts and restrictions on personnel movements in secure area.~~
- ~~l. Limitations on guard changes and unscheduled Contractor work.~~
- ~~m. Restrictions on smoking and eating in secure area.~~
- ~~m. Mandatory evacuation of area if ordered.~~
- ~~o. Additional chemical safety procedures required if storage buildings are to be opened or entered by Contractor.~~
- ~~p. Inoculations may be required for Contractor personnel.~~

~~The Contractor is responsible for making an evaluation of the above and for including reasonable costs within the bid price for normal security procedures in effect for the project location. Additional information is available from the Security Office at Dugway Proving Ground and it is strongly suggested that Contractors contact the Security Office prior to bid times.~~

~~(A) Base-wide identification of employees~~

~~The Contractor shall submit the following information on its company letterhead not less than 7 calendar days prior to the start of work on this project.~~

- ~~(1) Project Name~~
- ~~(2) Project Location~~
- ~~(3) Project start date~~
- ~~(4) Anticipated completion date~~
- ~~(5) Name, nationality, and social security number of each employee who will be working on this project.~~
- ~~(6) Registration numbers of all vehicles that will be required to enter the Base.~~

~~(C) Special requirements for entry onto the flightline~~

~~(1) In addition to Base-wide identification, personnel entering onto the flight line shall submit driver license numbers on the entry-access letter. The Contractor shall submit all vehicle license numbers which will require access to the base and flight line.~~

~~(2) All personnel who need to drive on the flight line will take the base flight line training course. The course is offered every Monday at 0800 and is approximately 2 hours long. Only those trained will be allowed to drive on the flight line. It will be the Contractor's responsibility to ensure a trained driver is available for driving on the flight line. If a trained driver is not available, vehicle will have to be~~

~~escorted at the escorts convenience. It will be the Corps of Engineers's construction managers responsibility to ensure the prime contractor informs all his subcontractors of the flight line criteria. Only vehicles with the company logo will be allowed on the flight line. Each vehicle to be driven on the flight line will require a red line badge. All vehicles requiring access onto the base will require temporary passes to allow easier daily access to the base. Only vehicles necessary for construction work will be allowed on the flight line. No private vehicles will be allowed. The contractor shall keep the number of vehicles needing access to the flight line to a minimum.~~

~~(3) The contractor shall access the flight line from either the 1200 gate (open from 6:00 am to 10:00 pm, M-F) or the contractor gate located behind 1600 (access as required). The contractor shall use the closest gate to the construction site to minimize traffic along the flight line (between 1210 and 1600). Access to the flight line at times other than normal working hours will require coordination with base security police one week prior to the requirement.~~

~~(4) For access to areas across the ramp for construction of the additional ramp area and pads, the contractor shall use only one path straight across the ramp area. This will be directly across from the 1200 gate. If necessary a road will be painted for the contractor to follow. Vehicles will not be allowed across the ramp at any other point as it has a tremendous impact on taxiing aircraft.~~

~~(5) The contractor shall have sweeper support to keep the ramp area free from foreign object damage (FOD). The area shall be swept as necessary not just on an hourly or daily basis. Any loads being driven onto the flight line shall be covered to minimize FOD. A FOD check will be a mandatory operation for base security police during the construction period.~~

~~(D) Use of fire hydrants~~

~~Any use of the fire hydrants will be coordinated one week in advance with the base fire department and airfield management.~~

~~(E) Cooperation with Others:~~

~~During the life of this contract, other Contractors will be performing operations in the general area where work under this contract is being performed. The Contractor shall cooperate with others in all respects wherever necessary for the better prosecution of the work. As far as practicable, all persons working in the vicinity shall have equal rights to the use of all transportation facilities and grounds within the limitations specified in the CONTRACT CLAUSES, Section 00700. The obligation of the Contractor under this contract shall include jointly planning and scheduling the work, on a cooperative basis, with other Contractors in order to minimize delays and interferences. The Contractor shall so arrange his operations as to not interfere with other work in progress. In case of dispute or disagreement regarding use of transportation and storage facilities and rights of access, the decision of the Contracting Officer shall govern.~~

~~_____ (F) Landfills and Disposal Verification:~~

~~_____ Prior to conclusion of the contract, receipt and approval of the Contractor's disposal submittal must be accomplished. For off-base disposal of demolition debris and hazardous waste the Contractor shall, as a minimum, submit the following to the Environmental Management Office, AFFTC/EM:_____~~

~~_____ (1) Name and address of the proposed landfill to be used for disposal of construction project demolition waste~~

~~_____ (2) Landfill class~~

~~_____ (3) Material list with quantities to be disposed at the proposed landfill~~

~~_____ (A) Borrow material~~

~~_____ Borrow material will be obtained off Base at no additional cost to the Government.~~

~~_____ (B) Clean fill site~~

~~_____ There will no longer be a clean fill dump site available on Post.~~

~~_____ (A) Temporary Fence:~~

~~_____ The Contractor shall erect and maintain a temporary site fence. The fence shall be at least a 6'-0" high chain link fence installed on metal posts. A vision inhibitor consisting of slats or other approved means, shall be installed. The fence shall be capable of withstanding wind loads of 60 m.p.h. without damage. All materials and installation are subject to approval of the Contracting Officer's Representative. The fence shall encompass the entire project site. The fence location and design shall be submitted for approval. The submittal shall provide detailed drawings and computations signed by a registered engineer. The layout will include the proposed location of access gates. Gates are to be locked at all times when the Contractor is not on site. For purposes of safety, the Contractor shall provide tagged keys to the Fort Irwin Resident Engineer's Office and the Fort Irwin Fire Department. The Contractor shall clean daily the fence perimeter, both within the fence and outside of the fence to prevent any accumulation of trash and debris adjacent to the fence. The fence will be removed upon a written notice by the Contracting Officer's Representative.~~

~~_____ (B) Contaminated soil:~~

~~_____ This project is located in a traditional non-hazardous location, the surface is unused desert environment. In the event of an encounter with contamination during construction, the following specific guidance will apply:~~

~~_____ (1) If visual evidence and/or detectable odor is encountered, construction work shall stop immediately and the Contractor shall notify~~

~~the Post Environmental Branch, extension 3740. The Directorate of Public Works (DPW) Environmental Branch will immediately perform a preliminary site investigation to include samples and analysis. Then, based on findings, will initiate clean up procedures. After clean up procedures are completed, the area will be resampled and reanalyzed to certify that the area is clean of contamination and if clean, work would be allowed to continue. The DPW Environmental Branch will certify in writing that the area is clean and construction work may continue.~~

~~_____ (a) Availability of Work Areas:~~

~~_____ When applicable, phasing of the work will be coordinated with the Contracting Officer or his duly authorized representative, who will determine availability of areas for stockpiling of materials, ingress/egress to/from site, and the specific location where the work is to be performed. The Contractor shall restrict himself and his employees to the immediate area wherein the work required under this contract is to be accomplished. For airfield projects, each day prior to commencing work, the Contractor shall notify Base Operations, phone No. 655-4401, number of personnel, equipment, and vehicles that will be working on airfield runway and shoulder.~~

~~_____ (b) Operational Readiness Inspection and Practice Exercise Occurrences:~~

~~_____ At any time during the construction period, one or more Operational Readiness Inspection (ORI) and/or practice exercise may be held at March Air Force Base. If the Contractor and his personnel are in the area involved, they will be controlled in accordance with standard security procedures and may be required to cease work in the affected area. The maximum duration of an ORI is 7 calendar days while that of a practice exercise is 2 calendar days. The Contractor shall have no claim for damages for any such cause or delay, but shall be entitled to such extension of the time herein specified for the completion of the work as the Contracting Officer shall determine to be just and proper, provided, however, that such claim for such extension of time is made by the Contractor in writing to the Contracting Officer within one week from the time when any such cause for delay occurs.~~

~~_____ (c) Normal Working Hours:~~

~~_____ The normal working hours will be established at the pre-construction conference. Any desired deviations from the schedule established at the pre-construction conference will require a written request to the Resident Engineer or the Contracting Officer Representative two (2) weeks in advance of the desired deviation.~~

~~_____ (A) Material Exported from McClellan AFB:~~

~~_____ (1) General: All material to be exported from McClellan AFB shall be accompanied by a Refuse Material Transportation Permit. All unsatisfactory, unstable, and surplus satisfactory material produced during construction shall be disposed of on base in designated spoil areas on the~~

~~north end of the base. Construction debris such as concrete and asphalt rubble, wood, organic material or other trash shall be removed off the Government reservation. Spoil disposed of on base shall be clean of all material to be removed from the base.~~

~~(2) Determination of Contamination: Prior to award of the contract, the Air Force will have determined if there are any contaminated soils at the site and disposed of those found. If any materials are found during construction which appear to be contaminated, the Contracting Officer shall be notified immediately. The materials will be sampled and tested by the Air Force before further work in the area. The Contractor shall work in other areas while the questioned material is examined and tested. If material is determined to be contaminated, disposal methods shall be determined at that time. If material is determined to be uncontaminated, it will be disposed of per the contract requirements.~~

~~(3) Transportation and Exit Permit: All vehicles leaving the base with disposal material require a Refuse Material Transportation Permit. The permits will be completed by the quality control representative. The Contracting Officer will provide the permits to the quality control representative for each vehicle on an as need basis. The Contractor shall insure that each vehicle has a transportation and exit permit for each load.~~

~~(B) Pass and Identification Procedure:~~

~~The Contractor shall be responsible for the administration, monitoring and issuance of identification badges to his employees. Badges shall be typed and logged by the Contractor prior to signing by the Corps and photo lamination by the Security Police. Forms and instruction will be provided by the Resident Office. Expired or otherwise invalid badges shall be returned to the Corps of Engineers. Retained percentage will be held for unsecured or unreturned ID badges.~~

~~(C) Quiet Hours:~~

~~(1) To accommodate ceremonial events on the installation, the Contractor shall observe designated Quiet Hours as directed by the Contracting Officer.~~

~~(2) During designated Quiet Hours, all vehicle, construction, and clean-up activities shall cease and work site shall be quiet. Exceptions may be permitted on a case-by-case basis for quiet, non-disruptive work in areas remote from ceremonial events, but only as specifically permitted in advance by the Contracting Officer.~~

~~(3) The Contractor will be given two weeks prior notice of designated Quiet Hours. Anticipated frequency and duration of Quiet Hours is approximately once a month for approximately two hours.~~

~~(D) Trenches and Excavations:~~

~~(1) Trenches or excavations shall be backfilled, compacted and finished to existing grade with final surface material within forty-eight~~

~~(48) hours of starting to trench or excavate.~~

~~(2) If Contractor's operation requires a longer period of time, a waiver request stating the hours or days actually needed to complete the work must be filed by letter to the Contracting Officer. The letter must state the Contract Number, name of the Contractor, location and size of opening, time needed to complete the work, proposed start date and signed by the Contractor.~~

~~(3) This requirement is not meant to limit the Contractor's necessary work schedule or operations, but to emphasize and enforce the need to minimize the time excavations and trenches are left open. The Contracting Officer will approve all waiver requests if the time requested is "reasonable". If the time is considered unreasonable, the Contractor will be asked to re-evaluate and revise his request.~~

~~(4) Each separate excavation and trench system will require individual waivers (i.e., trenching and excavating work in different work sites of the base or time period requirements, but under the same contract.~~

~~(5) No trench or hole shall be left open overnight, over weekends or days when no construction is taking place, without protection with either traffic weight covers or barriers approved by the Contracting Officer.~~

~~(E) Work Requirements:~~

~~(1) No equipment or vehicles shall be left on the streets, outside the Contractor's fenced area, or blocking sidewalks during off-work time. No parking will be allowed on landscaped grounds.~~

~~(2) Material or equipment approved to be left on the roof shall be secured in a manner that will insure protection of Government personnel and property in the event of wind or rain storm or other similar circumstances.~~

~~(3) No roofing material will be allowed on the site except that which can be installed within that day's work schedule. All other material shall be stored at the Contractor's, Contracting Officer approved, storage lot.~~

~~(4) Contractor shall provide non-combustible or self-extinguishing material drop cloths to isolate areas exposed to dust, debris or noise, or to cover material storage during construction in building interiors.~~

~~(5) Contractor shall take necessary care to ensure inclement weather does not damage Government property and shall schedule work so as to minimize its impact on progress of the work.~~

~~(6) No work will be permitted overhead of Government personnel unless barriers and guarding devices are used that meet the Contracting Officer's approval.~~

~~_____ (F) Existing Equipment/Property:~~

~~_____ (1) Protective Coverings/Enclosures: Provide protective coverings and cover any Government equipment/property in the work area during construction (i.e. desks, computers, tables, chairs, carpet, etc.). At the end of each work day, the Contractor shall protect all entrances and/or exterior openings to the work area from inclement weather. Proposed protection methods shall be submitted to the Contracting Officer for approval.~~

~~_____ (2) Protect building wall surfaces and sidewalls from staining with roofing bitumen, sealants or other construction activities. If inadvertent soiling or marking is done it shall be cleaned and restored (or recoated) prior to the end of the day unless otherwise approved by the Contracting Officer.~~

~~_____ (3) Removal and Replacement Responsibility: Replace or repair all existing finished surfaces, utilities, equipment, products, vegetation, and structures or parts thereof that have been damaged, or have had to be removed, or cut into by the Contractor in order to perform work specified in this project.~~

~~_____ (G) Grounds Protection:~~

~~_____ (1) No parking or driving of vehicles or equipment, or storage of material will be permitted on grass or landscaped areas without the approval of the Contracting Officer.~~

~~_____ (2) Any grass or landscaped areas damaged by the Contractor shall be immediately repaired or replaced to their original condition as determined by the Contracting Officer. Grass areas shall be repaired with acceptable grass sod material. Broadcast seeding will not be allowed.~~

~~_____ (A) Contractor Yard Site:~~

~~_____ This paragraph specifies limited Contractor use of federal property for yard and office. Requirements are as follows:~~

~~_____ (1) Directorate of Engineering and Housing (DEH) Fort Ord will designate land area and facilities that may be used by Contractor for yard, office, and storage space.~~

~~_____ (1) Director of Facility Engineering (DFE) Camp Roberts will designate land area and facilities that may be used by Contractor for yard, office, and storage space.~~

~~_____ (2) The site and facilities provided to the Contractor shall be used only in connection with the contract and only for the term of the contract.~~

~~_____ (3) Contractor shall not permit vehicles or trailers to remain on the site outside of normal working hours, and shall not allow facilities on the site to be used as temporary residences.~~

~~_____ (4) Contractor may construct temporary structures or park office trailers on the site.~~

~~_____ (5) Site shall be maintained in a clean condition; trash and debris shall not be permitted.~~

~~_____ (6) Site and facilities shall be returned to (DEH) (DFE) in satisfactory condition before transfer of construction, unless prior arrangement has been made.~~

~~_____ (A) Haul Route Cleanup:_____~~

~~_____ The Contractor shall clean, sweep, or pick up, as necessary, mud, rocks, trash, or any other type of debris spilled along haul routes, immediately after passage. Cleanup shall be performed to the satisfaction of the Contracting Officer.~~

~~_____ (B) Tree Relocation:_____~~

~~_____ Trees, plants, shrubs, etc., designated for salvage shall be carefully removed and replanted at locations on Nellis AFB as shown on the drawings. Excavation shall be accomplished so as to avoid unnecessary damage to roots, limbs and foliage, and the plant shall be maintained in good condition until replanted in its new location.~~

~~_____ (C) Pavement Excavation:_____~~

~~_____ The Contractor shall notify the Contracting Officer of the starting date, location, and scope of any cutting and removal of pavement. The Contractor shall also report the length of time necessary to complete the work, replace the pavement and make the parking lot or street fully operational. When pavement excavation will be continuous for more than 5 days, the schedule of work for each day shall be submitted. The daily schedule shall be updated as necessary by each Monday if total duration is greater than 5 working days. The notification will be in writing and submitted to the Contracting Officer for approval at least 7 work days prior to the start of work.~~

~~_____ (A) General:_____~~

~~_____ All family housing quarters will be occupied during the period of performance of this contract. The following scheduling and notice giving procedures will be required during this contract in order to provide the Contractor with scheduled access to the quarters with a minimum of delays and a minimum disruption to the occupants.~~

~~_____ (B) Scheduling Requirements:_____~~

~~_____ The Contractor shall prepare a schedule to insure that building occupants are notified that work will be performed in their quarters and that the occupants are to be home when the work is done. This schedule will also be used to insure that work is performed on the date that is provided to the occupants. This schedule is in addition to other schedules required by other sections of these specifications. The schedule shall be~~

~~substantially similar to the sample included herein. This schedule shall show work for the next four weeks and it shall be revised and submitted weekly. A copy of this schedule shall be delivered to the Contracting Officer and the housing area mayor. The address of the housing area mayor will be provided by the Contracting Officer.~~

~~_____ (C) Notice Requirements:_____~~

~~_____ The Contractor shall post a notice on the door of each quarters, 14 to 21 days prior to doing work in the quarters. This notice will be in the form of a letter with blank spaces that the Contractor will fill in for quarters number, date work will be done, date notice is posted and other pertinent information. An original of this letter will be supplied by the Contracting Officer for reproduction by the Contractor. A copy of the notice as delivered to the occupant shall be provided at the same time to the Contracting Officer and to the housing area mayor.~~

~~_____ (D) Bidding Information:_____~~

~~_____ For the purposes of bidding and scheduling, assume that 10% of the quarters will have to be rescheduled due to the occupants not being home on the scheduled date. No adjustments in contract time or amount will be made until that number of units have been rescheduled.~~

~~_____ (E) Schedule Maintenance:_____~~

~~_____ All reasonable efforts must be made to perform the work on the exact date given in the posted notice to the occupant. Reasonable efforts include, but are not limited to the use of extra crews and extra supervisors, overtime work, air freight of materials and similar measures to insure on time performance.~~

~~_____ (1) Contractor Caused Delays: If work in any quarters cannot be performed on the date given in the notice to the occupant because of acts of the Contractor, such as over optimistic scheduling, material or labor shortages, etc., a notice of delay shall be delivered to the occupant and to the Contracting Officer as soon as the delay becomes known. A revised work date must be approved by the Contracting Officer before a revised notice containing the new work date is delivered to the occupant and the housing area mayor and the Contracting Officer. The revised work start date must be 14 to 21 days after the revised notice is delivered.~~

~~_____ (2) Other Delays: If work in any quarters cannot be performed on the date given in the notice to the occupant because of reasons other than acts of the Contractors, such as occupant not being home, differing site conditions substantially slowing the work, etc., the Contracting Officer shall be notified so that a new work date can be established.~~

~~_____ (F) Other Requirements:_____~~

~~_____ (1) Name Card: Upon completion of the work and final cleanup in each quarters, the workmen shall leave with the occupant a card containing the name(s) of the workmen, who performed the work in that unit.~~

~~(2) Identification Requirements: The Contractor shall provide a identification card for each employee bearing an easily recognizable photograph of the employee, the Contractor's name and the workman's name. Names shall be at least as large as standard typewriter printing. The workman's hard hats shall bear the name or insignia of the Contractor. The ID card shall be prominently displayed at all times when work is being performed.~~

~~(3) Employee Listing: The Contractor shall furnish to the Contracting Officer a list of all workmen, who will be performing work inside any quarters. The Contracting Officer will provide to the Contractor a temporary letter of identification for each worker. No workmen will be allowed into any quarters whose name is not on the list given to the Contracting Officer.~~

~~(4) Availability of Quarters: Ten percent of the total number of buildings in each area will be made available upon receipt of notice to proceed. Thereafter they will be available on a one for one basis. When a completed building has a final inspection and acceptance, the next building will be made available. More buildings may be made available, if the Contractor's performance indicates that the units can be consistently completed in a timely manner in accordance with the Scheduling Requirements, Notice Requirements and Completion of Units paragraphs contained herein.~~

~~(5) Completion of Units: No payment will be made for partially completed quarters. Once work has begun in any quarters, work shall be performed in a diligent and uninterrupted manner until completed. Multiple entries into the same quarters shall be kept to a minimum and will be permitted only by the Contracting Officers approval. Maintenance of adequate supplies of available materials and labor to complete all work in any single quarters during one entry period is a Quality Control requirement.~~

~~(6) Clean-Up: Quarters shall be left in a vacuum clean condition in the area where work was done. Contractor caused debris shall be removed from the quarters and disposed of properly. Use of quarters restrooms is not permitted.~~

~~*** DDRW - SHARPE SITE ***~~

~~(A) Contractor - Visitor Badges~~

~~(1) Contractors will apply for badges at the Security Operations Pass & ID Office, Building S-108, Sharpe Facility. Contractors may be required to submit Security Form DD 3988-2, National Agency Questionnaire (NAQ), for all proposed superintendents and/or foremen, at least one week prior to initiation of work and prior to badges being issued. This form may be obtained at the Pass & ID Office. When applying for a badge, contractor and subcontractor, personnel must present a drivers license or another identification card with a photograph, and a copy of the contract. Badges will be issued to and worn by supervisors and/or foreman who will be responsible for the conduct of their crew while on DDRW San Joaquin Facilities (Sharpe and Tracy).~~

~~_____ (2) A minimum of one week prior to entry and initiation of work on San Joaquin Facilities, the Prime Contractor shall submit a list of all prime and subcontractor employees including any other personnel required to perform work on San Joaquin Facilities during the contract performance period. The list is to be submitted to both the Contracting Officer Representative (COR), and to the Security Office, Building 1A, for construction at the Tracy Facility. If personnel are added or changed during the contract performance period, a revised list is to be submitted prior to any new employees' arrival for work at San Joaquin Facilities, Security may refuse entry to employees not on the employee list.~~

~~_____ (3) Badges will be issued for the contract performance period. A check will be made periodically by Security on the status of these badges. Normally, on projects longer than one month, a badge will be issued to the Prime Contractor's superintendents or foreman. Normally, on projects of one month or less, a badge will be issued only to the Prime Contractor's superintendent. The Security Office may approve additional badges on service contracts and on particularly large or complex construction projects.~~

~~_____ (4) All Prime Contractor and subcontractor employees will be required to sign in the first day at Pass & ID Office (Building 1A at Tracy). During the contract performance period, a contractor employee with a badge will be required to escort employees without badges between the gate and the project site.~~

~~_____ (5) Suppliers, vendors, or other one-time or occasional visitors do not need to be escorted to the project site; however, a contractor employee with a badge must notify the Security Officer at the gate. Notification will be done on the day of the visit, and include the name of the company and the nature of the visit. Security may refuse entry without this notification.~~

~~_____ (6) All expired or unnecessary badges will be returned to the issuing office. The Contractor agrees to pay a replacement fee of \$22.00 for each badge not returned.~~

~~_____~~
***** SIERRA *****

~~_____ (A) Contractors by virtue of contract award will be given access privileges to Sierra Army Depot (SIAD). Contractors/sub-contractors are required to provide the Security Division, through the Corps of Engineers, Sierra, a letter of introduction identifying all company personnel who will be working at SIAD by complete name, address, and Social Security number, date and place of birth, citizenship, and Resident Alien Number (if applicable). Depot access badges will be issued at the Security Division, Building P-100.~~

~~_____ (1) Each member of the Contractor's work force shall be individually badged at the Depot Identification Office. The badge shall be retained by the Contractor's employee throughout the contract period.~~

~~_____ (2) Contractor is responsible for the turn-in of all security~~

~~badges, e.g., completion of contract, termination of employee, etc.~~

~~_____ (3) Report lost badges to the Pass and ID section, DLES phone number 4108 as soon as the loss is discovered.~~

~~_____ (4) Be prepared to produce security badges each time entering a security area. Temporary badge for any individual who may have forgotten his/her badge can be obtained from the Identification/Registration Section.~~

~~_____ (B) Traffic Enforcement:~~

~~_____ (1) Traffic laws are enforced by the Security Division using state codes. All roads/streets have speed limit signs posted.~~

~~_____ (2) Violations are adjudicated by the U.S. Magistrate. Court appearances may be requested or mandatory.~~

~~_____ (3) Radar is used to enforce traffic speed limits.~~

~~_____ (C) Work Schedule:~~

~~_____ Work must be accomplished between the hours of 6:30 A.M. and 5:00 P.M., Monday through Thursday, except Federal holidays. Prior to the beginning of work, the Contractor shall present to the Contracting Officer or his authorized representative, his proposed schedule of work. A written work schedule shall be submitted to maintain an accurate 2 week task plan. The schedule shall be updated weekly to maintain the 2 week task plan. The work schedule will be approved by the government as part of the scheduling process. This work schedule shall be strictly adhered to. The work schedule shall be in the form of a GANNT chart or equivalent, including dates and locations of work to be performed.~~

~~_____ Delays or temporary suspension of work resulting from adherence to the 2 week task plan shall be borne by the contractor at no additional cost to the Government.~~

~~_____ (1) Construction personnel who must temporarily be near Potential Explosive Sites (PESS) to perform their job will be provided the maximum practical protection from the effects of possible explosion. Workers in the vicinity of active PESS should be provided with at least Public Traffic Route (PTR) distance protection. Workers may be exposed to static ammunition storage or other PESS at distances less than PTR provided that no operations are permitted at the PES while the construction workers are present.~~

~~_____ If workers must be exposed to active PESS at less than PTR distance, the MACOM will approve control measures implemented to minimize the chance of an explosion occurring. Documentation showing the rationale for control measure taken will be maintained until operations have been completed and workers have permanently vacated the work site.~~

~~_____ All Contractor Work scheduled in the ammunition area at SIAD must be coordinated with points of contact between the Corps of Engineers, the Directorate of Ammunition Operations and the Directorate of Public Works;~~

~~Engineering Plans and Services Division of Sierra Army Depot. This will minimize work stoppage in the ammunition operations areas.~~

~~_____ (D) Vehicles entering restricted areas on the Depot, whether Contractor-owned or privately-owned, shall undergo inspections for safety and will be issued a pass. Vehicle permits will be issued for up to 45 days maximum. Each vehicle will be required to carry a fire extinguisher at all times.~~

~~_____ (1) Company or privately-owned vehicles, when parked, must have ignition keys removed. After duty hours, vehicles left on the Depot will be parked outside restricted areas and properly secured or immobilized.~~

~~_____ (2) Contractor is solely responsible for the removal of incapacitated vehicles or equipment from restricted areas.~~

~~*** FOR MAGAZINE AREA ONLY ***~~

~~_____ (E) Additional Security Requirements for the Secure Area:~~

~~_____ (1) All personnel granted access to the Magazine Area will have to be under authorized escort at all times during the performance of their work, except those individuals who have been determined to be trustworthy as a result of the favorable completion of a NAC (or ENTNAC). Each time Contractor vehicles enter or leave these areas, they will be subject to delays due to security procedures inclusive of a search.~~

~~_____ (2) All Contractor/subcontractor personnel vehicles must be escorted by Security between the entrance of the Magazine Area and the construction site. Escorts will remain at the construction site. The Contractor may expect about a 1 hour delay per day.~~

~~_____ (3) Company vehicles requiring access into the Magazine Area or other restricted area must first be inspected by Quality Assurance. Approvals will be annotated on the vehicle pass. All vehicles must be escorted by Security.~~

~~*** TOOELE AD, UT ***~~

~~_____ (A) Work Schedule:~~

~~_____ (1) The Contractor shall perform the work required on this project within the normal hours of the work week at Tooele Army Depot. The work week at Tooele Army Depot is Monday through Thursday, with normal hours from 6:30 am to 5:00 pm. The Contractor is responsible for making an evaluation of this required four (4) day, forty (40) hour work week and include this requirement in the preparation of his bid/offer. The Contractor's progress schedule shall reflect this requirement for a four (4) day, forty (40) hour work week. Any work that the Contractor wishes to perform outside of these hours must have prior approval from the Contracting Officer's Representative. The Contractor shall obtain this approval by submitting a written request to the Contracting Officer's Representative no later than seven (7) working days in advance of the dates requested by the Contractor.~~

~~_____ (2) The Communications Office shall be notified at least 24 hours before excavation activities are started. The Contractor shall make sure all lines are located before excavation commences.~~

~~_____ (3) Construction vehicles entering the Depot shall pass a safety inspection.~~

~~_____ (4) Vehicles entering the Depot shall be insured and licensed.~~

~~_____ (5) Admittance to the Work Site: The Contractor is solely responsible for all acts committed by persons admitted to the Government work site at the request of the Contractor.~~

~~*** USE FOR NON-SECURE AREA (NORTH AREA) ***~~

~~_____ (B) Security Procedures:~~

~~_____ (1) All Contractor employees shall be U.S. citizens.~~

~~_____ (2) Foreign Nationals: Army regulations prohibit foreign nationals from entering Army installations without prior written approval from the installation's commander. Requests for foreign national employees to enter the depot shall be submitted for approval to the Director of Law Enforcement and Security at least 14 days prior to the desired date of employment. Such requests shall be fully justified and will be considered on a case-by-case basis.~~

~~_____ (3) Initial and subsequent issuance of access badge for all Contractor personnel.~~

~~_____ (4) Citations can be issued by Depot security guards. Violators may have to appear in magistrate court in answer to a citation.~~

~~_____ (5) Drivers shall carry a valid driver's license.~~

~~_____ (6) Equipment: All mobile equipment (e.g., trucks, forklifts) shall be secured after normal duty hours. Commercial type vehicles shall have the ignition key removed and the doors locked and windows rolled up.~~

~~_____ (7) Property Pass: Contractor/subcontractor personnel hauling material/equipment into or out of Tooele Army Depot shall have in their possession a valid DA Form 1818, Individual Property Pass, signed by an authorized representative of Facilities Engineering Division or the Tooele Army Depot supervisor assigned to the project. Incoming material listed on a purchase order from the Contractor will be sufficient to allow the material onto the depot.~~

~~_____ (8) Vehicle/Package Inspection Program: All vehicles/packages entering onto, within the confines of, or departing Tooele Army Depot are subject to inspection by authorized security personnel.~~

~~_____ (9) Any questions pertaining to security operations/regulations should be directed to Mr. Warren Stewart or Ms. Nicole Higgins, Ext.~~

~~2559/2568.~~

~~*** USE FOR SECURE AREA (SOUTH AREA) ONLY ***~~

~~(B) Security Procedures:-~~

~~The proposed construction is located at the Tooele Army Depot, South Area. Security procedures for access to the area may have a significant influence on the Contractor's method and schedule for work performance. Any or all of the following security procedures may apply to Contractor's personnel and materialmen seeking access to the project site:~~

- ~~a. Initial and subsequent issue of access badge.~~
- ~~b. Vehicle passes and vehicle safety inspection by Army personnel.~~
- ~~c. Denial of access of certain personnel, including foreign nationals.~~
- ~~d. Attendance at safety briefings by Base prior to entering area.~~
- ~~e. Issue and maintenance of protective mask.~~
- ~~f. Blood tests.~~
- ~~g. Exchange badge procedure for access to exclusion area.~~
- ~~h. Inspection of vehicles and contents upon entering/departing area.~~
- ~~i. Restrictions on storage of material within exclusion area.~~
- ~~j. Required demobilization of construction equipment stored in exclusion area.~~
- ~~k. Escorts and restrictions on personnel movements in exclusion area.~~
- ~~l. Limitations on guard changes and unscheduled Contractor work.~~
- ~~m. Restrictions on smoking and eating in exclusion area.~~
- ~~n. Mandatory evacuation of area if ordered.~~
- ~~o. Additional chemical safety procedures required if storage buildings are to be opened or entered by Contractor.~~

~~The Contractor is responsible for making an evaluation of the above and for including reasonable costs within the bid/offer price for normal security procedures in effect for the project location. Additional information is available from the Security Office at Tooele Army Depot and it is strongly suggested that Contractors contact the Security Office prior to bid/offer times.~~

~~*** DDRW - TRACY SITE ***~~

~~(A) Contractor - Visitor Badges~~

~~(1) Contractors will apply for badges at the Security Operations Pass & ID Office, Tracy Facility. Contractors may be required to submit Security Form DD 3988-2, National Agency Questionnaire (NAQ), for all proposed superintendents and/or foremen, at least one week prior to initiation of work and prior to badges being issued. This form may be obtained at the Pass & ID Office. When applying for a badge, contractor and subcontractor, personnel must present a drivers license or another identification card with a photograph, and a copy of the contract. Badges will be issued to and worn by supervisors and/or foreman who will be responsible for the conduct of their crew while on DDRW San Joaquin Facilities (Sharpe and Tracy).~~

~~_____ (2) A minimum of one week prior to entry and initiation of work on San Joaquin Facilities, the Prime Contractor shall submit a list of all prime and subcontractor employees including any other personnel required to perform work on San Joaquin Facilities during the contract performance period. The list is to be submitted to both the Contracting Officer Representative (COR), and to the Security Office, Building 1A, for construction at the Tracy Facility. If personnel are added or changed during the contract performance period, a revised list is to be submitted prior to any new employees' arrival for work at San Joaquin Facilities, Security may refuse entry to employees not on the employee list.~~

~~_____ (3) Badges will be issued for the contract performance period. A check will be made periodically by Security on the status of these badges. Normally, on projects longer than one month, a badge will be issued to the Prime Contractor's superintendents or foreman. Normally, on projects of one month or less, a badge will be issued only to the Prime Contractor's superintendent. The Security Office may approve additional badges on service contracts and on particularly large or complex construction projects.~~

~~_____ (4) All Prime Contractor and subcontractor employees will be required to sign in the first day at Pass & ID Office (Building 1A at Tracy). During the contract performance period, a contractor employee with a badge will be required to escort employees without badges between the gate and the project site.~~

~~_____ (5) Suppliers, vendors, or other one-time or occasional visitors do not need to be escorted to the project site; however, a contractor employee with a badge must notify the Security Officer at the gate. Notification will be done on the day of the visit, and include the name of the company and the nature of the visit. Security may refuse entry without this notification.~~

~~_____ (6) All expired or unnecessary badges will be returned to the issuing office. The Contractor agrees to pay a replacement fee of \$22.00 for each badge not returned.~~

~~*** TRAVIS AFB - PARAGRAPH MAY NEED EDITING ***~~

~~_____ (A) Base Regulations:_____~~

~~_____ (1) The Contractor shall conform to all Base Regulations and directives (as specifically identified at the pre-performance conference) that pertain to security, safety, traffic, fire, and personnel clearance, insofar as they apply to the Contractor's activities.~~

~~_____ (2) All Contractor/subcontractor personnel vehicles must be escorted by Security between the entrance of base, across the flight line, to the construction site. The Contractor may expect about a 1 hour delay per day.~~

~~_____ (B) Equipment List, Warranty Stickers and Maintenance Manuals:_____~~

~~1. For each equipment item installed under this contract, the Contractor shall affix a properly filled out Equipment Warranty Sticker (EWS), Optional Form 274. The Government will provide the blank EWS to the Contractor. In addition, the Contractor shall provide an equipment listing for all installed equipment. The listing shall be sequentially numbered and, as minimum, contain the following information for each equipment item: type/description, date installed, date warranty expires, installed location, manufacturer, model number, serial number, Hp, volts and amps.~~

~~2. Equipment list, warranty stickers, and maintenance manuals shall be provided and approved prior to final acceptance of work under this contract.~~

~~(C) Contractor's Storage Area: At the time of contract award, the Government will assign an outside area to the Contractor for the storage of his supplies and equipment. The Contractor shall be responsible for his own security and weatherproofing. Missing or damaged material shall be replaced by the Contractor at no additional cost to the Government. At the completion of the contract:~~

~~1. All temporary fences and structures that the Contractor uses to protect his materials shall be removed.~~

~~2. The storage area shall be cleaned of all debris and demolition material and repaired as required to bring the site back to its original condition.~~

~~(D) Demolition, Removal, and Excess Materials: All materials, equipment, and refuse generated through the demolition work required by this contract shall become the property of the Contractor and shall be disposed of by the Contractor off base at the Contractor's expense unless specifically listed otherwise in the demolition section of the specifications. The Contractor shall be aware that within the confines of Fairfield, California, including Travis AFB, if the contractor subcontracts for the removal of debris/refuse that the City of Fairfield has an exclusive franchise agreement with Solano Garbage Company (707) 422-4244, to perform such service.~~

~~*** VANDENBERG AFB ***~~

~~(A) Security.~~

~~(1) The Contractor shall obtain all passes, badges, decals, or other identification media required for security clearance to areas where work is performed. Obtain vehicle and individual identification media at the Pass and Registration Section, Building 11032, 6-1853. Identification media shall be surrendered to the Pass and Registration Section upon termination of the Contract, or termination of an individual's employment with the Contractor.~~

~~*** RETAIN THE NEXT PARAGRAPH IF THE WORK IS IN A MILITARY RESTRICTED OR CONTROLLED AREA REQUIRING THE CONTRACTOR TO OBTAIN ESCORTS WITH THE APPROPRIATE CLEARANCE. ***~~

~~(2) The work to be performed is in a military restricted or controlled area. The Contractor must comply with the entry control policies for the area. The Contractor and its employees are required to have at least a SECRET personnel security clearance. In the event the Contractor cannot comply with the investigative or clearance requirement, it is the responsibility of the Contractor to obtain escort officials who are authorized unescorted entry to the work area. It is also the Contractor's responsibility to coordinate with the area Office of Primary Responsibility (OPR) at least 5 work days prior to start of Contract performance. For information on security services, contact 30 SPW/SP, 6-9011. The Contractor shall provide enough escort officials for uninterrupted visual surveillance (within 50 feet) of all individuals not having required security clearance performing work as part of the Contract.~~

~~(B) Use or travel of vehicle or heavy equipment on location outside the project limits shown on the drawings is prohibited.~~

~~(C) Internal combustion engines:~~

~~All internal combustion engines other than engines equipped with turbochargers or pollution control catalytic converters, which are operated in off-road conditions, shall be equipped with U.S. Forest Service approved spark arresters.~~

~~*** USUALLY FOR S. VANDENBERG SLC-6 AREA, WHEN REQUESTED BY TM ***~~

~~(D) 72 Hour/11 day Scheduling Requirements:~~

~~(1) The Contractor shall participate in the 72 hour/11 day scheduling meeting held at 0800 each day at the Ready Building, Space Launch Complex 6. The meeting discusses in detail (hour by hour) specific work activities by each of the several on-site Contractors within each facility at Space Launch Complex 6 for the next 72 hours. Work activities on a shift basis are discussed for the next 11 days, 4th through 14th day.~~

~~(2) The Contractor shall present his detailed work schedule to include the location of the activity, the number of personnel involved, special equipment being utilized, special safety considerations, and any access or work constraints onto others at these meetings. Accurate advance planning is paramount to increase the probability of priority of work access. The Government cannot guarantee access to the work site to the Contractor; however, every effort shall be made to assure that a fair and reasonable decision is arrived at whenever the Contractor's schedule conflicts with the requirements of other on-site Contractors.~~

~~(E) Cooperation with Others:~~

~~During the life of this contract, other Contractors will be performing operations in the general area where work under this contract is being performed. The Contractor shall cooperate with others in all respects wherever necessary for the better prosecution of the work. As far as practicable, all persons working in the vicinity shall have equal rights to the use of all transportation facilities and grounds within the limitations specified in the CONTRACT CLAUSES. The obligation of the~~

~~Contractor under this contract shall include jointly planning and scheduling the work, on a cooperative basis, with other Contractors in order to minimize delays and interferences. The Contractor shall so arrange his operations as to not interfere with other work in progress. In case of dispute or disagreement regarding use of transportation and storage facilities and rights of access, the decision of the Contracting Officer shall govern.~~

~~*** YUMA PROVING GROUND ***~~

~~1.12 MANDATORY WORK STOPPAGES~~

~~(A) A mandatory work stoppage occurs whenever the Contractor is restricted from working a full workday and is unable to reallocate work forces to other locations. All costs associated with five mandatory work stoppages must be included in the bid price. No additional compensation or extension to the Contract performance period will be given as a result of five mandatory work stoppages.~~

~~(1) In the event that the Contractor's work force is required to evacuate any part of the working area during working hours established by the Contractor for this contract, the Government will then make an adjustment under the clause entitled, FAR 52.212-12 SUSPENSION OF WORK, see Section 00700. The Government's liability will be considered to be limited to reimbursement for loss of time of Contractor's employees and equipment which otherwise would have been employed on the job. The completion time for any part of the work will not be extended if the total number of working hours of work stoppage does not exceed 0.8 times the number of calendar days in the period between the date of notice to proceed and the specified completion date. In the event the Contractor is required to evacuate the area in excess of the time specified above, the completion times will be adjusted.~~

~~(B) The Contractor may be required, without advance notice, to move work to a different location. The Contractor shall be prepared to increase or decrease his work forces with appropriate trades to perform work in the relocated work areas at no additional cost to the Government.~~

~~(C) The Contractor shall notify the Contracting Officer when a mandatory work stoppage occurs for recording purposes. Otherwise, the work stoppage will not be credited to the Contractor.~~

~~1.13 SOIL DENSITY TEST (USING METERS CONTAINING RADIOACTIVE MATERIALS)~~

~~*** AIR FORCE ONLY EXCEPT VANDENBERG ***~~

~~Nuclear methods are not acceptable for soil and soil-aggregate density tests required by this contract except as stated in DIVISION 2. Testing for official results shall be conducted as specified in DIVISION 2 of this contract. If the Contractor proposes to use meters containing radioactive materials to obtain unofficial results for his own convenience, the Contractor shall adhere to the following requirements:~~

~~_____ (A) A USAF Radioactive Material Permit shall be obtained prior to work being performed.~~

~~_____ (B) The Contractor shall contact the installation Radiation Protection Officer (RPO) at least 45 days prior to intended use so adequate time is provided for processing the paperwork and obtaining the USAF Radioactive Material Permit.~~

~~_____ (C) The Contractor shall notify the RPO before bringing the radioactive material onto the installation and must notify the RPO when radioactive material is removed. The Contractor shall ensure that the RPO, installation fire department, and safety office know the locations where the material will be stored and used.~~

~~_____ (D) The Contractor shall comply with the requirements of his/her NRC or Agreement State license and the USAF Radioactive Material Permit.~~

~~_____ (E) The Installation RPO will periodically check the use of the radioactive material to ensure proper radiological health precautions are being followed. If the RPO discovers improper radiological procedures, the RPO will immediately notify the contract monitor to initiate corrective actions.~~

~~_____ (F) Applications for USAF Radioactive Material Permits are submitted as follows:~~

~~_____ (1) All applications for permits shall be submitted to host base RPO for review and approval of qualified users to work on Air Force installations.~~

~~_____ (2) Requests will be submitted in duplicate to RPO and will include:~~

~~_____ a. Evidence of a valid Nuclear Regulatory Commission (NRC) or Agreement State Radioactive Material License.~~

~~_____ b. A copy of an NRC Form 241, or a similar document (such as a letter), listing the specific licensable items the Contractor wishes to use on the base (in the case of an Agreement State licensee, the original must be forwarded by the Contractor to the appropriate NRC region).~~

~~_____ c. Proof of a valid Air Force contract.~~

~~_____ (3) Non-Air Force organizations which possess Agreement State licenses must forward an NRC Form 241 directly to the applicable NRC regional office as well as to the committee (Reference Title 10, Code of Federal Regulations, Part 150.20). Agreement State licenses are valid for only 180 calendar days per calendar year. If the non-Air Force organization that possesses the Agreement State license wishes to conduct operations on the Air Force installation for more than 180 days per year, it must apply for and be issued an NRC license before a permit may be issued.~~

~~_____ (G) Renewal or termination of a USAF Radioactive Material Permit is processed as follows:~~

~~_____ (1) Non-Air Force organizations must formally apply for either a renewal or termination of their permit upon its expiration. Permits do not automatically terminate upon reaching their expiration date but remain active pending final disposition of the radioactive material.~~

~~_____ (2) If the original contract is renewed or continued, then an application for renewal must contain the same information as the initial request.~~

~~_____ (3) If work under the contract has been completed, the non-Air Force organization shall submit a formal application to terminate the permit. This application shall include appropriate disposal documents and radiation survey data to confirm that the radioactive materials have been removed from the installation. (AFR 161-16)~~

~~*** ARMY PROJECTS ONLY ***~~

~~_____ (A) Nuclear methods are not acceptable for soil and soil-aggregate density tests required by this contract except as stated in DIVISION 2. Testing for official results shall be conducted as specified in DIVISION 2 of this contract. If the Contractor proposes to use meters containing radioactive materials to obtain unofficial results for his own convenience, the Contractor shall adhere to the following requirements:~~

~~_____ (B) In accordance with 06.E of EM 385-1-1, Safety and Health Requirements Manual, the Contractor shall obtain a service permit to use, store, operate, or handle a radiation producing machine or radioactive materials on a Department of Defense (DoD) Installation. The service permit shall be obtained from the appropriate U.S. Army Command through the Contracting Officer's Representative. The Contractor should notify the Contracting Officer during the pre-work conference if a radiation producing device will be utilized on a DoD Installation in order to determine the permit application requirements, and allow a lead time of 45 days for obtaining a permit.~~

~~_____ (C) The Contractor is responsible for providing a copy of any Nuclear Regulatory Commission (NRC) licenses per the Code of Federal Regulations 10 CFR "Energy" for all radioactive sources brought onto the DoD installation by the Contractor and/or subcontractors. These licenses shall be provided to the Contracting Officer's Representative, before the radioactive sources is allowed on the DoD installation.~~

~~*** VANDENBERG ONLY ***~~

~~_____ (A) Prior to any operations using radioactive material, operators will ensure the following is given to the Base Radiation Safety Officer (BRSO)(30 AMDS/SCPB;6-7811) for review and approval at least two weeks prior to operations.~~

~~_____ (1) A copy of a valid and current USAF Permit, for Air Force users; or a copy of a valid and current Nuclear Regulatory Commission License or~~

~~Agreement State License with Nuclear Regulatory Commission Form 241, for non-Air Force users.~~

~~(2) A copy of a valid and current Radiation Safety Program.~~

~~(3) A copy of a valid and current Emergency Response Information.~~

~~(4) Operating parameters, including:~~

~~a. Radioisotope~~

~~b. Activity~~

~~c. Time of Operation~~

~~d. Date of Operation~~

~~e. Location of Operation~~

~~f. Contractor/Subcontractor Name~~

~~g. Contractor Point of Contact (POC) and phone number; and USAF POC and phone number.~~

~~(B) Operators are required to have the following on hand while operating:~~

~~(1) A copy of a valid and current USAF Permit, for Air Force users; or a copy of a valid and current Nuclear Regulatory Commission License or Agreement State License with Nuclear Regulatory Commission Form 241, for non-Air Force users.~~

~~(2) A copy of a valid and current Radiation Safety Program.~~

~~(3) A copy of a valid and current Emergency Response Information.~~

~~(4) A copy of Nuclear Regulatory Commission Form 3.~~

~~(5) A copy of documents required by 10 CFR 19, Notices, Instruction and Reports to Workers: Inspection and Investigations, paragraph 11, Posting of Notices to Workers.~~

~~(6) A visible 2 mR/hr line must be established prior to operation, to ensure safety of Air Force personnel and assets.~~

~~(C) Strict adherence to 10 CFR 19, Notices, Instruction and Reports to Workers: Inspection and Investigations; 10 CFR 20, Standards for Protection Against Radiation; and 10 CFR 21, Reporting of Defects and Noncompliance; and Air Force Instruction 40-201, Managing Radioactive Material in the USAF, is required while operating on Vandenberg AFB, CA. The Base Radiation Safety Officer (30 AMDS/SGPB), or his designee, may conduct unannounced on-site visits to ensure established radiation safety practices are being conducted.~~

~~(D) Additional requirements exist for operations other than industrial~~

~~radiography, soil densitometry, etc; for example, irradiators (10 CFR 36) and well-logging (10 CFR 39). Consult BRSO for specific requirements for operators using irradiators or performing well-logging for at least four weeks prior to operation.~~

~~NOTE: If Department of Energy sources are used, certification of exemption from Nuclear Regulatory Commission licensing requirements is required prior to operations. When moving Radioactive Material on Vandenberg AFB, CA, contact personnel according to Radioactive Material Tracking Checklist.~~

~~Vandenberg AFB, CA Radioactive Material Tracking Checklist~~

	Transfers				
	From One				
	Prior to	Moves in	Permittee/	Prior to	
	Coming on	Base	Licensee	Leaving	
	Base	Boundaries	To another	Launched	Base
Permitted AF	contact	contact	contact	contact	contact
Radioactive	B/P/U RSO	U RSO	B/P/U RSO	B/P/U RSO	B/P/U RSO
Material,					
30 SW					
Permitted AF	contact	contact	contact	contact	contact
Radioactive	B/P/U RSO	U RSO	B/P/U RSO	B/P/U RSO	B/P/U RSO
Material,					
other than					
30 SW					
AF Contractor	contact	contact	contact	contact	
	B/P RSO	P RSO	B/P RSO	B/P RSO	
Army/Navy/DoD	contact	contact	contact	contact	
Component	B/P RSO	B RSO	B/P RSO	B/P RSO	
NASA	contact	contact	contact	contact	
	B/P RSO	P RSO	B/P RSO	B/P RSO	
NASA Contractor	contact	contact	contact	contact	
	B/P RSO	P RSO	B/P RSO	B/P RSO	
Department of	contact	contact	contact	contact	
Energy	B/P RSO	P RSO	B/P RSO	B/P RSO	
Licensed					
Radioactive					
Material					
Department of	contact	contact	contact	contact	contact
Energy	B/U RSO	B/U RSO	B/U RSO	B/U RSO	B/U RSO
non-Licensed					
Radioactive					
Material					

~~NOTES:~~~~B RSO - Base Radiation Safety Officer -- 30 AMDS/SCPB, 6-7811~~~~P RSO - Permit Radiation Safety Officer -- Each permit has its own P RSO~~~~U RSO - Unit Radiation Safety Officer -- Each unit has its own U RSO~~~~1.14 DISPOSAL OF REMOVED MATERIALS~~

~~_____ (A) The Government inspector will examine all materials removed from the project not indicated for reuse, and will tag or otherwise designate those materials which are serviceable or salvable.~~

~~_____ (B) Serviceable or salvageable items, except for locks, latches, and cylinders, shall be turned in, by appointment, to the base Defense Reutilization and Marketing Office (DRMO) or Base Supply by the Contractor. All locks, latches, and cylinders shall be turned in to the Base Lockshop. The Contractor shall schedule DRMO appointments far enough in advance to allow efficient processing of turn-ins. Scrap metal shall be segregated into ferrous and nonferrous metals, and shall be cut, dismantled, palletized, or prepared as required by the DRMO office for acceptance. Dismantling of equipment or material into separate components may be required. The Contractor shall protect materials from damage or theft during the interval between removal and disposal. Any serviceable or salvageable items not accepted by DRMO or Base Supply, for whatever reason, will become the property of the Contractor and will be properly handled, transported, and be disposed of off-base by the Contractor in conformance with all federal, state, and local regulations. See Section 01130 for disposal of hazardous materials.~~

~~_____ (C) Unusable items (with no salvage value) shall be transported to the base sanitary landfill by the Contractor as directed by the Contracting Officer. The Contracting Officer's Representative will inspect all loads of refuse and will issue a landfill access ticket. The purpose of the ticket will be to verify that the refuse was taken from a Vandenberg Air Force Base project. The issuing of the ticket does not relieve the Contractor from the responsibility of properly hauling, handling, and disposing of all refuse. The Contractor shall weigh-in at Building 11505 prior to transporting material to the landfill. Items being transported shall be segregated into dissimilar materials. All items determined to be unacceptable for disposal in the landfill, as determined by the Contracting Officer's Representative, shall become the property of the Contractor and be disposed of off base at no additional cost to the Government. Vehicles used in transporting refuse shall have a tarpaulin or covering to prevent spillage. The base landfill is subject to daily limits of disposal. In the event the limits are reached, the Contractor shall dispose of refuse off-base at no additional cost to the Government. See Section 01130 for disposal of hazardous materials.~~

~~1.15 SITE CONDITIONS~~

~~_____ The native surface soils at Presidio of Monterey are generally an aeolian soil (silty sand, sandy silt). This overlies residual soil (clayey sand or sandy clay) on bedrock. The bedrock is of varying degrees of weathering depending upon relative location to drainage features,~~

~~fractures, joints and susceptibility of rock to weathering. Consequently the subsurface profile can be quite irregular and erratic even over short horizontal distances. Also, it is not unusual to find lenses, ledges or boulders of fresh rock and zones of weathered rock within the soil mantle well above the general "fresh" bedrock level. Based on our experience, soil and weathered rock that causes refusal of the standard penetrometer advancement can normally be excavated with conventional construction machinery. To effectively remove soil or weathered rock that cause refusal of the standard penetrometer requires equipment with ripping implements. Furthermore, our experience has shown that material encountered during explorations that causes auger refusal (rock) generally requires blasting, pneumatic hammering or other methods for efficient removal. This is particularly true of excavations within confined areas. Depending on several factors such as joints, fractures, bedding, equipment, skill of equipment operators, etc. it may be possible to remove some "auger refusal" materials by ripping. This contract calls for Contractor to excavate any material (soil, weathered rock, or rock) to the specified grades regardless of the type of materials encountered. No additional money will be paid for excavation of rock to a point 6 inches below indicated depth.~~

~~(A) The aeolian soils at the Presidio of Monterey are moderately permeable and offer little resistance to percolation, however the underlying residual soils are highly impermeable and block percolation. Although ground water was not observed in all the borings, after periods of rainfall the interface between the aeolian and residual soils often becomes saturated. As with most soils this increased moisture results in a soil with lower shear strength and potentially may become unstable when overstressed by heavy construction equipment. To minimize the amount of overstressing it is necessary to use light construction equipment to remove and transport the soil. This contract requires the Contractor to excavate all material to the required grade regardless of its classification or moisture state. Materials found to be potentially unstable or unstable, beyond the limits of required excavation, shall be removed and replaced as stated in Division 2 - Site Work, hereinafter.~~

~~1.16 GOVERNMENT RETAINED ARCHITECT-ENGINEER (A/E)~~

~~The Government may retain the services of an A/E to increase the level of confidence that the construction Contractor has complied with the requirements of the construction contract. The A/E's role in observing, monitoring or inspecting the activities of the construction Contractor is not intended in any way to require the A/E to assume any responsibility for the construction methods, means, techniques or procedures, including any health or safety requirements, be subjected to nonmeritorious litigation relating to site accidents or other circumstances associated with the construction Contractor's activities. The A/E shall be named as an additional insured on all comprehensive general liability insurance policies carried by the construction Contractor.~~

~~1.17 SALVAGE RIGHTS, WOOD PRODUCTS~~

~~The Fort Ord Complex, which includes Fort Ord, Presidio of Monterey, and Fort Hunter Liggett, has instituted a woodcutting program whereby all wood byproducts, including those generated by a Contractor in performance of his work, are sold to individuals for firewood.~~

~~_____ (A) Definition:_____~~

~~_____ Wood products means only trees and limbs over 3 inches in diameter. Stumps, brush, and other such wood byproducts resulting from demolition and construction work shall be disposed of off Government property.~~

~~*** OPT 1 - PRESIDIO OF MONTEREY ***~~

~~_____ (B) Wood products generated from work shall be delivered to the Base sanitary landfill.~~

~~*** OPT 2 - FT HUNTER-LIGGETT ***~~

~~_____ (B) Wood products generated from work performed at Fort Hunter Liggett shall be delivered to the Fort Hunter Liggett sanitary landfill.~~

~~1.18 DISPOSAL OF MATERIAL~~

~~_____ (A) All excess material, waste, and unsuitable material shall be removed from Government property.~~

~~1.19 HAUL ROUTE PLAN~~

~~This plan shall include offices, material storage areas and structures and the access routes to these areas. Haul routes from the sites through the military reservations to major highways shall be indicated. All required traffic signs, special limits, warning devices, lighting and other such safety devices required by EM 385-1-1, OSHA, local cities and Cal Trans (on state roads) shall be shown. Provisions shall be made in the plan for alternate routes when excavations block designated haul routes. The plan shall be revised and resubmitted if the haul routes being used are not as shown on the plan.~~

~~_____ (A) Coordination with Technical Specifications:_____~~

~~_____ Work for sections such as Demolition, Grading, Tree Removal and other sections with excavations shall be coordinated with this plan.~~

~~_____ (B) Protection of Land Resources:_____~~

~~_____ This Haul Plan shall include the requirements of SECTION: ENVIRONMENT PROTECTION especially paragraph, PROTECTION OF LAND RESOURCES and all the clauses referenced therein.~~

~~1.20 AIRFIELD FOREIGN OBJECT DAMAGE (FOD)~~

~~_____ (A) Clean up:_____~~

~~_____ Contractor shall be responsible for the cleanliness of his work areas at all times during his contract performance. This shall include but not be limited to immediate clean-up of any material that may spread onto aircraft taxiways, aprons, ramps and pads. Contractor shall provide a pavement vacuum/sweeper at the project site at all times during his performance. Every time any haul vehicles cross the taxiways, aprons, ramps and pads, the area shall be cleaned by the pavement vacuum/sweeper~~

~~immediately. The Contractor shall be responsible for repair or replacement of any foreign object damages to the aircrafts or components of the aircrafts resulting from his negligence.~~

1.8 CONTRACTOR SAFETY PERSONNEL REQUIREMENTS (1985 JAN HQ USACE)

(A) Full-time, on-site, safety coverage by contractors shall be required for the life of the contract.

(B) The following conditions shall be met:

(1) The Contractor shall employ, to cover all hours of work at the project site(s), at least one safety and health person to manage the Contractor's safety program; duties which are not germane to the safety program shall not be assigned to this person(s). The principal safety and health person shall report to and work directly for the Contractor's top on-site manager, corporate safety office, or other high-level official of equivalent position. The safety and health person(s) shall have the authority to take immediate steps to correct unsafe or unhealthful conditions. The employment of a safety and health person(s) shall not abrogate the safety and health responsibilities of other personnel.

(2) Qualifications for Safety and Health Person(s).

(a) Safety and Health Person(s) shall have a degree in engineering or safety in at least a four year program from an accredited school and shall have been engaged in safety and occupational health for at least one (1) year of experience (no time being credited to this one (1) year unless at least fifty (50) percent of the time was devoted to safety and occupational health) and shall have at least one (1) year experience in construction, or--

(b) Safety and Health Person(s) shall have legal registration as a Professional Engineer or a Certified Safety Professional and shall have been engaged in safety and occupational health for at least one (1) year of experience (no time being credited to this one (1) year unless at least fifty (50) percent of the time was devoted to safety and occupational health) and shall have at least one (1) year experience in construction, or--

(c) Safety and Health Person(s) shall have a degree other than that specified in paragraph, Qualifications for Safety and Health Person(s) above, and shall have been engaged in safety and occupational health for at least three (3) years of experience (no time being credited to these three (3) years unless at least fifty (50) percent of the time each year was devoted to safety and occupational health) and shall have at least two (2) years experience in construction, or--

(d) In lieu of a degree, Safety and Health person(s) shall have been engaged in safety and occupational health for at least five (5) years of experience (no time being credited to these five (5) years unless at least fifty (50) percent of the time each year was devoted to safety and occupational health) and shall have at least two (2) years experience in construction.

(e) First aid work is not a creditable experience.

(3) The name and qualifications of the nominated safety and health person(s) shall be furnished to the Contracting Officer for acceptability and a functional description of duties shall be provided prior to the pre-work conference.

NOTE: The Contractor shall have one or more Safety and Health Persons, each of whom meets the qualifications of (B)(2) Qualifications for Safety and Health Person(s), physically present on the actual site of the work whenever work of any sort is being performed by a Contractor, subcontractor, or supplier personnel on the work site. The foregoing clause language shall not be interpreted to contravene this note.

1.9 MONTHLY SAFETY INSPECTION

A monthly on-site inspection will be made by the insurance carriers of the prime and subcontractors. The Contractor's safety program will be reviewed and a meeting will be held with the Contracting Officer's Representative to discuss the job-site safety. A written report will be made by the Contractor stating the results of the inspection and the action taken.

1.10 ~~AREAS OF RADAR RADIATION HAZARD~~ VHS Video Tape

~~The Contractor shall provide a VHS Video Tape of travel routes. The tape shall be annotated as to location and to mileages from the vehicle odometer. A cope of the tape shall be provided to the contracting officer prior to heavy vehicle travel on these roadways. The tape will be used to determine the Contractor's damage, if any, to the roadways. Roadways to be taped shall be determined by the Contractor and Contracting officer. The work under this contract is to be performed in, or in the vicinity of, areas that may be hazardous at times due to radar radiation. Construction activities and Contractor's personnel shall not be allowed within such areas without prior arrangement with and the approval of the Contracting Officer. The Contractor shall maintain a close working relationship with the Contracting Officer's representative and shall govern his activities within such areas as said representative may arrange with operating personnel of the Air Force.~~

1.24 ~~HAZARDOUS NOISE AREA~~

~~Work area for this contract is located within a high noise area and can be hazardous to the human ear. The Contractor is responsible for providing adequate ear protection as may be required for Contractor's personnel at the job site.~~

1.25 ~~WARRANTY PROBLEM PROCEDURE~~

~~Upon receipt of the written notice from the Contracting Officer as stated in paragraph WARRANTY OF CONSTRUCTION, subparagraph 5, the Contractor shall report to Building Number 384, BSI Work Order Branch, to pick up a copy of the work order describing the warranty problem. After the warranty item has been corrected the Contractor shall return the completed work order to Building Number 384 and indicate the corrective action taken.~~

1.11 AGGREGATE SOURCES

~~_____ (A) Concrete aggregates may be produced from the approved sources listed below:~~

~~_____ (1) Sources of fine aggregate. (List the sources in an appropriate manner.)~~

~~_____ (2) Sources of coarse aggregate. (List the sources in an appropriate manner.)~~

~~_____ (B) Concrete aggregates may be furnished from any of the above listed sources or at the option of the Contractor may be furnished from any other source designated by the Contractor and approved by the Contracting Officer, subject to the conditions hereinafter stated.~~

~~_____ (C) After the award of the contract, the Contractor shall designate in writing, only one source or one combination of sources from which he proposes to furnish aggregates. If the Contractor proposes to furnish aggregates from a source or from sources not listed above, he may designate only a single source or a single combination of sources for aggregates. Samples for acceptance testing shall be provided as required by Section: _____ of the Technical Specifications. If a source for coarse or fine aggregate so designated by the Contractor is not approved for use by the Contracting Officer, the Contractor may not submit for approval other sources but shall furnish the coarse or fine aggregate, as the case may be, from a listed source listed above at no additional cost to the Government.~~

~~_____ (D) Listing of a concrete aggregate source is not to be construed as approval of all material from that source. The right is reserved to reject materials from certain localized areas, zones, strata, or channels, when such materials are unsuitable for concrete aggregate as determined by the Contracting Officer. Materials produced from a listed source shall meet all the requirements of Section: _____ of the Technical Specifications of these specifications.~~

~~* ALT 2 (CONCRETE AGGREGATE)***~~**

~~_____ (A) Source: The Contractor shall produce the concrete aggregate from the Quarry site which is located approximately _____ miles _____ (direction) of the site as shown on the drawings. The deposit is owned by the Government and is made available to the Contractor free of charge for production of aggregate required under this contract. There is available within the designated area an adequate supply of material from which concrete aggregate meeting the requirement of these specifications can be produced. The Government guarantees that a sufficient amount of material of suitable quality for production of all of the concrete aggregate required is available within the deposit, and that concrete aggregates of suitable quality can be produced by mechanical means with a properly designed and operated plant without hand-picking or similar operations. However, the amount of work involved or the amount of unsatisfactory materials required to be wasted in order to produce a sufficient quantity of suitable concrete aggregate shall be the responsibility of the Contractor and the Government shall not be held liable for costs resulting~~

~~from such work or waste.~~

~~(B) Explorations: The Quarry site has been explored by the Government to determine the character and extent of materials available. The locations of the _____ (name the type or types of explorations) are shown on the contract drawings. [The logs of the core drill holes are also shown on the drawings.] [Samples of materials secured are available for inspection at _____.] [Cores recovered during drilling are available for inspection at _____.] The results of explorations are furnished for information only. These data are the result of limited explorations and tests conducted by and for the Government and are accurate to the extent of the scope of the investigations conducted. The Government will not be responsible for any deduction, interpretation or conclusion drawn therefrom by the Contractor.~~

(~~C~~A) Operations:

(1) Limits of Work Area: The limits of the area within which operations may be carried on are shown on the drawings. [The depth to which the Contractor may operate is subject to approval, but is limited only by the extent of the existence of satisfactory material.] [The limits of depth to which the Contractor may operate are shown on the drawings.]

(2) Disposal of Waste Materials: All overburden removed, and all other waste material including materials designated unsuitable for use in the production of concrete aggregate shall be disposed of in approved disposal areas. All disposal areas shall be left in a neat and sightly condition, graded and sloped to drain properly to the satisfaction of the Contracting Officer. No separate payment will be made for the disposal of waste material but the cost thereof shall be included in the respective bid prices for the various parts of the concrete work in which the aggregates are used.

(3) Plan of Operations: Prior to beginning operations in the deposit, the Contractor shall submit a plan of operation in sufficient detail to indicate the following:

(i) The proposed extent of the operation including depth.

(ii) The method and schedule of overburden stripping operations.

(iii) The proposed location of waste disposal areas.

The plan of operations in the deposit shall be subject to approval, but approval of the plan will not in any way relieve the Contractor of the responsibility to operate in the deposit in a safe and systematic manner.

1.12 BID ITEM OVERRUN

Throughout the contract, (at a minimum, every two weeks) the Contractor shall be responsible to monitor placement or installation of unit price items (if any) with respect to the original estimated quantities shown in

the contract. If placement or installation indicates a possible overrun with respect to the original estimated quantities shown in the contract, the Contractor shall immediately provide written notification to the Contracting Officer with revised total estimated quantities.

~~1.28 COLOR SCHEME FOR CONTRACTOR FACILITIES~~

~~(A) All Contractor storage and operational facilities including temporary structures, signs and fencing, that remain at the site shall be compatible with the color scheme used on the project signs as directed by the Contracting Officer.~~

~~1.29 ONE YEAR MAINTENANCE CONTRACT~~

~~(A) The equipment manufacturer or his authorized representative shall provide all equipment, materials and labor to maintain all portions of the equipment listed below for one year after the complete system is placed in operation, responding effectively to calls from the Using Service within 24 hours.~~

~~*** INSERT ATTACHED LIST ***~~

~~(B) In lieu of such a maintenance contract, provide a complete set of replacement parts and equipment that will allow any replaceable element, part or component of the system to be replaced. Further, technically qualified staff of the equipment manufacturer shall be available by telephone, during all normal factory working hours to advise previously trained, Using Service personnel on what steps should be taken to correct the problem related.~~

~~1.30 UNITED STATES NOT A PARTY~~

~~(A) No appropriated funds exist for the construction which is the subject of this IFB. Article 1, Section 9, Clause 7, of the U.S. Constitution states: "No money shall be drawn from the Treasury, but in Consequence of Appropriations made by Law". 41 USC 11 states: No contract --- on behalf of the United States shall be made, unless the same is authorized by law or under an appropriation adequate to its fulfillment---". 41 USC 12 states: "No contract shall be entered into for the erection, repair, or furnishing of any public building -- which shall bind the Government to pay a larger sum of money than the amount in the Treasury appropriated for the specific purpose."~~

~~(B) Since no funds have been appropriated for the construction, it would be illegal for the United States of America to enter into a contract for the construction.~~

~~(C) A sum of money has been placed in an account (the fund) for the contract. The fund will be the party with which the successful bidder enters into a contract.~~

~~(D) In the event funds are insufficient to complete the project the Contractor will have no obligation to continue work on the project. This is the only exception to the last sentence of the disputes clause.~~

~~(E) It is foreseeable that funds in addition to those in the account~~

~~may not be available. It will be the responsibility of the Contractor to manage his affairs so that he does not require in excess of those available (see d. above).~~

~~(F) Where there is any indication in this IFB, or the resulting contract, that the United States is a party to this construction, it shall nevertheless be understood that it is merely the fund, and not the United States, which is the party indicated.~~

~~1.31 WARRANTY OF CONSTRUCTION~~

~~(a). Performance Bond.~~

~~(1). It is understood that the Contractor's Performance Bond will remain effective throughout the life of all warranties and warranty extensions.~~

~~(2). In the event the Contractor or his designated representative fails to commence and diligently pursue any work required under the Warranty of Construction Section of the Technical Provisions within a reasonable time after receipt of written notification pursuant to the requirements thereof, the Contracting Officer shall have a right to demand that said work be performed under the Performance Bond by making written notice on the surety. If the surety fails or refuses to perform the obligation it assumed under the Performance Bond, the Contracting Officer shall have the work performed by others, and after completion of the work, shall make demand for reimbursement of any or all expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.~~

~~(3). Warranty repair work which arises to threaten the health or safety of personnel, the physical safety of property or equipment, or which impairs operations, habitability of living spaces, etc., will be handled by the Contractor on an immediate basis as directed verbally by the Contracting Officer or his authorized representative. Written verification will follow verbal instructions. Failure of the Contractor to respond as verbally directed will be cause for the Contracting Officer or his authorized representative to have the warranty repair work performed by others and to proceed against the Contractor as outlined in the paragraph b. above.~~

~~(b). Pre-Warranty Conference. Prior to contract completion and at a time designated by the Contracting Officer or his authorized representative, the Contractor shall meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of SECTION 00700, Paragraph, WARRANTY OF CONSTRUCTION, of this specification. Communication procedures for Contractor notification of warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer or his authorized representative for the execution of the construction warranty shall be established/reviewed at this meeting.~~

~~In connection with these requirements and at the time of the Contractor's quality control completion inspection, the Contractor will furnish the name, telephone number and address of a licensed and bonded company which~~

~~is authorized to initiate and pursue warranty work action on behalf of the Contractor. This single point of contact will be located within the local service area of the warranted construction, will be continuously available, and will be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of his responsibilities in connection with Section 00700, Paragraph, WARRANTY OF CONSTRUCTION.~~

~~(c). Equipment Warranty Identification Tags. The Contractor shall provide warranty identification tags on all equipment installed under this contract.~~

~~(d). Contractor's Response to Warranty Service Requirements. The following warranty service requirements are applicable to this contract. Following notification by the Contracting Officer or the Contracting Officer's Representative the Contractor shall respond to a warranty service requirement identified by the Contracting Officer's Representative in accordance with the "Warranty Service Priority List" of this program. This list prioritizes warranty work into the categories:~~

~~— First Priority 1A Perform on site inspection to evaluate situation, determine course of action, initiate work within 24 hours and work continuously to completion or relief.~~

~~— Second Priority 1B Perform on site inspection to evaluate situation, determine course of action, initiate work within 48 hours and work continuously to completion of relief.~~

~~— Third Priority All other work to be initiated within 5 work days and work continuously to completion or relief.~~

~~— The "Warranty Service Priority List" shall be compiled by the Contractor and approved by the Contracting Officer.~~

~~Should parts be required to complete the work and the parts are not immediately available the Contractor shall have a maximum of 12 hours after arrival at the job site to provide the Contracting Officer's Representative with firm written proposals for emergency alternatives and temporary repairs for Government participation with the Contractor to provide emergency relief until the required parts are available on site for the Contractor to perform permanent warranty repair. The Contractor's proposals shall include a firm date and time that the required parts shall be available on site to complete the permanent warranty repair. The Contracting Officer's Representative will evaluate the proposed alternatives and negotiate the alternative considered to be in the best interest of the Government to reduce the impact of the emergency condition. Alternatives considered by the Contracting Officer's Representative will include the alternative for the Contractor to "Do Nothing" while waiting until the required parts are available to perform permanent warranty repair. Negotiating a proposal which will require Government participation and the expenditure of Government funds shall constitute a separate procurement action by the using service.~~

1.13 PAYMENT

No separate payment will be made for the work covered under this section and all costs in connection therewith will be considered a subsidiary obligation of the Contractor.

1.14 NON CONTRACT WORK

The Contractor and/or his subcontractors shall not perform any work or erect any structure for third parties, landowners or otherwise, within the limits of the rights-of-way without prior approval of the Contracting Officer.

1.15 DAMAGE TO ROADS

The Contractor shall preserve and protect all existing private or project access or right-of-way roads. At the completion of work and prior to the Contractor leaving the project, he shall restore to pre-project conditions all such roads. Repairs shall include replacement of base rock and/or surface treatment as required.

~~1.35 SIGNAL LIGHTS~~

~~The Contractor shall display signal lights and conduct his operations in accordance with the General Regulations of the Department of the Army and of the Coast Guard governing lights and day signals to be displayed by towing vessels with tows on which no signals can be displayed, vessels working on wrecks, dredges, and vessels engaged in laying cables or pipe or in submarine or bank protection operations, lights to be displayed on dredge pipe lines, and day signals to be displayed by vessels of more than 65 feet in length moored or anchored in a fairway or channel, and the passing by other vessels of floating plant working in navigable channels, as set forth in Commandant U.S. Coast Guard Instruction M16672,2 Navigation Rules: International Inland (Comdtinst M16672,2) or 33 C.F.R. 81 Appendix A (International) and 33 C.F.R. 84 through 33 C.F.R. 89 (Inland) as applicable.~~

~~1.36 PLANT LAYOUT DRAWINGS~~

~~Drawings, in triplicate, showing the layout of the plant the Contractor proposes to use on the work shall be submitted by the Contractor for review by the Contracting Officer. The drawings shall show the locations of the principal components of the construction plant; offices; shop and storage buildings; housing facilities, if any; and storage areas and yards which the Contractor proposes to construct at the site of the work and elsewhere. The Contractor shall also furnish for review by the Contracting Officer drawings, in triplicate, showing the general features of his aggregate processing plant; aggregate transporting, storage and reclaiming facilities; aggregate rinsing and dewatering plant, if required; coarse aggregate rescreening plant, if required; concrete batching and mixing plant; concrete conveying and placing plant; and when precooling of concrete is required, the cooling plant. The drawing shall appropriately show the capacity of each major feature of the plant including the rated capacity of the aggregate production plant in tons per hour of fine and coarse aggregates; rated capacity of the aggregate transporting, storage and reclaiming facilities; volume of aggregate storage; capacity of cement~~

~~and pozzolan storage; rated capacity of the concrete batching and mixing plant in cubic yards per hour; and when used rating capacity of plant for precooling of concrete. Drawings in triplicate showing any changes in plant made during design and erection or after the plant is in operation shall be submitted to the Contracting Officer for review. Two sets of the drawings will be retained by the Contracting Officer and one set will be returned to the Contractor with comments.~~

~~1.37 VARIATIONS IN ESTIMATED QUANTITIES - SUBDIVIDED ITEMS - (DREDGING)~~

~~_____ This clause is applicable only to the items listed herein.~~

~~_____ (a) In order to permit the Contractor to distribute his indirect costs properly to Items Nos. [____], these items have been subdivided into two sub-items. All the Contractor's indirect costs for each of these items, exclusive of mobilization and demobilization of dredge, will be included in the bid price for the first sub-item listed under the respective item. Variation from the estimated quantity in the actual work performed under any second sub-item or elimination of all work under such a second sub-item will not be the basis for an adjustment in contract unit price.~~

~~_____ (b) Where the actual quantity of work performed for Items Nos. [____] is less than 90% of the quantity of the first sub-item listed under such item, the Contractor will be paid at the contract unit price for that sub-item for the actual quantity of work performed and, in addition, an equitable adjustment in contract price shall be made upon demand of the Contractor. The equitable adjustment in price for the under-run shall be made on the basis that the Contractor has assumed the risk and is entitled to no adjustment for the first 10% under-run.~~

~~_____ (c) If the parties fail to agree upon the adjustment to be made, the dispute shall be determined as provided in Clause, DISPUTES, of the CONTRACT CLAUSES, Section 00700.~~

1.16 INSPECTION

The inspectors will direct the maintenance of the gauges, ranges, location marks and limit marks in proper order and position; but the presence of the inspector shall not relieve the Contractor of responsibility for the proper execution of the work in accordance with the specifications. The Contractor will be required:-

~~_____ (A) To furnish, on the request of the Contracting Officer or any inspector, the use of such boats, boatmen, laborers, and material forming a part of the ordinary and usual equipment and crew of the dredging plant as may be reasonably necessary in inspecting and supervising the work. However, the Contractor will not be required to furnish such facilities for the survey, prescribed in the clause entitled "Final Examination and Acceptance".~~

~~_____ (B) To furnish, on the request of the Contracting Officer or any inspector, suitable transportation from all points on shore designated by the Contracting Officer to and from the various pieces of plant, and to and~~

~~from the dumping grounds.~~

~~Should the Contractor refuse, neglect, or delay compliance with these requirements, the specific facilities may be furnished and maintained by the Contracting Officer, and the cost thereof will be deducted from any amounts due or to become due the Contractor.~~

~~1.39 ACCOMMODATIONS AND MEALS FOR INSPECTORS~~

~~The Contractor shall furnish regularly to inspectors on board the dredge or other craft upon which they are employed suitable space for office purposes. The space shall be properly heated, ventilated, and lighted, and shall have a desk which can be locked, and a chair for each inspector. The entire cost to the Contractor for furnishing and maintaining the foregoing accommodations shall be included in the contract price. If the Contractor fails to meet these requirements, the facilities referred to above will be secured by the Contracting Officer, and the cost thereof will be deducted from payments to the Contractor.~~

~~1.40 SHOALING~~

~~If, before the contract is completed, shoaling occurs in any section previously accepted, including shoaling in the finished channel, because of the natural lowering of the side slopes, redredging at contract price, within the limit of available funds, may be done if agreeable to both the Contractor and the Contracting Officer.~~

~~1.41 CONTINUITY OF WORK~~

~~No payment will be made for work done in any area designated by the Contracting Officer until the full depth required under the contract is secured in the whole of such area, unless prevented by ledge rock, nor will payment be made for excavation in any area not adjacent to and in prolongation of areas where full depth has been secured except by decision of the Contracting Officer. Should any such nonadjacent area be excavated to full depth during the operations carried on under the contract, payment for all work therein may be deferred until the required depth has been made in the area intervening. The Contractor may be required to suspend dredging at any time when for any reason the gauges or ranges cannot be seen or properly followed.~~

~~1.4 USE OF EXPLOSIVES~~

~~(A) When blasting is found to be necessary for removal of rock or other material the Contractor shall take all necessary precautions for the protection of individuals and property exposed to his operations.~~

~~(1) The amount of explosives permitted aboard the drill boat at any one time will be subject to the approval of the Contracting Officer, but in no case shall such amount exceed that required by the Contractor for one day's operations.~~

~~(2) Provision shall be made for jettisoning explosives aboard the drill boat in emergencies.~~

~~(3) Delay electric blasting caps shall be used in all blasts where the amount of explosives fired is in excess of _____ pounds so that no explosion in any one instance will exceed _____ pounds of explosives, and no series of explosions or total blast will exceed _____ pounds of explosives properly placed in drill holes.~~

~~(4) The amount of explosives to be used in a single blast in surface blasting, if found to be necessary, shall not exceed _____ pounds.~~

~~(5) The Contractor shall make necessary arrangements, as may be required by the Contracting Officer, to prevent damage to any vessel, moored or underway, building or structure and preserve the crew or occupants thereof from exposure to injury as a result of the Contractor's operations.~~

~~(B) The handling, storage, and use of explosives shall be governed by the applicable provisions of the section on "Blasting" of the Corps of Engineers manual EM 385-1-1, dated October 1992, entitled "Safety and Health Requirements Manual", as amended, referred to in the clause entitled ACCIDENT PREVENTION, see Section 00700. In addition, the Contractor shall make necessary arrangements as may be required by applicable U.S. Coast Guard, state, county, municipal or port authority codes, rules, regulations and laws and shall be responsible for compliance therewith.~~

~~1.43 FINAL EXAMINATION AND ACCEPTANCE~~

~~(A) As soon as practicable after the completion of the entire work or any section thereof (if the work is divided into sections) as in the opinion of the Contracting Officer will not be subject to damage by further operations under the contract, such work will be thoroughly examined at the cost and expense of the Government by sounding or by sweeping, or both, as determined by the Contracting Officer. Should any shoals, lumps, or other lack of contract depth be disclosed by this examination the Contractor will be required to remove same by dragging the bottom or by dredging at the contract rate for dredging, but if the bottom is soft and the shoal areas are small and form no material obstruction to navigation, the removal of such shoal may be waived by the discretion of the Contracting Officer. The Contractor or his authorized representative will be notified when soundings and/or sweepings are to be made, and will be permitted to accompany the survey party. When the area is found to be in a satisfactory condition, it will be accepted finally. Should more than two sounding or sweeping operations by the Government over an area be necessary by reason of work for the removal of shoals disclosed at a prior sounding or sweeping, the cost of such third and any subsequent sounding or sweeping operations will be charged against the Contractor at the rate of \$1,000.00 per day for each day in which the Government plant is engaged in sounding or sweeping and/or is enroute to or from the site or held at or near the said site for such operations.~~

~~(B) Final acceptance of the whole or a part of the work and the deductions or corrections of deductions made thereon will not be reopened after having once been made, except on evidence of collusion, fraud, or obvious error, and the acceptance of a completed section shall not change~~

~~the time of payment of the retained percentages of the whole or any part of the work.~~

1.17 ~~RADIO COMMUNICATIONS~~BID ITEM OVERRUN

~~Throughout the contractor, (at a minimum, every two weeks) the contractor shall be responsible to monitor placement or installation of unit price items (if any) with respect to the original estimated quantities shown in the contract. If placement or installation indicates a possible overrun with respect to the original estimated quantities shown in the contract, the Contractor shall immediately provide written notification to the contracting officer with revised total estimated quantities. To facilitate and insure the safe passage of vessels in the channel as specified in paragraph PHYSICAL DATA, the Contractor shall provide, operate and maintain on his plant, radio facilities capable of voice communication with vessels using the channel. Station licensing and frequency authorizations shall be the responsibility of the Contractor.~~

1.45 ~~CERF IMPLEMENTATION~~

~~If the work specified in this contract is performed by a hopper dredge(s), the owner must have an active Basic Ordering Agreement (BOA) for the hopper dredge(s) on file with the Corps. The Contractor shall be obligated to make the hopper dredge(s) available to serve in the Corps of Engineers Reserve Fleet (CERF) at any time that the hopper dredge(s) is performing work under this contract. When the Contracting Officer is notified of the decision to activate this dredge(s) into the CERF, he shall take appropriate action to release the dredge(s). He may then extend or terminate the contract to implement whichever action is in the best interest of the Government. The CERF contractor shall also be subject to the following conditions:~~

~~a. The Director of Civil Works may require the contractor to perform emergency dredging at another CONUS (48 contiguous states) site for a period of time equal to the remaining time under this contract at the date of notification plus up to ninety (90) days at the previously negotiated rate which appears on the schedule of prices in the BOA.~~

~~b. The Chief of Engineers may require the contractor to perform emergency dredging at an OCONUS (Outside CONUS which includes Alaska, Hawaii, Puerto Rico, the Virgin Islands, or U.S. Trust Territories) site or a period of time equal to the time remaining under this contract at the date of notification plus up to one hundred eighty (180) days at the negotiated rate which appears on the schedule of prices in the BOA.~~

~~c. The CERF shall be activated by the Chief of Engineers or the Director of Civil Works; then the Ordering Contracting Officer will notify the contractor. From the time of notification, the selected hopper dredge(s) must depart for the emergency assignment within seventy-two (72) hours for CONUS or ten (10) days for OCONUS assignments.~~

~~d. A confirming delivery order will be issued pursuant to the Basic Ordering Agreement (BOA) by the Ordering Contracting Officer. Such~~

~~delivery order shall utilize the schedule of rates in the BOA for the specific hopper dredge(s).~~

~~e. If during the time period specified in a, b, or c, above, a CERF vessel(s) is still required, the contract performance may be continued for additional time by mutual agreement.~~

1.18 ENVIRONMENTAL LITIGATION

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

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

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

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SECTION 02230a

CLEARING AND GRUBBING

~~06/97~~

PART 1 GENERAL

1.1 DEFINITIONS

1.1.1 Clearing

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, and rubbish occurring in the areas to be cleared.

1.1.2 Grubbing

Grubbing shall consist of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas.

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

Materials Other Than Salable Timber; ~~_____~~, ~~_____~~

Written permission to dispose of such products on private property shall be filed with the Contracting Officer.

1.3 MEASUREMENT

1.3.1 Measured Clearing

Clearing shall be measured in acres of clearing actually performed. Areas of light brush, shrubs, and other vegetation that can be cut with a brush hook, scythe, or mowing machine shall not be measured as clearing.

1.3.2 Measured Grubbing

Grubbing shall be measured in acres of grubbing actually performed. Areas where tree roots and timber are less than 3 inches in diameter and areas where roots of brush, shrubs, and other vegetation can be removed by

plowing shall not be measured as grubbing.

1.3.3 Measured Clearing and Grubbing

Clearing and grubbing shall be measured in acres of clearing and grubbing actually performed.

1.3.4 Measured Tree Removal

Tree removal shall be measured by the number of trees of stated sizes removed from areas outside the clearing and grubbing areas. The size shall be determined by the average diameter of the trunk 4 feet above the ground line. The size of stumps designated for removal as trees shall be determined by the diameter of the trunk 4 feet above the ground line. The diameter shall be measured to the nearest full inch.

1.4 PAYMENT

1.4.1 Paid Clearing

Payment for clearing will be made at the contract unit price per acre for clearing, and this price shall constitute full compensation for all labor, equipment, tools, and incidentals necessary to complete the work specified herein.

1.4.2 Paid Grubbing

Payment for grubbing will be made at the contract unit price per acre for grubbing, and this price shall constitute full compensation for all labor, equipment, tools, and incidentals necessary to complete the work specified herein.

1.4.3 Paid Clearing and Grubbing

Payment will be made at the contract unit price for clearing and grubbing, and this price shall constitute full compensation for all labor, equipment, tools, and incidentals necessary to complete the work specified herein.

1.4.4 Paid Tree Removal

Payment for tree removal will be made at the contract unit price for removing trees, or stumps designated as trees, that are outside the area designated for clearing or grubbing in accordance with the following schedule of sizes:

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 CLEARING

Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left

standing. Trees designated to be left standing within the cleared areas shall be trimmed of dead branches 1-1/2 inches or more in diameter and shall be trimmed of all branches the heights indicated or directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Cuts more than 1-1/2 inches in diameter shall be painted with an approved tree-wound paint. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require. [Clearing shall also include the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work.]

3.2 GRUBBING

Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings, and areas to be paved. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground.

3.3 TREE REMOVAL

Where indicated or directed, trees and stumps that are designated as trees shall be removed from areas outside those areas designated for clearing and grubbing. This work shall include the felling of such trees and the removal of their stumps and roots as specified in paragraph GRUBBING. Trees shall be disposed of as specified in paragraph DISPOSAL OF MATERIALS.

3.4 DISPOSAL OF MATERIALS

~~3.4.1 Salable Timber~~

~~All felled timber from which saw logs, pulpwood, posts, poles, ties, mine props, or cordwood can be produced shall be considered as salable timber, and shall be trimmed of limbs and tops, sawed into salable lengths of [] feet, and stockpiled at locations as directed. The disposal of the stockpiled timber will be by the Government.~~

3.4.1 [Enter Appropriate Subpart Title Here] ~~3.4.1 Materials Other Than Salable Timber~~

Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations, ~~except for salable timber,~~ shall be disposed of ~~[in the designated waste disposal area] [outside the limits of Government-controlled land at the Contractor's responsibility] [by burning],~~ except when otherwise directed in writing. Such directive will state the conditions covering the disposal of such products and will also state the areas in which they may be placed. ~~[Refuse to be burned shall be burned at specified locations and in a manner to prevent damage to existing structures and appurtenances, construction in progress, trees, and other vegetation. The Contractor shall be responsible for compliance with all~~

~~Federal and State laws and regulations and with reasonable practice relative to the building of fires. Burning or other disposal of refuse and debris and any accidental loss or damage attendant thereto shall be the Contractor's responsibility.]~~

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SECTION 02300A

EARTHWORK

~~12/97~~

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 ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

- AASHTO T 180 (1997) Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and an 457 mm (18-in) Drop
- AASHTO T 224 (1996) Correction for Coarse Particles in the Soil Compaction Test

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- ASTM C 136 (1996a) Sieve Analysis of Fine and Coarse Aggregates
- ASTM ~~D 422C~~ 117 ~~(1963; R 1998) Particle-Size Analysis of Soils~~
Gradation tests
- ASTM D 1140 (1997) Amount of Material in Soils Finer than the No. 200 (75-micrometer) Sieve
- ASTM D 1556 (1990; R 1996e1) Density and Unit Weight of Soil in Place by the Sand-Cone Method
- ASTM D 1557 (1991; R 1998) 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 (1998) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- ASTM ~~D 2922~~ ~~(1996e1) Density of Soil and~~

~~Soil Aggregate in Place by Nuclear Methods
(Shallow Depth)~~

ASTM D 2937	(1994) Density of Soil in Place by the Drive-Cylinder Method
ASTM D 3017	(1988; R 1996el) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(1998) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.2 MEASUREMENT

1.2.1 Excavation

The unit of measurement for excavation and borrow will be the cubic yard, computed by the average end area method from cross sections taken before and after the excavation and borrow operations. The volume to be paid for will be the number of cubic yards of material measured in its original position and removed from the excavation and borrow areas, including the excavation for ditches, gutters, and channel changes, when the material is acceptably utilized or disposed of as herein specified. The measurements will include authorized excavation of rock, authorized excavation of unsatisfactory subgrade soil, and the volume of loose, scattered rocks and boulders collected within the limits of the work; allowance will be made on the same basis for selected backfill ordered as replacement. The measurement will not include the volume of subgrade material or other material that is scarified or plowed and reused in-place, and will not include the volume excavated without authorization or the volume of any material used for purposes other than directed. The volume of overburden stripped from borrow pits and the volume of excavation for ditches to drain borrow pits, unless used as borrow material, will not be measured for payment. The measurement will not include the volume of any excavation performed prior to the taking of elevations and measurements of the undisturbed grade.

~~1.2.2 Topsoil Requirements~~

~~Separate excavation, hauling, and spreading or piling of topsoil and related miscellaneous operations will be considered subsidiary obligations of the Contractor, covered under the contract unit price for excavation.~~

~~1.2.3 Overhaul Requirements~~

~~The unit of measurement for overhaul will be the station-yard. The number of station-yards of overhaul to be paid for will be the product of number of cubic yards of overhaul material measured in the original position, multiplied by the overhaul distance measured in stations of 100 feet. The overhaul distance will be the distance in stations between the center of volume of the overhaul material in its original position and the center of volume after placing, minus the free-haul distance in stations. The haul distance will be measured along the shortest route determined by the~~

~~Contracting Officer as feasible and satisfactory. Unsatisfactory materials or waste will not be measured for overhaul where the length of haul for borrow is within the free-haul limits.~~

1.3 PAYMENT

Payment will constitute full compensation for all labor, equipment, tools, supplies, and incidentals necessary to complete the work.

1.3.1 Classified Excavation

Classified excavation will be paid for at the contract unit prices per cubic yard for common or rock excavation.

1.3.2 Unclassified Excavation

Unclassified excavation will be paid for at the contract unit price per cubic yard for unclassified excavation.

1.3.3 Classified Borrow

Classified borrow will be paid for at the contract unit prices per cubic yard for common or rock borrow.

1.3.4 Unclassified Borrow

Unclassified borrow will be paid for at the contract unit price per cubic yard for unclassified borrow.

~~1.3.5 Authorized Overhaul~~

~~Authorized overhaul will be paid for at the contract unit price per station yard for overhaul in excess of the free-haul limit as designated in paragraph DEFINITIONS.~~

1.4 DEFINITIONS

1.4.1 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,] [CH,] [MH].~~

Satisfactory materials for grading shall be comprised of stones less than 3 & inches, ~~except for fill material for pavements and railroads which shall be comprised of stones less than 3 inches~~ in any dimension.

1.4.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills; trash; refuse; backfills from previous construction; and material classified as satisfactory which contains root and other organic matter or frozen material. The Contracting Officer shall be notified of any contaminated materials.

~~1.4.3 Cohesionless and Cohesive Materials~~

~~Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic. Testing required for classifying materials shall be in accordance with ASTM D 4318, ASTM C 136, ASTM D 422, and ASTM D 1140.~~

1.4.3 Degree of Compaction

Degree of compaction required, except as noted in the second sentence, 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. Since ASTM D 1557 applies only to soils that have 30 percent or less by weight of their particles retained on the 3/4 inch sieve, the degree of compaction for material having more than 30 percent by weight of their particles retained on the 3/4 inch sieve shall be expressed as a percentage of the maximum density in accordance with AASHTO T 180 Method D and corrected with AASHTO T 224. To maintain the same percentage of coarse material, the "remove and replace" procedure as described in the NOTE 8 in Paragraph 7.2 of AASHTO T 180 shall be used.

~~1.4.5 Overhaul~~

~~Overhaul is the authorized transportation of satisfactory excavation or borrow materials in excess of the free-haul limit of [] stations. Overhaul is the product of the quantity of materials hauled beyond the free-haul limit, and the distance such materials are hauled beyond the free-haul limit, expressed in station yards.~~

~~1.4.6 Topsoil~~

~~Material suitable for topsoils obtained from [offsite areas] [excavations] [areas indicated on the drawings] is defined as [].~~

1.5 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

Earthwork; [], [].

Procedure and location for disposal of unused satisfactory material.
Blasting plan when blasting is permitted. Proposed source of borrow material.

Notification of encountering rock in the project. Advance notice on the

opening of excavation or borrow areas. Advance notice on shoulder construction for rigid pavements.

SD-06 Test Reports

Testing; [____], [____].

Within 24 hours of conclusion of physical tests, Two[____] copies of test results, including calibration curves and results of calibration tests.

SD-07 Certificates

Testing; [____], [____].

Qualifications of the commercial testing laboratory or Contractor's testing facilities.

1.6 SUBSURFACE DATA

~~No subsurface soil information is available for the project site. Materials in cut banks may be unyielding or contain rock that will require ripping and excavation by large trackhoe sized equipment; no additional compensation shall be forthcoming for extra construction effort to excavate rock and unyielding materials. Subsurface soil boring logs are [shown on the drawings] [appended to the SPECIAL CONTRACT REQUIREMENTS]. The subsoil investigation report and samples of materials taken from subsurface investigations may be examined at [____]. These data represent the best subsurface information available; however, variations may exist in the subsurface between boring locations.~~

1.7 CLASSIFICATION OF EXCAVATION

~~[No consideration will be given to the nature of the materials, and all excavation will be designated as unclassified excavation.] [Excavation specified shall be done on a classified basis, in accordance with the following designations and classifications. Materials in the cut banks may be unyielding or contain rock that will require ripping and excavation by large trackhoe sized equipment; no additional compensation shall be forthcoming for extra excavation effort to excavate rock and unyielding materials.]~~

~~1.7.1 Rock Excavation~~

~~Rock excavation shall include blasting, excavating, grading, and disposing of material classified as rock and shall include the satisfactory removal and disposal of boulders 1/2 cubic yard or more in volume; solid rock; rock material that is in ledges, bedded deposits, and unstratified masses, which cannot be removed without systematic drilling and blasting; and firmly cemented conglomerate deposits possessing the characteristics of solid rock impossible to remove without systematic drilling and blasting. The removal of any concrete or masonry structures, except pavements, exceeding 1/2 cubic yard in volume that may be encountered in the work shall be included in this classification. If at any time during excavation, including excavation from borrow areas, the Contractor~~

~~encounters material that may be classified as rock excavation, such material shall be uncovered and the Contracting Officer notified by the Contractor. The Contractor shall not proceed with the excavation of this material until the Contracting Officer has classified the materials as common excavation or rock excavation and has taken cross sections as required. Failure on the part of the Contractor to uncover such material, notify the Contracting Officer, and allow ample time for classification and cross sectioning of the undisturbed surface of such material will cause the forfeiture of the Contractor's right of claim to any classification or volume of material to be paid for other than that allowed by the Contracting Officer for the areas of work in which such deposits occur.~~

1.7.1 Common Excavation

Common excavation shall include the satisfactory removal and disposal of all materials not classified as rock excavation.

1.8 BLASTING

~~[Blasting shall be performed as specified in Section [_____]. The Contractor shall submit a Blasting Plan and obtain written approval prior to performing any blasting. The plan shall contain provisions for storing, handling and transporting explosives as well as for the blasting operations. The Contractor shall be responsible for damage caused by blasting operations.] [Blasting will not be permitted.]~~

1.9 UTILIZATION OF EXCAVATED MATERIALS

Unsatisfactory materials removed from excavations shall be disposed of in designated waste disposal or spoil areas. Satisfactory material removed from excavations shall be used, insofar as practicable, in the construction of fills, embankments, subgrades, shoulders, bedding (as backfill), and for similar purposes. No satisfactory excavated material shall be wasted without specific written authorization. Satisfactory material authorized to be wasted shall be disposed of in designated areas approved for surplus material storage or designated waste areas as directed. Newly designated waste areas on Government-controlled land shall be cleared and grubbed before disposal of waste material thereon. Coarse rock from excavations shall be stockpiled and used for constructing slopes or embankments adjacent to streams, or sides and bottoms of channels and for protecting against erosion. No excavated material shall be disposed of to obstruct the flow of any stream, endanger a partly finished structure, impair the efficiency or appearance of any structure, or be detrimental to the completed work in any way.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 STRIPPING OF TOPSOIL

Where indicated or directed, topsoil shall be stripped to a depth of six (6) [_____] inches. Topsoil shall be spread on areas already graded and prepared for topsoil, or transported and deposited in stockpiles convenient

to areas that are to receive application of the topsoil later, or at locations indicated or specified. 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. Any surplus of topsoil from excavations and grading shall be ~~{stockpiled in locations indicated}~~ ~~{removed from the site}~~.

3.2 GENERAL EXCAVATION

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. Satisfactory excavated materials shall be transported to and placed in fill or embankment within the limits of the work. Unsatisfactory materials encountered within the limits of the work shall be excavated below grade and replaced with satisfactory materials as directed. Such excavated material and the satisfactory material ordered as replacement shall be included in excavation. Surplus satisfactory excavated material not required for fill or embankment shall be disposed of in areas approved for surplus material storage or designated waste areas. Unsatisfactory excavated material shall be disposed of in designated waste or spoil areas.

During construction, excavation and fill shall be performed in a manner and sequence that will provide proper drainage at all times. Material required for fill or embankment in excess of that produced by excavation within the grading limits shall be excavated from the borrow areas indicated or from other approved areas selected by the Contractor as specified.

3.2.1 Ditches, Gutters, and Channel Changes

Excavation of ditches, gutters, and channel changes shall be accomplished by cutting accurately to the cross sections, grades, and elevations shown. Ditches and gutters shall not be excavated below grades shown. Excessive open ditch or gutter excavation shall be backfilled with satisfactory, thoroughly compacted, material or with suitable stone or cobble to grades shown. Material excavated shall be disposed of as shown or as directed, except that in no case shall material be deposited less than 4 feet from the edge of a ditch. The Contractor shall maintain excavations free from detrimental quantities of leaves, brush, sticks, trash, and other debris until final acceptance of the work.

3.2.2 Drainage Structures

Excavations shall be made to the lines, grades, and elevations shown, or as directed. Trenches and foundation pits shall be of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Rock or other hard foundation material shall be cleaned of loose debris and cut to a firm, level, stepped, or serrated surface. Loose disintegrated rock and thin strata shall be removed. When concrete or masonry is to be placed in an excavated area, the bottom of the excavation shall not be disturbed. Excavation to the final grade level shall not be made until just before the concrete or

masonry is to be placed. Where pile foundations are to be used, the excavation of each pit shall be stopped at an elevation 1 foot above the base of the footing, as specified, before piles are driven. After the pile driving has been completed, loose and displaced material shall be removed and excavation completed, leaving a smooth, solid, undisturbed surface to receive the concrete or masonry.

3.3 SELECTION OF BORROW MATERIAL

Borrow material shall be selected to meet the requirements and conditions of the particular fill or embankment for which it is to be used. Borrow material ~~shall~~ may be obtained from the ~~borrow areas~~ Ella Road Borrow Site ~~shown on drawings~~ ~~within the limits of the project site, selected by the Contractor~~ ~~or~~ ~~from approved private sources~~. Unless otherwise provided in the contract, the Contractor shall obtain from the owners the right to procure material, pay royalties and other charges involved, and bear the expense of developing the sources, including rights-of-way for hauling. Borrow material from approved sources on Government-controlled land may be obtained without payment of royalties. Unless specifically provided, no borrow shall be obtained within the limits of the project site without prior written approval. Necessary clearing, grubbing, and satisfactory drainage of borrow pits and the disposal of debris thereon shall be considered related operations to the borrow excavation.

3.4 OPENING AND DRAINAGE OF EXCAVATION AND BORROW PITS

The Contractor shall notify the Contracting Officer sufficiently in advance of the opening of any excavation or borrow pit to permit elevations and measurements of the undisturbed ground surface to be taken. Except as otherwise permitted, borrow pits and other excavation areas shall be excavated providing adequate drainage. Overburden and other spoil material shall be transported to designated spoil areas or otherwise disposed of as directed. Borrow pits shall be neatly trimmed and drained after the excavation is completed. The Contractor shall ensure that excavation of any area, operation of borrow pits, or dumping of spoil material results in minimum detrimental effects on natural environmental conditions.

3.5 GRADING AREAS

Where indicated, work will be divided into grading areas within which satisfactory excavated material shall be placed in embankments, fills, and required backfills. The Contractor shall not haul satisfactory material excavated in one grading area to another grading area except when so directed in writing.

3.6 BACKFILL

Backfill adjacent to any and all types of structures shall be placed and compacted to at least 90 percent laboratory maximum density for cohesive materials ~~or 95 percent laboratory maximum density for cohesionless materials~~ to prevent wedging action or eccentric loading upon or against the structure. Ground surface on which backfill is to be placed shall be prepared as specified in paragraph PREPARATION OF GROUND SURFACE FOR EMBANKMENTS. Compaction requirements for backfill materials shall also

conform to the applicable portions of paragraphs PREPARATION OF GROUND SURFACE FOR EMBANKMENTS, EMBANKMENTS, and SUBGRADE PREPARATION, and Section 02630 STORM-DRAINAGE SYSTEM; and Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

3.7 PREPARATION OF GROUND SURFACE FOR EMBANKMENTS

3.7.1 General Requirements

Ground surface on which fill is to be placed shall be stripped of live, dead, or decayed vegetation, rubbish, debris, and other unsatisfactory material; plowed, disked, or otherwise broken up to a depth of eight (8) []; pulverized; moistened or aerated as necessary; thoroughly mixed; and compacted to at least 90 percent laboratory maximum density for cohesive materials ~~or 95 percent laboratory maximum density for cohesionless materials~~. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment. The prepared ground surface shall be scarified and moistened or aerated as required just prior to placement of embankment materials to assure adequate bond between embankment material and the prepared ground surface, and compaction of the earth fill shall not in any way damage the filter fabric or drainage layer.

3.7.2 Frozen Material

Embankment shall not be placed on a foundation which contains frozen material, or which has been subjected to freeze-thaw action. This prohibition encompasses all foundation types, including the natural ground, all prepared subgrades (whether in an excavation or on an embankment) and all layers of previously placed and compacted earth fill which become the foundations for successive layers of earth fill. All material that freezes or has been subjected to freeze-thaw action during the construction work, or during periods of temporary shutdowns, such as, but not limited to, nights, holidays, weekends, winter shutdowns, or earthwork operations, shall be removed to a depth that is acceptable to the Contracting Officer and replaced with new material. Alternatively, the material will be thawed, dried, reworked, and recompactd to the specified criteria before additional material is placed. The Contracting Officer will determine when placement of fill shall cease due to cold weather. The Contracting Officer may elect to use average daily air temperatures, and/or physical observation of the soils for his determination. Embankment material shall not contain frozen clumps of soil, snow, or ice.

3.8 EMBANKMENTS

3.8.1 Earth Embankments

Earth embankments shall be constructed from satisfactory materials free of organic or frozen material and rocks with any dimension greater than 3 inches. The material shall be placed in successive horizontal layers of loose material not more than eight (8) [] inches in depth. Each layer shall be spread uniformly on a soil surface that has been moistened or

aerated as necessary, and scarified or otherwise broken up so that the fill will bond with the surface on which it is placed. After spreading, each layer shall be plowed, disked, or otherwise broken up; moistened or aerated as necessary; thoroughly mixed; and compacted to at least 90 percent laboratory maximum density for cohesive materials or ~~95 percent laboratory maximum density for cohesionless materials~~. Compaction requirements for the upper portion of earth embankments forming subgrade for pavements shall be identical with those requirements specified in paragraph SUBGRADE PREPARATION. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment.

~~3.8.2 Rock Embankments~~

~~Rock embankments shall be constructed from material classified as rock excavation, as defined above, placed in successive horizontal layers of loose material not more than [] inches in depth. Pieces of rock larger than [] inches in the greatest dimension shall not be used. Each layer of material shall be spread uniformly, completely saturated, and compacted to a minimum density of [] pcf. Each successive layer of material shall adequately bond to the material on which it is placed. Compaction shall be accomplished with vibratory compactors weighing at least [] tons, heavy rubber-tired rollers weighing at least [] tons, or steel-wheeled rollers weighing at least [] tons. [Rock excavation shall not be used as fill material for the construction of pavements.][In embankments on which pavements are to be constructed, rock shall not be used above a point [] inch below the surface of the pavement.]~~

3.9 SUBGRADE PREPARATION

3.9.1 Construction

Subgrade shall be shaped to line, grade, and cross section, and compacted as specified. This operation shall include plowing, disking, and any moistening or aerating required to obtain specified compaction. Soft or otherwise unsatisfactory material shall be removed and replaced with satisfactory excavated material or other approved material as directed. Rock encountered in the cut section shall be excavated to a depth of 6 inches below finished grade for the subgrade. Low areas resulting from removal of unsatisfactory material or excavation of rock shall be brought up to required grade with satisfactory materials, and the entire subgrade shall be shaped to line, grade, and cross section and compacted as specified. ~~After rolling, the surface of the subgrade for roadways shall not show deviations greater than one-half (1/2)[] inch when tested with a eight (8)[] foot straightedge applied both parallel and at right angles to the centerline of the area.~~ ~~After rolling, the surface of the subgrade for airfields shall not show deviations greater than [] inch when tested with a [] foot straightedge applied both parallel and at right angles to the centerline of the area.~~ The elevation of the finish subgrade shall not vary more than 0.05 foot from the established grade and cross section.

3.9.2 Compaction

Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment. Except for paved areas and railroads, each layer of the embankment shall be compacted to at least ninety(90)~~{_____}~~ percent of laboratory maximum density.

~~3.9.2.1 Subgrade for Railroads~~

~~Subgrade for railroads shall be compacted to at least 90 percent laboratory maximum density for cohesive materials or 95 percent laboratory maximum density for cohesionless materials.~~

3.9.2.1 Subgrade for Pavements

Subgrade for pavements shall be compacted to at least ninety (90)~~{_____}~~ percentage laboratory maximum density for the depth below the surface of the pavement shown. When more than one soil classification is present in the subgrade, the top six (6)~~{_____}~~ inches of subgrade shall be scarified, windrowed, thoroughly blended, reshaped, and compacted.

3.9.2.2 Subgrade for Shoulders

Subgrade for shoulders shall be compacted to at least ninety(90)~~{_____}~~ percentage laboratory maximum density for the ~~{depth below the surface of shoulder shown}~~ ~~{full depth of the shoulder}~~.

3.10 SHOULDER CONSTRUCTION

Shoulders shall be constructed of satisfactory excavated or borrow material or as otherwise shown or specified. Shoulders shall be constructed as soon as possible after adjacent paving is complete, but in the case of rigid pavements, shoulders shall not be constructed until permission of the Contracting Officer has been obtained. The entire shoulder area shall be compacted to at least the percentage of maximum density as specified in paragraph SUBGRADE PREPARATION above, for specific ranges of depth below the surface of the shoulder. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, vibratory compactors, or other approved equipment. Shoulder construction shall be done in proper sequence in such a manner that adjacent ditches will be drained effectively and that no damage of any kind is done to the adjacent completed pavement. The completed shoulders shall be true to alignment and grade and shaped to drain in conformity with the cross section shown.

3.11 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 that the degree of finish for subgrades shall be specified in paragraph SUBGRADE PREPARATION. 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.

~~3.12 PLACING TOPSOIL~~

~~On areas to receive topsoil, the compacted subgrade soil shall be scarified to a 2 inch depth for bonding of topsoil with subsoil. Topsoil then shall be spread evenly to a thickness of [] inches and graded to the elevations and slopes shown. Topsoil shall not be spread when frozen or excessively wet or dry. Material required for topsoil in excess of that produced by excavation within the grading limits shall be obtained from [offsite areas] [areas indicated].~~

3.12 TESTING

Testing shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval. If the Contractor elects to establish testing facilities, no work requiring testing will be permitted until the Contractor's facilities have been inspected and approved by the Contracting Officer. Field in-place density shall be determined in accordance with ~~[ASTM DC 1556]~~117 and ASTM C136] ~~[ASTM D 2167]~~ ~~[ASTM D 2922]~~. ~~[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. ASTM D 2922 results in a wet unit weight of soil and when using this method ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall also be checked along with density calibration checks as described in ASTM D 3017; the calibration checks of both the density and moisture gauges shall be made at the beginning of a job on each different type of material encountered and at intervals as directed by the Contracting Officer.] [ASTM D 2937, Drive Cylinder Method shall be used only for soft, fine-grained, cohesive soils.]~~ -When test results indicate, as determined by the Contracting Officer, that compaction is not as specified, the material shall be removed, replaced and recompacted to meet specification requirements. Tests on recompacted areas shall be performed to determine conformance with specification requirements. Inspections and test results shall be certified by a registered professional civil engineer. 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. The following number of tests, if performed at the appropriate time, will be the minimum acceptable for each type operation.

3.12.1 Fill and Backfill Material Gradation

One test per 1,000[] cubic yards stockpiled or in-place source material. Gradation of fill and backfill material shall be determined in accordance with ~~[ASTM C 136]~~ ~~[ASTM D 422C 117 and C 136]~~ ~~[ASTM D 1140]~~.

3.12.2 In-Place Densities

- a. One test per 5,000[] square feet, or fraction thereof, of each lift of fill or backfill areas compacted by other than hand-operated machines.

- b. One test per 1,000~~[_____]~~ square feet, or fraction thereof, of each lift of fill or backfill areas compacted by hand-operated machines.
- c. One test per 500~~[_____]~~ linear feet, or fraction thereof, of each lift of embankment or backfill for ~~[roads]~~ ~~[airfields]~~.
- ~~d. One test per [_____] linear feet, or fraction thereof, of each lift of embankment or backfill for railroads.~~

3.12.3 Check Tests on In-Place Densities

~~If ASTM D 2922 is used, i~~n-place densities shall be checked by ASTM D 1556 as follows:

- a. One check test per lift for each 20,000~~[_____]~~ square feet, or fraction thereof, of each lift of fill or backfill compacted by other than hand-operated machines.
- b. One check test per lift for each 5,000~~[_____]~~ square feet, of fill or backfill areas compacted by hand-operated machines.
- c. One check test per lift for each 1,000~~[_____]~~ linear feet, or fraction thereof, of embankment or backfill for ~~[roads]~~ ~~[airfields]~~.
- ~~d. One check test per lift for each [_____] linear feet, or fraction thereof, of embankment or backfill for railroads.~~

3.12.4 Moisture Contents

In the stockpile, excavation, or borrow areas, a minimum of two tests per day per type of material or source of material being placed during stable weather conditions shall be performed. During unstable weather, tests shall be made as dictated by local conditions and approved by the Contracting Officer.

3.12.5 Optimum Moisture and Laboratory Maximum Density

Tests shall be made for each type material or source of material including borrow material to determine the optimum moisture and laboratory maximum density values. One representative test per 5,000~~[_____]~~ cubic yards of fill and backfill, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum density.

3.12.6 Tolerance Tests for Subgrades

Continuous checks on the degree of finish specified in paragraph SUBGRADE PREPARATION shall be made during construction of the subgrades.

3.13 SUBGRADE AND EMBANKMENT PROTECTION

During construction, embankments and excavations shall be kept shaped and drained. Ditches and drains along subgrade shall be maintained to drain

effectively at all times. The finished subgrade shall not be disturbed by traffic or other operation and shall be protected and maintained by the Contractor in a satisfactory condition until ballast, subbase, base, or pavement is placed. The storage or stockpiling of materials on the finished subgrade will not be permitted. No subbase, base course, ballast, or pavement shall be laid until the subgrade has been checked and approved, and in no case shall subbase, base, surfacing, pavement, or ballast be placed on a muddy, spongy, or frozen subgrade.

-- End of Section --

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DIVISION 02 - SITE WORK

SECTION 02378A

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SECTION 02378A

GEOTEXTILES USED AS FILTERS

~~05/95~~

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 123	(1996a) Standard Terminology Relating to Textiles
ASTM D 4354	(1996) Sampling of Geosynthetics for Testing
ASTM D 4355	(1992) Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
ASTM D 4491	(1999) Water Permeability of Geotextiles By Permittivity
ASTM D 4533	(1991; R 1996) Trapezoid Tearing Strength of Geotextiles
ASTM D 4632	(1991; R 1996) Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	(1999) Determining Apparent Opening Size of a Geotextile
ASTM D 4833	(1988; R 1996) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D 4873	(1997) Identification, Storage, and Handling of Geosynthetic Rolls
ASTM D 4884	(1996) Strength of Sewn or Thermally Bonded Seams of Geotextiles

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 1110-2-1601	(1991; Change 1-1994) Hydraulic Design of Flood Control Channels
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1.2 UNIT PRICES

1.2.1 Geotextiles

1.2.1.1 Payment

Payment will be made at the contract unit price and will constitute full compensation to the contractor for providing all plant, labor, material, and equipment and performing all operations necessary for the complete and satisfactory installation of the geotextile. The following items are included in the contract unit price for Geotextiles and will not be counted a second time in the process of determining the extent of geotextile placed: Material and associated equipment and operation used in laps, seams, or extra length; securing pins and associated material, equipment, and operations; and material and associated equipment and operations used to provide cushioning layer of sand or gravel or both to permit increase in allowable drop height of stone. No payment will be made for geotextiles replaced because of waste, contamination, damage, repair, or due to contractor fault or negligence.

1.2.1.2 Measurement

Installed geotextiles will be measured for payment in place to the nearest ~~_____~~ square ~~feet~~yard of protected area as delineated in the drawings.

1.2.1.3 Unit of Measure

Unit of measure: ~~_____~~ square ~~feet~~yard.

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-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 ~~_____~~~~6600~~ 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; ~~[_____], [_____]~~

~~Submit the manufacturer's certification of the geotextile material. 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.~~

1.4 SHIPMENT, HANDLING, AND STORAGE

1.4.1 Shipment and Storage

Only approved geotextile ~~rolls~~, ~~panels~~, ~~[_____]~~ 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.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Geotextile

2.1.1.1 General

The geotextile shall be a ~~woven~~~~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	<u>200</u> —	ASTM D 4632
SEAM STRENGTH	lb	— <u>55</u>	ASTM D 4632

TABLE 1
MINIMUM PHYSICAL REQUIREMENTS FOR DRAINAGE GEOTEXTILE

PUNCTURE	lb	<u>55</u>	ASTM D 4833
TRAPEZOID TEAR	lb	<u>55</u>	ASTM D 4533
PERMEABILITY	cm/sec	<u>20 gal/min/sf</u>	
ASTM D 4491			
APPARENT OPENING			
SIZE	U.S. SIEVE	<u>No finer than N0.70 No coarser than</u>	
<u>N0.40</u>	ASTM D 4751		
PERMITTIVITY	sec -1		ASTM D 4491
ULTRAVIOLET			
DEGRADATION	Percent	50 AT 500 Hrs <u>570 AT 500 Hrs</u>	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. The sheets of geotextile shall be attached at the factory or another approved location, if necessary, to form sections not less than [three] feet wide. Seams shall be tested in accordance with method ASTM D 4884. 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 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. † Conformance testing shall be performed in accordance with the manufacturers approved quality control manual. †† 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 †† in accordance with ASTM D 4354 (Procedure Method B) †† at a frequency of once per 100,000 square feet †. 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 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 placed with the long dimension ~~{parallel}~~ ~~{perpendicular}~~ to the ~~{center}~~controlline of the channel~~[[shoreline]]~~~~[[trench]]~~ levee and laid smooth and free of tension, stress, folds, wrinkles, or creases. The strips shall be placed to provide a minimum width of ~~{ }12~~ inches of overlap for each joint. The placement procedure requires that the length of the geotextile be approximately ~~{ }5~~ percent greater than the slope length. 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 ~~{bedding layer}~~ ~~[[riprap]]~~ is placed shall be allowed. The temporary pins shall be removed as the ~~{bedding}~~~~[[granular material]]~~~~[[riprap]]~~ is placed to relieve high tensile stress which may occur during placement of material on the geotextile. Design protection of riprap should be in compliance with EM 1110-2-1601. Trimming shall be performed in such a manner that the geotextile shall not be damaged in any way.

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 [granular filter materials][bedding materials][riprap] 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 riprap or other materials.† This may be accomplished by limiting the height of drop to less than 1 foot, by placing a cushioning layer of sand or gravel on top of the geotextile before placing the material, or other methods deemed necessary. Care should be taken to ensure that the utilized cushioning materials shall not impede the flow of water.‡ 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 ~~CUSHIONING MATERIAL~~Drain Rock Layer

Placing of ~~cushioning material~~drain rock layer shall be performed in a manner to insure intimate contact of the geotextile with the prepared surface and with the ~~cushioning material~~drain rock layer. The placement shall also be performed in a manner that shall not damage the geotextile including tear, puncture, or abrasion. On sloping surfaces the ~~cushioning material~~drain rock layer shall be placed from the bottom of the slopes upward. During placement, the height of the drop of riprap material shall not be greater than 12 inches. Any geotextile damaged beneath the ~~cushioning material~~drain rock layer 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} {panels} {_____} shall be {12} {24}{36}{_____} inches. Appropriate measures will be taken to insure required overlap exists after cushion placement.

3.5.2 Sewn Seams

High strength thread should be used such that seam test should conform to ASTM D 4884. The thread shall meet the chemical, ultraviolet, and physical requirements of the geotextile, and the color shall be different from that of the geotextile. The seam strength shall be equal to the strength required for the geotextile in the direction across the seam. Overlapping J-type seams are preferable over prayer-type seams as the overlapping geotextile reduces the chance of openings to occur at the seam. Double sewing shall be used specially for field seams to provide a safety factor against undetected missed stitches.

3.6 {FIELD TESTING

Geotextile {in tension }shall be field tested.}

-- End of Section --

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SECTION 02525A

RELIEF WELLS

~~09/01~~

PART 1 GENERAL

1.1 SCOPE of work

This section, in conjunction with the contract drawings, covers new relief wells in their entirety including well drilling, well screen, riser pipe, gravel pack, outlet works, well development, and pumping tests.

1.2 QUALITY CONTROL

1.2.1 General

The Contractor shall perform the inspection, sampling and testing, corrective actions, and submit the required reports to substantiate compliance with the technical provisions of this specification. Responsibility for quality control of relief well construction shall be the Contractor's. To accomplish quality control of relief well construction the Contractor shall form an organization responsible through the quality control engineer to the Contractor's project manager. The Contractor's quality control organization shall have personnel sufficient in number to monitor at all times the relief well construction activities

1.2.2 Inspection.

The Contractor's quality control organization shall be responsible to observe and control, for compliance with the technical specifications, all relief well construction including but not limited to the following: survey layout, materials, drilling method, joints, bottom plug, materials storage, well pipe assembly and installation, backfilling, cleaning, development, pumps, pump testing, discharge channels, safety and rehabilitation of existing wells. Completed relief wells shall be protected against damage and contamination. The detailed inspection may be assigned to the construction foreman supervising the work.

1.2.3 Sampling and Testing

The Contractor's quality control organization shall verify that all relief well materials conform to these specifications before delivery to the project.

1.2.4 Action Required

When quality control monitoring or testing detects non-conformance with specifications, corrective action shall be directed. The details of the irregularities and the actions directed to correct them shall be reported immediately to the representative of the Contracting Officer and included in the daily Quality Control report. Corrective action shall include steps taken to assure against recurrence of the irregularity.

1.3 APPLICABLE PUBLICATIONS

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

1.3.1 Department of the Army, Corps of Engineers, Engineer Manual

EM 1110?2?1906 Laboratory Soils Testing, 30 November 1970.

1.3.2 American Society for Testing and Materials (ASTM)

A 312/A312M-94 (REV B) Seamless and Welded Austenitic Stainless Steel Pipes

C117-95 Materials Finer Than 75-UM (No. 200) Sieve in Mineral Aggregates by Washing

C-136-95 Sieve analysis of Fine and Coarse Aggregates

F 480-94 Thermoplastic Well Casing Pipe and couplings Made in Standard Dimension Ratios (SDR) Schedule 40 and Schedule 80

1.3.3 The Aluminium Association (AA)

AA SAS-30 (1986) Aluminum Construction Manual Series - Secion 1 Specifications for Aluminum Structures

1.3.4 American Welding Society (AWS)

Structural Welding Code - Steel

1.4 MEASUREMENT AND PAYMENT

1.4.1 Relief Well.

Compensation for the relief well will be made at the contract unit price and shall include materials, equipment, and labor required to drill, develop, perform tests, and complete the relief well. Depth shall be measured as a total linear distance between the ground surface (top of berm) and 2--feet below the bottom of the tail pipe. If the total depth of the relief well is greater than that specified in the contract for Item "RELIEF WELLS INSTALLED AND TESTED", the additional depth shall be paid for at the contract unit price for Item "ADDITIONAL RELIEF WELL DEPTH". Any holes or wells ordered abandoned by the Contracting Officer due to no fault of the Contractor will be paid for under Item "ADDITIONAL RELIEF WELL DEPTH". No payment will be allowed for wells abandoned due to faulty construction practices or for the convenience of the Contractor. No separate payment will be made for relief wells screen, riser, check valves, gravel pack, development, or backfill.

~~1.4.2 Additional Relief Well Depth.~~

~~— Compensation for all relief well depth which is more than that specified will be made at the unit price per linear foot for Item "ADDITIONAL RELIEF WELL DEPTH". Unit price for "ADDITIONAL RELIEF WELL DEPTH" shall include all additional well screen and riser pipe (if needed), materials, labor and equipment necessary to complete the well as specified in the field by the Contracting Officer.~~

1.4.2 Relief Well Horizontal Drain Pipe ~~1.4.3 Relief Well Horizontal Drain Pipe~~

By definition, the lengths of horizontal double-walled steel or ductile iron, or equivalent 8"-inside diameter drain pipe connecting the relief well outlet works to the concrete drain ditch. This system also includes all couplings and wire screen mesh, excavation, backfill with lean mix concrete, and other incidental materials as shown on the contract drawings.

Payment will be for linear feet under Item ~~---~~"8" DIA. STEEL PIPE."

1.4.3 Manholes and Inlets ~~1.4.4 Manholes and Inlets~~

The quantities of precast manholes with inlets will be measured as the total number of manholes with inlets, complete with concrete pads cast in place, manhole frames and covers, and constructed as shown on drawings. The depths of the relief well outlet works are as shown on the contract drawings. Payment for the manholes will be for each installed manhole under Item "PRECAST MANHOLES WITH, FRAMES, Clean out, COVER AND CHECK VALVE."

1.5 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "~~FI~~OGA" designation are for information only. The following shall be submitted in accordance with SECTION 01330 - SUBMITTAL PROCEDURES:

SD-06 Instructions

Placing Pipe [~~FI~~OGA]. These shall include printed copies of the manufacturer's recommendations for installation procedures of the material being placed, prior to installation.

SD-14 Samples

Drain Pipe [GA]. Submit samples of the pipe, couplings and outfall screen, before work is started.

SD- Samples

1.5.1 Drilling and Construction Plan

[GA]. Proposed plan for drilling holes and constructing relief wells, before beginning work. The plan shall include, but not limited to, the proposed method of drilling, and methods and equipment proposed for developing the well and for performing the pump tests. No work shall be performed until the drilling plan has been approved and no deviation from the approved drilling plan will be permitted without approval of the Contracting Officers Representative (COR). Details of specific methods to be employed to control potential contamination or pollution arising from well installation activities, shall also be included.

1.5.2 Materials~~1.5.1 Materials~~

[GA]. Before installation, all materials, construction details or methods shall be submitted to the Government for approval. This includes, but is not limited to all well screen, filter pack material, and cement grout mixture proportions.

1.5.3 As-Constructed Drawings~~1.5.2 As-constructed Drawings~~

[GA]. Upon completion of the installation of the relief well system, the Contractor shall submit to the Contracting Officer, As-Constructed drawings which shall accurately depict details of the relief well construction. The drawings shall include details on the well screen material, size, length, slot size and installation details. Also, the riser pipe and outlet works details shall be shown on the As-Constructed drawings. The As-Constructed drawings shall include a Schedule of Materials describing the length of each section of well screen and riser pipe used to meet the total lengths specified for each well.

1.5.4 Permits~~1.5.3 Permits~~

All work shall conform to the requirements of the State of California, County of Yuba, and any local health departments as applicable. Any permitting, licensing, and submittal requirements are the responsibility of the Contractor.

1.6 LOCATION AND WELL DESIGN

The typical relief well design is shown on drawings. The well numbers, locations, and approximate lengths of riser pipe and well screen in each of the 19 relief wells are shown on the Relief Well Schedule. All measurements are approximate. The final design lengths for the well construction will be determined in the field by the Contracting Officer as the work proceeds. The Government anticipates the depths of the completed holes may differ from those shown on Contract Drawings.

1.7 SUBSURFACE CONDITIONS

Previous geotechnical explorations in the area suggest the Contractor will likely encounter alluvial and fluvial sedimentary deposits consisting of a wide variety of grain sizes including clay, silt, sand, gravel and cobbles in varying thicknesses and degrees of compaction or cementation. Prior drilling suggest that generally there is a top stratum consisting of fine grained materials which is underlain by a pervious stata of coarse-grained deposits including, but not limited to sandy gravel, gravely sand, sand, and silty sand. Scattered cobbles may also be encountered throughout the coarser strat. Underlying the pervious strata is one of stiff lean clay and or silt.

PART 2 PRODUCTS

2.1 OUTER (CONDUCTOR) CASING

2.1.1 General

The outer casing shall be of galvanized or black steel pipe, conforming to ASTM A 53 or AWWA C200, as applicable. The casing shall be a minimum 18-inch inner diameter with a minimum thickness equal to U.S. Standard Gauge 8 (0.1719 inches). Joints shall be either threaded and coupled, or field welded in accordance with AWWA C206.

2.2 WELL SCREEN AND RISER PIPE

2.2.1 General

Well screen shall be of the type specified below and shall be of the dimensions hereinafter specified and as shown on the drawings. Screen openings shall be uniform in size and pattern, and shall be spaced approximately equally around the circumference of the pipe. Before installation all well screen shall be approved by the Contracting Officer.

2.2.2 Stainless Steel Well Screen

2.2.2.1 General

The well screen shall be of the continuous slot, wire-wound design. It shall be fabricated by circumferentially wrapping a triangularly shaped wire around a circular array of internal rods. The wire configuration shall produce inlet slots with sharp outer edges, widening inwardly so as to minimize clogging. Each juncture between the horizontal wire and the vertical rods shall be fusion welded under water by the electrical resistance method.

2.2.2.2 Materials

All pipes, rods, bars, wire, and fittings shall be stainless steel conforming to ASTM A 312, Grade TP316.

2.2.2.3 Well Screen

The width of the clear space between the wire wrappings shall be as specified below and shall provide a total open area as recommended by the manufacturer for the slot size specified. The screen shall have a minimum clear inside diameter of 7-7/8-inches. Collapse, column, and tensile strength of the well screen shall be adequate to allow safe installation and development of the wells.

Relief Well Number	Slot Size (inches)
1	0.2050
2	0.0640
3	0.0640
4	0.2500
5	0.2500
6	0.0640
7	0.0640
8	0.0640
9	0.0640
10	0.0640
11	0.2500
12	0.2500
13	0.2500
14	0.0640
15	0.0640
16	0.0640
17	0.0640
18	0.0640
19	0.0640Text

2.2.2.4 Well Screen Coupling

Coupling for the stainless steel well screen shall consist of the same material as the well screen and shall be threaded, and/or fitted with a weld ring. The couplings shall conform in design to the couplings recommended by the manufacturer of the well screen. Joints shall be designed and constructed to support the weight of the screen and/or pipe as it is lowered into the hole.

2.2.3 Stainless Steel Riser Pipe

The relief well riser pipe and fittings shall be manufactured from stainless steel conforming to ASTM A 312, Grade TP~~2~~-316. The pipe roundness, wall thickness, and straightness shall meet the ASTM specifications. The riser pipe shall be Schedule 10 wall thickness with a minimum inside diameter of 8--inches. Discharge details at the top of the riser pipe shall be as shown on the ~~sketches~~ drawing. Couplings between the riser pipe and the well screen and between adjacent pieces of riser pipe sections shall be as specified for well screen pipes.

2.2.4 Stainless Steel Tail Pipe

The relief well shall be fitted with 2-foot sections of tail pipe as specified on drawings, to be constructed below the well screen from the type of stainless steel material used for the riser pipe specified in 02525a-2.2.3. The purpose of the tail pipe assembly is to provide a sediment trap for materials entering the well through the well screen.

2.2.5 Bottom Plug for Tail Pipe

The bottom plug for each tail pipe shall be made of the same material and at least the same minimum thickness as the tail pipe. Plugs shall be the same diameter as the outside of the screen and fastened to the bottom of the tail pipe portion in an approved manner.

2.2.6 Check Valve

The check valves shall be fabricated in accordance with details shown on the drawings and as specified herein. The aluminum parts, at the Contractor's option, may be any one or a combination of aluminum alloys 3005~~2~~-H14, 6061~~2~~-T~~2~~4, or T6. The 3/8~~2~~-inch diameter hollow aluminum guide rods shall be carefully bent to avoid flattening at the bends. The seat for the check valve shall be constructed of a 1/4-inch aluminum plates with a neoprene gasket constructed as indicated on the drawings. The neoprene gasket shall have a thickness of ~~1/8-inch~~ 1/2-inch and shall be fabricated from neoprene gasket material. The aluminum guide rods shall be connected to the plates by welding conforming to the applicable provisions of the AA Specification SAS-30. The check valve shall be temporarily installed on top of the riser pipe immediately after completion of the development pumping, and thereafter shall be kept in place on the pipe at all times, except during pumping, cleaning operations, and actual addition of riser pipe during installation until the total length of the riser pipe is installed. Immediately after the riser pipe is installed to final height, the top of the riser pipe shall be modified for proper fitting of the check valve.

2.3 DRAIN PIPE

Pipe for the drain pipe shall be of the size indicated on the contract drawings and shall conform to the requirements specified and will include all couplings necessary to complete the construction as shown on the contract drawings.

2.3.1 Steel Pipe

Pipe, couplings, and fittings shall be as recommended by the pipe manufacturer and to the sizes shown in the contract drawings.

2.4 SAND FILTER PACK MATERIALS

2.4.1 General

Material for the sand filter pack around the riser pipes and screens shall be a washed sand composed of hard, non-carbonate, tough, and durable particles free from adherent coating. The sand filter pack material shall contain no detrimental quantities of organic matter nor soft, friable, thin, or elongated particles. Sand filter pack materials shall be uniformly graded between the following gradation requirements.

2.4.1.1 Well Screen constructed with 0.060-inch slot size (See Paragraph 2.2.2.3)

Gradation of filter pack for the wells which will be constructed using the 0.060-inch slotted well screen shall conform to following (commonly referred to as 8 X 20):

U.S. Standard Sieve No	Percent by Weight Passing
No. 6	100
No. 8	95-100
No. 12	60-75
No. 16	15-30
No. 20	0-10
No. 30	0-5

2.4.1.2 Well Screen constructed with 0.250-inch slot size (See Paragraph 2.2.2.3)

Gradation of filter pack for the wells which will be constructed using the 0.250-inch slotted well screen shall conform to ASTM C-33, Size 8 and have the following:

U.S. Standard Sieve No	Percent by Weight Passing
1/2-inch	100
3/8-inch	85-100
No. 4	10-30
No. 8	0-10
No. 16	0-5

2.4.2 Particle Size Distribution

The particle size distribution of the sand filter pack shall be sampled and tested by the Contractor using the U. S. Standard Sieve Nos. described in 02525a-2.4.1. No later than 48 hours before being placed in the relief well, the particle size distribution of the sand filter pack shall be determined from a sample obtained from the material stockpiled and the results supplied to the contracting officer. The sand filter pack material and its gradation shall be approved by the Contracting Officer before it is placed in the well.

The laboratory test procedure shall conform to that presented in EM 1110-~~222~~-1906, Appendix V. All points on individual grading curves obtained from representative samples of sand filter material shall lie between the boundary limits as defined by smooth curves drawn through the tabulated grading limits plotted on a mechanical analysis diagram. The individual grading curves within these limits shall not exhibit abrupt changes in slope denoting skip grading, scalping of certain sizes, or other irregularities which would be detrimental to the proper functioning of the sand filter.

~~2.5 MISCELLANEOUS MATERIALS~~

~~2.5.1 Wire Screen Mesh~~

~~The wire screen mesh for the relief well outfall pipes shall be as specified on the contract drawings.~~

2.5 CONCRETE

Concrete shall conform to ASTM Contractor 94, Option A, with a 3/8--inch nominal maximum size aggregate, a maximum slump of 5--inches, air content of percent, and a compressive strength of 2500 psi. Concrete shall conform to package normal weight concrete conforming to ASTM Contractor 387.

PART 3 EXECUTION

3.1 DRILLING

3.1.1 General Requirements

The Contractor will ensure that the execution of the works shall be by competent workmen and performed under the direct supervision of an experienced well driller. Casing pipe, well screen, and joint couplings shall be of compatible materials throughout each well. The pilot hole and relief well shall be drilled straight, plumb, and circular from top to bottom.

3.1.2 Drilling and Setting Outer Casing

The ~~pilot~~ hole shall be ~~reamed~~drilled to the required ~~diameter,~~depth the outer casing installed and grouted in place as specified below. A minimum 18-inch diameter outer casing shall be furnished and placed to a depth of 10 feet, or as determined in the field by the Contracting Officer. The Contractor shall install the outer casing such that at the completion of construction of each relief well the top of the casing will correspond to the elevation specified in the Relief Well Schedule. The hole for the

outer casing shall be drilled to a sufficient size to leave a concentric annular space of not less than 4--inches between the outside of the outer casing and the walls of the hole. The diameter of the outer casing shall be sized to provide sufficient space for drilling a minimum 16-inch diameter hole through it. The method of drilling shall be approved by the Contracting Officer and shall conform to all state and local standards for well construction. The annular space between the outer casing and the walls of the holes shall be filled with concrete as specified in paragraph 2.5 CONCRETE. Placement of concrete shall be done continuously in such a manner as will ensure that the entire annular space is filled in one operation. After concrete placement is completed, drilling operations shall not be resumed for at least 72 hours to allow proper setting of the grout. Measurement and payment for concrete used to set the outer casing shall be as specified in SECTION 02754a Concrete for Small Projects.

3.1.3 Relief Wells

After the grout has set, a 16-inch minimum diameter relief well shall be drilled through the outer casing to the depth specified on The Relief Well Schedule, or as determined by the Contracting Officer. The Relief wells shall be drilled by the mud rotary method, or other method approved by the Contracting Officer, in such a manner which will prevent caving of the hole before or during the placement of the well screen, riser pipe and sand filter pack. Methods which involve significant displacement of the formation, or which may reduce the yield of the well, will not be permitted. Drilling and installation of well screen and sand filter pack shall be completed for each well without interruption. Before the drilling operation begins on each well, the Contractor shall demonstrate that all material, equipment, and experienced personnel are mobilized and that all equipment necessary for the job is adequate for an efficient operation and is operating in a satisfactorily manner. Loss of a hole or well because of lack of material, inadequate or faulty equipment, or careless operating procedures will be considered cause for an abandoned well due to fault of the Contractor. The digging of mud pits or similar excavations will not be allowed.

3.1.4 Temporary Casing

Temporary well casing of either iron or steel of sufficient length to case to the bottom of all borings shall be available at the construction site. Temporary well casing may be used to support the sides of the entire hole during drilling and placement of outer casing, well screen, riser pipe, and sand filter pack and to support the sides of the unbackfilled portion of the hole during development of the well. Any temporary casing shall have an inside diameter large enough to provide the minimum filter thickness, specified in 02525a-3.3.2 entirely around the well screen or riser pipe and shall have sufficient thickness to retain its shape and maintain a true section throughout its depth and may be in sections of any convenient length. The temporary casing shall be securely anchored to the drill rig or ground surface at all times until removed. The temporary casing shall be such as to permit its removal without interfering with the filter or riser pipe. Methods of installation which will create a cavity outside the temporary casing will not be permitted.

3.1.5 Obstructions Encountered

If obstructions are encountered in the foundation which, in the opinion of

the Contracting Officer, render it impracticable to complete the well to the directed depth, the Contracting Officer may adjust the depth to conform to that of the obstruction. Where obstructions are encountered, drilling shall be continued until it is demonstrated to the Contracting Officer that further efforts to advance the drill hole are impracticable.

3.2 INSTALLATION OF RISER PIPE, SCREEN, AND TAIL PIPE ASSEMBLY

3.2.1 Assembly

All materials to construct the riser pipe, well screen, and tail pipe shall be in new and good condition before installation and all couplings and other accessory parts shall be securely fastened in place. The successive lengths of pipe shall be arranged to provide accurate placement of the screen sections in the soil strata. The riser pipe, ~~screen~~ and tail pipe assembly shall be equipped with an appropriate centering guide (centralizer) of the appropriate diameter which will satisfactorily center the pipe and screen in the well and will hold it securely in position while the sand filter pack material is being placed as specified in 02525a~~2~~-3.3. A centralizer shall be placed at 20-foot intervals along the length of the stainless steel riser pipe and on the stainless steel tail pipe section.

3.2.2 Joints

Sections of relief well pipe shall be jointed together as specified in 02525a~~2~~-2.2.2.4. Joints shall be designed and constructed to have the strength of the pipe capable to support the weight of the relief well string as it is lowered into the hole. When not practicable to construct joints that will support the weight of the relief well stem, the stem shall be supported at the lower end by any approved means that will assure that the joints do not open while being lowered into place in the well.

3.2.3 Installation

The assembled riser pipe, screen and tail pipe assembly shall be placed in the hole in such manner as to avoid jarring impacts and to ensure that the assembly is centered and not damaged or disconnected. After the screen and riser pipe have been placed, a sand filter pack shall be constructed around the screen section as specified in 02525a-3.3.2 and the well developed as specified in 02525a~~2~~-3.4. The Contractor shall be responsible for ensuring that the top of the riser pipe is at the elevation designated in the Relief Well Schedule prior to placement of the sand filter pack of the well and that the top surface of the riser pipe is smooth and perpendicular to the axis of the riser pipe to facilitate an adequate seal between the riser pipe and the check valve.

3.3 PLACING OF SAND FILTER PACK

3.3.1 General

After the riser pipe, screen and tail pipe have been placed, the Contractor shall place the sand filter pack using the tremie method or an approved alternative which prevents segregation.

3.3.2 Construction of Sand Filter Pack

The approved sand filter pack shall be constructed around the screen by filling the annular space between the screen and the wall of the hole to the depths designated in the Relief Well Schedule, Sheet B8 with filter

sand material specified in 02525a-2.4.1. The sand filter pack shall have a minimum thickness of not less than 4--inches between the outside of the well screen and the inside of the gravel pack and shall be placed to the top of the outer casing as shown in the contract drawings. Acceptable construction of the relief well demands that the sand filter pack be placed without segregation because the filter when placed in increments tend to segregate as they pass through water, with coarse particles falling faster than fine particles. Therefore, the Contractor shall install the sand filter pack by using the tremie method to maintain a continuous flow of filter material and thus minimize segregation of the material. The tremie pipe should be at least 2-inches in diameter, be perforated with slots 1/16 to 2/32 inch wide, and about 6 inches long, and have flush screw joints. The slots allow the filter material to become saturated, thereby breaking the surface tension and prevent bridging of the filter in the tremie. The tremie pipe shall be lowered to the bottom of the open drill hole~~If the sand filter material is placed using the free-fall method, the Contractor shall do so by pouring it directly into the annular space at a rate as rapid and continuous as possible while at the same time preventing bridging of the filter material. A temporary PVC pipe lowered into the annular space prior to placement of the filter material and shaken during placement should reduce the likelihood of bridging.~~ The sand filter pack shall be installed continuously and without interruption until the filter material has been placed to the level specified above.

Contractor shall place a temporary seal in the annulus space to assure that no foreign material will be allowed to enter between the time the filter pack is placed and the construction of the well seal.

If temporary casing is used during drilling, the sand filter pack shall be placed in increments not to exceed 2 feet. The temporary casing shall be raised in small increments approximately equal to the increments of the filter pack placed, except at no time prior to the completion of the placement of the sand filter pack shall the bottom of the casing be less than 1-foot below the top of the sand filter pack in the hole. The placing of the sand filter pack material and withdrawal of the temporary casing shall be continued until the sand filter pack has been placed to the level shown on the contract drawings.

The Contractor shall provide a weighted tape or other approved means of measuring the sand filter pack depth in the hole. The Contractor shall continuously measure the depth to the top of the sand filter pack during the entire filling process in insure that bridging has not occurred. Prior to and during placement of the sand filter pack, the top of the well casing shall be covered or otherwise shielded to prevent the sand filter pack from entering the casing.

3.4 DEVELOPMENT

3.4.1 General

Following placement of ~~gravel~~ sand filter pack materials the Contractor shall develop the relief well by surging and bailing or by high velocity jetting and simultaneous air-lift pumping. At the time of development, the well shall be free of drawdown or surging effects due to pump testing, developing or drilling at another location. The Contractor shall be

responsible for maintaining the needed access and work areas at the relief well and the necessary clearance in the relief well to accomplish development. The Contractor shall furnish, install or construct the necessary discharge line and troughs to conduct and dispose of the discharge a sufficient distance from the work areas to prevent damage. Development shall be conducted to achieve a stable well of maximum efficiency and shall be continued until little or no material from the foundation or gravel sand filter pack can be pulled into the well by pumping. As development proceeds, gravel sand filter pack material shall be added to the annular space around the screen to maintain the top elevation of the gravel pack at the specified elevation. The Contractor shall provide a pressure transducer with an integrated silicon strain gauge bridge an electronic data logger (with a paper readout) for accurately determining the water level in the well under all conditions. If, at any time during the development process it becomes apparent, in the opinion of the Contracting Officer, that the well may be damaged, operations shall be immediately curtailed. The Contracting Officer may require a change in method if the Contractor's method does not accomplish the desired results. If after initial development and 6- hours of additional development, a well continues to produce excess sand, the Contracting Officer may order the Contractor to abandon the well as specified in 02525a-3.78. All materials pulled into the well by the development process shall be removed prior to performing the pumping test.

3.4.2 Well Development

The Contractor shall develop the relief wells using a combination of surging and bailing. Prior to the beginning of development, the wells shall be pumped or bailed to insure a relatively free inflow of water. The surge block shall be approximately 1-inch smaller in diameter than the inside diameter of the relief well and be constructed of material that will not damage the screen if the block comes in contact with the screen. The wells shall be surged through short intervals throughout the screened interval for a period of one hour, or until little or no additional material from the foundation or filter pack can be pulled through the screen. Prior to commencing surging, and periodically during development by this method, all sand and/or other materials shall be removed from inside the screen. All materials pulled into the well by the surging process shall be removed by the Contractor.

In the event that surging and bailing fails to develop the well adequately, the Contractor shall develop the well by using high-velocity, horizontal jetting and simultaneous air-lift pumping. The outside diameter of the jetting tool shall be 1/2 to 1--inch less than the inside diameter of the screen. The exit velocity of the jetting fluid shall be between 150 and 300 fps and have a pressure at the nozzle of approximately 200 psi. Circulation of the jetting water will not be allowed. The jetting shall proceed from the bottom of the screen to the top. The tool shall be rotated at a speed of 1-rpm. It shall be positioned at one level for not less than 2 minutes and shall then be raised to the next level. Individual jetting levels shall be spaced no more than 6--inches vertically apart. Sizing of the eductor pipe, air line, and air compressor shall be adequate to efficiently pump the well at a rate from 10 to 20 percent more than the volume of water introduced through the jetting tool. The eductor pipe shall be placed no more than 5--feet above the top of the jetting tool

during development. At the start of the air-line pumping the quantity of air injected shall only be sufficient to initiate flow through the screen.

3.5 WELL SEALING

After each new well has been developed, the annular space above the inner and outer casings shall be sealed by a steel plate annulus ring of the same material and thickness as the outer casing welded to both riser pipe and the outer casings with a continuous weld to form a water tight bond as shown on the Contract Drawings.

3.6 TESTS

3.6.1 Pump Testing

Upon completion but before acceptance, each well shall undergo a pump test with which to determine the specific capacity and transmissivity. The pump test for each relief well shall be conducted following development and shall occur no sooner than 24 hours after development. After the well is developed and allowed to equilibrate for at least 24 hours, and before pump testing, the static water level in each well shall be measured and recorded. The pumping tests shall be conducted under the direction of the Contracting Officers Representative. The Contractor shall test each well by pumping continuously for a minimum of two hours. The pumping shall be at a constant rate sufficient to produce a discharge of 50 to 150 gallons per minute followed by a 2 hour pump shut-down and static water level rebound test. No test pumping of a well will be permitted concurrently with drilling or pumping of any other well within 500 feet therefrom. In the event that the pump test is interrupted, other than by order of the Contracting Officers Representative, prior to the completion of the specified period of continuous operation, the test shall be re-run at no additional expense to the Government.

The Contractor shall determine, for each well installed, the specific capacity and transmissivity of the screened formation using an appropriate method after the well has been developed. The Contractor shall propose the details of the method expected to be used and the references for those methods in the ~~Relief Well Installation Plan~~Drilling and Construction Plan.

Except for formation water from the well, no other water or liquid shall be introduced to the well as a part of this test. The Contractor shall also monitor the water levels in an adjacent well while the pump test is being performed. Water level measurements from both wells shall be provided to the Government after completion of the tests. The Contractor shall furnish, install, or construct the necessary pipe discharge line, troughs, or ditches necessary to dispose of the permeability test discharge a sufficient distance from the work area to prevent damage. The tests will be conducted under the direction of the Contracting Officer. Test data will be recorded by Contractor personnel on WES Form 796 "Relief Well Pumping Test Report". If data loggers are used the print-outs and ASCII data files are to be submitted to the Government Representative. Prior to starting the test all material shall be removed from the bottom of the well. ~~If the test is interrupted, other than by order of the Contracting Officer, the test shall be re-run.~~ Upon completion of the pump test, the Contractor shall remove all equipment, electrical lines, and debris, and

shall backfill any excavated areas with impervious material.

3.6.1.1 Sand Infiltration

In the event that sand or other material infiltrates into the well as a result of the pumping test, the following procedure shall be followed: If the rate of sand infiltration during the latter part of the two hour pumping test has not been reduced to 5 mg/L or less, the well shall be resurged by manipulation of the test pump for 20 minutes after which the test pumping shall be resumed and shall be continued at the constant rate specified above until the sand infiltration rate is reduced to 5 mg/L, but not for more than a total of eight hours.

Upon completion of the pumping test, any sand or filter material in the bottom of the well shall be removed by pumping or by other approved methods, after which the Contractor shall remove all equipment, discharge lines, etc., and restore the site to its original condition.

3.6.2 Equipment

3.6.2.1 Pump

The Contractor shall provide a deep-well submersible pump capable of producing the specified discharge over a period of time sufficient to satisfactorily perform the pumping test specified. The Contractor shall provide, without additional cost to the Government, the electrical power, control box and the necessary wiring which shall be removed at the completion of the pumping test.

3.6.2.2 Water Level

The Contractor shall provide means for accurately determining the water level in the well to within 0.01-foot, under all conditions.

3.6.2.3 Flow Meter

The Contractor shall furnish and install a calibrated flow meter of standard design for the purpose of measuring the discharge from the well during the pumping test. The calibration of the flow meter shall be checked at regular intervals.

3.6.2.4 Rossum Sand Sampler

The Contractor shall furnish and have thorough knowledge of the use of an approved Rossum centrifugal sand sampler and appurtenant piping and valving for accurate determination of the discharge sand content.

3.6.3 Data

The following test data shall be obtained and recorded by the Contractor on either a WES Form 796 or an approved alternative. Items (6) and (7) will be checked by the Contracting Officer.

(1) Time of water level measurement.

(2) Depth of water in well before, during, and after pumping. The time intervals for measuring the water levels shall be every minute for the first 10 minutes of the test, and then every 10 minutes thereafter for the duration of the pumping test.

- (3) Flow in gpm.
- (4) Depth of water in well before and after pumping.
- (5) Depth of water in closest adjacent well before and during pumping, when requested by the Contracting Officer.
- (6) The depth of sand in well before, during, and after pumping.
- (7) Sand content of discharge in mg/L plotted against time of pumping.

3.6.4 Additional Pumping Test Measurements

In addition to the measurements and record-keeping required of the Contractor, the Government or its representative may require access to the well to perform additional water level measurements in the pumped well and nearby relief wells.

3.6.5 Records

The Contractor shall obtain and furnish to the representative of the Contracting Officer for record purposes the elevation of the water in each well before and after the development pumping, the flow in gpm at the completion of the pumping and the time of observation. The water surface elevation shall be obtained immediately before starting the surge pump and the water surface elevation and flow shall be obtained just before stopping the pump upon completion of the development pumping. This data shall be recorded on WES Form 797, a copy of which is attached at the end of this section.

3.7 EXCAVATION FOR DRAIN PIPES

Excavation of relief well outlet works horizontal drains shall be in accordance with the applicable portions of SECTION 2231 Clearing and Grubbing.

3.7.1 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 12-inches to permit satisfactory jointing and thorough tamping of the bedding material under and around the pipe. Care shall be taken not to over-excavate.

3.7.2 Bedding

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

3.7.3 Placing Pipe

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

backfilling, and those pipes damaged during placement shall be removed and replaced.

3.7.4 Backfilling

After the drain pipe has been properly installed, select material from excavation or borrow, at a moisture content that will facilitate compaction, shall be placed along both sides of the pipe in layers not exceeding 6--inches in compacted depth. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe. Each layer shall be thoroughly compacted with mechanical tampers or rammers. This method of filling and compacting shall continue until the fill has been completed.

3.7.5 Movement of Construction Machinery

In 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 drain pipe system at any stage of construction shall be at the Contractors risk. Any damaged pipe shall be repaired or replaced at the Contractors expense.

3.8 Abandoned Relief Wells

Wells to be abandoned shall be grouted to the ground surface with a cement grout by means of a tremmie grout pipe inserted to the bottom of the well.

The tremmie pipe may be withdrawn as the grout is pumped into the hole, however, the bottom of the tremmie pipe shall remain at least 2 feet below the surface of the grout. The grout shall be injected through the pipe and forced upward toward the surface. When the grout reaches the surface, it shall be allowed to flow to waste until the Contracting Officers Representative determines that the grouting has been satisfactorily accomplished. The grout mix shall consist of a mix of 1 bag of Portland cement, 300 pounds of sand and 7 gallons of water. An approved expansive agent shall be added to the mix, and shall be at a rate of 1-percent expansive agent by weight of the cement

-- End of Section --

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SECTION 02714A

DRAINAGE LAYER

~~07/01~~

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 ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)~~

AASHTO MP 1	(1998) Provisional Specification for Performance Graded Asphalt Binder
AASHTO T 102	(1983; R 1996) Spot Test of Asphaltic Materials

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 29/C 29M	(1997) Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C 88	(1999a) Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
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	(1996a) Sieve Analysis of Fine and Coarse Aggregates
ASTM C 150	(1999a) Portland Cement
ASTM C 595	(2000a) Blended Hydraulic Cements
ASTM C 595M	(1997) Blended Hydraulic Cements (Metric)
ASTM D 5	(1997) Penetration of Bituminous Materials
ASTM D 75	(1987; R 1997) Sampling Aggregates

ASTM D 140	(2000) Sampling Bituminous Materials
ASTM D 946	(1982; R 1999) Penetration-Graded Asphalt-Cement for Use in Pavement Construction
ASTM D 1250	(1980; R 1997e1) Petroleum Measurement Tables
ASTM D 1856	(1995a) Recovery of Asphalt From Solution By Absor Method
ASTM D 2172	(1995) Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D 2487	(2000) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1996e1) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988; R 1996e1) Water Content of Soil and Rock In Place by Nuclear Methods (Shallow Depth)
ASTM D 3381	(1982; R 1999) Viscosity-Graded Asphalt-Cement for Use in Pavement Construction
ASTM D 4791	(1999) Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM E 548	(1994e1) General Criteria Used for Evaluating Laboratory Competence

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

~~Waybills and Delivery Tickets; [____], [____]~~

~~Certified waybills and delivery tickets for all aggregates, bituminous, and cementitious materials actually used.~~

SD-06 Test Reports

~~Sampling and Testing; [____], [____]~~

Copies of field test results within 24 hours of completion of tests.

Approval of Materials; G, ~~_____~~

Material sources and material test results prior to field use.

Evaluation; ~~_____~~, ~~_____~~

Test section construction report.

1.3 UNIT PRICES

1.3.1 Waybills and Delivery Tickets

Copies of waybills and delivery tickets shall be submitted during the progress of the work. Before the final payment is allowed, the Contractor shall file certified waybills and certified delivery tickets for all aggregates, bituminous, and cementitious materials actually used.

1.3.2 Measurement

Deductions will be made for any material wasted, unused, rejected, or used for the convenience of the Contractor.

1.3.2.1 Aggregate Drainage Layer Material

The quantity of aggregate drainage layer material completed and accepted shall be measured in cubic yards. The volume of aggregate drainage layer material in place and accepted shall be determined by the average job thickness obtained in accordance with paragraph THICKNESS CONTROL and the dimensions indicated. ~~The choke stone shall be considered as part of the drainage layer thickness and shall not be measured separately.~~

~~1.3.2.2 Bituminous or Cement Stabilized Drainage Layer~~

~~The quantity of bituminous or cement stabilized drainage layer material completed and accepted shall be measured in 2000 pound tons, excluding the weight of the asphalt or portland cement used in the mix.~~

~~1.3.2.3 Bituminous Material~~

~~The quantity of asphalt cement used in the bituminous stabilized mix shall be measured by the number of gallons of material used in the accepted work corrected to gallons at 60 degrees F in accordance with ASTM D 1250.~~

~~1.3.2.4 Cementitious Material~~

~~The quantity of portland cement used in the cement stabilized mix shall be measured by the number of short hundred-weight (cwt) units of cement used in the accepted work.~~

1.3.3 Payment

The quantities of drainage layer aggregates ~~and bituminous or cementitious materials~~ as specified above will be paid for at the contract unit prices, which will constitute full compensation for the construction and completion of the drainage layer, including the test section, and the furnishing of all other necessary labor and incidentals.

~~1.4 SYSTEM DESCRIPTION~~

~~The Contractor shall build a drainage layer under the pavements as indicated on drawings and the drainage layer shall consist of [Rapid Draining Material (RDM)][Open Graded Material stabilized with a choke stone] [Open Graded Material stabilized with cement or bituminous].~~

1.4 FIELD COMPACTION

Field compaction requirements shall be based on the results of a test section constructed by the Contractor, using the materials, methods, and equipment proposed for use in the work. The test section shall meet the requirements of paragraph TEST SECTION.

1.5 EQUIPMENT

1.5.1 General Requirements

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.

~~1.6.2 Placement Equipment~~

~~An asphalt paving machine shall be used to place drainage layer material. Alternate methods may be used if it can be demonstrated in the test section that these methods obtain the specified results.~~

1.5.2 Compaction Equipment

A dual or single smooth 10 ton (min.) vibratory drum roller which provides a maximum compactive effort without crushing the drainage layer aggregate shall be used to compact drainage layer material.

~~1.6.4 Bituminous Mixing Plant~~

~~The bituminous mixing plant shall be an automatic or semiautomatic controlled, commercially manufactured unit capable of producing a bituminous stabilized aggregate mixture consistent with the job mix formula (JMF). Drum mixers shall be prequalified at the production rate to be used during full scale operations. The prequalification tests shall include extraction methods in accordance with ASTM D 2172 and recovery of the asphalt cement in accordance with ASTM D 1856. The penetration of the recovered asphalt binder shall not be less than 60 percent of the original penetration in accordance with ASTM D 5.~~

~~1.6.5 Cementitious Mixing Plant~~

~~The cementitious mixing plant shall be an automatic or semiautomatic controlled, commercially manufactured unit capable of producing a cement stabilized aggregate mixture consistent with the job mix formula determined by the Government. Aggregate and cement shall be dry mixed sufficiently to prevent cement balls from forming when water is added.~~

1.6 WEATHER LIMITATION

Drainage layer material shall be placed when the atmospheric temperature is above 35 degrees F. Areas of completed drainage layer or underlying courses that are damaged by freezing, rainfall, or other weather conditions or by contamination from sediments, dust, dirt, or foreign material shall be corrected by the Contractor to meet specified requirements.

1.7 SAMPLING AND TESTING

1.7.1 General Requirements

Sampling and testing shall be the responsibility of the Contractor. Sampling and testing shall be performed by an approved commercial testing laboratory, or by the Contractor subject to approval. If the Contractor elects to establish testing facilities of his own, approval of such facilities shall be based on compliance with ASTM E 548, and no work requiring testing will be permitted until the Contractor's facilities have been inspected and approved. The first inspection of the facilities will be at the expense of the Government and any subsequent inspections required because of failure of the first inspection shall be at the expense of the Contractor. Such costs will be deducted from the total amount due the Contractor. Drainage layer materials shall be tested to establish compliance with the specified requirements.

~~1.8.2 Sampling~~

~~Aggregate samples shall be taken in accordance with ASTM D 75. Bituminous samples shall be taken in accordance with ASTM D 140. Bituminous or cement stabilized mixture samples shall be taken using methods approved by the Contracting Officer.~~

1.7.2 Test Methods

~~1.8.3.1 Sieve Analyses~~

~~Sieve analyses shall be made in accordance with ASTM C 117 and ASTM C 136.~~

~~1.8.3.2 Density Tests~~

~~Field density tests for RDM drainage layers shall be made in accordance with ASTM D 2922 by Direct Transmission Method for the full depth of the lift. When using this method, ASTM D 3017 shall be used to determine the~~

~~moisture content of the aggregate drainage layer material. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gauges shall be made by the prepared containers of material method, as described in paragraph "Calibration" of ASTM D 2922, on each different type of material being tested at the beginning of a job and at intervals as directed by the Contracting Officer.~~

~~1.8.3.3 Soundness Test~~

~~Soundness tests shall be made in accordance with ASTM C 88.~~

~~1.8.3.4 Los Angeles Abrasion Test~~

~~Los Angeles abrasion tests shall be made in accordance with ASTM C 131.~~

1.7.2.1 Flat or Elongated Particles Tests

Flat and/or elongated particles tests shall be made in accordance with ASTM D 4791.

1.7.2.2 Fractured Faces Tests

When aggregates are supplied from crushed gravel, approved test methods shall be used to assure the aggregate meets the requirements for fractured faces in paragraph AGGREGATES.

~~1.8.3.7 Bitumen Extraction~~

~~Bitumen extraction tests shall be made in accordance with ASTM D 2172.~~

1.7.3 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 including 0.02mm size material.
- b. Flat and/or elongated particles
- c. Fractured Faces
- ~~d. Los Angeles abrasion.~~
- ~~e. Soundness.~~

1.7.4 Testing Frequency

1.7.4.1 Aggregate Layer

Field density and moisture content tests shall be performed at a rate of at least one test for every ~~{2000}~~ ~~{_____}~~ square / yards of completed area and not less than one test for each day's production. Sieve analyses shall be performed at a rate of at least one test for every ~~{6000}~~ ~~{_____}~~ square / yards of completed area. Soundness tests, Los Angeles abrasion tests, fractured faces tests and flat and/or elongated particles tests shall be performed at the rate of one test for every 12,000/ square yards of production.

~~1.8.5.2 Stabilized Layer~~

~~Sieve analyses shall be performed on aggregates prior to addition of asphalt or portland cement, at a rate of at least one test for every {6000} {_____} square yards of completed area and not less than one test for each days production. Extraction tests on bituminous stabilized material shall be made at the same frequency. Soundness tests, Los Angeles abrasion tests, fractured faces tests, and flat and/or elongated particles tests shall be performed at the rate of one test for every 12,000 square yards of production.~~

1.7.5 Approval of Materials

1.7.5.1 Aggregate

The aggregate source shall be selected at least ~~{60}~~ ~~{_____}~~ days prior to field use in the test section. Tentative approval of the source will be based on certified test results to verify that materials proposed for use meet the contract requirements. Final approval of both the source and the material will be based on test section performance and tests for gradation, soundness, Los Angeles abrasion, flat and/or elongated particles tests and fractured faces tests. For aggregate drainage layer materials, these tests shall be performed on samples taken from the completed and compacted drainage layer course within the test section. ~~For bituminous or cement stabilized drainage layer material, these tests shall be performed on aggregate samples taken prior to addition of bituminous or cementitious material and subsequent placement in the test section.~~

~~1.8.6.2 Bituminous or Cementitious Materials~~

~~Bituminous or cementitious sources and certified material test results shall be submitted for approval not less than {60} {_____} days prior to field use in the test section.~~

~~PART 2 PRODUCTS~~

~~2.1 GOVERNMENT APPROVAL~~

~~Asphalt or cement stabilized material will require Government notification and delivery of approved materials in accordance with paragraph BITUMINOUS OR CEMENT STABILIZED JOB-MIX FORMULA.~~

2.1 AGGREGATES

Aggregates shall consist of clean, sound, hard, durable, angular particles

of crushed stone, crushed slag, or crushed gravel which meet the specification requirements. Slag shall be an air-cooled, blast-furnace product having a dry weight of not less than 65 pcf determined by ASTM C 29/C 29M. The aggregates shall be free of silt and clay as defined by ASTM D 2487, vegetable matter, and other objectionable materials or coatings.

2.1.1 Aggregate Quality

The aggregate shall have a soundness loss not greater than ~~18~~ 10 percent weighted averaged at 5 cycles when tested in magnesium sulfate in accordance with ASTM C 88. The aggregate shall have a percentage of loss on abrasion not to exceed ~~40~~ 20 after 500 revolutions as determined by ASTM C 131. The percentage of flat and/or elongated particles shall be determined by ASTM D 4791 with the following modifications. The aggregates shall be separated into 2 size fractions. Particles greater than 1/2 inch sieve and particles passing the 1/2 inch sieve and retained on the No. 4 sieve. The percentage of flat and/or elongated particles in either fraction shall not exceed 20 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. When the aggregate is supplied from more than one source, aggregate from each source shall meet the specified requirements. When the aggregate is supplied from crushed gravel it shall be manufactured from gravel particles, 90 percent of which by weight are retained on the maximum-size sieve listed in TABLE I. In the portion retained on each sieve specified, the crushed gravel shall contain at least ~~90~~ 75 percent by weight of crushed pieces having two or more freshly fractured faces with the area of each face being at least equal to 75 percent of the smallest midsectional area of the face. When two fractures are contiguous, the angle between planes of the fractures must be at least 30 degrees in order to count as 2 fractured faces.

2.1.2 Gradation Requirements

Drainage layer aggregates shall be well graded within the limits specified in TABLE I.

TABLE I. GRADATION OF DRAINAGE LAYER MATERIAL
Percentage by Weight Passing ~~Square Mesh Sieve~~

Sieve	Rapid draining Material (PDM)	Material Open Graded Material (OGM)	Choke Stone	OGM Stabilized
Designation				
1-1/2 inch	100	100	100	100
1 inch	70-100	95-100	100	95-100
3/4 inch	50-100		100	
1/2 inch	40-80	25-80	100	25-80
3/8 inch	30-100		80-100	
No. 4	10-100	0-10	10-100	0-10
No. 8	0-25	0-5	5-40	0-5
No. 16	0-5		0-10	

~~NOTE 1: The values are based on aggregates of uniform specific gravity, and the percentages passing the various sieves may require appropriate correction by the Contracting Officer when aggregates of varying specific gravities are used.~~

~~NOTE 2: Choke stone is required to stabilize the OGM for constructability of the overlying layer. If approved by the COR, the OGM can be constructed without choke stone, provided equipment is not operated on the finished surface of the OGM. Choke stone shall be made up of hard, durable, crushed aggregate having 90 percent of the stone with fractured faces. The gradation for the choke stone shall be based on the following criteria:~~

- ~~a. The ratio of the D15 of the OGM to the D15 of the choke stone shall be less than 5.~~
- ~~b. The ratio of the D50 of the OGM to the D50 of the choke stone shall be greater than 2.~~

~~NOTE 3: For RDM, the coefficient of uniformity (CU) shall be greater than 3.5. (CU = D60/D10). The contractor is responsible for adjusting the RDM gradation within the ranges listed in Table I to provide a stable construction surface for the proposed equipment and method of transporting materials or the drainage layer can be stabilize with portland cement or asphalt at no additional cost to the government, if approved during the test section.~~

~~NOTE 4: Asphalt cement or portland cement will be required to stabilize the OGM.~~

~~2.3 BITUMINOUS MATERIALS~~

~~Asphalt cement to be mixed with aggregates shall conform to [ASTM D 946 Penetration Grade [____]] [ASTM D 3381 viscosity Grade AASHTO MP 1PG [____]]. In addition, the asphalt cement shall show a negative spot when subjected to the spot test in accordance with AASHTO T 102, using the standard naphtha specified.~~

~~2.4 CEMENTITIOUS MATERIALS~~

~~Portland cement to be mixed with aggregates shall conform to [ASTM C 150, Type I, IA, II or IIA] [ASTM C 595, Type IS or IS (A)].~~

~~2.5 BITUMINOUS OR CEMENT STABILIZED JOB-MIX FORMULA~~

~~The bituminous stabilized mix shall consist of a mixture of OGM and a minimum of 2 percent asphalt cement by weight. Tolerances for bituminous stabilized material shall be maintained for field production at plus or minus 0.25 percent for asphalt cement and plus or minus 25 degrees F for mixing temperatures. The cement stabilized mix shall consist of OGM and a minimum of 200 pounds of portland cement per cubic yard with a water/cement ratio of 0.37. Based on the test section performance, the Contractor shall be responsible for adjustments (increases) in asphalt cement or portland cement quantities to ensure the stabilized drainage layer will not rut or~~

~~be disturbed by the Contractor's proposed paving method. The Contractor shall submit a job-mix formula (JMF) with the test section report for Contracting Officer approval.~~

PART 3 EXECUTION

3.1 STOCKPILING AGGREGATES

Aggregates shall be stockpiled at locations designated by the Contracting Officer. Stockpile areas shall be cleared and leveled prior to stockpiling aggregates. Aggregates shall be stockpiled to prevent segregation and contamination. Aggregates obtained from different sources shall be stockpiled separately.

3.2 TEST SECTION

3.2.1 Data

A test section shall be constructed to evaluate the ability to carry traffic, including placement of overlaying material and the constructability of the drainage layer including required mixing, placement, and compaction procedures. Test section data will be used by the Contracting Officer to validate the required number of compaction passes given in paragraph Compaction Requirements and the field dry density requirements for full scale production.

3.2.2 Scheduling

The test section shall be constructed a minimum of [30] [_____] days prior to the start of full scale production to provide sufficient time for an evaluation of the proposed materials, equipment and procedures including Government QA testing.

~~3.2.3 Location and Size~~

~~The test section shall be placed [inside the production paving limits][outside production paving limits in an area with similar subgrade and subbase conditions approved by the Contracting Officer]. The underlying courses and subgrade preparation, required for the pavement section, shall be completed, inspected and approved in the test section prior to constructing the drainage layer. The test section shall be a minimum of [100] [_____] feet long and two full paving lanes wide side by side.~~

3.2.3 Initial Testing

Certified test results, to verify that the materials proposed for use in the test section meet the contract requirements, shall be provided by the Contractor and approved by the Contracting Officer prior to the start of the test section.

~~3.2.5 Mixing, Placement, and Compaction~~

~~Mixing, placement, and compaction shall be accomplished using equipment~~

~~meeting the requirements of paragraph EQUIPMENT. Compaction equipment speed shall be no greater than 1.5 miles per hour. Compaction shall start from the outside edges of the paving lane and proceed to the centerline of the lift being placed. The roller shall stay a minimum of one half the roller width from the outside edge of the drainage layer being placed until the desired density is obtained. The outside edge shall then be rolled.~~

3.2.4 Procedure

3.2.4.1 RDM Aggregate Drainage Layer Tests

The test section shall be constructed with aggregate in a wet state so as to establish a correlation between number of roller passes and dry density achievable during field production. Three separate areas within the test section shall be designated, each area shall be tested for density, moisture, and gradation. All testing shall be completed in the middle third of the test section being placed. Density and moisture content tests shall be conducted in accordance with ASTM D 2922 and ASTM D 3017. Sieve analysis tests shall be conducted on samples, taken adjacent to the density test locations. One set of tests (i.e. density, moisture, and sieve analysis) shall be taken before the third compaction pass and after each subsequent compaction pass at three separate locations as directed by the Contracting Officer. A pass shall be considered the movement of a roller over the drainage layer area for one direction only. Compaction for the RDM shall consist of a maximum of 5 passes in the vibrating state and one final pass in the static state. Compaction passes and density readings shall continue until the difference between the average dry densities of any two consecutive passes is less than or equal to / 1.0 pcf.

~~3.2.6.2 Bituminous/Cement Stabilized Drainage Layer~~

~~The test section shall be constructed with the same equipment used for production. Three separate areas within the test section shall be designated for sampling. All testing shall be completed in the middle third of the test section being placed. Visual examination of each sample shall be made by the contracting officer to determine if and when crushing of aggregate occurs. One sample shall be taken by the contractor before compaction and after each subsequent compaction pass at three separate locations as directed by the Contracting Officer. Compaction shall continue for a maximum of 6 passes. A pass shall be considered the movement of a roller over the drainage layer area for one direction only. Placement procedures and equipment shall be as described herein. The contracting officer shall determine the number of passes required for compaction from the test section.~~

3.2.4.2 OGM with Choke Stone

The test section shall be constructed with aggregate in a moist state. When the OGM gradation is used, density testing shall not be required, only gradation testing shall be required. Three separate areas within the test section shall be designated for sampling. All testing shall be completed in the middle third of the test section being placed. The maximum number of passes per lift shall be 8. A pass shall be considered the movement of a roller over the drainage layer area for one direction only. Placement

procedures and equipment shall be as described herein. Sieve analysis tests shall be conducted on samples. One set of sieve tests shall be taken before the third compaction pass and after each subsequent compaction pass at three separate locations as directed by the Contracting Officer. Compaction for the OGM shall consist of first 5 passes in the vibrating state and one final pass in the static state. The contracting officer shall determine the number of passes required for production from the results of the test section. If choke stone is used to stabilize the surface of OGM, the choke stone shall be placed after final static compaction of the OGM. The choke stone shall be spread in a thin layer no thicker than $\frac{1}{2}$ inch and worked into the surface of the OGM using two additional passes of a vibratory roller and wetting. Sieve testing is not required after the compaction of the choke stone.

~~3.2.7 Evaluation~~

~~Within 10 days of completion of the test section, the Contractor shall submit to the Contracting Officer a Test Section Construction Report complete with all required test data and correlations. The Contracting Officer will evaluate the data and validate the required number of passes of the roller, the need for a final static pass of the roller, and provide the dry density for field density control during construction.~~

3.3 PREPARATION OF UNDERLYING COURSE

Prior to constructing the drainage layer, the underlying course shall be cleaned of all foreign materials. During construction, the underlying course shall contain no frozen material. The underlying course shall conform to Section 02721 SUBBASE COURSES. Ruts or soft yielding spots in the underlying courses 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. 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 drainage layer is placed.

3.4 TRANSPORTING MATERIAL

3.4.1 Aggregate Drainage Layer Material

Aggregate drainage layer material shall be transported to the site in a manner which prevents segregation and contamination of materials.

~~3.4.2 Bituminous Stabilized Material~~

~~Bituminous stabilized material shall be transported from the mixing plant to the site in trucks having tight, clean, smooth beds lightly coated with an approved releasing agent to prevent adhesion of the stabilized material to the truck beds. Excessive releasing agent shall be drained prior to loading. Each load shall be covered with canvas or other approved material of ample size to protect the stabilized material from the weather and to prevent loss of heat. Loads that have crusts of cold, unworkable material or have become wet will be rejected. Hauling over freshly placed material~~

~~will not be permitted.~~

~~3.4.3 Cement Stabilized Material~~

~~Cement stabilized material shall be transported from the mixing plant to the site in trucks equipped with protective covers. Loads that have crusts of unworkable material or have become excessively wet will be rejected. Hauling over freshly placed material will not be permitted.~~

3.5 PLACING

3.5.1 General Requisites

Drainage layer material shall be placed on the underlying course in lifts of uniform thickness using equipment meeting the requirements of paragraph EQUIPMENT. When a compacted layer / 6 inches or less in thickness is required, the material shall be placed in a single lift. When a compacted layer in excess of / 6 inches is required, the material shall be placed in lifts of equal thickness. No lift shall exceed / 6 inches or be less than / 3 inches when compacted. The lifts when compacted after placement shall be true to the grades or levels required with the least possible surface disturbance. Where the drainage layer is placed in more than one lift, the previously constructed lift shall be cleaned of loose and foreign material.

Such adjustments in placing procedures or equipment shall be made to obtain true grades and minimize segregation and degradation of the drainage layer material. Choke stone used to stabilize the surface of the OGM shall be spread in a thin layer no thicker than / 1/2 inch. The OGM shall be brought to grade and the choke stone placed and rolled as described in paragraph; TEST SECTION.

~~3.5.2 Placement of Stabilized Material~~

~~Bituminous stabilized material having temperatures less than 175 degrees F when dumped into the asphalt paving machine will be rejected. The paving machine shall be adjusted so that the surface of the lift being laid will be smooth and continuous without tears and pulls. Irregularities in alignment of the lift left by the paving machine shall be corrected by trimming directly behind the machine. Immediately after trimming, the edges of the lift shall be thoroughly compacted by a method approved by the Contracting Officer. Distortion of the lift during tamping will not be permitted. If more than one lift is required, the longitudinal joint in one lift shall offset that in the lift immediately below by at least 1 foot; however, the joint in the top layer shall be at the centerline of the pavement. Transverse joints in one layer shall be offset by at least 2 feet from transverse joints in the previous layer. Transverse joints in adjacent strips shall be offset a minimum of 10 feet. At the end of each day's construction, a straight transverse construction joint shall be formed by cutting back into the completed work to form a true vertical face free of loose or shattered material. Material along construction joints not properly compacted shall be removed.~~

~~3.5.3 Placing Adjacent Stabilized Strips~~

~~The stabilized material shall be placed in consecutive adjacent strips~~

~~having a minimum width of 10 feet, except where edge lanes require strips less than 10 feet to complete the area. In placing adjacent strips, the screed of the paving machine shall overlap the previously placed strip 3 to 4 inches and shall be sufficiently high so that compaction will produce a smooth, dense joint. The stabilized material placed on the edge of the previously placed strip by the paver shall be pushed back to the edge of the strip being placed. Excess stabilized material shall be removed and wasted.~~

~~3.5.4 Hand Spreading~~

~~In areas where machine spreading is impractical, drainage layer material shall be spread by hand. The material shall be spread uniformly in a loose layer to prevent segregation. The material shall conform to the required grade and thickness after compaction.~~

3.6 COMPACTION REQUIREMENTS

Compaction shall be accomplished using rollers meeting the requirements of paragraph EQUIPMENT and operating at a rolling speed of no greater than / 1.5 miles per hour. Each lift of drainage material, including shoulders when specified under the shoulders, shall be compacted with the number of passes of the roller as follows: ~~RDM material shall use 4 passes in the vibratory state and one in the static. Cement or Bituminous stabilized OGM material shall use 3 passes in the vibratory state and one in the static state. OGM stabilized with choke stone shall use 4 passes in the vibratory state on OGM and 2 additional roller passes on the choke stone in the vibratory state with wetting.~~ The Contracting Officer will validate the number of roller passes after the test section is evaluated and before production starts. In addition, a minimum field dry density, as specified by the Contracting Officer, shall be maintained. If the required field dry density is not obtained, the number of roller passes shall be adjusted in accordance with paragraph DEFICIENCIES. Aggregate shall be compacted in a moisture state as determined in the test section. Excessive rolling resulting in crushing of aggregate particles shall be avoided. Choke stone used to stabilize the surface of the OGM shall be worked into the surface of the OGM by two passes of a vibratory roller and wetting. Compaction of bituminous stabilized material shall begin immediately when the material has cooled to / 170 degrees F. Not more than 30 minutes shall elapse between the start of moist mixing of cement stabilized material and the start of field compaction and field compaction shall be completed within 60 minutes. In all places not accessible to the rollers, the drainage layer material shall be compacted with mechanical hand operated tampers.

3.7 FINISHING

The top surface of the drainage layer shall be finished after final compaction as determined from the test section. Adjustments in rolling and finishing procedures shall be made to obtain grades and minimize segregation and degradation of the drainage layer material.

~~3.8 CURING OF CEMENT STABILIZED MATERIAL~~

~~The completed cement stabilized drainage layer shall be cured with water~~

~~for a period of 12 hours following completion of compaction. Curing operations shall commence within 3 hours after compaction. Curing shall consist of one of the following: 1) Sprinkling the surface of the drainage layer with a fine spray of water every 2 hours for the required 12-hour period, 2) by continuously saturated burlap or cotton mats, or by continuously saturated plastic coated burlap, 3) Impervious sheet-curing. Curing water shall be applied so that the cement paste on the surface of the mixture will not be eroded. Water trucks will not be permitted on the completed cement stabilized drainage layer. Impervious sheeting curing shall consist of all surfaces being thoroughly wetted and then completely covered with the sheeting. Sheeting shall be at least 18 inches wider than the stabilized drainage layer surface to be covered. Covering shall be laid with light-colored side up. Covering shall be lapped not less than 12 inches and securely weighted to prevent displacement so that it remains in contact with the surface during the specified length of curing. Coverings shall be folded down over exposed edges of slabs and secured by approved means. Sheets shall be immediately repaired or replaced if tears or holes appear during the curing period.~~

~~3.9 EDGES OF DRAINAGE LAYER~~

~~Shoulder material shall be placed along the edges of the drainage layer course in a quantity that will compact to the thickness of the layer being constructed. At least 3 feet width of the shoulder shall be rolled and compacted simultaneously with the rolling and compacting of each lift of the drainage layer.~~

~~3.10 SMOOTHNESS TEST~~

~~The surface of the top lift shall not deviate more than 3/8 inch when tested with either a 10 or 12 foot straightedge applied parallel with and at right angles to the centerline of the area to be paved. Deviations exceeding 3/8 inch shall be corrected in accordance with paragraph DEFICIENCIES.~~

~~3.11 THICKNESS CONTROL~~

~~The completed thickness of the drainage layer shall be within 1/2 inch of the thickness indicated. Thickness shall be measured at intervals providing at least one measurement for each 500 square yards of drainage layer. Measurements shall be made in test holes at least 3 inches in diameter unless the contractor can demonstrate, for COR approval, that a steel rod pushed through the drainage layer clearly stops at the material interface. Where the measured thickness is more than 1/2 inch deficient, such areas shall be corrected in accordance with paragraph DEFICIENCIES. Where the measured thickness is 1/2 inch more than indicated, it will be considered as conforming to the requirements plus 1/2 inch, provided the surface of the drainage layer is within 1/2 inch of established grade. The average job thickness shall be the average of all job measurements as specified above but within 1/4 inch of the thickness shown on the drawings.~~

~~3.12 DEFICIENCIES~~

~~3.12.1 Grade and Thickness~~

~~Deficiencies in grade and thickness shall be corrected so that both grade and thickness tolerances are met. Thin layers of material shall not be added to the top surface of the drainage layer to meet grade or increase thickness. If the elevation of the top of the drainage layer is more than 1/2 inch above the plan grade it shall be trimmed to grade and finished in accordance with paragraph FINISHING. If the elevation of the top surface of the drainage layer is 1/2 inch or more below the required grade, the surface of the drainage layer shall be scarified to a depth of at least 3 inches, new material shall be added, and the layer shall be blended and recompact to bring it to grade. Where the measured thickness of the drainage layer is more than 1/2 inch deficient, such areas shall be corrected by excavating to the required depth and replaced with new material to obtain a compacted lift thickness of at least 3 inches. The depth of required excavation shall be controlled to keep the final surface elevation within grade requirements and to preserve layer thicknesses of materials below the drainage layer.~~

~~3.12.2 Density~~

~~Density shall be considered deficient if the field dry density test results are below the dry density specified by the Contracting Officer. If the densities are deficient, the layer shall be rolled with 2 additional passes of the specified roller. If the dry density is still deficient, work will be stopped until the cause of the low dry densities can be determined and reported to the Contracting Officer.~~

~~3.12.3 Smoothness~~

~~Deficiencies in smoothness shall be corrected as if they are deficiencies in grade or thickness. All tolerances for grade and thickness shall be maintained while correcting smoothness deficiencies.~~

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SECTION 02821A

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SECTION 02821A

FENCING

~~02/02~~

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 116	(2000) Metallic-Coated, Steel Woven Wire Fence Fabric
ASTM A 121	(1999) Zinc-Coated (Galvanized) Steel Barbed Wire
ASTM A 153/A 153M	(2001) Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 176	(1999) Stainless and Heat-Resisting Chromium Steel Plate, Sheet, and Strip
ASTM A 392	(1996) Zinc-Coated Steel Chain-Link Fence Fabric
ASTM A 478	(1997) Chromium-Nickel Stainless Steel Weaving and Knitting Wire
ASTM A 491	(1996) Aluminum-Coated Steel Chain-Link Fence Fabric
ASTM A 585	(1997) Aluminum-Coated Steel Barbed Wire
ASTM A 666	(2000) Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
ASTM A 702	(1989; R 1994e1) Steel Fence Posts and Assemblies, Hot Wrought
ASTM A 780	(2000) Repair of Damaged and Uncoated Areas of Hot-Dipped Galvanized Coatings
ASTM A 824	(1995) Metallic-Coated Steel Marcellled Tension Wire for Use With Chain Link Fence

ASTM C 94/C 94M	(2000e2) Ready-Mixed Concrete
ASTM D 4541	(1995e1) Pull-Off Strength of Coatings Using Portable Adhesion Testers
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 626	(1996a) Fence Fittings
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
ASTM G 23	(1996) Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials
ASTM G 26	(1996) Operating Light-Exposure Apparatus (Xenon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials
ASTM G 53	(1996) Operating Light- and Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials

~~AMERICAN WOOD PRESERVERS' ASSOCIATION (AWPA)~~

AWPA C1	(2000) All Timber Products - Preservative Treatment by Pressure Processes
AWPA C4	(1999) Poles - Preservative Treatment by Pressure Processes

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-07 Certificates~~

~~Chain Link Fence; [____], [____]~~

~~—Statement, signed by an official authorized to certify on behalf of the manufacturer, attesting that the chain link fence and component materials meet the specified requirements.~~

~~SD-10 Operation and Maintenance Data~~

~~Electro-Mechanical Locks; [____], [____]~~

~~Gate Operator; [____], [____]~~

~~—[Six] [____] copies of operating and maintenance instructions, a minimum of 2 weeks prior to field training. Operating instructions shall outline the step-by-step procedures required for system startup, operation, and shutdown. The instructions shall include the manufacturer's name, model number, service manual, parts list, and brief description of all equipment and their basic operating features. Maintenance instructions shall include routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guide. The instructions shall include the general gate layout, equipment layout and simplified wiring and control diagrams of the system as installed.~~

~~[1.3] APPROVAL OF POLYVINYL CHLORIDE-COATED FENCE MATERIALS~~

~~Polyvinyl chloride-coated fence materials shall be thoroughly inspected for cracking, peeling, and conformance with the specifications by the Contracting Officer's Representative prior to installation. Any fence materials rejected by the Contracting Officer's Representative shall be replaced by the contractor with approved materials at no additional cost to the Government.]~~

~~PART 2 PRODUCTSPART 2 PRODUCTS~~

~~2.1 FENCE FABRIC2.1 FENCE FABRIC~~

~~Fence fabric shall conform to the following:~~

~~2.1.1 Chain Link Fence Fabric~~

~~[ASTM A 392, [Class 1] [Class 2], zinc-coated steel wire with minimum coating weight of [1.2] [2.0] 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. [Polyvinyl chloride coating for fabric and all other fence components shall be manufacturer's standard [____] in color.] Fabric height shall be [[6] [7] feet] [[____] feet] [as shown]. Fabric shall be twisted and barbed on the top selvage and knuckled on the bottom selvage.~~

~~2.1.2 Woven Wire~~

~~Woven wire shall conform to ASTM A 116 [No. 9 farm] [No. 12-1/2 close mesh] [No. 14-1/2 wolf-proof] [No. 13 poultry and garden] [No. 14-1/2 chick] fence; grade, size as indicated.~~

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 frames shall be polyvinyl chloride-coated steel pipe (Group IA)(Group IC) with external coating Type A, a nominal pipe size (NPS) 1-1/2, conforming to ASTM F 1043.]

~~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. For high security applications, each end member of gate frames shall be extended sufficiently above the top member to carry three strands of barbed wire in horizontal alignment with barbed wire strands on the fence.

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. [Post shall be either Group IA steel pipe, Group IC, Group II, roll-formed steel sections, or Group III steel H-sections and shall be zinc coated (Type A) and polyvinyl chloride coated conforming to the requirements of ASTM F 1043.] 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.~~

2.3.1 Metal Posts for Farm Style Fence

Metal posts shall conform to ASTM A 702 zinc-coated, [T-section] [U-Section]; length as indicated. Accessories shall conform to ASTM A 702.

2.3.2 Composite Polyester Resin Reinforced Line Posts

Polyester resin reinforced line posts shall be produced from unsaturated polyester resin reinforced with E-glass. Posts shall be filled with an appropriate filler material to form a rigid structural support member. The post shall meet the strength requirements of ASTM F 1043 for heavy industrial fencing. Posts shall be protected from UV and moisture degradation by a protective veil impregnated with resin (8 to 12 mil minimum) and an acrylic based (2 mil minimum) coating system. Posts shall exhibit corrosion and ultraviolet resistance as demonstrated when exposed to accelerated environmental test chamber for not less than 3,600 hours. The post shall show no structural failure (i.e., less than 10% loss of strength) as a result of exposure to moisture and lamps required in ASTM G 23, ASTM G 26 and ASTM G 53. Post coating system strength shall be tested in accordance with ASTM D 4541 for 90% adhesion strength. Posts shall be [green] [black] [brown] in color. Provide outside diameter as specified in ASTM F 1043 for round steel pipe.

~~2.3.4 Wood Posts~~

~~Wood posts shall be cut from sound and solid trees free from short or reverse bends in more than one plane. Tops shall be convex rounded or inclined. Posts shall be free of ring shake, season cracks more than 1/4 inch wide, splits in the end, and unsound knots. Size and shape of posts shall be as indicated. Posts shall be treated in accordance with AWPA C1 or AWPA C4 as applicable.~~

2.4 BRACES AND RAILS

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. [Braces and rails shall be [Group IA] [Group IC], steel pipe, size NPS 1-1/4 or Group II, formed steel sections, size 1-21/32 inch and shall be zinc coated (Type A) and polyvinyl chloride-coated conforming to the requirements of ASTM F 1043.] Group II, formed steel sections, size 1-21/32 inch, conforming to ASTM F 1043, may be used as braces and rails if Group II line posts are furnished.

2.5 WIRE

2.5.1 Tension Wire

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

2.5.2 Barbed Wire for Farm Style Fence

Barbed wire shall conform to ASTM A 121 [~~uncoated~~] [~~zinc-coated~~] [~~copper-coated~~], class 1, 13 gauge wire with 13-1/2 gauge 4-point barbs spaced no more than 6 inches apart.

~~2.6 ACCESSORIES~~

~~ASTM F 626. Ferrous accessories shall be zinc or aluminum coated. [Ferrous accessories shall also be polyvinyl chloride-coated, minimum~~

~~thickness of 0.006 inch, maximum thickness of 0.015 inch. Color coating of fittings shall match the color coating of the fabric.] Truss rods shall be furnished for each terminal post. Truss rods shall be provided with turnbuckles or other equivalent provisions for adjustment. Barbed wire shall be 2 strand, 12-1/2 gauge wire, zinc-coated, Class 3 in accordance with ASTM A 121 or aluminum coated Type I in accordance with ASTM A 585. Barbed wire shall be four-point barbed type steel wire. Barbed wire support arms shall be the [single] [V] arm type and of the design required for the post furnished. Tie wire for attaching fabric to rails, braces, and posts shall be 9 gauge steel wire and match the coating of the fence fabric. [Tie wires for attaching fabric to tension wire on high security fences shall be 16 gage stainless steel. The tie wires shall be a double loop and 6.5 inches in length.] Miscellaneous hardware coatings shall conform to ASTM A 153/A 153M unless modified. [Threaded hardware shall be painted to match polyvinyl chloride coatings.]~~

~~2.7 BARBED TAPE~~

~~Reinforced barbed tape, [double coil] [single coil], for fence toppings shall be fabricated from 430 series stainless steel with a hardness range of Rockwell (30N) 37-45 conforming to the requirements of ASTM A 176. The stainless steel strip shall be 0.025 inch thick by 1 inch wide before fabrication. Each barb shall be a minimum of 1.2 inch in length, in groups of 4, spaced on 4 inch centers. The stainless steel core wire shall have a 0.098 inch diameter with a minimum tensile strength of 140 psi and shall be in accordance with ASTM A 478. [Reinforced barbed tape, single coil, for ground application shall meet the above requirements.] [Non-reinforced barbed tape, single coil, for ground applications shall be fabricated from 301 series stainless steel, with a hardness range of Rockwell (30N) 50-55, in accordance with ASTM A 666. The stainless steel strip shall be 0.025 inch thick by 1.21 inches wide before fabrication. Each barb shall be a minimum of 1.2 inch in length, in groups of 4, spaced on 4 inch centers.] Sixteen gauge stainless steel twistable wire ties shall be used for attaching the barbed tape to the barbed wire [and to the fence for ground application].~~

~~2.6 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.~~

~~2.9 PADLOCKS~~

~~Padlocks shall conform to ASTM F 883, Type [PO1] [____], Option[s] [A, B, and G] [____] [and] [____], Grade [6] [____]. [EPB], Size 1-3/4 inch. [All padlocks shall be keyed alike]. [All padlocks shall be keyed into master key system as specified in Section 08710 DOOR HARDWARE].~~

~~2.10 GATE OPERATOR~~

~~Electric gate operators for sliding gates shall be as follows: Electrical gate operators shall have a right angle gearhead instantly reversing motor~~

~~with magnetic drum-type brake, friction disc clutch, reversing starter with thermal overload protection, and a chain-driven geared rotary-type automatic limit switch. Gears shall consist of a hardened steel machine-cut worm and mating bronze gear. All gears and bearings shall operate in a bath of oil. Gate operators with V-belt pulleys will not be allowed. Gate operators shall be equipped with an emergency release to allow the gate to be operated manually. The emergency release mechanism shall be capable of being locked in the engaged or disengaged position. Positive stops shall be provided on the gate tracks as a backup to the limit switches.~~

~~2.11 ELECTRO-MECHANICAL LOCKS~~

~~Electro-mechanical locking devices for sliding gates and personnel gates shall be solenoid actuated such that the deadbolt retracts when the solenoid is energized and remains electrically retracted until the gate is closed. The solenoid shall be the continuous duty type, rated for 120V ac, 60Hz operation. The locking device shall be unlockable by key and shall be keyed on both sides. Status of the electro-mechanical lock shall be monitored by two limit switches (integral to the locking device) wired in series. One switch shall monitor the deadlock lever and the other switch shall monitor the locking tongue.~~

PART 3 EXECUTION

3.1 INSTALLATION

Fence shall be installed to the lines and grades indicated. The area on either side of the fence line shall be cleared to the extent indicated. Line posts shall be spaced equidistant at intervals not exceeding 10 feet. 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. Waste material shall be spread where directed. The ground surface irregularities along the fence line shall be eliminated to the extent necessary to maintain a [1] [2] inch clearance between the bottom of the fabric and finish grade.

3.3 POST INSTALLATION

~~3.3.1 Posts for Chain Link Fence~~

~~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. For high security fences, fence post rigidity shall be tested by applying a 50 pound force on the post, perpendicular to the fabric, at 5 feet above ground; post movement measured at the point where the force is applied shall be less than or equal to 3/4 inch from the relaxed position; every tenth post shall be tested for rigidity; when a post fails this test, further tests on the next four posts on either side of the failed post shall be made; all failed posts shall be removed, replaced, and retested at the Contractor's expense.~~

~~3.3.2 Posts for Farm Style Fence~~

~~For wood posts, the Contractor shall excavate to depth indicated and brace post until backfill is completed. Backfill shall be placed in layers of 9 inches or less, moistened to optimum condition, and compacted with hand tampers or other approved method. Posts shall be set plumb and in proper alignment. Metal posts shall be driven or set in concrete as indicated.~~

~~3.4 RAILS~~

~~3.4.1 Top Rail~~

~~Top rail shall be supported at each post to form a continuous brace between terminal posts. Where required, sections of top rail shall be joined using sleeves or couplings that will allow expansion or contraction of the rail. Top rail, if required for high security fence, shall be installed as indicated on the drawings.~~

~~3.4.2 Bottom Rail~~

~~The bottom rail shall be bolted to double rail ends and double rail ends shall be securely fastened to the posts. Bolts shall be peened to prevent easy removal. Bottom rail shall be installed before chain link fabric.~~

~~3.5 BRACES AND TRUSS RODS~~

~~Braces and truss rods shall be installed as indicated and in conformance with the standard practice for the fence furnished. Horizontal (compression) braces and diagonal truss (tension) rods shall be installed on fences over 6 feet in height. A center brace or 2 diagonal truss rods shall be installed on 12 foot fences. Braces and truss rods shall extend from terminal posts to line posts. Diagonal braces shall form an angle of approximately 40 to 50 degrees with the horizontal. No bracing is required on fences 6 feet high or less if a top rail is installed.~~

~~3.6 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 [1 foot] [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.~~

~~3.7 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] [12] 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] [1] plus or minus 1/2 inch above the ground. For high security fence, after the fabric installation is complete, the fabric shall be exercised by applying a 50 pound push-pull force at the center of the fabric between posts; the use of a 30 pound pull at the center of the panel shall cause fabric deflection of not more than 2-1/2 inches when pulling fabric from the post side of the fence; every second fence panel shall meet this requirement; all failed panels shall be resecured and retested at the Contractor's expense.~~

~~3.4 BARBED WIRE~~~~3.8 BARBED WIRE SUPPORTING ARMS AND BARBED WIRE~~

~~3.8.1 General Requirements~~

~~Barbed wire supporting arms and barbed wire shall be installed as indicated and as recommended by the manufacturer. Supporting arms shall be anchored [to the posts in a manner to prevent easy removal with hand tools] [with 3/8 inch diameter plain pin rivets or, at the Contractor's option, with studs driven by low-velocity explosive-actuated tools for steel, wrought iron, ductile iron, or malleable iron. Studs driven by an explosive-actuated tool shall not be used with gray iron or other material that can be fractured. A minimum of two studs per support arm shall be used.] Barbed wire shall be pulled taut and attached to the arms with clips or other means that will prevent easy removal.~~

~~3.4.1 Barbed Wire for Farm Style Fence~~

~~Wire shall be installed on the side of the post indicated. Wire shall be pulled taut to provide a smooth uniform appearance, free from sag. Wire shall be fastened to line posts at approximately 15 inch intervals unless indicated otherwise.~~

~~3.9 GATE INSTALLATION~~

~~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. [Slide] [Lift] 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. For farm style fencing, standard metal gate assemblies with frame and fittings necessary for complete installation or wood gates shall be furnished as shown.~~

~~3.5 BARBED INSTALLATION~~ 3.10 ~~BARBED TAPE INSTALLATION~~

~~Stainless steel reinforced barbed tape shall be installed as detailed on the drawings. Barbed tape shall be stretched out to its manufacturer's recommended length, set on top of the barbed wire and "V" shaped support arms, and then secured to the barbed wire. The barbed tape shall be secured to the barbed wire at the two points and at every spiral turn of both coils as shown on the drawings. Stainless steel [reinforced] [non-reinforced] barbed tape for ground applications shall be installed [per manufacturer's recommendations] [as shown on the drawings].~~

~~3.11 GROUNDING~~

~~[Fences crossed by overhead powerlines in excess of 600 volts shall be grounded as specified in Section 13100A LIGHTNING PROTECTION SYSTEM. Electrical equipment attached to the fence shall be grounded as specified in [Section 16370A ELECTRICAL DISTRIBUTION SYSTEM, AERIAL] [Section 16375A ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND].] [Fences shall be grounded on each side of all gates, at each corner, at the closest approach to each building located within 50 feet of the fence, and where the fence alignment changes more than 15 degrees. Grounding locations shall not exceed 650 feet. Each gate panel shall be bonded with a flexible bond strap to its gate post. 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 --

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SECTION 02921A

EROSION CONTROL SEEDING01/02

PART 1 GENERAL

The work shall consist of furnishing erosion control seeding and revegetation of all disturbed areas including, but not limited to staging area, borrow areas, and reconstructed levee slopes, of the project as designated on the plans and as specified herein. All necessary labor, materials, equipment, and services shall be provided for the site preparation and application.

All work shall be done by an experienced crew familiar with horticulture and industry methods and standards for erosion control hydroseeding. The hydroseeding crew shall have a minimum of 2 years of applicable on-the-job experience and employ modern equipment and state of the art methods.

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.

AGRICULTURAL MARKETING SERVICE (AMS)Org

AMS-01 Federal Seed Act Regulations (1995)

FEDERAL SPECIFICATIONS (FS)Org

FS 0-F-241 (Rev D) Fertilizers, Mixed, Commercial

FS JJJ-S-181 (Rev B) Seeds, Agricultural

~~AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)~~

~~ASTM C 602 (1995a) Agricultural Liming Materials~~

~~ASTM D 2028 (1976; R 1997) Cutback Asphalt
(Rapid-Curing Type)~~

~~ASTM D 4972 (1995a) pH of Soils~~

~~ASTM D 5268 (1992; R 1996) Topsoil Used for
Landscaping Purposes~~

~~ASTM D 5883 (1996e1) Use of Rotary Kiln Produced
Expanded Shale, Clay or Slate (ESCS) as a
Mineral Amendment in Topsoil Used for
Landscaping and Related Purposes~~

~~ASTM D 977~~~~(1998) Emulsified Asphalt~~~~U.S. DEPARTMENT OF AGRICULTURE (USDA)~~~~AMS Seed Act~~~~(1995) Federal Seed Act Regulations Part
201~~

1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals ~~not~~ having a "GFIO" 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-031 Product Data~~ Data and Project Submittal Schedules

Computed Area; GA. A tabulation of computed area will be submitted for approval by the contracting officer prior to seed application.

Computation of seed mix; GA. A tabulation of pounds of seed required to obtain the required live seed rate will be submitted for approval by the contracting officer prior to seed application.

Manufacturer's Literature; FIO. Manufacturer's literature discussing physical characteristics, application and installation instructions for erosion control material, and for chemical treatment material.

SD-07 Schedules

Equipment List; FIO. A list of proposed seeding and mulching equipment to be used in performance of seeding operation, including descriptive data and calibration tests.

SD-08 Statements

Delivery; FIO. Delivery schedule, at least 10 days prior to the intended date of the first delivery.

SD-13 Certificates

Certificates of compliance certifying that materials meet the requirements specified, prior to the delivery of materials. Certified copies of the reports for the following materials shall be included:

a. Seed: (FIO) For mixture, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, date tested and state certification.

b. Fertilizer: (FIO) For chemical analysis, composition percent.

~~Equipment; [____], [____]~~

~~Surface Erosion Control Material; [____], [____]~~

~~Chemical Treatment Material; [____], [____]~~

~~—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.~~

~~Finished Grade and Topsoil; [____], [____]~~

~~—Finished grade status.~~

~~Topsoil; [____], [____]~~

~~—Availability of topsoil from the stripping and stock piling operation.~~

~~Quantity Check; [____], [____]~~

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

~~Seed Establishment Period; [____], [____]~~

~~—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; [____], [____]~~

~~—Maintenance work performed, area repaired or reinstalled, diagnosis for unsatisfactory stand of grass plants.~~

~~Application of Pesticide; [____], [____]~~

~~—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.~~

~~SD-04 Samples~~

~~Delivered Topsoil; [____], [____]~~

~~— Samples taken from several locations at the source.~~

Soil Amendments; [____], [____]

~~— A 10 pound sample.~~

Mulch; [____], [____]

~~— A 10 pound sample.~~

~~SD-06 Test Reports~~

Equipment Calibration; [____], [____]

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

Soil Test; [____], [____]

~~— 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; [____], [____]

Topsoil; [____], [____]

pH Adjuster; [____], [____]

Fertilizer; [____], [____]

Organic Material; [____], [____]

Soil Conditioner; [____], [____]

Mulch; [____], [____]

Asphalt Adhesive; [____], [____]

Pesticide; [____], [____]

~~— 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, maximum percent weed seed content, and date tested.~~

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

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

~~— d. Fertilizer. Chemical analysis and composition percent.~~

- ~~— e. Organic Material: Composition and source.~~
- ~~— f. Soil Conditioner: Composition and source.~~
- ~~— g. Mulch: Composition and source.~~
- ~~— h. Asphalt Adhesive: Composition.~~
- ~~— i. Pesticide. EPA registration number and registered uses.~~

1.3 SOURCE INSPECTION

~~The source of delivered topsoil shall be subject to inspection.~~Not Applicable

1.4 DELIVERY, INSPECTION, STORAGE, AND HANDLING

The Corps shall be notified 72 hours prior to delivery of seed and start of hydroseeding operation.

1.4.1 ~~Delivery~~Delivery

~~A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery.~~Seed shall be delivered to the job site in unopened separate containers with the seed tag attached. Opened containers or containers without a seed tag will not be accepted.

1.4.1.1 ~~Delivered Topsoil~~Protection

~~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.~~Seeds, fertilizers, and other materials shall be protected from weather and contamination during delivery. Opened containers or containers without State approved seed tag will not be accepted.

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. Seed shall be inspected upon arrival at the job site by the Contracting Officer for conformity to type and quality in accordance with paragraph MATERIALS. Other materials shall be inspected for meeting specified requirements and unacceptable materials shall be removed from the job site.~~

1.4.3 ~~Storage~~Sampling

~~Materials shall be stored in designated areas. Seed, lime, and fertilizer 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. The Contracting Officer or Corps Biologist will collect a representative sample from each seed bag. The samples will be bagged and labeled individually to seed type, lot type, and date sampled. The samples collected will be stored off-site in a cool, dry location for testing by the Contracting Officer. At the Contracting Officers discretion, samples will be sent to a seed laboratory certified by the Association of Official Seed Analysts, or a seed technologist certified by the Society of Commercial Seed Technologists for analysis to verify seed type, mixture, germination and purity.~~

1.4.4 ~~Handling~~Storage

~~Except for bulk deliveries, materials shall not be dropped or dumped from vehicles. Seeds and fertilizers shall be stored in cool, dry locations away from contaminants. Chemical treatment materials shall not be stored with other landscape materials.~~

1.4.5 ~~Time Limitation~~Handling

~~Hydroseeding time limitation for holding seed in the slurry shall be a maximum 24 hours.~~

1.4.5.1 Materials

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

PART 2 PRODUCTS

2.1 SEED MATERIALS

2.1.1 ~~Seed Classification~~

2.1.1.1 Seed Classification

State-certified seed of the latest season's crop shall be provided in original sealed packages bearing the producer's guaranteed analysis for

percentages of mixture, purity of live seed, germination, hard seed, weed seed content, and inert material. Seeds species not certified by the State shall be tested for purity and germination by a seed laboratory certified by the Association of Official Seed Analysts, or a seed technologist certified by the Society of Commercial Seed Technologists. Labels shall be in conformance with AMS-01 and applicable state seed laws.

2.1.1.2 Seed Mixture

The seed mixture shall be applied at the rate of 60 lbs pure live seed per acre. The mixture shall be proportioned by weight as follows:

<u>Common Name</u>	<u>Botanical Name</u>	<u>%Purity / %Germination</u>	<u>Lbs Pure Live Seed per Acre*</u>
Bermuda Grass	Cynodon dactylon	95% / 85%	10 pounds
Blando brome	Bromus mollis	95% / 85%	15 pounds
Zorro fescue	Vulpia myuros	90% / 80%	10 pounds
California Brome	Bromus carinatus Ssp. Californium	95% / 85%	5 pounds
Meadow barley	Hordeum Brachyantherum	90% / 80%	8 pounds
California Poppy	Eschscholzia californica	98% / 75%	5 pounds
Rose clover-Hykon	Trifolium hirtum	98% / 85%	7 pounds
Total			60 pounds

* Pure live seed shall be determined by multiplying the percentage of total germination (including hard seed) by the percentage of purity.

2.1.1.3 Quality

Seed shall conform to FS JJJ-S-181. Weed seed shall not exceed 1 percent by weight of the total mixture. Wet, moldy, or otherwise damaged seed shall be rejected and removed from project site.

2.1.1.4 Seed Mixing

The field mixing of seed shall be performed on site in the presence of the Contracting Officer. Legume seeds shall be inoculated before mixing as per seed supplier's recommendations.

~~[State-certified] [State-approved] seed 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 Fertilizer

Fertilizer shall be commercial grade, free flowing, uniform in composition and conforming to FS 0-F-241. Granular ammonium-phosphate-sulfate fertilizer shall consist of the following nitrogen-phosphorus-potassium: ratio: 16 percent nitrogen, 20 percent phosphorus, and 0 percent potassium.

2.1.3 Straw

Straw shall be free from weeds, mold, and other deleterious materials.

2.1.3.1 Straw

Straw shall be stalks from rice, furnished in air-dry condition and with a consistency for placing with commercial mulch-blowing equipment.

2.1.3.2 Wood Cellulose Fiber

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

2.1.4 Water

Water shall be clear and not contain elements toxic to plant life. Water will be Contractor supplied.

2.1.5 Erosion Control Material

Not Applicable

2.1.6 Stabilizing Emulsion (solids)

Stabilizing emulsion shall be in a dry powder form, may be reemulsifiable, and shall be a processed organic adhesive used as a soil binder.

2.1.7 Hydroseeding Equipment

Equipment used for the hydroseeding applications of slurry shall be commercial-type hydroseeder system with a built-in agitator with an operating capacity sufficient to agitate suspend, and homogeneously mix the slurry.

~~2.1.2 Permanent Seed Species and Mixtures~~

~~Permanent seed species and mixtures shall be proportioned by weight as follows:~~

Botanical Name	Common Name	Mixture Percent by Weight	Percent Pure Live Seed
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~~LAWN SEED~~

[]	[]	[]	[]
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~~FIELD SEED~~

[]	[]	[]	[]
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~~2.1.3 Temporary Seed Species~~

~~Temporary seed species for surface erosion control or overseeding shall be as follows:~~

Botanical Name	Common Name	Percent Pure Live Seed
---------------------------	------------------------	---------------------------------------

[]	[]	[]
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~~2.1.4 Quality~~

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

~~2.1.5 Seed Mixing~~

~~The mixing of seed may be done by the seed supplier prior to delivery, or on site as directed.~~

~~2.1.6 Substitutions~~

~~Substitutions will not be allowed without written request and approval from the Contracting Officer.~~

~~2.2 TOPSOIL~~

~~Topsoil shall be as defined in ASTM D 5268. When available, the topsoil shall be the existing surface soil stripped and stockpiled onsite in accordance with Section 02300A EARTHWORK. 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 for the seed specified. Topsoil shall be free from slag, cinders, stones, lumps of soil, sticks, roots, trash or other material over a minimum 1-1/2 inch diameter. Topsoil shall be free from viable plants and plant parts.~~

~~2.3 SOIL AMENDMENTS~~

~~Soil amendments shall consist of pH adjuster, fertilizer, organic material~~

~~and soil conditioners meeting the following requirements. Vermiculite shall not be used.~~

~~2.3.1 pH Adjuster~~

~~The pH adjuster shall be an agricultural liming material in accordance with ASTM C 602. These materials may be burnt lime, hydrated lime, ground limestone, sulfur, or shells. The pH adjuster shall be used to create a favorable soil pH for the plant material specified.~~

~~2.3.1.1 Limestone~~

~~Limestone material shall contain a minimum calcium carbonate equivalent of 80 percent. Gradation: A minimum 95 percent shall pass through a No. 8 sieve and a minimum 55 percent shall pass through a No. 60 sieve. To raise soil pH, ground limestone shall be used.~~

~~2.3.1.2 Hydrated Lime~~

~~Hydrated lime shall contain a minimum calcium carbonate equivalent of 110 percent. Gradation: A minimum 100 percent shall pass through a No. 8 sieve and a minimum 97 percent shall pass through a No. 60 sieve.~~

~~2.3.1.3 Burnt Lime~~

~~Burnt lime shall contain a minimum calcium carbonate equivalent of 140 percent. Gradation: A minimum 95 percent shall pass through a No. 8 sieve and a minimum 35 percent shall pass through a No. 60 sieve.~~

~~2.3.2 Fertilizer~~

~~[It shall be as recommended by the soil test] [The nutrients ratio shall be [] percent nitrogen, [] percent phosphorus, and [] percent potassium]. Fertilizer shall be controlled release commercial grade, free-flowing, uniform in composition, and consist of a nitrogen-phosphorus-potassium ratio. The fertilizer shall be derived from sulphur coated urea, urea formaldehyde, plastic or polymer coated pills, or isobutylenediurea (IBDU). Fertilizer shall be balanced with the inclusion of trace minerals and micro-nutrients.~~

~~2.3.3 Nitrogen Carrier Fertilizer~~

~~[It shall be as recommended by the soil test] [The nutrients ratio shall be [] percent nitrogen, [] percent phosphorus, and [] percent potassium]. Nitrogen carrier fertilizer shall be commercial grade, free-flowing, and uniform in composition. The fertilizer may be a liquid nitrogen solution.~~

~~2.3.4 Organic Material~~

~~Organic material shall consist of either bonemeal, rotted manure, decomposed wood derivatives, recycled compost, or worm castings.~~

~~2.3.4.1 Bonemeal~~

~~Bonemeal shall be finely ground, steamed bone product containing from 2 to 4 percent nitrogen and 16 to 40 percent phosphoric acid.~~

~~2.3.4.2 Rotted Manure~~

~~Rotted manure shall be unleached horse, chicken or cattle manure containing a maximum 25 percent by volume of straw, 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.~~

~~2.3.4.3 Decomposed Wood Derivatives~~

~~Decomposed wood derivatives shall be ground bark, sawdust, yard trimmings, or other wood waste material that is free of stones, sticks, soil, and toxic substances harmful to plants, and is fully composted or stabilized with nitrogen.~~

~~2.3.4.4 Recycled Compost~~

~~Compost shall be a well decomposed, stable, weed free organic matter source. Compost shall be derived from food; agricultural or industrial residuals; biosolids (treated sewage sludge); yard trimmings; or source-separated or mixed solid waste. The compost shall possess no objectionable odors and shall not resemble the raw material from which it was derived. The material shall not contain substances toxic to plants. Gradation: The compost material shall pass through a 3/8 inch screen, possess a pH of 5.5 to 8.0, and have a moisture content between 35-55 percent by weight. The material shall not contain more than 1 percent by weight of man-made foreign matter. Compost shall be cleaned of plastic materials larger than 2 inches in length. The Contractor shall comply with EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS.~~

~~2.3.4.5 Worm Castings~~

~~Worm castings shall be screened from worms and food source, and shall be commercially packaged.~~

~~2.3.5 Soil Conditioner~~

~~Soil conditioner shall be sand, super absorbent polymers, calcined clay, or gypsum for use singly or in combination to meet the requirements of the soil test.~~

~~2.3.5.1 Sand~~

~~Sand shall be clean and free of toxic materials. Gradation: A minimum 95 percent by weight shall pass a No. 10 sieve and a minimum 10 percent by weight shall pass a No. 16 sieve. Greensand shall be balanced with the inclusion of trace minerals and nutrients.~~

~~2.3.5.2 Super Absorbent Polymers~~

~~To improve water retention in soils, super absorbent polymers shall be sized and applied according to the manufacturer's recommendations. Polymers shall be added as a soil amendment and be cross-linked polyacrylamide, with an absorption capacity of 250-400 times its weight. Polymers shall also be added to the seed and be a starch grafted polyacrylonitrile, with graphite added as a tacky sticker. It shall have an absorption capacity of 100 plus times its weight.~~

~~2.3.5.3 — Calcined Clay~~

~~Calcined clay shall be granular particles produced from montmorillonite clay calcined to a minimum temperature of 1200 degrees F. Gradation: A minimum 90 percent shall pass a No. 8 sieve; a minimum 99 percent shall be retained on a No. 60 sieve; and a maximum 2 percent shall pass a No. 100 sieve. Bulk density: A maximum 40 pounds per cubic foot.~~

~~2.3.5.4 — Gypsum~~

~~Gypsum shall be commercially packaged, free flowing, and a minimum 95 percent calcium sulfate by volume.~~

~~2.3.5.5 — Expanded Shale, Clay, or Slate (ESCS)~~

~~Rotary kiln produced ESCS material shall be in conformance with ASTM D 5883.~~

~~2.4 — MULCH~~

~~Mulch shall be free from weeds, mold, and other deleterious materials. Mulch materials shall be native to the region.~~

~~2.4.1 — Straw~~

~~Straw shall be stalks from oats, wheat, rye, barley, or rice, furnished in air-dry condition and with a consistency for placing with commercial mulch-blowing equipment.~~

~~2.4.2 — Hay~~

~~Hay shall be native hay, sudan-grass hay, broomsedge hay, or other herbaceous mowings, furnished in an air-dry condition suitable for placing with commercial mulch-blowing equipment.~~

~~2.4.3 — 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.~~

~~2.4.4 — Paper Fiber~~

~~Paper fiber mulch shall be recycled news print that is shredded for the purpose of mulching seed.~~

~~2.5 ASPHALT ADHESIVE~~

~~Asphalt adhesive shall conform to the following: Emulsified asphalt, conforming to ASTM D 977, Grade SS-1; and cutback asphalt, conforming to ASTM D 2028, Designation RC-70.~~

~~2.6 WATER~~

~~Water shall be the responsibility of the Contractor, unless otherwise noted. Water shall not contain elements toxic to plant life.~~

~~2.7 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.~~

~~2.8 SURFACE EROSION CONTROL MATERIAL~~

~~Surface erosion control material shall conform to the following:~~

~~2.8.1 Surface Erosion Control Blanket~~

~~Blanket shall be machine produced mat of wood excelsior formed from a web of interlocking wood fibers; covered on one side with either knitted straw blanket-like mat construction; covered with biodegradable plastic mesh; or interwoven biodegradable thread, plastic netting, or twisted kraft paper cord netting.~~

~~2.8.2 Surface Erosion Control Fabric~~

~~Fabric shall be knitted construction of polypropylene yarn with uniform mesh openings 3/4 to 1 inch square with strips of biodegradable paper. Filler paper strips shall have a minimum life of 6 months.~~

~~2.8.3 Surface Erosion Control Net~~

~~Net shall be heavy, twisted jute mesh, weighing approximately 1.22 pounds per linear yard and 4 feet wide with mesh openings of approximately 1 inch square.~~

~~2.8.4 Surface Erosion Control Chemicals~~

~~Chemicals shall be high-polymer synthetic resin or cold-water emulsion of selected petroleum resins.~~

~~2.8.5 Hydrophilic Colloids~~

~~Hydrophilic colloids shall be physiologically harmless to plant and animal life without phytotoxic agents. Colloids shall be naturally occurring, silicate powder based, and shall form a water insoluble membrane after curing. Colloids shall resist mold growth.~~

~~2.8.6 Erosion Control Material Anchors~~

~~Erosion control anchors shall be as recommended by the manufacturer.~~

PART 3 EXECUTION

~~PART 3 EXECUTION~~

~~3.1 INSTALLING SEEDING TIMES AND CONDITIONS~~

~~3.1.1 Seeding Time~~

~~Seed shall be installed from [] to [] for spring establishment; from [] to [] for summer establishment; and from [] to [] for fall establishment. Seeding shall be applied within the **October to November** planting window or as directed by the Contracting Officer.~~

~~3.1.2 Seeding Conditions~~

~~Seeding operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture, or other unsatisfactory conditions prevail, the work shall be stopped when directed. When special conditions warrant a variance to the seeding operations, proposed alternate times shall be submitted for approval.~~

~~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, and mechanical analysis. Sample collection on site shall be random over the entire site. Sample collection for stockpiled topsoil shall be at different levels in the stockpile. The soil shall be free from debris, noxious weeds, toxic substances, or other materials harmful to plant growth. The test shall determine the quantities and type of soil amendments required to meet local growing conditions for the seed species specified.~~

~~3.2 SITE PREPARATION~~

~~3.2.1 Finished Grade and Topsoil Grading~~

~~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 02300A.~~

~~EARTHWORK, prior to the commencement of the seeding operation. The Contracting Officer shall verify that rough grades are as indicated on the drawings, and the placing of topsoil and the rough grading has been completed in accordance with SECTION 02210: EXCAVATION AND LEVEE FILL. Graded surfaces are best left rough for better seed germination areas. All sloped areas will be tractor walked in a vertical pattern to create ridges for seeds.~~

3.2.1.1 Field Area Debris

All rubbish, construction debris, and other material which might hinder proper vegetation establishment shall be removed from the site.

~~3.2.2 Application of Soil Amendments~~

~~3.2.2.1 Applying pH Adjuster~~

~~[The pH adjuster shall be applied as recommended by the soil test] [The application rate shall be [] pounds per 1000 square yards]. The pH adjuster shall be incorporated into the soil to a maximum 4 inch depth or may be incorporated as part of the tillage operation.~~

~~3.2.2.2 Applying Fertilizer~~

~~[The fertilizer shall be applied as recommended by the soil test] [The application rate shall be [] pounds per 1000 square yards]. Fertilizer shall be incorporated into the soil to a maximum 4 inch depth or may be incorporated as part of the tillage or hydroseeding operation.~~

~~3.2.2.3 Applying Soil Conditioner~~

~~[The soil conditioner shall be as recommended by the soil test] [The application rate shall be [] pounds per 1000 square yards]. The soil conditioner shall be spread uniformly over the soil a minimum 1 inch depth and thoroughly incorporated by tillage into the soil to a maximum 4 inch depth.~~

~~3.2.2.4 Applying Super Absorbent Polymers~~

~~Polymers shall be spread uniformly over the soil as recommended by the manufacturer and thoroughly incorporated by tillage into the soil to a maximum 4 inch depth.~~

~~3.2.3 Tillage~~

~~Soil on slopes up to a maximum 3-horizontal-to-1-vertical shall be tilled to a minimum 4 inch depth. On slopes between 3-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 method. Rototillers shall be used where soil conditions and length of slope permit. On slopes 1-horizontal-to-1 vertical and steeper, no tillage is required. 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, fertilizer, 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 1 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 Lawn Area Debris~~

~~Debris and stones over a minimum 5/8 inch in any dimension shall be removed from the surface.~~

~~3.2.4.3 Field Area Debris~~

~~Debris and stones over a minimum 3 inch in any dimension shall be removed from the surface.~~

~~3.2.4.4 Protection~~

~~Areas with the prepared surface shall be protected from compaction or damage by vehicular or pedestrian traffic and surface erosion.~~

3.3 INSTALLATION SEEDING

~~Prior to installing seed, 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.~~

3.3.1 Installing Seed General

~~Seeding method shall be [Broadcast Seeding] [Drill Seeding] [Hydroseeding]. Seeding procedure shall ensure even coverage. Gravity feed applicators, which drop seed directly from a hopper onto the prepared soil, shall not be used because of the difficulty in achieving even coverage, unless otherwise approved. Absorbent polymer powder shall be mixed with the dry seed at the rate recommended by the manufacturer. Prior to seeding, any previously prepared seedbed areas compacted or damaged by interim rain, traffic or other cause, shall be reworked to restore the ground condition previously specified. Seeding operations shall not take place when the wind velocity will prevent uniform seed distribution.~~

~~3.3.1.1 Broadcast Seeding~~

~~Seed shall be uniformly broadcast at the rate of [] pounds per 1000 square feet 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 1/4 inch depth by disk harrow, steel mat drag,~~

~~cultipacker, or other approved device.~~

~~3.3.1.2 Drill Seeding~~

~~Seed shall be uniformly drilled to a maximum 1/2 inch depth and at the rate of [] pounds per 1000 square feet, using equipment having drills a maximum 7 inches distance apart. Row markers shall be used with the drill seeder. Half the total rate of seed application shall be drilled in 1 direction, with the remainder of the seed rate drilled at 90 degrees from the first direction. The drilling equipment shall be maintained with half full seed boxes during the seeding operations.~~

~~3.3.1.3 Rolling~~

~~The entire area shall be firmed with a roller not exceeding 90 pounds per foot roller width. Slopes over a maximum 3-horizontal-to-1 vertical shall not be rolled. Areas seeded with seed drills equipped with rollers shall not be rolled.~~

3.3.2 Hydroseeding

~~Seed shall be mixed to ensure broadcast at the rate of [] pounds per 1000 square feet. Seed and fertilizer shall be added to water and thoroughly mixed to meet the rates specified. The time period for the seed to be held in the slurry shall be a maximum 24 hours. [Wood cellulose fiber mulch and tackifier shall be added at the rates recommended by the manufacturer after the seed, fertilizer, and water have been thoroughly mixed to produce a homogeneous slurry.] Slurry shall be uniformly applied under pressure over the entire area. The hydroseeded area shall not be rolled.~~The time limitation for holding seed in the slurry shall be a maximum 24 hours. The seed mix, wood cellulose fiber, and water shall be mixed, on site, to form a uniform slurry. The slurry shall be mixed in tanks having continuous agitation so that homogeneous mixture is discharged hydraulically evenly through hoses on to the areas to be seeded. The mixture shall be applied to achieve a 100 percent coverage of all designated areas at the rates specified. The seeding operations shall be halted when, in the opinion of the Contracting Officer, conditions of high winds, excessive moisture or other factors are not conducive to normal industry standards and satisfactory results. The hydroseeded area shall not be rolled.

3.3.2.1 Hydroseeding Application for Sandy or Sandy-Loam Embankments

Not Applicable for this Site

3.3.2.2 Hydroseeding Application for Fine Textured Soil Embankments and Flat Ground

Step #1. Seed shall be applied at the indicated rates. The mixture shall be applied within 60 minutes after the seed has been added to the mixture.

<u>Material</u>	<u>Pounds per Acre</u>
-----------------	------------------------

Seed (pure live seed)	60
Fiber	500
Commercial Fertilizer	300

Step #2. Straw shall be applied at the rate of 2.0 tons per acre.

Step #3. Tacking material mixture in the indicated proportions shall be applied with hydro-seeding equipment.

<u>Material</u>	<u>Pounds per Acre</u>
Fiber	1500
Tackifier (solids)	100
Commercial Fertilizer	

All references to area in application rates refer to slope measurement.

3.3.2.3 Straw

Straw shall be applied to all seeded areas upon completion and approval of the seeding application by the Contracting Officer. Straw shall be spread by hand, blower-type spreader or other approved method. Straw broadcasting shall be started on the windward side of relatively flat areas or on the upper part of the steep slope and continued uniformly until the area is covered. The straw shall not be bunched. All seeded areas shall have straw broadcast over them on the same day as the seeding.

~~3.3.3 Mulching~~

~~3.3.3.1 Hay or Straw Mulch~~

~~Hay or straw mulch shall be spread uniformly at the rate of 2 tons per acre. Mulch shall be spread by hand, blower-type mulch spreader, or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of steep slopes, and continued uniformly until the area is covered. The mulch shall not be bunched or clumped. Sunlight shall not be completely excluded from penetrating to the ground surface. All areas installed with seed shall be mulched on the same day as the seeding. Mulch shall be anchored immediately following spreading.~~

~~3.3.3.2 Mechanical Anchor~~

~~Mechanical anchor shall be a V-type-wheel land packer; a scalloped-disk land packer designed to force mulch into the soil surface; or other suitable equipment.~~

~~3.3.3.3 Asphalt Adhesive Tackifier~~

~~Asphalt adhesive tackifier shall be sprayed at a rate between 10 to 13 gallons per 1000 square feet. Sunlight shall not be completely excluded from penetrating to the ground surface.~~

~~3.3.3.4 Non-Asphaltic Tackifier~~

~~Hydrophilic colloid shall be applied at the rate recommended by the manufacturer, using hydraulic equipment suitable for thoroughly mixing with water. A uniform mixture shall be applied over the area.~~

~~3.3.3.5 Asphalt Adhesive Coated Mulch~~

~~Hay or straw mulch may be spread simultaneously with asphalt adhesive applied at a rate between 10 to 13 gallons per 1000 square feet, using power mulch equipment which shall be equipped with suitable asphalt pump and nozzle. The adhesive-coated mulch shall be applied evenly over the surface. Sunlight shall not be completely excluded from penetrating to the ground surface.~~

~~3.3.3.6 Wood Cellulose Fiber, Paper Fiber, and Recycled Paper~~

~~Wood cellulose fiber, paper fiber, or recycled paper shall be applied as part of the hydroseeding operation. The mulch shall be mixed and applied in accordance with the manufacturer's recommendations.~~

~~3.3.4 Watering Seed~~

~~Watering 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 inch depth. Run-off and puddling shall be prevented. Watering trucks shall not be driven over turf areas, unless otherwise directed. Watering of other adjacent areas or plant material shall be prevented.~~

3.4 SURFACE EROSION CONTROL

Not Applicable

~~3.4.1 Surface Erosion Control Material~~

~~Where indicated or as directed, surface erosion control material shall be installed in accordance with manufacturer's instructions. Placement of the material shall be accomplished without damage to installed material or without deviation to finished grade.~~

~~3.4.2 Temporary Seeding~~

~~[The application rate shall be [_____] pounds per 1000 square yards.] When directed during contract delays affecting the seeding operation or when a quick cover is required to prevent surface erosion, the areas designated shall be seeded in accordance with temporary seed species listed under Paragraph SEED.~~

~~3.4.2.1 Soil Amendments~~

~~When soil amendments have not been applied to the area, the quantity of 1/2 of the required soil amendments shall be applied and the area tilled in~~

~~accordance with paragraph SITE PREPARATION. The area shall be watered in accordance with paragraph Watering Seed.~~

~~3.4.2.2 Remaining Soil Amendments~~

~~The remaining soil amendments shall be applied in accordance with the paragraph Tillage when the surface is prepared for installing seed.~~

3.5 ~~QUANTITY CHECK~~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.

3.6 ~~APPLICATION OF PESTICIDE~~RESTORATION AND CLEAN UP

~~When application of a pesticide becomes necessary to remove a pest or disease, a pesticide treatment plan shall be submitted and coordinated with the installation pest management program.~~

3.6.1 ~~Technical Representative~~Restoration

~~The certified installation pest management coordinator shall be the technical representative, and shall be present at all meetings concerning treatment measures for pest or disease control. They may be present during treatment application.~~Existing area, pavements and facilities that have been damaged from the erosion control operation shall be restored to original condition at the Contractor's expense.

3.6.2 ~~Application~~Clean Up

~~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. A closed system is recommended as it prevents the pesticide from coming into contact with the applicator or other persons. Water for formulating shall only come from designated locations. Filling hoses shall be 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. A pesticide plan shall be submitted.~~Excess and waste material shall be removed from the planting operation and shall be disposed of off the site. Adjacent paved areas shall be cleaned. **Hay bale ties shall be removed from the project site and not deposited on adjacent roads.**

3.7 ~~RESTORATION AND CLEAN UP~~SEED ESTABLISHMENT PERIOD

3.7.1 ~~Restoration~~Commencement

~~Existing turf areas, pavements, and facilities that have been damaged from~~

~~the seeding operation shall be restored to original condition at Contractor's expense. The seed establishment period to obtain a healthy stand of grass plants shall begin on the first day of work under this contract and shall end 3 months after the last day of the seeding operation. 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.~~

3.7.2 ~~Clean Up~~ Satisfactory Stand of Grass Plants

~~Excess and waste material shall be removed from the seeded areas and shall be disposed offsite. Adjacent paved areas shall be cleaned. Grass plants shall be evaluated for species and health when the grass plants are a minimum of 1 inch high. A satisfactory stand of vegetation from the seeding operation for a satisfactory stand of 10 plants per square foot. The total bare spots shall not exceed 2 percent of the each seeded area.~~

3.8 ~~PROTECTION OF INSTALLED AREAS~~ FINAL ACCEPTANCE

3.8.1 Final Inspection

~~A final inspection shall be held by the Contracting Officer to determine any deficiencies in work after completion of seeding operations, clean-up, and plant establishment. Time for the inspection shall be established in writing by the Contracting Officer.~~

~~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 Section 10430A EXTERIOR SIGNAGE.~~

3.9 ~~SEED ESTABLISHMENT PERIOD~~ MEASUREMENT AND PAYMENT

3.9.1 ~~Commencement~~ Erosion Control Seeding

~~The seed establishment period to obtain a healthy stand of grass plants shall begin on the first day of seeding work under this contract and shall continue through the remaining life of the contract and end [3] [4] [6] [12] months after the last day of the seeding operation required by this contract. 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 coordinated with Sections 02922A SODDING, 02923A SPRIGGING, and 02930A EXTERIOR PLANTING. The seed establishment period shall be modified for inclement weather, shut down periods, or for separate completion dates of areas. Payment for work in this section shall be made at the contract per acre price for item "Erosion Control Seeding." Such payment shall constitute full compensation for all required materials and work associated with this section and shall include all costs in connection therewith. Seeding of staging area shall be at Contractor's expense.~~

~~3.9.2 Satisfactory Stand of Grass Plants~~

~~Grass plants shall be evaluated for species and health when the grass plants are a minimum 1 inch high.~~

~~3.9.2.1 Lawn Area~~

~~A satisfactory stand of grass plants from the seeding operation for a lawn area shall be a minimum 100 grass plants per square foot. Bare spots shall be a maximum [6] [9] inches square. The total bare spots shall be a maximum 2 percent of the total seeded area.~~

~~3.9.2.2 Field Area~~

~~A satisfactory stand of grass plants from the seeding operation for a field area shall be a minimum 100 grass plants per square foot. The total bare spots shall not exceed 2 percent of the total seeded area.~~

~~3.9.3 Maintenance During Establishment Period~~

~~Maintenance of the seeded areas shall include eradicating weeds, insects and diseases; protecting embankments and ditches from surface erosion; maintaining erosion control materials and mulch; protecting installed areas from traffic; mowing; watering; and post-fertilization.~~

~~3.9.3.1 Mowing~~

- ~~a. Lawn Areas: Lawn areas shall be mowed to a minimum 3 inch height when the turf is a maximum 4 inches high. Clippings shall be removed when the amount cut prevents sunlight from reaching the ground surface.~~
- ~~b. Field Areas: Field areas shall be mowed once during the season to a minimum 3 inch height. Clippings shall be removed when the amount cut prevents sunlight from reaching the ground surface.~~

~~3.9.3.2 Post-Fertilization~~

~~[The fertilizer shall be applied as recommended by the soil test] [The application rate shall be [] pounds per 1000 square yards]. A maximum 1/2 pound per 1000 square feet of actual available nitrogen shall be provided to the grass plants. The application shall be timed prior to the advent of winter dormancy and shall be made without burning the installed grass plants.~~

~~3.9.3.3 Pesticide Treatment~~

~~Treatment for disease or pest shall be in accordance with paragraph APPLICATION OF PESTICIDE.~~

~~3.9.3.4 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.~~

~~3.9.3.5 Maintenance Record~~

~~A record of each site visit shall be furnished, describing the maintenance work performed; areas repaired or reinstalled; and diagnosis for unsatisfactory stand of grass plants.~~

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SECTION 03307A

CONCRETE FOR MINOR STRUCTURES AND FIBER CONCRETE DITCH LINER

PART 1 GENERAL

This section 03307A guide to formwork for concrete and fiber concrete ditch liner to suite different kind shape of concrete ditches such as triangle ditch concrete liner, trapezoidal shape ditch concrete liner, and rectangular ditch concrete liner.

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 318M	(1995) Metric Building Code Requirements for Structural Concrete and Commentary
ACI 347R	(1994; R 1999) Guide to Formwork for Concrete

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 185	(1997) Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
ASTM A 615/A 615M	(2000) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM C 143/C 143M	(2000) Slump of Hydraulic Cement Concrete
ASTM C 150	(1999a) Portland Cement
ASTM C 171	(1997a) Sheet Materials for Curing Concrete
ASTM C 172	(1999) Sampling Freshly Mixed Concrete
ASTM C 231	(1997e1) 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 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 494/C 494M	(1999ae1) Chemical Admixtures for Concrete
ASTM C 595	(2000a) Blended Hydraulic Cements
ASTM C 595M	(1997) Blended Hydraulic Cements (Metric)
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 1752	(1984; R 1996e1) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D 75	(1987; R 1997) Sampling Aggregates
ASTM D 98	(1998) Calcium Chloride
ASTM E 96	(2000) Water Vapor Transmission of Materials

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-03 Product Data

Air-Entraining Admixture; FIO[____], [____]
~~{Accelerating Admixture}; {FIO_____}, {_____}~~
 Water-Reducing or Retarding Admixture; ~~{FIO_____}, {_____}~~
 Curing Materials; {FIO_____}, [____]
~~{Reinforcing Steel}; {FIO_____}, [____]~~
~~{Expansion Joint Filler Strips, Premolded}; {FIO_____}, [____]~~
~~{Joint Sealants - Field Molded Sealants}; {FIO_____}, [____]~~
~~{Waterstops}; {FIO_____}, [____]~~

Manufacturer's literature is available from suppliers which demonstrates compliance with applicable specifications for the above materials.

Batching and Mixing Equipment; {FIO_____}, [____]

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; {FIO_____}, [____]

The methods and equipment for transporting, handling, depositing, and consolidating the concrete shall be submitted prior to the first concrete placement.

~~{Formwork}; {FIO_____}, [____]~~

Formwork design shall be submitted prior to the first concrete placement.

SD-06 Test Reports

Aggregates; ~~{FIO_____}, [____]~~

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; {FIO_____}, [____]

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

Cementitious Materials; ~~{FIO_____}, {_____}~~

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; ~~{FIO_____}, {_____}~~

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.

1.3 UNIT PRICES

1.3.1 Concrete

1.3.1.1 Payment

All costs associated with ~~{manufacturing,}~~ furnishing, delivering, placing, finishing, and curing of concrete for the various items of the schedule, which price shall include the cost of all formwork. Payment for concrete for which payment is made as a lump sum is ~~{not}~~ to be included in this unit price payment item. Payment for grout, preformed expansion joints, field-molded sealants, waterstops, reinforcing steel bars or wire reinforcement is ~~{not}~~ to be included in this unit price payment item.

1.3.1.2 Measurement

Concrete will be measured for payment on the basis of the actual volume of concrete within the pay lines of the structures as indicated. Measurement of concrete placed against the sides of any excavation without the use of intervening forms will be made only within the pay lines of the structure. No deductions will be made for rounded or beveled edge, for space occupied by meal work, for electrical conduits or timber, or for voids or embedded items that are either less than 5 cubic feet in volume or 1 square foot in cross section.

1.3.1.3 Unit of Measure

Unit of measure: cubic yard.

1.4 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.

1.4.1 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.

1.4.2 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.

1.4.3 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 ~~[34,000,000]~~ [] psi at 28 days (90 days if pozzolan is used). The maximum nominal size coarse aggregate shall be ~~[3/4]~~ [] inch ~~[1 inch]~~ ~~[1-1/2 inches]~~, in accordance with ACI 318/318R. The air content shall be between ~~4.5~~ ~~3~~ and ~~7.55~~ percent. The slump shall be between 2 and 5 inches. The maximum water cement ratio shall be ~~[0.5450]~~ [0.] .

~~1.5 REGULATORY REQUIREMENTS~~

~~The [state statutory and regulatory requirements] [] listed below form a part of this specification to the extent referenced.~~

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 ~~except that the tricalcium aluminate of the Type III or IIIA cement shall be limited to 5.~~

2.1.1.2 Pozzolan

Pozzolan shall conform to ASTM C 618, Class C or F, including requirements of Tables 1A and 2A.

2.1.2 Aggregates

Aggregates shall meet the quality and grading requirements for coarse aggregate shall conform to the requirements of ASTM C 33 Class Designations 4M or better size 57.

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

Calcium chloride shall meet the requirements of ASTM D 98. Other 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. High-range water reducing admixture Type F may be used only when approved, approval being contingent upon particular placement requirements as described in the Contractor's Quality Control Plan.

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. Welded steel wire fabric shall conform to the requirements of ASTM A 185. 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 Waterstops

Waterstops shall conform to COE CRD-C 572.

2.1.9 Formwork

The design and engineering of the formwork as well as its construction, shall be the responsibility of the Contractor.

2.1.10 Form Coatings

Forms for exposed surfaces shall be coated with a nonstaining form oil, which shall be applied shortly before concrete is placed.

~~2.1.11 Vapor Barrier~~

~~Vapor barrier shall be polyethylene sheeting with a minimum thickness of 6 mils or other equivalent material having a vapor permeance rating not exceeding 0.5 perms as determined in accordance with ASTM E 96.~~

2.1.11 Curing Materials

Curing materials shall conform to the following requirements.

2.1.11.1 Impervious Sheet Materials

Impervious sheet materials, ASTM C 171, type optional, except polyethylene

film, if used, shall be white opaque.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 General

Construction joints shall be prepared to expose coarse aggregate, 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. 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, 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 Vapor Barrier Installation~~

~~Vapor barriers shall be applied over gravel fill. Edges shall be lapped not less than 6 inches. All joints shall be sealed with pressure-sensitive adhesive not less than 2 inches wide. The vapor barrier shall be protected at all times to prevent injury or displacement prior to and during concrete placement.~~

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.]

3.1.5 Waterstops

Waterstops shall be installed and spliced as directed by the manufacturer.

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 rodding, spading, or internal vibrating equipment. External vibrating equipment may be used when authorized. 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. The distance between insertions shall be approximately 1.5 times the radius of action of the vibrator and overlay the adjacent, just-vibrated area by a few inches. The vibrator shall penetrate rapidly to the bottom of the layer and at least 6

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 General

No finishing or repair will be done when either the concrete or the ambient temperature is below 50 degrees F.

3.5 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.

3.6 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.

3.6.1 Float Finish

Surfaces to be float finished shall be screeded and darbyed 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.

3.6.2 Expansion and Contraction Joints

Expansion and contraction joints shall be ~~provide~~ 1 ~~inch~~ thick transverse expansion joints where new work abuts an existing concrete. Expansion joints shall be provided at a maximum spacing of / 10 feet ~~on~~ unless otherwise indicated. Contraction joints shall be provided at a maximum spacing of 6ft ~~linear feet~~ inslab [and at a Contraction joints shall be cut at a minimum of / 1 inch(es) deep with a jointing tool after the surface has been finished.]

3.7 CURING AND PROTECTION

Beginning immediately after placement and continuing for at least 7 days, ~~+~~ except for concrete made with Type III cement, at least 3 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.

3.8 TESTS AND INSPECTIONS

3.8.1 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.

3.8.2 Inspection Details and Frequency of Testing

3.8.2.1 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.

3.8.2.2 Air Content

Air content shall be checked at least twice during each shift that concrete is placed . Samples shall be obtained in accordance with ASTM C 172 and tested in accordance with ASTM C 231.

3.8.2.3 Slump

Slump shall be checked twice during each shift that concrete is produced . Samples shall be obtained in accordance with ASTM C 172 and tested in accordance with ASTM C 143/C 143M.

3.8.2.4 Consolidation and Protection

The Contractor shall ensure that the concrete is properly consolidated, finished, protected, and cured.

3.8.3 Action Required

3.8.3.1 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.

3.8.3.2 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.

3.8.3.3 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.

3.8.4 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 01451 CONTRACTOR QUALITY CONTROL.

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SECTION 15131A

VERTICAL PUMPS, AXIAL-FLOW AND MIXED-FLOW IMPELLER-TYPE

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 NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI S2.19 (1989; R 1997) Mechanical Vibration - Balance Quality Requirements of Rigid Rotors, Part 1: Determination of Permissible Residual Unbalance

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 108 (1999) Steel Bars, Carbon, Cold-Finished, Standard Quality

ASTM A 217/A 217M (2001) Steel Castings, Martensitic, Stainless and Alloy, for Pressure-Containing Parts, Suitable for High-Temperature Service

ASTM A 269 (2000) Seamless and Welded Austenitic Stainless Steel Tubing for General Service

ASTM A 27/A 27M (1995; R 2000) Steel Castings, Carbon, for General Application

ASTM A 276 (2000) Stainless Steel Bars and Shapes

ASTM A 285/A 285M (1990; R 1996) Pressure Vessel Plates, Carbon Steel, Low- and Intermediate-Tensile Strength

ASTM A 312/A 312M (2000) Seamless and Welded Austenitic Stainless Steel Pipes

ASTM A 351/A 351M (2000) Castings, Austenitic, Austenitic-Ferritic (Duplex), for Pressure-Containing Parts

ASTM A 352/A 352M (1993; R 1998) Steel Castings, Ferritic and Martensitic, for Pressure-Containing Parts, Suitable for Low-Temperature Service

ASTM A 36/A 36M (2000a) Carbon Structural Steel

ASTM A 48 (1994ae1) Gray Iron Castings

RECLAMATION DISTRICT NO. 784
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ASTM A 48M	(1994e1) Gray Iron Castings (Metric)
ASTM A 516/A 516M	(1990; R 1996) Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service
ASTM A 576	(1990b; R 1995e1) Steel Bars, Carbon, Hot-Wrought, Special Quality
ASTM A 609/A 609M	(1991; R 1997) Castings, Carbon, Low-Alloy, and Martensitic Stainless Steel, Ultrasonic Examination Thereof
ASTM A 668/A 668M	(1996e1) Steel Forgings, Carbon and Alloy, for General Industrial Use
ASTM B 148	(1997) Aluminum-Bronze Sand Castings
ASTM B 584	(2000a) Copper Alloy Sand Castings for General Applications
ASTM D 2000	(1999) Rubber Products in Automotive Applications
ASTM E 165	(1995) Liquid Penetrant Examination
ASTM E 709	(1995) Magnetic Particle Examination

AMERICAN WATER WORKS ASSOCIATION(AWWA)

AWWA C200	(1997) Steel Water Pipe - 6 In. (150 mm) and Larger
AWWA C203	(1997; Addenda C203a - 1999) Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot-Applied
AWWA C207	(1994) Steel Pipe Flanges for Waterworks Service - Sizes 4 In. Through 144 In. (100 mm Through 3,600 mm)
AWWA C208	(1996) Dimensions for Fabricated Steel Water Pipe Fittings

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(2000) Structural Welding Code - Steel
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ASME INTERNATIONAL (ASME)

ASME B106.1M	(1985) Design of Transmission Shafting (Second Printing)
ASME B16.5	(1996; B16.5a) Pipe Flanges and Flanged Fittings NPS 1/2 thru NPS 24
ASME B46.1	(1995) Surface Texture (Surface Roughness,

Waviness, and Lay)

HYDRAULIC INSTITUTE (HI)

- HI 2.1-2.5 (1994) Vertical Pumps
- HI 2.6 (1994) Vertical Pump Test
- HI 9.1-9.5 (1994) Pumps - General Guidelines

ISA - THE INSTRUMENTATION, SYSTEMS AND AUTOMATION SOCIETY (ISA)

- ISA RP2.1 (1985) Manometer Tables

1.2 PRICES

1.2.1 Vertical Pumps, Axial-Flow and Mixed-Flow Impeller-Type

1.2.1.1 Payment

Payment will be made for costs associated with furnishing and installing the vertical pumps, axial-flow and mixed-flow impeller-type, as specified.

1.2.1.2 Unit of Measure

Unit of measure: lump sum.

1.3 SYSTEM DESCRIPTION

Design, furnish, and install two (2) identical vertical axial-flow or mixed-flow, single stage impeller-type pumps.

1.3.1 Design Requirements

- a. Pumps are for the purpose of pumping storm water from the Clark Slough (landside) into the Feather River access ditch (waterside). Water pumped will not exceed 90 degrees F, will be relatively turbid, and may contain sand, silt, and vegetative trash capable of passing trashrack. Trash-racks will have four (4) inch clear openings. Pumps shall be designed to operate in the dry.
- b. Pumps shall be driven by the vertical motors described in Section 16221A ELECTRIC MOTORS, 3-PHASE VERTICAL INDUCTION TYPE .
- c. Design pump so that no major modifications, alterations, or additions will be required to the pumping station or suction bays to accommodate it. However, requests for changes in setting of pump, supports, and accessories, which would involve only minor modifications, will be considered. Design pump so that pump parts will fit within the limiting horizontal and vertical dimensions shown and so installation and maintenance can be accomplished by truck crane from the access road. Pumps, or pump parts assembled at pumping station shall be capable of being lowered through floor openings shown with minimum of 1 inch clearance around each side.

1.3.2 Capacities

The pump shall:

- a. Discharge not less than 16,000 gal/min against total head corresponding to head of 35 feet with water surface in sump at Elevation 28 feet.
- b. Discharge not less than 20,000 gal/min against total head corresponding to head of 30 feet with water surface in sump at Elevation 30 feet.
- c. Discharge not less than 22,000 gal/min against total head corresponding to head of 25 feet with water surface in sump at Elevation 30 feet.
- d. Be capable of constant-speed operation from total head corresponding to head of 40 feet down to total head corresponding to head of 20 feet with water surface in sump at Elevation 28.

1.4 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

Drawings; G

Within 90 days of notice of award of contract, submit drawings listed below. Submit drawings of sufficient size to be easily read. Submit information in the English language. Dimensions shall be in English .

- a. Outline drawings of pump showing pertinent dimensions and weight of each component of the pump.
- b. Drawing showing details and dimensions of pump mounting design or layout including any embedded items.
- c. Cross-sectional drawings of pump showing each component. Show major or complicated sections of pump in detail. Indicate on each drawing an itemized list of components showing type, grade, and class of material used and make and model number of standard component used.
- d. Detail and assembly drawings of entire pump. Include all dimensions required to manufacture pump.
- e. Drawings covering erection and installation, which Contractor intends to furnish to erecting engineer.

SD-03 Product Data

Materials; FIO

Furnish two copies of purchase orders, mill orders, shop orders for materials, and work orders, including orders placed or extended by each supplier. Contractor shall at time of submittal of drawings furnish list designating materials to be used for each item.

Furnish, within 60 days of notice of award, names of manufacturers of machinery and other equipment which Contractor contemplates incorporating in the work, together with performance capacities and other relevant information pertaining to the equipment.

Spare Parts; FIO

Furnish 10 copies of manufacturer's complete parts list showing all parts and spare parts and bulletins for pump. Clearly show all details and parts, and adequately describe parts or have proper identification marks.

Total Head; G

Submit computations of total head and losses.

Shipping Bills; FIO

Copies of certified shipping bills, in duplicate, shall be mailed promptly to Contracting Officer.

Installation and Erection Instructions Manual; FIO

No later than time of pump delivery, furnish three copies of typed or printed, and bound, manual describing procedures to be followed by erecting engineer in erecting, assembling, installing, and dry-and wet-testing pump. To the extent necessary or desirable, coordinate and consolidate description of pump with similar descriptions specified for motor.

Description shall be complete, orderly, step-by-step explanation of operations required, and shall also include such things as alignment procedures, bolt torque values, permissible blade/bowl clearances; permissible bowl out-of-roundness; permissible shaft misalignment; recommended instrument setups; recommended gages and instruments; bearing clearances; and similar details.

Description shall be complemented and supplemented by drawings, sketches, photos, and similar materials to whatever extent necessary or desirable, and the overall result shall be a description that may be comprehended by an engineer or mechanic without extensive experience in erecting or installing pumps of this type.

SD-04 Samples

Materials; G

Submit samples of materials as directed. Equipment, materials, and articles installed or used without the approval of the Contracting Officer shall be at risk of subsequent rejection.

SD-06 Test Reports

Witness Test; G

Submit notification that the witness test is ready to be run along with curves and sample calculations required by paragraph WITNESS TEST.

Factory Test; G

Submit a factory test report as required by paragraph TEST REPORT.

SD-10 Operation and Maintenance Data

Operation and Maintenance Instructions Manual; G

Furnish 10 copies of manual containing complete information on operation, lubrication, adjustment, routine and special maintenance, disassembly, repair, reassembly, and trouble diagnostics of pump and auxiliary units. Operation and maintenance manual and both parts lists shall be printed on good quality 8-1/2 by 11-inch paper, bound separately between flexible, durable covers. Drawings incorporated in manual or parts lists, may be reduced to page size provided they are clear and legible, or may be folded into the manual to page size. Photographs or catalog cuts of components may be included for identification.

1.5 DELIVERY, STORAGE AND HANDLING

1.5.1 General

Furnish shipping bills or memorandums of all shipments of finished pieces or members to designated site, giving designation mark and weight of each piece, number of pieces, total weight, and if shipped by rail in carload lots, car initial and number.

1.5.2 Processing for Storage

Prepare pumps (and spare parts) for storage indoors. Indoor storage shall consist of a permanent building that has leak-proof roof, full walls to contain stored equipment, and a concrete floor or temporary trailers. A temporary structure may also be built at job site for equipment storage that will contain features of the permanent building above except that provision for ventilation will be provided and floor may be crushed rock. A vapor barrier will be provided below the crushed rock. Crushed rock will be of sufficient thickness so that settlement of equipment will not occur. Equipment stored on crushed rock will have cribbing under each support location so that equipment does not come in contact with crushed rock. A plastic barrier will be placed between equipment and wood cribbing. Submit a list of equipment and materials requiring

humidity-controlled storage to Contracting Officer no later than 30 days prior to shipment of pumping units. Long term storage (greater than 6 months) requirements shall be in accordance with pump manufacturers recommendations.

1.6 PROJECT/SITE CONDITIONS

1.6.1 Datum

Elevations shown or referred to in specifications, are above or below National Geodetic Vertical Datum (NGVD) 1929.

1.6.2 Static Head

Static head is the difference, in feet, between water surface elevation in sump and water surface elevation of river. Total head includes static head, friction losses outside of equipment being furnished, plus velocity head loss. A curve showing friction losses plus velocity head for pumped capacities is included at the end of this section.

1.7 MAINTENANCE

1.7.1 Special Tools

Furnish one set of all "special tools" required to completely assemble, disassemble, or maintain pump. "Special tools" refer to oversized or specially dimensioned tools, special attachment or fixtures, or any similar items. If required, provide a device for temporarily supporting pump shaft and impeller during assembly, disassembly, and reassembly of motor when thrust bearing is not in place. Lifting devices required for use in conjunction with truck crane shall be furnished. Provide portable steel cabinet large enough to accommodate all "special tools" furnished under this paragraph and as required by Section(s) 16221A ELECTRIC MOTORS, 3-PHASE VERTICAL INDUCTION TYPE , . Mount cabinet on four rubber-tired casters. Provide drawers to accommodate tools. Fit front of cabinet with doors hinged to swing horizontally. Furnish doors with necessary stops, catches, and hasps for completely securing cabinet with a padlock. Furnish padlock complete with three keys. Pack "special tools" in wooden boxes if size and weight do not permit storage in tool cabinet. Provide slings if box and tools are heavier than 75 pounds.

1.8 ERECTION ENGINEER(S)

Furnish one or more competent erecting engineers fluent in English language who is knowledgeable about the installation of the vertical pumps and associated drive machinery. Erecting engineers provided by this section shall include those from Contractor's suppliers. When so requested, erecting engineers shall provide and be responsible for providing complete and correct direction during initial starting and subsequent operation of equipment until field tests are completed. Erecting engineer shall initiate instructions

for actions necessary for proper receipt, inspection, handling, uncrating, assembly, and testing of equipment. The Erecting Engineer(s) shall also keep a record of measurements taken during erection, and shall furnish one copy to Contracting Officer on request or on completion of installation of assembly or part. Erecting engineer shall instruct Contracting Officer in operation and maintenance features of work.

PART 2 PRODUCTS

2.1 MATERIALS AND METALWORK FABRICATION

If not specified, materials and fabrication shall conform to the requirements of Section 05055A METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS and Section 05502A METALS: MISCELLANEOUS, STANDARD ARTICLES, SHOP FABRICATED ITEMS. Material selection not specified shall be guided by HI 9.1-9.5 for corrosion, erosion, and abrasion resistance. Deviations from the specified materials shall be submitted in accordance with paragraph SUBMITTALS.

2.1.1 Designated Materials

Designated materials shall conform to the following specifications, grades, and classifications.

MATERIAL	GRADE	CLASS	SPECIFICATION
Aluminum-Bronze	Alloy No. C95500 Castings		ASTM B 148
Cast Iron		Class No. 30A, 30B, and 30C	ASTM A 48
Cast Steel	Grade 65-35 annealed		ASTM A 27/A 27M
Coat Tar Protective Coatings - Hot Applies			AWWA C203
Cold-Rolled Steel Bars	min. Wt. Str. 65,000 psi		ASTM A 108
Copper Alloy Castings	Alloy No. C93700		ASTM B 584
Corrosion-Resistant Alloy Castings	Grade CA15 CA6NM CF8M		ASTM A 217/A 217M ASTM A 352/A 352M ASTM A 351/A 351M
Dimensions for Steel Water Pipe Fittings			AWWA C208
Hot-Rolled Stainless	Graded G10200 and G11410		ASTM A 576

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MATERIAL	GRADE	CLASS	SPECIFICATION
Ring Flanges		Class B	AWWA C207
Rubber Products in Automotive Appl.			ASTM D 2000
Seamless and Welded Aust. Stainless Steel Pipe			ASTM A 312/A 312M
Stainless Bars and Shapes	Grades S30400 and S41000		ASTM A 276
Steel Forgings		Class F	ASTM A 668/A 668M
Steel Pipe 6 inches and Larger			AWWA C200
Steel Plates, Pressure Vessel	Grade 55		ASTM A 516/A 516M
Steel Plates, Structural Quality	Grade B		ASTM A 285/A 285M
Structural Steel			ASTM A 36/A 36M
Surface Texture (Surface Roughness, Waviness, and Lay)			ASME B46.1

2.1.2 Bolted Connections

2.1.2.1 Bolts, Nuts, and Washers

Bolts, nuts, and washers shall conform to requirements of paragraph MATERIALS AND METALWORK FABRICATION, subparagraph DESIGNATED MATERIALS, and paragraph VERTICAL PUMPS, subparagraph PUMP COLUMN AND DISCHARGE ELBOW, subparagraph NUTS AND BOLTS for types required. Use beveled washers where bearing faces have a slope of more than 1:20 with respect to a plane normal to bolt axis.

2.1.2.2 Materials Not Specifically Described

Materials not specifically described shall conform to latest ASTM specification or to other listed commercial specifications covering class or kinds of materials to be used.

2.1.3 Metalwork

2.1.3.1 Flame Cutting of Material

Flame cutting of material other than steel shall be subject to approval of Contracting Officer. Shearing shall be accurately done, and all portions of work neatly finished. Steel may be cut by mechanically guided or hand-guided torches, provided an accurate profile with a smooth surface free from cracks and notches is

secured. Surfaces and edges to be welded shall be prepared in accordance with AWS D1.1. Chipping and/or grinding will not be required except where specified and as necessary to remove slag and sharp edges of mechanically guided or hand-guided cuts not exposed to view. Visible or exposed hand-guided cuts shall be chipped, ground, or machined to metal free of voids, discontinuities, and foreign materials.

2.1.3.2 Alignment of Wetted Surfaces

Exercise care to assure that correct alignment of wetted surfaces being joined by a flanged joint is being obtained. Where plates of the water passage change thickness, transition shall occur on the outer surface, leaving inner surface properly aligned. When welding has been completed and welds have been cleaned, but prior to stress relieving, joining of plates shall be carefully checked in the presence of Government inspector for misalignment of adjoining parts. Localized misalignment between inside or wetted surfaces of an adjoining flange-connected section of pump or formed suction intake shall not exceed amount shown in Column 4 of Table 1 for the respective radius or normal distance from the theoretical flow centerline. Misalignments greater than allowable amount shall be corrected by grinding away offending metal, providing the maximum depth to which metal is to be removed does not exceed amount shown in Column 5 of Table 1. No metal shall be removed until Contractor has assured himself and Contractor Officer that no excessive stresses will occur in remaining material and that excessive local vibration will not result from removal of the material. Where required correction is greater than the amount in Column 5 of Table 1, pipe shall be rejected for use. Proposed procedure for all corrective work, other than minor grinding, shall be approved by Contracting Officer prior to start of corrective work. Corrective work shall be finished by grinding corrected surface to a smooth taper. Length of the taper along each flow line element shall be 10 times the depth of the offset error at flow line. Wetted surface irregularities that might have existed in an approved model shall not be reason for accepting comparable surface irregularities in prototype pump.

TABLE 1

(1) Pipe Diameter Inches	(2) Pipe Radius or Distance Inches	(3) Pipe Thickness Inches	(4) Maximum Offset Inches	(5) Grind-Not More Than Inches
24	12	3/8	1/16	3/32
30	15	3/8	1/16	3/32
36	18	3/8	3/32	3/32
42	21	1/2	3/32	1/8
48	24	1/2	1/8	1/8
54	27	1/2	1/8	1/8
60	30	3/4	5/32	3/16
72	36	1	5/32	3/16
84	42	1-1/8	3/16	1/4

TABLE 1

(1) Pipe Diameter Inches	(2) Pipe Radius or Distance Inches	(3) Pipe Thickness Inches	(4) Maximum Offset Inches	(5) Grind-Not More Than Inches
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2.1.3.3 Stress-Relieving Procedure

After all fabrication welding is completed, and prior to any machining, stress-relieve bell by heat treatment. Contractor shall submit proposed stress-relieving procedure for approval by Contracting Officer.

2.1.4 Examination of Castings

All castings shall be cleaned and carefully examined for surface defects. All defects shall be further examined by nondestructive means. Examination personnel shall be qualified/certified in accordance with applicable ASTM requirements. The examination procedure and qualification of the examiner shall be submitted for approval. Examination tests shall be made in the presence of the Contracting Officer. The Contractor shall choose the examination procedure best suited for the application.

2.1.4.1 Examination Procedures

- a. Ultrasonic - Inspection shall conform to the applicable provisions of ASTM A 609/A 609M.
- b. Magnetic Particle - Inspection shall conform to the applicable provisions of ASTM E 709.
- c. Liquid Penetrant - Inspection shall conform to the applicable provisions of ASTM E 165.

2.1.4.2 Acceptance and Repair Criteria

Acceptance and repair criteria shall be in accordance with Section 05055A METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS.

2.2 VERTICAL PUMPS

2.2.1 Speed

Rotative speed of pump shall be no greater than 800 rpm.

2.2.2 Reverse Rotation

Pump shall withstand, with no damage, full rotative speed caused by subjecting pump to reverse flow. Head used to determine this reverse rotative speed is calculated from specified highest discharge side water elevation and lowest pump intake side water elevation. Pump and its connected electric motor shall be capable of full reverse rotative speed when acting as a turbine by reverse water flow. Use the highest head specified in paragraph STATIC HEAD

to determine the reverse speed.

2.2.3 Efficiency

Pump efficiency, as defined in HI 2.6, shall include losses from the suction bell to the discharge elbow outlet and shall not be less than 80 percent at the head-capacity condition(s) specified in paragraph CAPACITIES.

2.2.4 Suction Bell

Make suction bell of either cast iron, cast steel, or welded steel plate, . Provide flanged connection for mating with impeller bowl with a rabbet fit or four equally spaced dowels installed in the vertical position for initial alignment purposes and to maintain concentric alignment of pump. Steel plate, if used, shall have thickness of not less than one-half ($\frac{1}{2}$) inch. Suction bell shall be made in one piece. Suction bell shall be supported entirely by pump casing. Supports from sump floor will not be acceptable, except those that are part of a formed suction intake. Umbrellas, if used, should be supported by suction bowl. Construct umbrella in two pieces if a single piece umbrella could not be removed using pump opening in operating floor. Provide bolted flanges on each half of umbrella and provide for easily removable bolted connection to suction bowl. Provide sufficient lifting lugs on umbrella to aid in handling.

2.2.5 Impeller Bowl

Make impeller bowl of either cast iron, cast steel, welded steel plate or a combination of cast steel and steel plate . Steel plate, if used, shall have thickness of not less than 5/8 inch after machining is completed. Welds shall be heat-treated stress-relieved before final machining. Provide flanges for mating with suction bell and impeller bowl or two-piece construction of impeller. Flanged connections with suction bell and the diffuser or split construction shall be provided with a rabbet fit or four equally spaced dowels installed in the vertical position for initial alignment purposes and to maintain concentric alignment of pump. Machine finish impeller-swept area in impeller bowl to at least 125 microinch rms and concentric with impeller axis. For mixed-flow impellers, angle in impeller bowl shall equal the outside angle of impeller blade tips. Tolerance for concentricity of impeller with the impeller axis shall not be greater than 20 percent of the operating clearance between impeller and impeller bowl.

2.2.6 Diffuser Bowl

Make diffuser bowl of cast iron, cast steel, welded steel plate, or a combination of cast steel and steel plate. Steel plate, if used, shall have thickness of not less than 5/8 inch after machining is completed. Diffuser shall contain support for upper impeller shaft bearing and have vanes to guide the pumped flow. Equip diffuser bowl with a bypass drain to outside of pump from the diffuser cavity

located between the enclosing tube connection and impeller. Furnish throttle bushing located in the cavity immediately above impeller. Bypass drain and throttle bushing should be designed to reduce water pressure on lower seal. Impeller back-wear rings can also be used to reduce water pressure on lower seal.

2.2.7 Pump Column and Discharge Elbow

2.2.7.1 Column and Discharge Elbow

Make column and discharge elbow of either cast iron, cast steel, or welded steel plate. Steel plate, if used, shall have thickness of not less than 5/8 inch after machining is completed. Elbow shall be of long radius type. Turning vanes shall not be used. Column and discharge elbow shall be designed to withstand internal pressures and external loadings associated with various conditions of pump operation. Provide flanges for mating individual segments together and for mating pump column to diffuser bowl. Flanges shall have rabbeted fits or four equally spaced dowels installed in flanges for initial alignment purposes and to maintain concentric alignment. The elbow shall terminate in a plain-end circular section. Diameter tolerance of plain end shall be .10 inch. Diameter of discharge end of elbow shall be as shown and shall allow standard diameter flexible couplings to be used. Adjustable thrust rods and thrust lugs shall be used to transfer the load by bridging the coupling.

2.2.7.2 Column and Discharge Elbow Support

Pump column and discharge elbow shall be designed for suspension from a baseplate assembly specified in paragraph BASE PLATE AND SUPPORTS and located at operating floor level.

2.2.7.5 Flanges

Machine flanges and drill bolt holes concentric with pump shaft vertical centerline, having tolerance of plus or minus one fourth of clearance between bolt and bolt hole. When fabricated from steel plate, flanges shall not be less than 1-1/2 inch thick after machining. Flange thickness after machining shall not vary more than 10 percent of greatest flange thickness. Provide external stiffeners, if needed. Construct fabricated flanges, as a minimum, to the dimensions of AWWA C207, Class B. Flanges on major components of pump casing (suction bell, impeller bowl, diffuser bowl, and column and elbow piping) shall be designed such that blind holes necessitating use of cap screws or stud bolts will not be used. Design flanges for connection to column pipe by at least two continuous fillet welds. One weld shall connect inside diameter of flange to pump column and the other shall connect outside diameter of pump column to flange. Final design of welds rests with manufacturer, and specified welds are the minimum requirement. They shall be parallel machined, when provided on each end of the same component, and mounted parallel to a plane that is normal to pump shaft centerline. Flanges on each end of the same component shall have parallel tolerance of 0.002 inch. Finish machine mating surface on flange to 125 microinch finish or better. Provide

flanges with minimum of three jacking bolts to aid in disassembly of pump.

2.2.7.6 Flanged Joints

Design flanged joints to be air-and water-tight, without the use of preformed gaskets, against positive and negative operating pressures that will be experienced, except that "PERMATEX" or equal gasketing compound will be permitted. Provide mating flanges, unless of the male-female rabbet type, with not less than four tapered dowels equally spaced around flange. If rabbeted fit is not used, then Contractor shall provide the method used to determine concentricity of connected pieces.

2.2.7.7 Nuts and Bolts

Bolts used in assembling pump and its supporting members, including anchor bolts and dowels, shall be of 300 series stainless steel. Use only bronze nuts and hexagonal bolts and nuts. Washers used shall be 300 series of stainless steel.

2.2.7.8 Galvanic Protection

When dissimilar metals are used, use zinc anodes. Provide machined mounting pads and install anodes on carbon steel or cast iron parts. Fasten anodes to bare material on pump so that continuity is obtained between anode and pump. Verify continuity by checking joint with an ohmmeter. Locate anodes on exterior of pump below normal sump level. Total weight of anodes used per pump shall be 80 pounds. Pump joints shall be electrically bonded at the joints.

2.2.7.9 Harnessed Coupling

Provide a flexible mechanical coupling, Dresser style or equal, to connect pump discharge elbow to discharge piping.

2.2.7.10 Wall Thimble

Wall thimble shall have one plain end to accommodate flexible mechanical coupling and one flanged end to mate with discharge piping. Plain end shall match pump discharge elbow in thickness and diameter and flanged end shall be drilled to match, and shall be capable of supporting without distortion, the flap valve. Provide seal ring on wall thimble located so that it is centered in the wall when embedded. In addition, furnish a 1/2 inch flanged vent nozzle equipped with an ASME B16.5 Standard 125 pound flange and locate where shown. Fabricate wall thimble from steel plates.

2.2.7.11 Discharge Piping

Discharge piping shall consist of a transition section and a wall thimble. Transition section shall have one plain end and one flanged end, and shall provide a change in cross section from round to square. The plain end shall match pump discharge elbow in thickness and diameter. Arrange wall thimble for embedment and with

flanges on each end. One end shall mate with flange on transition section and the other end shall mate with flap gate. Fabricate discharge flange with a minimum dimension of AWWA C207, Class D, drill to match. Discharge flange shall be capable of supporting without distortion the multiple shutter gate. Provide seal ring on wall thimble and located so that it is centered in the wall when embedded. In addition, furnish a inch flanged vent nozzle equipped with an ASME B16.5 Standard 125 pound flange and locate where shown. Discharge piping shall be fabricated from steel plate.

2.2.8 Impeller

Make impeller of cast steel, aluminum bronze or fabricated of welded steel plate.

2.2.8.1 Removal and Prior To Finishing

After removal from mold, and prior to finishing of surface imperfections, castings shall be inspected by Contracting Officer. Minor surface imperfections shall be filled or ground down as necessary to preserve correct contour and outline of impeller and to restore surface imperfections to the same degree of finish as surrounding surfaces. Correct surface pits, depressions, projections, or overlaps showing greater than 1/16 inch variation from the general contour for that section. Method and procedure for accomplishing repair shall be as required in Section 05055A METALWORK FABRICATION, MACHINE WORK, MISCELLANEOUS PROVISIONS. Castings that exhibit surface imperfections (as defined above) covering an area of more than 10 percent of blade surface will be rejected.

2.2.8.2 Balance

Balance impeller by the two-plane balancing technique. Impeller shall be balanced at maximum operating speed. Check balance at 110 percent of balance speed, and make needed corrections. Amount of allowable unbalance shall be in accordance with grade G6.3 of ANSI S2.19. Weights needed to obtain required level of balance shall be securely fastened to inside cavity of impeller hub. In no case will portions of the impeller be removed or weights be added to outside of hub, vanes, or water passages. Submit balancing procedure to Contracting Officer for approval at least four weeks prior to date of balancing. Each finished impeller shall be weighted and weight stamped on the bottom of hub. Weight shall be accurate to 0.5 percent of the total weight of impeller. Weighing and balancing shall be witnessed by Contracting Officer.

2.2.9 Shafting

2.2.9.1 Shaft

Impeller shaft shall be stainless steel and intermediate shaft(s) shall be same material as impeller shaft. Design shafting so that shaft sections shall not exceed 10 feet in length and that any necessary vertical adjustment of impeller can be made without

interfering with shaft alignment. Also provide for removal of impeller from below without disassembly of pump above impeller bowl.

If pump is multi-staged, design to permit the lower bowls and impeller to be easily removed for in-place inspections of upper propeller and bowl. Design shafts based on criteria set forth in ASME B106.1M for two different design cases. The first uses a factor of safety of 5 based on ultimate tensile strength of shaft material and rated horsepower of motor. The second uses 75 percent of the yield strength of shaft material and locked rotor torque of motor.

2.2.9.2 Couplings

Pump and motor shafts and pump shaft sections shall be coupled together using rigid flanged coupling capable of transmitting the forces and torques involved. Coupling halves shall be bolted together and shall be maintained concentric with each other, by means of a rabbet fit, to within 0.002 inch. Shaft coupling nut, if used, shall be retained by fitted bolts, and all tolerances specified for the coupling shall apply. Finish machine the flange and bore in one setup to insure that flange of coupling shall be true to the bore. Flange shall be perpendicular to the bore, and parallel to the opposite end and mating flanges to within 0.002 inch.

Flange shall be concentric to centerline of shaft to within 0.002 inch. Couplings, including keys and fasteners, shall be constructed of stainless steel materials. The finished shaft assembly shall be concentric about shaft centerline to within 0.004 inch. Shop assemble couplings and pump shaft and inspect for compliance with contract requirements. After inspection, matchmark parts, including fitted bolts, to their mating pieces.

2.2.9.3 Journals

Finish the shaft journal at all guide bearing and packing gland locations to at least 32 rms and finish shaft at seal journal locations to 16 rms. The Contractor has the option to install replaceable stainless steel one-piece sleeves at each bearing, packing gland and seal locations with the finishes stated above. Securely fasten sleeves to shaft to prevent movement. Keys and fasteners, if used, shall be made from corrosion resisting steel; fastening by adhesive or welding is not acceptable. The surface hardness at the seal locations shall be as recommended by the seal manufacturer.

2.2.9.4 Circumferential Line

A circumferential line shall be inscribed or etched on shaft above stuffing box and an adjustable pointer shall be provided and mounted opposite this line in order to indicate a change in vertical position of shaft and to permit realignment after motor removal.

2.2.10 Shaft Enclosure

Provide shaft enclosure to cover intermediate shaft and coupling.

It shall be rigid enough to be self-supporting. Design enclosure to be watertight and for easy assembly and disassembly in the field. Enclosing tubes constructed with screw type joints and using tension in tube to hold alignment, shall be constructed to prohibit tension tube from unscrewing when packing gland adjustments are made. Provide shaft enclosure for grease-lubricated pumps with a drain having a shut-off valve located outside of the to permit draining enclosure between operation periods. Locate drain at bottom of shaft enclosure. On oil-lubricated pumps, the enclosing tube below lowest bearing and above oil seals shall be fitted with an oil/water drain line to the outside of pump. Drain line shall have a check valve outside of pump to preclude entrance of sump water.

2.2.11 Lifting Lugs

Furnish major pump components with lifting lugs or eye bolts to facilitate handling. Design and arrange lugs or bolts to allow safe handling of pump components singly or collectively as required during shipping, installation, and maintenance.

2.2.12 Guide Bearings and Seals

2.2.12.1 Guide Bearings

Provide pump with sleeve-type bearings designed for oil lubrication. Bearing shall have a bronze lining in contact with shaft journal and shall be replaceable type. Arrange bearing liner for maximum distribution of oil for lubrication of journal surface. Bearings shall have a surface finish of 32 microinches rms or better to match journal finish. Since pumped water may contain some fine sand and silt in suspension, give special attention to the design and selection of bearing parts, especially seal rings, to preclude entrance of foreign material between bearing and journal due to differential water pressure.

2.2.12.2 Oil Lubrication Shaft Seals

Pumps designed for oil lubrication shall have a shaft seal system located below upper pump shaft bearing. Seal system shall consist of a seal containing two lip elements. Element facing bearing shall have a stainless steel garter spring back-up and be constructed of TFE (Teflon). Secondary element shall face impeller and be constructed of TFE. Use bullet-shaped assembly tool or other special tool over end of shaft or grooves in shaft to preclude damage to lip element during assembly. Assembly tools used are considered a special tool and shall be furnished to Government as part of special tools specified in paragraph MAINTENANCE, subparagraph SPECIAL TOOLS. Pumps having two stages shall have seals to protect extra bearings required by two stages of construction.

2.2.13 Bearing Heat Sensors

Fit impeller shaft bearings with temperature-sensing elements, inserted in bearings to within 1/8 inch of shaft. These

temperature-sensing elements shall be provided with temperature readouts mounted on motor instrument board. Provide visual and audible alarm system to warn of bearing overheating. Support leads and protect from water and mechanical damage. Terminate leads outside of pump casing in a waterproof connection head, Minco CH 339 or equal, and cap until final connections are made in the field. The connection head shall be rated watertight to (25 psi). Lead protection shall consist of pipes fastened to pump with brackets using bolts and nuts to permit their removal, and shall be constructed with enough unions to be completely disassembled. Leads passing through pump water passage in pump shall either be contained in a guide vane or be protected by Schedule 80 pipe. Protection pipe shall be removable if connected to shaft-enclosing tube. Install bearing heat sensors as shown in Figure 2 at end of the section. Run leads and wiring to a junction box located on baseplate. Provide terminal strip in junction box for connection of wiring to temperature readouts.

2.2.14 Thrust Bearing

Provide thrust bearing in the motor to carry total thrust load as required .

2.2.15 Packing Gland

Provide grease-lubricated packing gland split longitudinally to facilitate removal or renewal. Arrange it to permit inspection, repair, removal, or replacement of packing without entering pump from below operating room floor. Provide eye bolts and tapped holes in each half of the split gland if halves weigh over each.

2.3 LUBRICATION SYSTEM

Oil lubrication of shaft bearings shall consist of introducing oil at the top line shaft bearing and allowing oil to run down shaft for lubrication of lower bearings. Oil lubrication shall consist of an oil reservoir mounted on pump baseplate or pump driver at such height to permit gravity flow of oil to the highest lubrication point of pump shaft. Construct reservoir of transparent material to permit observation of quantity of oil in reservoir. Oil reservoir shall have a minimum capacity of 1 quart. Reservoir shall have a solenoid valve to permit oil flow whenever pump driver is in operation. Flow rate from oil reservoir shall be adjustable from five drips per minute to constant flow. Reservoir valve shall permit manual flow of oil when pump driver is not operating for prelubrication of shaft bearing. Construct oil line from oil reservoir to pump line shaft of stainless steel tubing and support at sufficient locations to preclude vibration of tubing when pump is operating. If pump has a bearing located below impeller, this bearing shall be grease-lubricated. Provide grease line with a grease fitting from this bearing to a location on top of baseplate. Provide a grease reservoir with this bearing configuration for containing extra grease. Shaft packing shall be lubricated by grease. Run grease lines to a location outside of driver pedestal and provide with a fitting for manual lubrication.

2.3.2 Lubrication System Accessories

2.3.2.1 Grease Gun

A hand operated, heavy duty lever grease gun for charging lubrication lines and for emergency lubrication shall be provided. Provide grease as recommended by the vertical pump manufacturer.

2.3.2.2 Service Facilities

A service facility consisting of a portable hand operated transfer pump, a hand-towed dolly, and a 120 pound drum of lubricant, all assembled and ready for operation shall be provided. The pump shall be self-contained and designed for mounting on the grease drum to protect the contents from the entrance of foreign matter. The pump shall deliver not less than one pound in not more than eight strokes of the pump handle under normal temperature conditions. Furnish necessary hose and quick disconnect coupling for a complete system. The hand-towed dolly shall have a rigid platform with four anti-friction bearing mounted wheels, a towing handle and a provision for securing the lubricant barrel. The type of lubricant shall be as recommended by the vertical pump manufacturer.

2.4 PAINTING

Painting shall be in accordance with Section 09965A PAINTING: HYDRAULIC STRUCTURES.

2.5 TESTS, INSPECTIONS, AND VERIFICATIONS

2.5.1 Critical Speeds

Assembled pumping unit, consisting of motor and pump shall be free from critical speeds or harmful torsional vibrations at all speeds encountered within the operating range.

2.5.1.1 Torsional Analysis

Before pump, gear drive, and engine are released for manufacture, engine supplier shall analyze the system for harmful torsional natural frequencies using mass elastic information provided by pump and gear drive manufacturers. A natural frequency that occurs within 25 percent above or below normal operating speed is considered to be unacceptable.

2.5.1.2

2.5.2 Lubricating System Tests

Test complete lubricating system for each pumping unit, as deemed necessary by Contracting Officer, to determine that system meets operational requirements specified. At least one valve of each size furnished shall be tested with the lubrication line removed from its bearing and fitted with a pressure relief valve and pressure gage. The pressure relief valve shall be adjusted to discharge it at the operating pressure specified and the system shall be operated through one or more cycles as required to obtain an accurate

measurement of the quantity of lubricant delivered, which shall be within plus or minus 20 percent of the theoretical delivery of the respective valve. Any component parts that are damaged as the result of these tests or that fail to meet the requirements of the specification shall be replaced, reinstalled, and retested at the Contractor's expense.

2.5.3 Factory Test

2.5.3.1 General

Performance of the pump to be furnished shall be accepted on the basis of the factory test. Cavitation testing shall be performed in accordance with HI 2.6 if no published NPSHR curves are available.

2.5.3.3 Instrumentation and Procedures

Each instrument shall be described in detail, giving all data applicable, such as manufacturer's name, type, model number, certified accuracy, coefficient, ratios, specific gravity of manometer fluid to be used, and smallest scale division. When necessary for clarity, sketch of instrument or instrument arrangement shall be included. Include fully detailed narrative description of each proposed method of instrumentation, procedures to be used, and a sample set of computations. State the lowest equivalent static head that is obtainable with the testing when operating along the head-capacity curve of proposed pump. Test procedures, except as specified, shall be in accordance with applicable provisions of HI 2.6.

- a. Head Measurements - Make head measurements using either a direct reading water column, mercury-air, mercury-water, a Meriam fluid manometer, or a pressure transducer. Measure vacuums with either a mercury-air, a mercury-water manometer, or a pressure transducer. Fluctuations shall be dampened sufficiently to permit column gages or a differential pressure transducer to be read to either closest 0.01 foot of water or Meriam fluid or 0.1 inch of mercury. Manometers shall be used as indicated by ISA RP2.1. When pressure transducers are used, their accuracy shall be checked with a manometer.
- b. Capacity - Determine capacity by calibrated venturi flowmeter or long-radius ASME flow nozzle. Do not use orifice plates. Connect venturi or nozzle taps to column gages equipped with dampening devices that will permit differential head to be determined to either the closest 0.01 foot of water or Meriam fluid or 0.1 inch of mercury. Magnetic flowmeters and flowmeters utilizing ultrasonic flow measurements will be acceptable if calibration of flowmeter has been completed within the last 6 months.
- c. Rotational Speed of Pump - Measure rotational speed of pump in accordance with "Method of Rotary Speed Movement" in HI 2.6, except that revolution counters shall not be used. Non-contacting hand-held electronic tachometers are acceptable. Device used shall permit speed to be determined to 1 rpm.
- d. Power Input - Measure power input to pump in accordance with

"Power Measurements" in HI 2.6. Use a method to permit pump brake horsepower to be determined to the closest 0.5 horsepower.

- e. Cavitation Tests - The instruments to be used for these tests shall be selected by the Contractor and shall be of the type suited for cavitation testing. However, in no case shall the instruments used yield results less accurate than those obtained with the performance test.

2.5.3.4 Pump Test

Test shall demonstrate that proposed pump complies with specified performance. Pump shall be capable of operation without instability over entire range of heads specified in paragraph CAPACITIES. Instability is defined, for this specification, as when one or more of the following conditions occur:

- a. Pump has two or more flow rates at the same total head;
- b. Head-capacity curve has a dip (region on curve where change in flow rate produces an abnormally low head);
- c. When any point in usable range of head-capacity curve cannot be repeated within 3 percent.

Rerun test if this occurs. Compliance with specifications will be determined from curves required by paragraph TEST RESULTS. Test procedures, except as specified, shall be in accordance with applicable provisions of HI 2.6. Temperature of water used for testing shall be approximately the same for all tests run and shall be recorded during test runs.

2.5.3.7 Witness Test

When the Contractor is satisfied that the tested pump performs in accordance with the requirements of the specifications and the guaranteed values, the Contractor shall notify the Contracting Officer that the witness tests are ready to be run and shall furnish two copies of the curves required in paragraph PUMP TEST along with a set of sample calculations with constants and conversion factors. Two weeks will be required to review this data before the Contracting Officer will be available to visit the Contractor's laboratory for witnessing the test. Should the results of the witness test reveal that the tested pump does not perform in accordance with the requirements of the specification and the guaranteed values, the Contractor shall make such changes as are required to make it acceptable before again notifying the Contracting Officer that the witness tests are ready to be run. Immediately upon completion of each witness test, copies of all data taken during the test shall be delivered to the Contracting Officer witnessing the test. Computations of test results and plotted preliminary curves shall be furnished to the witness.

2.5.3.8 Test Report

Submit, within 30 days of receipt of approval of the witness test,

to Government 3 bound copies of a report covering completely test setup and performance tests. Each test report shall include, as a minimum, the following:

- a. Statement of the purpose of test, name of project, contract number, and design conditions should be given. Where guaranteed values differ from specified values, they also should be given.
- b. A resume of preliminary studies, if such studies were made.
- c. Description of test pump and motor, including serial numbers, if available. Information required under "b" may be included here.
- d. Description of test procedure used, including dates, test personnel, any retest events, and witness test data.
- e. List of all test instruments with model numbers and serial numbers.
- f. Sample computations (complete).
- g. A discussion of test results.
- h. Conclusions.
- i. Photographic evidence in the form of either 24 color photographs of test equipment, test setup and representative test segments, and a VHS videotape, at least 30 minutes in length, covering the same information as photographs. All photographic evidence should be labeled with Contract number, location, date/time, and test activity. Videotape shall be voice annotated with the same information.
- j. Copies of instrument calibration.
- k. Copies of all recorded test data.
- l. Curves required by paragraph TESTS RESULTS.
- m. Curves showing the performance of the test pump.
- n. Drawings of the test setup showing all pertinent dimensions and elevations and a detailed dimensioned cross section of the pump.

2.6 BASEPLATE AND SUPPORTS

The baseplate shall be proportioned to support the entire pump assembly, the motor and the loads (including the results of the dynamic analysis) to which it may be subjected during operation. It shall be supported and anchored as shown on the drawings. Lifting lugs or eye bolts, special slings, strongbacks, or other devices necessary to handle the pump during loading, unloading, erection, installation, and subsequent disassembly and assembly shall be furnished. A sole plate shall be provided under the baseplate. Jacking bolts shall be provided for leveling the baseplate assembly.

An anchor bolt layout shall be provided to aid in placement of anchor bolts. All leveling jacking bolts shall be backed off after grouting so that they do not support any of the load. The pedestal supporting the motor shall contain a 1-inch lip to contain water

leakage from the shaft packing. A threaded drain to the sump shall be provided.

2.7 FREEZE PROTECTION

All parts of the pump shall have drain holes to eliminate trapped water that could freeze. These drain provisions shall be self-draining without any requirement to enter the sump.

2.8 FACTORY ASSEMBLY

The pump shall be assembled at the manufacturer's plant to assure proper fitting and alignment of all parts. Tolerances shall not exceed those specified or shown on the the Contractor's manufacturing drawings. Rotating elements shall be checked for binding. The suction bell, impeller housing, diffuser, and the discharge elbow shall be properly match marked and have their centerlines clearly marked on the outside of all flanges to facilitate erection and alignment in the field. The Contractor shall notify the Contracting Officer sufficiently in advance to permit a representative of the Contracting Officer to inspect and witness the pump assembly. All parts disassembled for shipment shall be matchmarked.

2.9 NAMEPLATE

The pump shall be identified by means of a separate name-plate permanently affixed in a conspicuous location. The plate shall bear the manufacturer's name, model designation, serial number if applicable, and other pertinent information such as horsepower, speed, capacity, type, direction of rotation, etc. The plate shall be made of corrosion-resisting metal with raised or depressed lettering and contrasting background.

2.10 INSTRUCTION PLATES

The pump shall be equipped with suitably located instruction plates, including any warnings and cautions, describing any special and important procedures to be followed in starting, operating, and servicing the equipment. Plates shall be made of corrosion-resisting metal with raised or depressed lettering and contrasting background.

2.11 GUARDS AND COVERS

Safety guards and/or covers shall be provided wherever necessary to protect the operators from accidental contact with moving parts. Guards and covers shall be of sheet steel, expanded metal, or another acceptable material and removable for disassembly of the pump.

2.12 PART 3 EXECUTION

3.1 INSTALLATION

The installation of the equipment furnished under this section and related drive machinery furnished under other sections of this specification shall be in accordance with the approved Installation and Erection Instructions Manual required by paragraph SUBMITTALS. The erection engineer(s), familiar with the equipment to be installed, shall supervise the handling, installation, start-up and testing of the equipment as required by paragraph ERECTION ENGINEER(S).

3.2 FIELD TESTS

3.2.1 Dry Tests

Pumping unit, consisting of pump and motor shall be tested in the dry to determine whether it has been properly erected and connected.

Such test shall be made when, and as, directed by Contracting Officer. After pumping unit has been completely assembled, including all rotating elements and lubrication system, operate at full rated speed for a period of 2 hours, to assure proper alignment and satisfactory operation. Take vibration measurements of the assembled pumping units in both the axial and radial direction at the pump operating speed. Vibration shall be measured as displacement in mils and shall not exceed the maximum displacement (mils-peak-to-peak) shown in the "good" range of General Machinery Vibration Severity Chart. This chart may be obtained from Entek IRD, 1700 Edison Drive, Cincinnati, Ohio 45150. Should tests reveal that there is a design deficiency or a manufacturing error in pumping unit components, the problem shall be promptly corrected by and at the expense of Contractor.

3.2.2 Wet Tests

Each pump unit shall be given a test under load, at or near normal operating conditions, for at least 4 hours or as directed by the Contracting Officer. The test shall be conducted by the Contractor and will be witnessed by the Government. All supplies and equipment required to conduct the test shall be provided by the Contractor. During the test the operation of the pumps will be observed and measurements of vibration and bearing temperatures shall be taken and recorded. Without additional costs to the Government, the Contractor shall make all changes and correct any errors for which the Contractor is responsible. The Contracting Officer may waive or postpone the test if sufficient water is not available. Appropriate changes will then be made to the contract.

3.2.2.1 Pump Vibration

Vibration measurements shall be taken in accordance with HI 2.1-2.5.

If it is not possible to operate the pump at its best efficiency point, vibration limits may be adjusted in accordance with the requirements of the stated standard.

RECLAMATION DISTRICT NO. 784
PUMP STATION NO. 2 RELOCATION

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