AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF PAGES
W02B0004	1	1

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. *(If applicable)*
0006	24 January 2003		

6. ISSUED BY CODE

LOS ANGELES DISTRICT, COE
CESPL-CT-WEST REGION BRANCH
P.O. BOX 532711
LOS ANGELES, CA 90053-2325

7. ADMINISTERED BY *(If other than Item 6)* CODE

8. NAME AND ADDRESS OF CONTRACTOR *(No., street, county, State and ZIP Code)*

CODE FACILITY CODE

(√)	
X	9A. AMENDMENT OF SOLICITATION NO. DACW09-02-B-0004
	9B. DATED *(SEE ITEM 11)* 17 OCTOBER 2002
	10A. MODIFICATION OF CONTRACTS/ORDER NO.
	10B. DATED *(SEE ITEM 13)*

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.)*

PRADO DAM EMBANKMENT AND OUTLET WORKS,
RIVERSIDE COUNTY, CA

This amendment is issued to:

a. REPLACE project_4.pdf with project_6.pdf; PROJECT TABLE OF CONTENTS

b. REPLACE the following Specification Sections in the Solicitation with the enclosed Specification Sections:

00010_6.pdf; SECTION 00010, BID SCHEDULE
00100_6.pdf; SECTION 00100, Instructions to Bidders
00800_6.pdf; SECTION 00800, Special Contract Requirements
00850_6.pdf; SECTION 00850, Rates of Wages
01200_6.pdf; SECTION 01200, General Requirements

(CONTINUED ON NEXT SHEET)

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)*	

BLOCK 14 – Continued

REPLACE the following Specification Sections in the Solicitation with the enclosed Specification Sections: (Continued)

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01270_6.pdf; SECTION 01270 Measurement and Payment
01451_6.pdf; SECTION 01451 Contractor Quality Control
01500_6.pdf; SECTION 01500 Quality Assurance
02480_6.pdf; SECTION 02480 Mechanically Stabilized Earth Walls
03305_6.pdf; SECTION 03305 Cast-In-Place Structural Concrete
05120_6.pdf; SECTION 05120 Structural Steel
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c. REVISE the "STOPLOGS" specification number from 05915 to 05615.

d. REPLACE the following Plans/Drawings in the Solicitation with the enclosed Plans/Drawings:

File No.	Sheet No.	Drawing Title
121/116 Rev. B	C-2	INDEX TO CONTRACT DRAWINGS, GENERAL LEGEND AND ABBREVIATIONS
121/117 Rev. B	C-3	INDEX TO CONTRACT DRAWINGS
121/118 Rev. A	C-4	SITE MAP
121/132 Rev. B	C-18	NORTH ACCESS ROAD & TOE ROAD IMPROVEMENT PLAN, PROFILE & SECTION
121/135 Rev. B	C-21	BORROW AREA ACCESS ROAD
121/144 Rev. B	C-30	OUTLET CHANNEL STRUCTURAL NOTES AND DETAILS
121/146 Rev. A	C-31	OUTLET CHANNEL TRAPEZOIDAL. CHANNEL LINING STRUCTURAL DETAILS
121/158 Rev. A	C-46	WATER SYSTEM SECTIONS/DETAILS AND OBSERVATION WELL DETAIL
121/265 Rev. B	S63	FLOAT WELL INTAKE - SECTIONS AND DETAILS 1
121/394 Rev. B	S65	MECHANICALLY STABILIZED EARTH WALLS INSPECTION ELEMENT PLACEMENT
121/396 Rev. B	S67	MECHANICALLY STABILIZED EARTH WALLS INSTRUMENTATION
121/371 Rev. A	E02	ELECTRICAL SITE PLAN
121/371 Rev. A	E07	POWER PLAN ELEVATION 596

e. ADD the following Plans/Drawings to the Solicitation:

121/363	C-68	SEISMIC INSTRUMENTATION DETAILS

- END OF SF 30 -

PROJECT TABLE OF CONTENTS

-- End of Project Table of Contents --

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SECTION 00010 - BID SCHEDULE

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
1	Mobilization and Preparatory Work	1	L.S.		
2	Diversion and Control of Water	1	L.S.		
3	Clear Site and Remove Obstructions - Outlet Works, Approach Channel, & Abutments	1	L.S.		
4	Clear Site and Remove Obstructions - Borrow Areas	1	L.S.		
5	Demolition of Existing Intake Structure and Access Bridge	1	L.S.		
6	Abandon Existing Outlet Conduit	1	L.S.		
7	Excavation, Outlet Works - Sta. 0+00 to Sta. 10+00	692,100	C.Y.		
8	Excavation, Outlet Works - Sta. 10+00 to Sta. 18+13.5	470,700	C.Y.		
9	Excavation, Outlet Works - Sta. 18+13.5 to Sta. 49+93	317,000	C.Y.		
10	Excavation, Outlet Works - Sta. 49+93 to Sta. 54+00	48,000	C.Y.		
11	Derrick Stone	9,700	Tons		
12	Excavation, Removal of Gravel Blanket	80,200	Tons		
13	Excavation, Removal of Stone Protection	6,300	Tons		
14	Excavation, Stripping	3,000	C.Y.		
15	Excavation, Toe	8,100	C.Y.		
16	Excavation, Existing Embankment Crest	51,500	C.Y.		
17	Foundation Preparation, Zone II Contact Area	1,200	S.Y.		
18	Embankment, Zone I Material	1,132,400	C.Y.		
19	Embankment, Zone II Material	233,600	C.Y.		
20	Embankment, Transition Zone Material	257,700	C.Y.		
21	Additional Rolling	60	Hours		
22	Compacted Fill, Levee	82,000	C.Y.		
23	Structural Backfill	23,500	C.Y.		
24	Miscellaneous Fill	208,500	C.Y.		
25	Mitigation Fill	4,900	C.Y.		
26	Subdrainage System, Outlet Works	1	L.S.		
27	Aggregate Base Course	6,000	Tons		
28	Asphalt Concrete Pavement	3,300	Tons		
29	Stone Protection	108,800	Tons		
30	Gravel Blanket Protection	37,500	Tons		
31	Bedding Material for Stone Protection	54,400	Tons		

32	Stone for Grouted Stone Protection	8,000	Tons		
33	Grouting Stone Protection	2,000	C.Y.		
34	Concrete, Intake Tower Structure				
	a. Concrete, Intake Tower Structure - Elev. 545' and Below	**22,300**	**C.Y.**		
	b. Concrete, Intake Tower Structure - Above Elev. 545'	**970**	**C.Y.**		
	c. Concrete, Float Well Intake	**230**	**C.Y.**		
35	Concrete, Transition Structure	15,260	C.Y.		
36	Concrete, Outlet Conduit	17,855	C.Y.		
37	Concrete, Stilling Basin				
	a. Concrete, Stilling Basin Invert - Sta.18+13.50 to Sta.21+02.50	8,400	C.Y.		
	b. Concrete, Stilling Basin	6,600	C.Y.		
38	Concrete, Drop Structure Retaining Wall	467	C.Y.		
39	Concrete, Outlet Works Sta. 21+02 to Sta. 49+93	24,500	C.Y.		
40	Concrete, Access Road	230	C.Y.		
41	Concrete, Stop Log Pads	35	C.Y.		
42	Concrete, Lean Mix Concrete Backfill	7,200	C.Y.		
43	Concrete Reinforcement	6,418	Tons		
44	Structural Steel	34	Tons		
45	Miscellaneous Steel and Metal Work	1	L.S.		
46	Interceptor Drain	288	L.F.		
47	V-Ditch	445	L.F.		
48	Control House Access Bridge	1	L.S.		
49	Stilling Basin Access Road Bridge	1	L.S.		
50	Mechanically Stabilized Earth Walls	18,535	S.F.		
51	MSE Instrumentation	1	L.S.		
52	42" Culvert Extension	1	L.S.		
53	Outlet Works Side Drain, Sta. 33+68	1	L.S.		
54	Outlet Works Side Drain, Sta. 35+38	1	L.S.		
55	Outlet Works Side Drain, Sta. 41+60	1	L.S.		
56	Accusonic Flow Meters	1	L.S.		
57	SAWPA Relocation/Protection				
	a. 60-inch Sewer Pipe Encasement	299	L.F.		
	b. Raise Exist. 48-inch Dia. Precast Concrete Manhole	1	L.S.		
	c. SARI Pipeline Reaches IV-A and IV-B Relocation	1	L.S.		
	d. Abandonment of Existing 60-inch SARI Pipeline	1	L.S.		

e.	Dual 48-inch HDPE Pipeline in Existing Outlet Structure	1	L.S.	_____	_____
f.	48-inch PVC Lined RCP, Fittings and Valves	1	L.S.	_____	_____
58	Water Distribution System				
a.	Chlorination Equipment	1	L.S.	_____	_____
b.	Pressurized Water Storage Tank	1	L.S.	_____	_____
c.	Water System Piping, Valves, and Appurtenances	1	L.S.	_____	_____
d.	Concrete Well Slab Foundation	1	L.S.	_____	_____
e.	3" Dia. PVC Well Discharge Pipe	1,746	L.F.	_____	_____
59	Water Well System				
a.	Bore Hole and Well Development	1	L.S.	_____	_____
b.	Well System Electrical Distribution	1	L.S.	_____	_____
60	Observation Well	4	EA.	_____	_____
61	Double Cable Trash Boom	1	L.S.	_____	_____
62	Metal Beam Guard Rail	3,063	L.F.	_____	_____
63	Chain Link Fence and Gates				
a.	5' Chain Link Fence	1,780	L.F.	_____	_____
b.	6' Chain Link Fence	2,820	L.F.	_____	_____
c.	6' Chain Link Fence w/ Slats	66	L.F.	_____	_____
d.	Barbed Wire Fence	654	L.F.	_____	_____
e.	6' Chain Link Gate (W=10')	1	EA.	_____	_____
f.	6' Chain Link Gate (W=20')	1	EA.	_____	_____
64	Pipe Gate	1	EA.	_____	_____
65	Settlement Plates	25	EA.	_____	_____
66	Survey Monuments	3	EA.	_____	_____
67	Staff Gages	26	EA.	_____	_____
68	Hydroseeding				
a.	First 62 Acres	62	Acre	_____	_____
b.	Over 62 Acres	85	Acre	_____	_____
69	Hydroseeding Maintenance				
a.	First 62 Acres	62	Acre	_____	_____
b.	Over 62 Acres	85	Acre	_____	_____
70	Generator and Storage Building	1	L.S.	_____	_____
71	Gaging Station	1	L.S.	_____	_____
72	Gage Station Electrical Distribution	1	L.S.	_____	_____
73	Seismic Instrumentation	1	L.S.	_____	_____

74	Stop Logs	16	EA.		
75	Regulating Outlet Slide Gates	6	EA.		
76	Emergency Closure Gates	2	EA.		
77	Low-Flow Outlet Control Valves	2	EA.		
78	Low-Flow Outlet Shut-Off Valves	2	EA.		
79	Low-Flow Bulkhead	1	L.S.		
80	Underhung Crane	1	L.S.		
81	Piping Systems	1	L.S.		
82	Plumbing	1	L.S.		
83	Washroom Accessories	1	L.S.		
84	Septic System	1	L.S.		
85	HVAC System	1	L.S.		
86	Power Distribution System	1	L.S.		
87	Generator Set	1	L.S.		
88	Fire Protection System	1	L.S.		
89	Passenger Elevator	1	L.S.		
90	Quality Assurance Support	1	L.S.		
91	As-built Drawings	1	L.S.		

SUB TOTAL ESTIMATED AMOUNT OF BASE BID (LINE ITEMS 0001-0091): $ -

Bid Item 92 - ALTERNATIVE 1

a.	Cement, low heat	**130,475**	**Cwt**		
b.	Fly Ash	**3,300**	**Tons**		
c.	Water Reducing Admixture	**959**	**Gal**		

SUBTOTAL ESTIMATED AMOUNT OF ALTERNATIVE 1 (LINE ITEMS 0092A-0092C): $ -

Bid Item 93 - ALTERNATIVE 2

a.	Cement, regular heat	**49,120**	**Cwt**		
b.	Ground Granulated Blast Furnace Slag	**5,526**	**Tons**		
c.	Water Reducing Admixture	**1,139**	**Gal**		

SUBTOTAL ESTIMATED AMOUNT OF ALTERNATIVE 2 (LINE ITEMS 0093A-0093C): $ -

BIDDERS ARE TO SUBMIT PRICES ON ALL LINE ITEMS IN THE BASE BID (0001-0091). IN ADDITION, BIDDERS MUST SUBMIT PRICES ON ALTERNATIVE 1 (0092A-0092C) OR ALTERNATIVE 2 (0093A-0093C) NOT BOTH. THE GOVERNMENT CONTEMPLATES AWARD OF ONE CONTRACT TO THE RESPONSIVE, RESPONSIBLE BIDDER WHO SUBMIT THE LOWEST BID FOR THE BASE BID AND ALTERNATIVE 1; OR THE LOWEST BID FOR THE BASE BID AND ALTERNATIVE 2. ANY BIDDER WHO SUBMITS A BID FOR BOTH ALTERNATIVE 1 AND ALTERNATIVE 2 WILL BE DEEMED NON-RESPONSIVE AND THEIR BID WILL BE REJECTED.

SECTION 00010 Bidders Notes/Bid Schedule

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

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

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

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

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

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

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

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

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

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

10. Payment of Electronic Funds Transfer (EFT) is the mandatory method of payment. The Contractors attention is directed to Contract Clause NO. 52.232-33 “Mandatory Information for Electronic Funds Transfer” located in Section 00700.

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

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

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

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

15. Bidders attention is directed to Section 00100 “Instructions to Bidders” Clause No. 52.0214-4001, entitled “Directions for Submitting Bids”. Please note that there are Special Instructions Pertaining to Hand-Carried Bids.

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

17. Bidders are to submit prices on all line items in the Base Bid (0001-0091). In addition, bidders must submit prices on Alternative 1 (0092A-0092C) or Alternative 2 (0093A-0093C) NOT BOTH. The Government contemplates award of one contract to the responsive, responsible bidder who submit the lowest bid for the Base Bid and Alternative 1; or the lowest bid for the Base Bid and Alternative 2. Any bidder who submits a bid for BOTH Alternative 1 and Alternative 2 will be deemed non-responsive and their bid will be rejected.

CERTIFICATE OF CORPORATE PRINCIPAL

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

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

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

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

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

CERTIFICATION AS TO CORPORATE PRINCIPAL

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

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

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

_____
CORPORATE PRINCIPAL

CORPORATE SEAL

_____
SECRETARY

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Section 00100 Instructions to Bidders

Section 00100

52.0000-4010 INQUIRIES

Perspective bidders/offerors should submit inquiries related to this solicitation by writing or calling the following (collect calls will not be accepted:

(1) For inquiries of a contractual nature (solicitation requirements, interpretation of contractual language) call:
Cindy Myrtetus
213-452-3247

For bid results only, call (213) 452-3235.

(2) All technical questions on the specification or drawings will be submitted in writing to:
Address:

USAED – Los Angeles District, ATTN: Steve Vaughn
P. O. Box 532711, ED-DA
Los Angeles, CA 90053-2325

Facsimile Number: 213-452-4248
e-mail address: stephen.h.vaughn@usace.army.mil

(3) Please include the solicitation number, project title and location of project with your questions. Written inquiries must be received by this office not later than 14 calendar days prior to bid opening date/date set for receipt of offers.

(4) Oral explanations or instructions are not binding. Any information given to a bidder/offeror which impacts the bid/offer will be given in the form of a written amendment to the solicitation.

52.0000-4023 SAFETY REQUIREMENTS

The bidder's attention is directed to the latest version of U.S Army Corps of Engineers Safety and Health Manual, EM 385-1-1, which will be strictly enforced. This publication may be obtained from the US Army Engineer District, Los Angeles, ATTN: Safety Office, P.O. Box 532711, Los Angeles, California 90053-2325.

52.0001-4004 BID RESULTS

The telephone number for bid results after the opening is Area Code (213) 452-3245.

52.211-2 AVAILABILITY OF SPECIFICATIONS LISTED IN THE DOD INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) AND DESCRIPTIONS LISTED IN THE ACQUISITION MANAGEMENT SYSTEMS AND DATA REQUIREMENTS CONTROL LIST, DOD 5010.12-L (DEC 1999)

Copies of specifications, standards, and data item descriptions cited in this solicitation may be obtained--
(a) From the ASSIST database via the Internet at http://assist.daps.mil; or

(b) By submitting a request to the--Department of Defense Single Stock Point (DoDSSP), Building 4, Section D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Telephone (215) 697-2667/2179, Facsimile (215) 697-1462.

(End of provision)

52.214-1 SOLICITATION DEFINITIONS--SEALED BIDDING (JUL 1987)

"Government" means United States Government.

"Offer" means "bid" in sealed bidding.

"Solicitation" means an invitation for bids in sealed bidding.

(End of provision)

52.214-3 AMENDMENTS TO INVITATIONS FOR BIDS (DEC 1989)

(a) If this solicitation is amended, then all terms and conditions which are not modified remain unchanged.

(b) Bidders shall acknowledge receipt of any amendment to this solicitation (1) by signing and returning the amendment, (2) by identifying the amendment number and date in the space provided for this purpose on the form for submitting a bid, (3) by letter or telegram, or (4) by facsimile, if facsimile bids are authorized in the solicitation. The Government must receive the acknowledgment by the time and at the place specified for receipt of bids.

(End of provision)

52.214-4 FALSE STATEMENTS IN BIDS (APR 1984)

Bidders must provide full, accurate, and complete information as required by this solicitation and its attachments. The penalty for making false statements in bids is prescribed in 18 U.S.C. 1001.

(End of provision)

52.214-5 SUBMISSION OF BIDS (MAR 1997)

(a) Bids and bid modifications shall be submitted in sealed envelopes or packages (unless submitted by electronic means) (1) addressed to the office specified in the solicitation, and (2) showing the time and date specified for receipt, the solicitation number, and the name and address of the bidder.

(b) Bidders using commercial carrier services shall ensure that the bid is addressed and marked on the outermost envelope or wrapper as prescribed in subparagraphs (a)(1) and (2) of this provision when delivered to the office specified in the solicitation.

(c) Telegraphic bids will not be considered unless authorized by the solicitation; however, bids may be modified or withdrawn by written or telegraphic notice.

(d) Facsimile bids, modifications, or withdrawals, will not be considered unless authorized by the solicitation.

(e) Bids submitted by electronic commerce shall be considered only if the electronic commerce method was specifically stipulated or permitted by the solicitation.

52.214-6 EXPLANATION TO PROSPECTIVE BIDDERS (APR 1984)

Any prospective bidder desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must request it in writing soon enough to allow a reply to reach all prospective bidders before the submission of their bids. Oral explanations or instructions given before the award of a contract will not be binding. Any information given a prospective bidder concerning a solicitation will be furnished promptly to all other prospective bidders as an amendment to the solicitation, if that information is necessary in submitting bids or if the lack of it would be prejudicial to other prospective bidders.

(End of provision)

52.214-7 LATE SUBMISSIONS, MODIFICATIONS, AND WITHDRAWALS OF BIDS (NOV 1999)

(a) Bidders are responsible for submitting bids, and any modifications or withdrawals, so as to reach the Government office designated in the invitation for bids (IFB) by the time specified in the IFB. If no time is specified in the IFB, the time for receipt is 4:30 p.m., local time, for the designated Government office on the date that bids are due.

(b)(1) Any bid, modification, or withdrawal received at the Government office designated in the IFB after the exact time specified for receipt of bids is “late” and will not be considered unless it is received before award is made, the Contracting Officer determines that accepting the late bid would not unduly delay the acquisition; and--

(i) If it was transmitted through an electronic commerce method authorized by the IFB, it was received at the initial point of entry to the Government infrastructure not later than 5:00 p.m. one working day prior to the date specified for receipt of bids; or

(ii) There is acceptable evidence to establish that it was received at the Government installation designated for receipt of bids and was under the Government's control prior to the time set for receipt of bids.

(2) However, a late modification of an otherwise successful bid that makes its terms more favorable to the Government, will be considered at any time it is received and may be accepted.

(c) Acceptable evidence to establish the time of receipt at the Government installation includes the time/date stamp of that installation on the bid wrapper, other documentary evidence of receipt maintained by the installation, or oral testimony or statements of Government personnel.

(d) If an emergency or unanticipated event interrupts normal Government processes so that bids cannot be received at the Government office designated for receipt of bids by the exact time specified in the IFB and urgent Government requirements preclude amendment of the IFB, the time specified for receipt of bids will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal Government processes resume.

(e) Bids may be withdrawn by written notice received at any time before the exact time set for receipt of bids. If the IFB authorizes facsimile bids, bids may be withdrawn via facsimile received at any time before the exact time set for receipt of bids, subject to the conditions specified in the provision at 52.214-31, Facsimile Bids. A bid may be withdrawn in person by a bidder or its authorized representative if, before the exact time set for receipt of bids, the identity of the person requesting withdrawal is established and the person signs a receipt for the bid.

(End of provision)

52.214-9 Failure to Submit Bid. (JUL 1995)

Recipients of this solicitation not responding with a bid should not return this solicitation, unless it specifies otherwise. Instead, they should advise the issuing office by letter, postcard, or established electronic commerce methods, whether they want to receive future solicitations for similar requirements.

52.214-18 PREPARATION OF BIDS--CONSTRUCTION (APR 1984)

(a) Bids must be (1) submitted on the forms furnished by the Government or on copies of those forms, and (2) manually signed. The person signing a bid must initial each erasure or change appearing on any bid form.

(b) The bid form may require bidders to submit bid prices for one or more items on various bases, including--

(1) Lump sum bidding;

(2) Alternate prices;

(3) Units of construction; or

(4) Any combination of subparagraphs (1) through (3) above.

(c) If the solicitation requires bidding on all items, failure to do so will disqualify the bid. If bidding on all items is not required, bidders should insert the words "no bid" in the space provided for any item on which no price is submitted.

(d) Alternate bids will not be considered unless this solicitation authorizes their submission.

52.214-19 CONTRACT AWARD--SEALED BIDDING--CONSTRUCTION (AUG 1996)

(a) The Government will evaluate bids in response to this solicitation without discussions and will award a contract to the responsible bidder whose bid, conforming to the solicitation, will be most advantageous to the Government, considering only price and the price-related factors specified elsewhere in the solicitation.

(b) The Government may reject any or all bids, and waive informalities or minor irregularities in bids received.

(c) The Government may accept any item or combination of items, unless doing so is precluded by a restrictive limitation in the solicitation or the bid.

(d) The Government may reject a bid as nonresponsive if the prices bid are materially unbalanced between line items or subline items. A bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated in relation to cost for other work, and if there is a reasonable doubt that the bid will result in the lowest overall cost to the Government even though it may be the low evaluated bid, or if it is so unbalanced as to be tantamount to allowing an advance payment.

52.214-34 SUBMISSION OF OFFERS IN THE ENGLISH LANGUAGE (APR 1991)

Offers submitted in response to this solicitation shall be in the English language. Offers received in other than English shall be rejected.

(End of provision)

52.214-35 SUBMISSION OF OFFERS IN U.S. CURRENCY (APR 1991)

Offers submitted in response to this solicitation shall be in terms of U.S. dollars. Offers received in other than U.S. dollars shall be rejected.

(End of provision)

52.0214-4001 DIRECTIONS FOR SUBMITING BIDS (MAR 2002)

Envelopes containing bids must be sealed, marked and addressed as follows:

MARK ENVELOPES:

Bid under IFB No. DACW09-02-B-0004
Bid Opening Date: February 6, 2003 AT 1:00 PM

ADDRESS ENVELOPES TO:

Department of the Army
U. S. Army Engineer District, Los Angeles
ATTN: Contracting Division
C/O: CINDY MYRTETUS
P. O. Box 532711
Los Angeles, CA 90053-2325

SPECIAL INSTRUCTIONS PERTAINING TO HAND-CARRIED BIDS:

Due to security precautions, all Corps of Engineers visitors/couriers are now required to check in at the Public Affairs Office (PAO), Suite 980, Wilshire Blvd, Los Angeles, CA. Bidders are no longer permitted to hand-carry their bids directly to Contacting Division without an authorized escort. **Bids may NOT be left unattended at the Public Affairs Office (PAO), Suite 980.**

Bidders who desire to hand-deliver their bids prior to the scheduled bid opening time/date must notify the Contracting Division to arrange for receipt of their bid by Contracting Division personnel. Normally the contact will be the Contract Specialist designated above. In the event the Contract Specialist cannot be reached, please call the main Contracting Division telephone number, 213-452-3231 or the following alternative telephone numbers -3233, -3245, -3234, or -3235, in order to request assistance.

30 minutes prior to the scheduled bid opening time/date, the Bid Opening Officer will be in the Public Affairs Office (PAO) Suite 980, to accept bids. After visitor in-processing, all bidders will subsequently be escorted to Bid Opening Room, where the bids will be publicly opened and read.

In order to expedite visitor processing, bidders are encouraged to complete the information requested on the Notice of Visitor(s) Form (attached). The completed form can be faxed to the Contract Specialist at (213)452-4184 or 4187, prior to the date for receipt of bids. In addition, no more than 2 visitors per firm will be permitted within the building. No exceptions will be made. The offeror is responsible for compliance with the security requirements and shall ensure that any company representative, courier or delivery personnel are aware of these special procedures pertaining to hand carried bids.

NOTICE OF VISITOR(S)

1. Date(s) of Visit *(Inclusive)*	**2. Arrival Time**	
3. Name of Visitor(s) *(Last, First)*	**4. Agency/Company of Visitor**	
5. Name of Person Being Visited *(Include Div, Br, Sec)*	**6. Suite Number**	**7. Telephone Number**
8. Contact Person *(if other than Person Being Visited)*		**9. Telephone Number**
10. Other Comments or Instructions		

- All visitors must report to the Public Affairs Office, Suite 980
- Visitors must use the Visitor Tag provided.
- Visitors must be escorted to Corps of Engineers floors
- Parking validation is only available for Engineering Division, Construction-Operations, and Information Management field personnel.
- Delivery personnel will be validated for 30 minutes only.

52.214-5000 ARITHMETIC DISCREPANCIES EFARS 52.214-5000

(a) For the purpose of initial evaluation of bids, the following will be utilized in resolving arithmetic discrepancies found on the face of the bidding schedule as submitted by bidders:

(1) Obviously misplaced decimal points will be corrected;

(2) Discrepancy between unit price and extended price, the unit price will govern;

(3) Apparent errors in extension of unit prices will be corrected;

(4) Apparent errors in addition of lump sum and extended prices will be corrected.

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

(c) These correction procedures shall not be used to resolve any ambiguity concerning which bid is low.

(End of statement)

52.0214-4583 TELEGRAPHIC BIDS/OFFERS ARE NOT ACCEPTABLE

Any telegram to modify or withdraw a bid/offer sent to this office must be physically delivered to the office designated for receipt of bid/offer by the date and time set for bid opening/receipt of proposals. No one from this office will be dispatched to the local telegraph office to pick up any telegram for any reason.

52.0214-4584 FACSIMILE BIDS/OFFERS

Facsimile bids/offers, modifications thereto, or cancellations of bids/offers will not be accepted.

52.0214-4599 EVALUATION FOR AWARD

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

52.216-1 TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a Firm Fixed Price contract resulting from this solicitation.

(End of clause)

52.225-12 NOTICE OF BUY AMERICAN ACT REQUIREMENT-- CONSTRUCTION MATERIALS UNDER TRADE AGREEMENTS (FEB 2000)

(a) Definitions. Construction material, designated country construction material, domestic construction material, foreign construction material, and NAFTA country construction material, as used in this provision, are defined in the clause of this solicitation entitled “Buy American Act--Balance of Payments Program--Construction Materials under Trade Agreements” (Federal Acquisition Regulation (FAR) clause 52.225-11).

(b) Requests for determination of inapplicability. An offeror requesting a determination regarding the inapplicability of the Buy American Act or Balance of Payments Program should submit the request to the Contracting Officer in time to allow a determination before submission of offers. The offeror shall include the information and applicable supporting data required by paragraphs (c) and (d) of FAR clause 52.225-11 in the request. If an offeror has not requested a determination regarding the inapplicability of the Buy American Act or Balance of Payments Program before submitting its offer, or has not received a response to a previous request, the offeror shall include the information and supporting data in the offer.

(c) Evaluation of offers. (1) The Government will evaluate an offer requesting exception to the requirements of the Buy American Act or Balance of Payments Program, based on claimed unreasonable cost of domestic construction materials, by adding to the offered price the appropriate percentage of the cost of such foreign construction material, as specified in paragraph (b)(4)(i) of FAR clause 52.225-11.

(2) If evaluation results in a tie between an offeror that requested the substitution of foreign construction material based on unreasonable cost and an offeror that did not request an exception, the Contracting Officer will award to the offeror that did not request an exception based on unreasonable cost.

(d) Alternate offers. (1) When an offer includes foreign construction material, other than designated country or NAFTA country construction material, that is not listed by the Government in this solicitation in paragraph (b)(3) of FAR clause 52.225-11, the offeror also may submit an alternate offer based on use of equivalent domestic, designated country, or NAFTA country construction material.

(2) If an alternate offer is submitted, the offeror shall submit a separate Standard Form 1442 for the alternate offer, and a separate price comparison table prepared in accordance with paragraphs (c) and (d) of FAR clause 52.225-11 for the offer that is based on the use of any foreign construction material for which the Government has not yet determined an exception applies.

(3) If the Government determines that a particular exception requested in accordance with paragraph (c) of FAR clause 52.225-11 does not apply, the Government will evaluate only those offers based on use of the equivalent domestic, designated country, or NAFTA country construction material, and the offeror shall be required to furnish such domestic, designated country, or NAFTA country construction material. An offer based on use of the foreign construction material for which an exception was requested--

(i) Will be rejected as nonresponsive if this acquisition is conducted by sealed bidding; or

(ii) May be accepted if revised during negotiations.

(End of provision)

52.228-1 BID GUARANTEE (SEP 1996)

(a) Failure to furnish a bid guarantee in the proper form and amount, by the time set for opening of bids, may be cause for rejection of the bid.

(b) The bidder shall furnish a bid guarantee in the form of a firm commitment, e.g., bid bond supported by good and sufficient surety or sureties acceptable to the Government, postal money order, certified check, cashier's check, irrevocable letter of credit, or, under Treasury Department regulations, certain bonds or notes of the United States. The Contracting Officer will return bid guarantees, other than bid bonds, (1) to unsuccessful bidders as soon as practicable after the opening of bids, and (2) to the successful bidder upon execution of contractual documents and bonds (including any necessary coinsurance or reinsurance agreements), as required by the bid as accepted.

(c) The amount of the bid guarantee shall be 20% percent of the bid price or $3,000,000.00, whichever is less.

(d) If the successful bidder, upon acceptance of its bid by the Government within the period specified for acceptance, fails to execute all contractual documents or furnish executed bond(s) within 10 days after receipt of the forms by the bidder, the Contracting Officer may terminate the contract for default.

(e) In the event the contract is terminated for default, the bidder is liable for any cost of acquiring the work that exceeds the amount of its bid, and the bid guarantee is available to offset the difference.

52.228-4506 INDIVIDUAL SURETIES IN SUPPORT OF BID BONDS

Bidder/offerors utilizing individual sureties in support of a bid bond shall include a Standard Form (SF) 28 (Affidavit of Individual Surety), accompanied by a pledge of acceptable assets from each person acting as an individual surety, and include these with the SF 24 (Bid Bond), and the bid itself (see clause titled "Pledges of Assets," FAR 52.228-11). Pledges of acceptable assets shall be in the form of (1) evidence of an escrow account and/or (2) a recorded lien on real estate. If this is an RFP, failure to provide required documentation described herein may cause the offeror to be deemed "unacceptable".

52.228-4507 BID GUARANTEE FORM AND AMOUNT

When bids/proposals exceed $100,000, the offeror shall furnish a separated bid guarantee in accordance with the solicitation provision titled "Bid Guarantee", FAR 52.228-1. In accordance with FAR 28.101-2 the bid guarantee amount shall be a least 20 percent of the "bid price" but shall not exceed $3 million. When the penal sum is expressed as a percentage, a maximum dollar limitation may be stated. If there are

option line items on the Pricing Schedule (Schedule B), the term "bid price" is hereby defined as the total bid not to include any amount for line items designated as "options". In bids/proposals that contain "additives", the "bid price" is defined as the total of all bid items including additive line items. FAR 28.106-1 states that a Standard Form (SF) 24 shall be used for the bid bond. In accordance with FAR 28.202(a)(1), corporate sureties utilized must appear on the list contained in the Department of Treasury Circular 570 titled "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and Acceptable Reinsuring Companies."

52.232-38 SUBMISSION OF ELECTRONIC FUNDS TRANSFER INFORMATION WITH OFFER (MAY 1999)

The offeror shall provide, with its offer, the following information that is required to make payment by electronic funds transfer (EFT) under any contract that results from this solicitation. This submission satisfies the requirement to provide EFT information under paragraphs (b)(1) and (j) of the clause at 52.232-34, Payment by Electronic Funds Transfer--Other than Central Contractor Registration.

(1) The solicitation number (or other procurement identification number).

(2) The offeror's name and remittance address, as stated in the offer.

(3) The signature (manual or electronic, as appropriate), title, and telephone number of the offeror's official authorized to provide this information.

(4) The name, address, and 9-digit Routing Transit Number of the offeror's financial agent.

(5) The offeror's account number and the type of account (checking, savings, or lockbox).

(6) If applicable, the Fedwire Transfer System telegraphic abbreviation of the offeror's financial agent.

(7) If applicable, the offeror shall also provide the name, address, telegraphic abbreviation, and 9-digit Routing Transit Number of the correspondent financial institution receiving the wire transfer payment if the offeror's financial agent is not directly on-line to the Fedwire and, therefore, not the receiver of the wire transfer payment.

(End of provision)

52.233-2 SERVICE OF PROTEST (AUG 1996)

(a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from Lucia A. Carvajal, P. O. Box 532711, Los Angeles, CA 90053-2325

(b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

(End of provision)

52.236-27 SITE VISIT (CONSTRUCTION) (FEB 1995)

(a) The clauses at 52.236-2, Differing Site Conditions, and 52.236-3, Site Investigations and Conditions Affecting the Work, will be included in any contract awarded as a result of this solicitation. Accordingly, offerors or quoters are urged and expected to inspect the site where the work will be performed.

(b) Site visits may be arranged during normal duty hours by contacting Julie Martinez at 562. 861.1094. An organized site visit will be held on November 7, 2002 at 10:00 AM. Please meet at the following location:

2493 Pomona-Rincon Rd
Corona, CA
(which is at the entrance gate of the facility)

52.211-5000 EVALUATION OF SUBDIVIDED ITEMS (MAR 1995)—EFARS

Item Nos. 0068,and 0069 are subdivided into two or more estimated quantities and are to be separately priced. The Government will evaluate each of these items on the basis of total price of its sub-items.

(End of clause)

SECTION 00800 Special Contract Requirements

SECTION 00800

52.0001- 4001 CONTRACT ADMINISTRATION DATA

The Contract Administration Office for this contract subsequent to award is:

Department of the Army
Los Angeles District, Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

ATTN: Cindy Myrtetus
Telephone No: Area Code (213) 452- 3247

Payment will be made by:

USACE Finance Center
ATTN: CEFC-AO-P
5270 Integrity Drive
Millington, TN 38054-5005

Submit Invoices to:

Refer to Block No. 26 of the Standard Form 1442, "Solicitation, Offer and Award" which will be completed at time of contract award.

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

The Contractor shall be required to (a) commence work under this contract within 1 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 1278 calendar days after the Contractor receives the Notice to Proceed. The time stated for completion shall include final cleanup of the premises.

(End of clause)

52.211-12 LIQUIDATED DAMAGES--CONSTRUCTION (SEP 2000)

(a) If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of $1,350.00 for each calendar day of delay until the work is completed or accepted.

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

(End of clause)

52.211-18 VARIATION IN ESTIMATED QUANTITY (APR 1984)

If the quantity of a unit-priced item in this contract is an estimated quantity and the actual quantity of the unit-priced item varies more than 15 percent above or below the estimated quantity, an equitable adjustment in the contract price shall be made upon demand of either party. The equitable adjustment shall be based upon any increase or decrease in costs due solely to the variation above 115 percent or below 85

percent of the estimated quantity. If the quantity variation is such as to cause an increase in the time necessary for completion, the Contractor may request, in writing, an extension of time, to be received by the Contracting Officer within 10 days from the beginning of the delay, or within such further period as may be granted by the Contracting Officer before the date of final settlement of the contract. Upon the receipt of a written request for an extension, the Contracting Officer shall ascertain the facts and make an adjustment for extending the completion date as, in the judgment of the Contracting Officer, is justified.

52.222-23 NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY FOR CONSTRUCTION (FEB 1999)

(a) The offeror's attention is called to the Equal Opportunity clause and the Affirmative Action Compliance Requirements for Construction clause of this solicitation.

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

Goals for minority participation for each trade	Goals for female participation for each trade
21% to 25.1%	6.9%

These goals are applicable to all the Contractor's construction work performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, the Contractor shall apply the goals established for the geographical area where the work is actually performed. Goals are published periodically in the Federal Register in notice form, and these notices may be obtained from any Office of Federal Contract Compliance Programs office.

(c) The Contractor's compliance with Executive Order 11246, as amended, and the regulations in 41 CFR 60-4 shall be based on (1) its implementation of the Equal Opportunity clause, (2) specific affirmative action obligations required by the clause entitled "Affirmative Action Compliance Requirements for Construction," and (3) its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade. The Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor, or from project to project, for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, Executive Order 11246, as amended, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

(d) The Contractor shall provide written notification to the Deputy Assistant Secretary for Federal Contract Compliance, U.S. Department of Labor, within 10 working days following award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the --

(1) Name, address, and telephone number of the subcontractor;

(2) Employer's identification number of the subcontractor;

(3) Estimated dollar amount of the subcontract;

(4) Estimated starting and completion dates of the subcontract; and

(5) Geographical area in which the subcontract is to be performed.

(e) As used in this Notice, and in any contract resulting from this solicitation, the "covered area" is Los Angeles County, California.

52.228-12 Prospective Subcontractor Requests for Bonds. (OCT 1995)

In accordance with Section 806(a)(3) of Pub. L. 102-190, as amended by Sections 2091 and 8105 of Pub. L. 103-355, upon the request of a prospective subcontractor or supplier offering to furnish labor or material for the performance of this contract for which a payment bond has been furnished to the Government pursuant to the Miller Act, the Contractor shall promptly provide a copy of such payment bond to the requester.

52.228-14 IRREVOCABLE LETTER OF CREDIT (DEC 1999)

(a) "Irrevocable letter of credit" (ILC), as used in this clause, means a written commitment by a federally insured financial institution to pay all or part of a stated amount of money, until the expiration date of the letter, upon presentation by the Government (the beneficiary) of a written demand therefor. Neither the financial institution nor the offeror/Contractor can revoke or condition the letter of credit.

(b) If the offeror intends to use an ILC in lieu of a bid bond, or to secure other types of bonds such as performance and payment bonds, the letter of credit and letter of confirmation formats in paragraphs (e) and (f) of this clause shall be used.

(c) The letter of credit shall be irrevocable, shall require presentation of no document other than a written demand and the ILC (including confirming letter, if any), shall be issued/confirmed by an acceptable federally insured financial institution as provided in paragraph (d) of this clause, and--

(1) If used as a bid guarantee, the ILC shall expire no earlier than 60 days after the close of the bid acceptance period;

(2) If used as an alternative to corporate or individual sureties as security for a performance or payment bond, the offeror/Contractor may submit an ILC with an initial expiration date estimated to cover the entire period for which financial security is required or may submit an ILC with an initial expiration date that is a minimum period of one year from the date of issuance. The ILC shall provide that, unless the issuer provides the beneficiary written notice of non-renewal at least 60 days in advance of the current expiration date, the ILC is automatically extended without amendment for one year from the expiration date, or any future expiration date, until the period of required coverage is completed and the Contracting Officer provides the financial institution with a written statement waiving the right to payment. The period of required coverage shall be:

(i) For contracts subject to the Miller Act, the later of--

(A) One year following the expected date of final payment;

(B) For performance bonds only, until completion of any warranty period; or

(C) For payment bonds only, until resolution of all claims filed against the payment bond during the one-year period following final payment.

(ii) For contracts not subject to the Miller Act, the later of--

(A) 90 days following final payment; or

(B) For performance bonds only, until completion of any warranty period.

(d) Only federally insured financial institutions rated investment grade or higher shall issue or confirm the ILC. The offeror/Contractor shall provide the Contracting Officer a credit rating that indicates the financial institution has the required rating(s) as of the date of issuance of the ILC. Unless the financial institution issuing the ILC had letter of credit business of less than $25 million in the past year, ILCs over $5 million

must be confirmed by another acceptable financial institution that had letter of credit business of less than $25 million in the past year.

(e) The following format shall be used by the issuing financial institution to create an ILC:

_____

[Issuing Financial Institution's Letterhead or Name and Address]

Issue Date _____

IRREVOCABLE LETTER OF CREDIT NO. _____

Account party's name _____

Account party's address _____

For Solicitation No. _____(for reference only)

TO: [U.S. Government agency]

[U.S. Government agency's address]

1. We hereby establish this irrevocable and transferable Letter of Credit in your favor for one or more drawings up to United States $_____. This Letter of Credit is payable at [issuing financial institution's and, if any, confirming financial institution's] office at [issuing financial institution's address and, if any, confirming financial institution's address] and expires with our close of business on _____, or any automatically extended expiration date.

2. We hereby undertake to honor your or the transferee's sight draft(s) drawn on the issuing or, if any, the confirming financial institution, for all or any part of this credit if presented with this Letter of Credit and confirmation, if any, at the office specified in paragraph 1 of this Letter of Credit on or before the expiration date or any automatically extended expiration date.

3. [This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.] It is a condition of this Letter of Credit that it is deemed to be automatically extended without amendment for one year from the expiration date hereof, or any future expiration date, unless at least 60 days prior to any expiration date, we notify you or the transferee by registered mail, or other receipted means of delivery, that we elect not to consider this Letter of Credit renewed for any such additional period. At the time we notify you, we also agree to notify the account party (and confirming financial institution, if any) by the same means of delivery.

4. This Letter of Credit is transferable. Transfers and assignments of proceeds are to be effected without charge to either the beneficiary or the transferee/assignee of proceeds. Such transfer or assignment shall be only at the written direction of the Government (the beneficiary) in a form satisfactory to the issuing financial institution and the confirming financial institution, if any.

5. This Letter of Credit is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of _____ [state of confirming financial institution, if any, otherwise state of issuing financial institution].

6. If this credit expires during an interruption of business of this financial institution as described in Article 17 of the UCP, the financial institution specifically agrees to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,

_____

[Issuing financial institution]

(f) The following format shall be used by the financial institution to confirm an ILC:

_____
[Confirming Financial Institution's Letterhead or Name and Address]

(Date) _____

Our Letter of Credit Advice Number _____

Beneficiary: _____ [U.S. Government agency]

Issuing Financial Institution: _____

Issuing Financial Institution's LC No.: _____

Gentlemen:

1. We hereby confirm the above indicated Letter of Credit, the original of which is attached, issued by _____ [name of issuing financial institution] for drawings of up to United States dollars _____/U.S. $_____ and expiring with our close of business on _____ [the expiration date], or any automatically extended expiration date.

2. Draft(s) drawn under the Letter of Credit and this Confirmation are payable at our office located at _____.

3. We hereby undertake to honor sight draft(s) drawn under and presented with the Letter of Credit and this Confirmation at our offices as specified herein.

4. [This paragraph is omitted if used as a bid guarantee, and subsequent paragraphs are renumbered.] It is a condition of this confirmation that it be deemed automatically extended without amendment for one year from the expiration date hereof, or any automatically extended expiration date, unless:

(a) At least 60 days prior to any such expiration date, we shall notify the Contracting Officer, or the transferee and the issuing financial institution, by registered mail or other receipted means of delivery, that we elect not to consider this confirmation extended for any such additional period; or

(b) The issuing financial institution shall have exercised its right to notify you or the transferee, the account party, and ourselves, of its election not to extend the expiration date of the Letter of Credit.

5. This confirmation is subject to the Uniform Customs and Practice (UCP) for Documentary Credits, 1993 Revision, International Chamber of Commerce Publication No. 500, and to the extent not inconsistent therewith, to the laws of _____ [state of confirming financial institution].

6. If this confirmation expires during an interruption of business of this financial institution as described in Article 17 of the UCP, we specifically agree to effect payment if this credit is drawn against within 30 days after the resumption of our business.

Sincerely,

_____

[Confirming financial institution]

(g) The following format shall be used by the Contracting Officer for a sight draft to draw on the Letter of Credit:

SIGNED DRAFT

_____

[City, State]

(Date) _____

[Name and address of financial institution]

Pay to the order of _____ [Beneficiary Agency] _____ the sum of United States $_____. This draft is drawn under Irrevocable Letter of Credit No. _____.

_____

[Beneficiary Agency]

By: _____

52.228-15 Performance and Payment Bonds--Construction (JUL 2000)-

(a) Definitions. As used in this clause--

Original contract price means the award price of the contract; or, for requirements contracts, the price payable for the estimated total quantity; or, for indefinite-quantity contracts, the price payable for the specified minimum quantity. Original contract price does not include the price of any options, except those options exercised at the time of contract award.

(b) Amount of required bonds. Unless the resulting contract price is $100,000 or less, the successful offeror shall furnish performance and payment bonds to the Contracting Officer as follows:

(1) Performance bonds (Standard Form 25). The penal amount of performance bonds at the time of contract award shall be 100 percent of the original contract price.

(2) Payment Bonds (Standard Form 25-A). The penal amount of payment bonds at the time of contract award shall be 100 percent of the original contract price.

(3) Additional bond protection. (i) The Government may require additional performance and payment bond protection if the contract price is increased. The increase in protection generally will equal 100 percent of the increase in contract price.

(ii) The Government may secure the additional protection by directing the Contractor to increase the penal amount of the existing bond or to obtain an additional bond.

(c) Furnishing executed bonds. The Contractor shall furnish all executed bonds, including any necessary reinsurance agreements, to the Contracting Officer, within the time period specified in the Bid Guarantee provision of the solicitation, or otherwise specified by the Contracting Officer, but in any event, before starting work.

(d) Surety or other security for bonds. The bonds shall be in the form of firm commitment, supported by corporate sureties whose names appear on the list contained in Treasury Department Circular 570, individual sureties, or by other acceptable security such as postal money order, certified check, cashier's check, irrevocable letter of credit, or, in accordance with Treasury Department regulations, certain bonds or notes of the United States. Treasury Circular 570 is published in the Federal Register or may be obtained from the U.S. Department of Treasury, Financial Management Service, Surety Bond Branch, 401 14th Street, NW, 2nd Floor, West Wing, Washington, DC 20227.

(e) Notice of subcontractor waiver of protection (40 U.S.C. 270b(c). Any waiver of the right to sue on the payment bond is void unless it is in writing, signed by the person whose right is waived, and executed after such person has first furnished labor or material for use in the performance of the contract.

(End of clause)

52.0028-4001 REQUIRED INSURANCE

Insurance is required as follows:

a. Either Workman's Compensation or Employer's Liability Insurance with a minimum limit of $100,000.00.

b. General Liability. The Contracting Officer shall require bodily injury liability insurance coverage written on the comprehensive form or policy of at least $500,000.00 per occurrence.

c. Automobile Liability Insurance for Bodily Injury and Property Damage with minimum limits of $200,000.00 for injury or death of any one person; $500,000.00 for each accident or occurrence of bodily injury liability; and $20,000.00 for each accident or occurrence for property liability.

d. In every case the insurance coverage shall amount to at least the limits stated above. However, where the Financial Responsibility Compulsory Insurance Law of the State in which the installation is located requires higher limits, the Automobile Liability Insurance Policy should provide coverage of at least those limits.

Prior to the commencement of work hereunder, the Contractor shall furnish to the Contracting Office a certificate or written statement of the above required insurance. The policies evidencing required insurance shall contain an endorsement to the effect that cancellation or any material change in the policies adversely affecting the interests of the Government in such insurance shall not be effective until 10 days after written notice thereof to the Contracting Officer.

The Contractor agrees to insert the substance of this clause, including this paragraph, in all subcontracts

52.0231-4001 EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (MAR 1995)
EFARS 52-231-5000

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

(b) Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36 substantiated by certified copies of paid invoices. Rates for equipment rented from an organization under common control, lease-purchase or sale-leaseback arrangements will be determined using the schedule except that rental costs leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees are allowable. Costs for major repairs and overhaul are unallowable.

(c) When actual equipment costs are proposed and the total amount of the pricing action is over $25,000, cost or pricing data shall be submitted on Standard Form 1411, "Contract Pricing Proposal Cover Sheet." By submitting cost or pricing data, the contractor grants to the contracting officer or an authorizing representative the right to examine those books, records, documents and other supporting data that will permit evaluation of the proposed equipment costs. After price agreement the contractor shall certify that the equipment costs of pricing data submitted are accurate, complete and current.

(End of clause)

52.232-4001 CONTINUING CONTRACTS (ALTERNATE) (MAR 1995) EFARS 52-232-5002

(a) Funds are not available at the inception of this contract to cover the entire contract price. The sum of $100,000.00 has been reserved for this contract and is available for payment to the contractor during the current fiscal year. It is expected that Congress will make appropriations for future fiscal years from which additional funds, together with funds provided by one or more non-federal project sponsors will be reserved for this contract. The liability of the United States for payment beyond the funds reserved for this contract is contingent on the reservation of additional funds.

(b) Failure to make payment in excess of the amount currently reserved, or that may be reserved from time to time, shall not be considered a breach of this contract, and shall not entitle the contractor to a price adjustment under the terms of this contract except as specifically provided in paragraphs (e) and (h) below.

(c) The Government may at any time reserve additional funds for payments under the contract if there are funds available for such purpose. The contracting officer will promptly notify the contractor of any additional funds reserved for the contract by issuing and administrative modification to the contract.

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

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

(f) 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 a "Suspension of Work" or similar clause or in any other manner under this contract.

(g) 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.

(h) 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 at no cost to the Government, except that, to the extent that

additional funds to make payment therefore are allocated to this contract, it may be treated as a termination for the convenience of the Government.

(i) 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 this 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.

(j) The term "Reservation" means monies that have been set aside and made available for payments under this contract.

52.236-1 PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984)

The Contractor shall perform on the site, and with its own organization, work equivalent to at least 35% percent of the total amount of work to be performed under the contract. This percentage may be reduced by a supplemental agreement to this contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

52.236-4 PHYSICAL DATA (APR 1984)

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

(a) The indications of physical conditions on the drawings and in the specifications are the result of site investigations by surveys.

(b) Weather conditions . The contractor shall satisfy himself as to the hazards likely to arise from weather conditions.

(c) Transportation facilities . The contractor shall make his own investigation of the conditions of existing public and private roads and clearances, restrictions, bridge load limits and other limitations affecting transportation and ingress and egress at the job site. The unavailability of transportation facilities or limitations thereof shall not become a basis for claims against the Government or extensions of time for completion of the work.

(d) N/A.

52.236-16 QUANTITY SURVEYS (APR 1984)

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

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

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

52.236-21 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FEB 1997)

(a) The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information as considered necessary, unless otherwise provided.

(b) Wherever in the specifications or upon the drawings the words "directed", "required", "ordered", "designated", "prescribed", or words of like import are used, it shall be understood that the "direction", "requirement", "order", "designation", or "prescription", of the Contracting Officer is intended and similarly the words "approved", "acceptable", "satisfactory", or words of like import shall mean "approved by," or "acceptable to", or "satisfactory to" the Contracting Officer, unless otherwise expressly stated.

(c) Where "as shown," as indicated", "as detailed", or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word "provided" as used herein shall be understood to mean "provide complete in place," that is "furnished and installed".

(d) Shop drawings means drawings, submitted to the Government by the Contractor, subcontractor, or any lower tier subcontractor pursuant to a construction contract, showing in detail (1) the proposed fabrication and assembly of structural elements, and (2) the installation (i.e., fit, and attachment details) of materials or equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the contractor to explain in detail specific portions of the work required by the contract. The Government may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.

(e) If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with contract requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate the Government's reasons therefore. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (f) below.

(f) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Contracting Officer approves any such variation, the Contracting Officer shall issue an appropriate contract modification, except that, if the variation is minor or does not involve a change in price or in time of performance, a modification need not be issued.

(g) The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated) of all shop drawings, will be retained by the Contracting Officer and one set will be returned to the Contractor.

52.0236-4001 PLANT AND MATERIAL REMOVAL AFTER CONTRACT TERMINATION (MAR 1996) EFARS 52.236-5000

Should this contract be terminated as provided in clause 52.232-4001

because of the failure of Congress to provide additional funds for its completion, the contractor may be permitted to remove plant and material on which payments for preparatory work have been made, subject to an equitable deduction from the amounts due the contractor to reimburse the United States for the unabsorbed value of such plant and material.

(End of clause)

52.249-4001 BASIS FOR SETTLEMENT OF PROPOSALS EFARS 52.249-5000

Actual costs will be used to determine equipment costs for a settlement proposal submitted on the total cost basis under FAR 49.206-2(b). In evaluating a terminations settlement proposal using the total costs basis, the following principals will be applied to determine allowable equipment costs:

(1) Actual costs for each piece of equipment, or groups of similar serial or series equipment, need not be available in the contractor's accounting records to determine total actual equipment costs.

(2) If equipment costs have been allocated to a contract using predetermined rates, those charges will be adjusted to actual costs.

(3) Recorded job costs adjusted for unallowable and unallowable expenses will be used to determine equipment operating expenses. [3]

(4) Ownership costs (depreciation) will be determined using the contractor's depreciation schedule (subject to the provisions of FAR 31.205-11).

(5) License, taxes, storage and insurance costs age normally recovered as an indirect expense and unless the contractor charges these costs directly to contracts, they will be recover through the indirect expense rate.

(End of Statement)

252.236-7001 CONTRACT DRAWINGS, MAPS, AND SPECIFICATIONS (AUG 2000)

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

(b) The Contractor shall--

(1) Check all drawings furnished immediately upon receipt;

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

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

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

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

(c) In general--

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

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

(d) Omissions from the drawings or specifications or the misdescription of details of work that are manifestly necessary to carry out the intent of the drawings and specifications, or that are customarily

performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work. The Contractor shall perform such details as if fully and correctly set forth and described in the drawings and specifications.

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

Title	File	Drawing No.
INDEX TO CONTRACT DRAWINGS, GENERAL LEGEND AND APPREVIATIONS	121/116	C-2 OF 73
INDEX TO CONTRACT DRAWINGS	121/117	C-3 OF 73

(End of clause)

252.236-7002 OBSTRUCTION OF NAVIGABLE WATERWAYS. (DEC 1991)

(a) The Contractor shall --

(1) Promptly recover and remove any material, plant, machinery, or appliance which the contractor loses, dumps, throws overboard, sinks, or misplaces, and which, in the opinion of the Contracting Officer, may be dangerous to or obstruct navigation;

(2) Give immediate notice, with description and locations of any such obstructions, to the Contracting Officer; and

(3) When required by the Contracting Officer, mark or buoy such obstructions until the same are removed.

(b) The Contracting Officer may --

(1) Remove the obstructions by contract or otherwise should the Contractor refuse, neglect, or delay compliance with paragraph (a) of this clause; and

(2) Deduct the cost of removal from any monies due or to become due to the Contractor; or

(3) Recover the cost of removal under the Contractor's bond.

(c) The Contractor's liability for the removal of a vessel wrecked or sunk without fault or negligence is limited to that provided in sections 15, 19, and 20 of the River and Harbor Act of March 3, 1899 (33 U.S.C. 410 et. seq.).

252.247-7023 TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)

(a) Definitions. As used in this clause --

(1) "Components" means articles, materials, and supplies incorporated directly into end products at any level of manufacture, fabrication, or assembly by the Contractor or any subcontractor.

(2) "Department of Defense" (DoD) means the Army, Navy, Air Force, Marine Corps, and defense agencies.

(3) "Foreign flag vessel" means any vessel that is not a U.S.-flag vessel.

(4) "Ocean transportation" means any transportation aboard a ship, vessel, boat, barge, or ferry through

international waters.

(5) "Subcontractor" means a supplier, materialman, distributor, or vendor at any level below the prime contractor whose contractual obligation to perform results from, or is conditioned upon, award of the prime contract and who is performing any part of the work or other requirement of the prime contract.

(6) "Supplies" means all property, except land and interests in land, that is clearly identifiable for eventual use by or owned by the DoD at the time of transportation by sea.

(i) An item is clearly identifiable for eventual use by the DoD if, for example, the contract documentation contains a reference to a DoD contract number or a military destination.

(ii) "Supplies" includes (but is not limited to) public works; buildings and facilities; ships; floating equipment and vessels of every character, type, and description, with parts, subassemblies, accessories, and equipment; machine tools; material; equipment; stores of all kinds; end items; construction materials; and components of the foregoing.

(7) "U.S.-flag vessel" means a vessel of the United States or belonging to the United States, including any vessel registered or having national status under the laws of the United States.

(b)(1) The Contractor shall use U.S.-flag vessels when transporting any supplies by sea under this contract.

(2) A subcontractor transporting supplies by sea under this contract shall use U.S.-flag vessels if--

(i) This contract is a construction contract; or

(ii) The supplies being transported are--

(A) Noncommercial items; or

(B) Commercial items that--

(1) The Contractor is reselling or distributing to the Government without adding value (generally, the Contractor does not add value to items that it contracts for f.o.b. destination shipment);

(2) Are shipped in direct support of U.S. military contingency operations, exercises, or forces deployed in humanitarian or peacekeeping operations; or

(3) Are commissary or exchange cargoes transported outside of the Defense Transportation System in accordance with 10 U.S.C. 2643.

(c) The Contractor and its subcontractors may request that the Contracting Officer authorize shipment in foreign-flag vessels, or designate available U.S.-flag vessels, if the Contractor or a subcontractor believes that --

(1) U.S.-flag vessels are not available for timely shipment;

(2) The freight charges are inordinately excessive or unreasonable; or

(3) Freight charges are higher than charges to private persons for transportation of like goods.

(d) The Contractor must submit any request for use of other than U.S.-flag vessels in writing to the Contracting Officer at least 45 days prior to the sailing date necessary to meet its delivery schedules. The Contracting Officer will process requests submitted after such date(s) as expeditiously as possible, but the Contracting Officer's failure to grant approvals to meet the shipper's sailing date will not of itself constitute a compensable delay under this or any other clause of this contract. Requests shall contain at a minimum --

(1) Type, weight, and cube of cargo;

(2) Required shipping date;

(3) Special handling and discharge requirements;

(4) Loading and discharge points;

(5) Name of shipper and consignee;

(6) Prime contract number; and

(7) A documented description of efforts made to secure U.S.-flag vessels, including points of contact (with names and telephone numbers) with at least two U.S.-flag carriers contacted. Copies of telephone notes, telegraphic and facsimile message or letters will be sufficient for this purpose.

(e) The Contractor shall, within 30 days after each shipment covered by this clause, provide the Contracting Officer and the Division of National Cargo, Office of Market Development, Maritime Administration, U.S. Department of Transportation, Washington, DC 20590, one copy of the rated on board vessel operating carrier's ocean bill of lading, which shall contain the following information --

(1) Prime contract number;

(2) Name of vessel;

(3) Vessel flag of registry;

(4) Date of loading;

(5) Port of loading;

(6) Port of final discharge;

(7) Description of commodity;

(8) Gross weight in pounds and cubic feet if available;

(9) Total ocean freight in U.S. dollars; and

(10) Name of the steamship company.

(f) The Contractor agrees to provide with its final invoice under this contract a representation that to the best of its knowledge and belief --

(1) No ocean transportation was used in the performance of this contract;

(2) Ocean transportation was used and only U.S.-flag vessels were used for all ocean shipments under the contract;

(3) Ocean transportation was used, and the Contractor had the written consent of the Contracting Officer for all non-U.S.-flag ocean transportation; or

(4) Ocean transportation was used and some or all of the shipments were made on non-U.S.-flag vessels without the written consent of the Contracting Officer. The Contractor shall describe these shipments in the following format:

ITEM DESCRIPTION	CONTRACT LINE ITEMS	QUANTITY
TOTAL		

(g) If the final invoice does not include the required representation, the Government will reject and return it to the Contractor as an improper invoice for the purposes of the Prompt Payment clause of this contract. In the event there has been unauthorized use of non-U.S.-flag vessels in the performance of this contract, the Contracting Officer is entitled to equitably adjust the contract, based on the unauthorized use.

(h) The Contractor shall include this clause, including this paragraph (h), in all subcontractors under this contract that--

(1) Exceed the simplified acquisition threshold in Part 2 of the Federal Acquisition Regulation; and

(2) Are for a type of supplies described in paragraph (b)(3) of this clause.

(End of clause)

252.247-7024 NOTIFICATION OF TRANSPORTATION OF SUPPLIES BY SEA (MAR 2000)

(a) The Contractor has indicated by the response to the solicitation provision, Representation of Extent of Transportation by Sea, that it did not anticipate transporting by sea any supplies. If, however, after the award of this contract, the Contractor learns that supplies, as defined in the Transportation of Supplies by Sea clause of this contract, will be transported by sea, the Contractor --

(1) Shall notify the Contracting Officer of that fact; and

(2) Hereby agrees to comply with all the terms and conditions of the Transportation of Supplies by Sea clause of this contract.

(b) The Contractor shall include this clause; including this paragraph (b), revised as necessary to reflect the relationship of the contracting parties--

(1) In all subcontracts under this contract, if this contract is a construction contract; or

(2) If this contract is not a construction contract, in all subcontracts under this contract that are for--

(i) Noncommercial items; or

(ii) Commercial items that--

(A) The Contractor is reselling or distributing to the Government without adding value (generally, the Contractor does not add value to items that it subcontracts for f.o.b. destination shipment);

(B) Are shipped in direct support of U.S. military contingency operations, exercises, or forces deployed in humanitarian or peacekeeping operations; or

(C) Are commissary or exchange cargoes transported outside of the Defense Transportation System in accordance with 10 U.S.C. 2643.

(End of clause)

52.211-5001 VARIATIONS IN ESTIMATED QUANTITIES, SUBDIVIDED ITEMS (MAR 1995)—EFARS

This variation in estimated quantities clause is applicable only to Items Nos**. 0068 and 0069** (a) Variation from the estimated quantity in the actual work performed under any second or subsequent sub-item or elimination of all work under such a second or subsequent 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**. 0068 and 0069** is less than 85% 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 shall be made in accordance with the clause FAR 52.211-18, Variation in Estimated Quantities. (c) If the actual quantity of work performed under Items Nos**. 0068 and 0069** exceeds 115% or is less than 85% of the total estimated quantity of the sub-item under that item and/or if the quantity of the work performed under the second sub-item or any subsequent sub-item under Items Nos. **0068 and 0069** exceeds 115% or is less than 85% of the estimated quantity of any such sub-item, and if such variation causes an increase or a decrease in the time required for performance of this contract the contract completion time will be adjusted in accordance with the clause FAR 52.211-18, Variation in Estimated Quantities.

(End of clause)

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

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

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

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

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

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

(i) Actual mobilization costs at completion of mobilization;

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

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

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

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Section 00850 Rates of Wages

General Decision Number CA020036

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 General Decision Number CA020036
 Superseded General Decision No. CA010036
 State: California
 Construction Type:
 BUILDING
 DREDGING
 HEAVY
 HIGHWAY
 County(ies):
 RIVERSIDE
 BUILDING CONSTRUCTION PROJECTS; DREDGING PROJECTS (does not
 include hopper dredge work); HEAVY CONSTRUCTION PROJECTS (does
 not include water well drilling); HIGHWAY CONSTRUCTION PROJECTS
 Modification Number     Publication Date
             0             03/01/2002
             1             03/08/2002
             2             03/22/2002
             3             03/29/2002
             4             05/10/2002
             5             05/17/2002
             6             05/24/2002
             7             06/07/2002
             8             06/21/2002
             9             07/05/2002
            10             07/19/2002
            11             08/02/2002
            12             08/09/2002
            13             08/23/2002
            14             09/06/2002
            15             09/20/2002
            16             10/04/2002
            17             10/25/2002
            18             11/08/2002
            19             12/13/2002
            20             01/03/2003
            21             01/17/2003
COUNTY(ies):
RIVERSIDE
 ASBE0005B  08/05/2002
                                      Rates           Fringes
Includes the application of all
insulating materials, protective
coverings, coatings, and finishings
to all types of mechanical systems
 INSULATOR/ASBESTOS WORKER             33.06           8.11
----------------------------------------------------------------
 ASBE0005D  12/17/2001
                                      Rates           Fringes
Includes preparation, wetting,
```

stripping, removal, scrapping,
vacuuming, bagging and disposing
of all insulation materials from
mechnical systems, wheather they
contain asbestos or not:

HAZARDOUS MATERIAL HANDLER	16.00	2.30

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* BOIL0092F 10/01/2002

	Rates	Fringes
BOILERMAKER	31.96	13.30

BRCA0004U 05/01/2002

	Rates	Fringes
BRICKLAYER; MARBLE MASON	28.22	6.20

BRCA0018G 06/01/2002

	Rates	Fringes
TILE LAYERS	26.50	7.45
TILE FINISHERS	16.65	2.91
MARBLE FINISHER	19.90	3.56

BRCA0018K 12/01/2000

	Rates	Fringes
TERRAZZO WORKER	26.78	5.34
TERRAZZO FINISHER	20.53	5.34

CARP0002B 07/01/2001

	Rates	Fringes
DIVERS:		
Diver, wet	486.08 per day	5.61
Diver, stand-by	243.04 per day	5.61
Diver tender	235.04 per day	5.61

CARP0002Q 07/01/2002

	Rates	Fringes
Work on wood framed construction of single family residences, apartments or condominiums under 4 stories		
DRYWALL INSTALLERS	19.00	5.18
DRYWALL STOCKER/SCRAPPER	10.00	4.68
All other work		
DRYWALL INSTALLERS	29.00	6.68
DRYWALL STOCKER/SCRAPPER	10.00	4.68

CARP0003E 07/01/2002

	Rates	Fringes
Work on wood frame, tilt up or concrete block construction including but not limited to: shopping centers, stores, office buildings, fast food establishments, also including curb, gutter and sidewalks where the total cost of the project does not exceed seven and one-half million ($7,500,000.00) dollars.		

CARPENTERS:		
Carpenter, cabinet installer, insulation installer, floor worker and acoustical installer	22.75	6.28
Shingler	22.88	6.28
Roof loader of shingles	15.42	6.28
Saw filer	22.83	6.28
Table power saw operator	22.85	6.28
Pneumatic nailer or power stapler	23.00	6.28
Fence builder	20.30	6.28
Millwright	23.25	6.28
Pile driver; Derrick barge; Bridge or dock carpenter; Cable splicer; Heavy framer; Rockslinger	22.88	6.28
Head rockslinger	22.98	6.28
Rock barge or scow	22.78	6.28
Scaffold builder	17.00	6.28
All other work:		
Carpenter, cabinet installer, insulation installer, floor worker and acoustical installer	29.00	6.68
Shingler	29.13	6.68
Roof loader of shingles	20.77	6.68
Saw filer	29.08	6.68
Table power saw operator	29.10	6.68
Pneumatic nailer or power stapler	29.25	6.68
Fence builder	24.79	6.68
Millwright	29.50	6.68
Pile driver; Derrick barge; Bridge or dock carpenter; Cable splicer; Heavy framer; Rockslinger	29.13	6.68
Rockslinger	29.13	6.68
Rock barge or scow	29.03	6.68
Scaffold builder	23.20	6.68

FOOTNOTE:

Work of forming in the construction of open cut sewers or storm drains, on operations in which horizontal lagging is used in conjunction with steel H-Beams driven or placed in pre-drilled holes, for that portion of a lagged trench against which concrete is poured, namely, as a substitute for back forms (which work is performed by piledrivers): $0.13 per hour additional.

CARP0003H 08/01/2002

	Rates	Fringes
MODULAR FURNITURE INSTALLER	14.00	5.16
FULL WALL TECHNICIAN	20.14	5.16
MOBILE FILING SYSTEM INSTALLERS	13.10	4.66

ELEC0011C 12/01/2001

	Rates	Fringes
COMMUNICATIONS AND SYSTEMS WORK:		

Installer	22.13	3% + 4.40
Technician	23.93	3% + 4.40

SCOPE OF WORK:
Installation, testing, service and maintenance of systems utilizing the transmission and/or transference of voice, sound, vision and digital for commercial, educational, security and entertainment purposes for the following: TV monitoring and surveillance, background-foreground music, intercom and telephone interconnect, inventory control systems, microwave transmission, multi-media, multiplex, nurse call systems, radio page, school intercom and sound, burglar alarms, fire alarm (see last paragraph below) and low voltage master clock systems in commercial buildings.
Communication Systems that transmit or receive information and/or control systems that are intrinsic to the above listed systems; inclusion or exclusion of terminations and testings of conductors determined by their function; excluding all other data systems or multiple systems which include control function or power supply; excluding installation of raceway systems, conduit systems, line voltage work, and energy management systems.
Does not cover work performed at China Lake Naval Ordnance Test Station.
Fire alarm work shall be performed at the current inside wireman total cost package.

ELEC0440A 12/02/2002

	Rates	Fringes
ELECTRICIAN	29.23	3%+9.66
CABLE SPLICER	29.73	3%+9.66

ZONE PAY: Zone A: Free travel zone for all contractors performing work in Zone A.
Zone B:Any work performed in Zone (B) shall add $8.00 per hour to the current wage scale. Zone (B) shall be the area from the eastern perimeter of Zone (A) to a line which runs north and south begininng at Little Morongo Canyon (San Bernardino/Riverside County Line), Southeast along the Coachella Tunnels, Colorado River Aqueduct and Mecca Tunnels to Pinkham Wash the South to Box Canyon Road, then southwest along Box Canyon Road to Highway 195 west onto 195 south to Highway 86 to Riverside/Imperial County Line.

ELEC1245C 06/01/2002

	Rates	Fringes
LINE CONSTRUCTION:		
Lineman; Cable splicer	33.16	4.5%+7.08
Equipment specialist (operates crawler tractors, commercial motor vehicles, backhoes, trenchers, cranes (50 tons and below), and overhead and underground distribution line equipment)	28.19	4.5%+6.80
Groundman	21.56	4.5%+6.80
Powderman	31.51	4.5%+6.84

ELEV0018A 09/15/2001

	Rates	Fringes

ELEVATOR MECHANIC	33.695	7.455

FOOTNOTE:
Vacation Pay: 8% with 5 or more years of service, 6% for 6 months to 5 years service. Paid Holidays: New Years Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Friday after, and Christmas Day.

ENGI0012C 07/01/2002

	Rates	Fringes
POWER EQUIPMENT OPERATORS:		
GROUP 1	27.85	11.85
GROUP 2	28.63	11.85
GROUP 3	28.92	11.85
GROUP 4	30.21	11.85
GROUP 5	30.43	11.85
GROUP 6	30.54	11.85
GROUP 7	30.66	11.85
GROUP 8	30.83	11.85
GROUP 9	30.93	11.85
GROUP 10	30.96	11.85
GROUP 11	31.04	11.85
GROUP 12	31.16	11.85
GROUP 13	31.33	11.85
GROUP 14	31.43	11.85
GROUP 15	31.54	11.85
GROUP 16	31.66	11.85
GROUP 17	31.83	11.85
GROUP 18	31.93	11.85
GROUP 19	32.04	11.85
GROUP 20	32.16	11.85
GROUP 21	32.33	11.85
CRANES, PILEDRIVING & HOISTING EQUIPMENT:		
GROUP 1	29.00	11.85
GROUP 2	29.78	11.85
GROUP 3	30.07	11.85
GROUP 4	30.21	11.85
GROUP 5	30.43	11.35
GROUP 6	30.54	11.85
GROUP 7	30.66	11.35
GROUP 8	30.83	11.85
GROUP 9	31.00	11.85
GROUP 10	32.00	11.85
GROUP 11	33.00	11.85
GROUP 12	34.00	11.85
GROUP 13	35.00	11.80
TUNNEL WORK:		
GROUP 1	30.28	11.85
GROUP 2	30.57	11.85
GROUP 3	30.71	11.85
GROUP 4	30.93	11.85
GROUP 5	31.04	11.85
GROUP 6	31.16	11.85
GROUP 7	31.46	11.85

FOOTNOTES: Workers required to suit up and work in a hazardous material environment: $1.00 per hour additional.
Combination mixer and compressor operator on gunite work shall be classified as a concrete mobile mixer operator.

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Bargeman; Brakeman; Compressor operator; Ditch Witch, with seat or similar type equipment; Elevator operator-inside; Engineer Oiler; Forklift operator (includes loed, lull or similar types under 5 tons; Generator operator; Generator, pump or compressor plant operator; Pump operator; Signalman; Switchman

GROUP 2: Asphalt-rubber plant operator (nurse tank operator); Concrete mixer operator-skip type; Conveyor operator; Fireman; Forklift operator (includes loed, lull or similar types over 5 tons; Hydrostatic pump operator; oiler crusher (asphalt or concrete plant); Petromat laydown machine; PJU side dum jack; Screening and conveyor machine oeprator (or similar types); Skiploader (wheel type up to 3/4 yd. without attachment); Tar pot fireman; Temporary heating plant operator; Trenching machine oiler

GROUP 3: Asphalt-rubber blend operator; Bobcat or similar type (side steer); Equipment greaser (rack); Ford Ferguson (with dragtype attachments); Helicopter radioman (ground); Stationary pipe wrapping and cleaning machine operator

GROUP 4: Asphalt plant fireman; Backhoe operator (mini-max or similar type); Boring machine operator; Boxman or mixerman (asphalt or concrete); Chip spreading machine operator; Concrete cleaning decontamination machine operator; Concrete Pump Operator (small portable); Drilling machine operator, small auger types (Texoma super economatic or similar types - Hughes 100 or 200 or similar types - drilling depth of 30' maximum); Equipment greaser (grease truck); Guard rail post driver operator; Highline cableway signalman; Horizontal Directional Drilling Machine; Hydra-hammer-aero stomper; Micro Tunneling (above ground tunnel); Power concrete curing machine operator; Power concrete saw operator; Power-driven jumbo form setter operator; Power sweeper operator; Roller operator (compacting); Screed operator (asphalt or concrete); Trenching machine operator (up to 6 ft.); Vacuum or much truck

GROUP 5: Articulating material hauler; Asphalt plant engineer; Batch plant operator; Bit sharpener; Concrete joint machine operator (canal and similar type); Concrete planer operator; Dandy digger; Deck engine operator; Derrickman (oilfield type); Drilling machine operator, bucket or auger types (Calweld 100 bucket or similar types - Watson 1000 auger or similar types - Texoma 330, 500 or 600 auger or similar types - drilling depth of 45' maximum); Drilling machine operator (including water wells); Hydrographic seeder machine operator (straw, pulp or seed), Jackson track maintainer, or similar type; Kalamazoo Switch tamper, or similar type; Machine tool operator; Maginnis internal full slab vibrator, Mechanical berm, curb or gutter(concrete or asphalt); Mechanical finisher operator (concrete, Clary-Johnson-Bidwell or similar); Micro tunnel system (below ground); Pavement breaker operator (truck mounted); Road oil mixing machine operator; Roller operator (asphalt or finish), rubber-tired earth moving equipment (single engine, up to and including 25 yds. struck); Self-propelled tar pipelining machine operator; Skiploader operator (crawler and wheel type, over 3/4 yd. and up to and including 1-1/2 yds.); Slip form pump operator (power driven hydraulic lifting device for concrete forms); Tractor operator-bulldozer, tamper-scraper (single engine, up to 100 h.p. flywheel and similar types, up to and including D-5 and

similar types); Tugger hoist operator (1 drum); Ultra high pressure waterjet cutting tool system operator; Vacuum blasting machine operator
GROUP 6: Asphalt or concrete spreading operator (tamping or finishing); Asphalt paving machine operator (Barber Greene or similar type); Asphalt-rubber distribution operator; Backhoe operator (up to and including 3/4 yd.), small ford, Case or similar; Cast-in-place pipe laying machine operator; Combination mixer and compressor operator (gunite work); Compactor operator (self-propelled); Concrete mixer operator (paving); Crushing plant operator; Drill Doctor; Drilling machine operator, Bucket or auger types (Calweld 150 bucket or similar types - Watson 1500, 2000 2500 auger or similar types - Texoma 700, 800 auger or similar types - drilling depth of 60' maximum); Elevating grader operator; Grade checker; Gradall operator; Grouting machine operator; Heavy-duty repairman; Heavy equipment robotics operator; Kalamazoo balliste regulator or similar type; Kolman belt loader and similar type; Le Tourneau blob compactor or similar type; Loader operator (Athey, Euclid, Sierra and similar types); Ozzie padder or similar types; P.C. slot saw; Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pumpcrete gun operator; Rotary drill operator (excluding caisson type); Rubber-tired earth-moving equipment operator (single engine, caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator (multiple engine up to and including 25 yds. struck); Rubber-tired scraper operator (self-loading paddle wheel type-John Deere, 1040 and similar single unit); Self-propelled curb and gutter machine operator; Shuttle buggy; Skiploader operator (crawler and wheel type over 1-1/2 yds. up to and including 6-1/2 yds.); Soil remediation plant operator; Surface heaters and planer operator; Tractor compressor drill combination operator; Tractor operator (any type larger than D-5 - 100 flywheel h.p. and over, or similar-bulldozer, tamper, scraper and push tractor single engine); Tractor operator (boom attachments), Traveling pipe wrapping, cleaning and bendng machine operator; Trenching machine operator (over 6 ft. depth capacity, manufacturer's rating); Ultra high pressure waterjet cutting tool system mechanic; Water pull (compaction) operator
GROUP 7: Drilling machine operator, Bucket or auger types (Calweld 200 B bucket or similar types-Watson 3000 or 5000 auger or similar types-Texoma 900 auger or similar types-drilling depth of 105' maximum); Dual drum mixer, dynamic compactor LDC350 (or similar types); Monorail locomotive operator (diesel, gas or electric); Motor patrol-blade operator (single engine); Multiple engine tractor operator (Euclid and similar type-except Quad 9 cat.); Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Pneumatic pipe ramming tool and similar types; Prestressed wrapping machine operator; Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Rubber tired earth moving equipment operator (multiple engine, Euclid, caterpillar and similar over 25 yds. and up to 50 yds. struck), Tower crane repairman; Tractor loader operator (crawler and wheel type over 6-1/2 yds.); Woods mixer operator (and similar Pugmill equipment)

GROUP 8: Auto grader operator; Automatic slip form operator; Drilling machine operator, bucket or auger types (Calweld, auger 200 CA or similar types - Watson, auger 6000 or similar types - Hughes Super Duty, auger 200 or similar types - drilling depth of 175' maximum); Hoe ram or similar with compressor; Mass excavator operator less tha 750 cu. yards; Mechanical finishing machine operator; Mobile form traveler operator; Motor patrol operator (multi-engine); Pipe mobile machine operator; Rubber-tired earth-moving equipment operator (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck); Rubber-tired self-loading scraper operator (paddle-wheel-auger type self-loading - two (2) or more units)
GROUP 9: Rubber-tired earth-moving equipment operator operating equipment with push-pull system (single engine, up to and including 25 yds. struck)
GROUP 10: Canal liner operator; Canal trimmer operator; Remote-control earth-moving equipment operator (operating a second piece of equipment: $1.00 per hour additional); Wheel excavator operator (over 750 cu. yds.)
GROUP 11: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine-up to and including 25 yds. struck)
GROUP 12: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)
GROUP 13: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 50 cu. yds. struck); Tandem tractor operator (operating crawler type tractors in tandem - Quad 9 and similar type)
GROUP 14: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, up to and including 25 yds. struck)
GROUP 15: Rotex concrete belt operator (or similar types); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds.and up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - multiple engine, up to and including 25 yds. struck)
GROUP 16: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - multiple engine,

Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)
GROUP 17: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)
GROUP 18: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, up to and including 25 yds. struck)
GROUP 19: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating with the tandem push-pull system (multiple engine, up to and including 25 yds. struck)
GROUP 20: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)
GROUP 21: Concrete pump operator-truck mounted; Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)
CRANES, PILEDRIVING AND HOISTING EQUIPMENT CLASSIFICATIONS
GROUP 1: Engineer oiler; Fork lift operator (includes loed, lull or similar types)
GROUP 2: Truck crane oiler
GROUP 3: A-frame or winch truck operator; Ross carrier operator (jobsite)
GROUP 4: Bridge-type unloader and turntable operator; Helicopter hoist operator
GROUP 5: Hydraulic boom truck; Stinger crane (Austin-Western or similar type); Tugger hoist operator (1 drum)
GROUP 6: Bridge crane operator; Cretor crane operator; Hoist operator (Chicago boom and similar type); Lift mobile operator; Lift slab machine operator (Vagtborg and similar types); Material hoist and/or manlift operator; Polar gantry crane operator; Self Climbing scaffold (or similar type); Shovel, backhoe, dragline, clamshell operator (over 3/4 yd. and up to 5 cu. yds. mrc); Tugger hoist operator
GROUP 7: Pedestal crane operator; Shovel, backhoe, dragline, clamshell operator (over 5 cu. yds. mrc); Tower crane repair; Tugger hoist operator (3 drum)
GROUP 8: Crane operator (up to and including 25 ton capacity); Crawler transporter operator; Derrick barge operator (up to and including 25 ton capacity); Hoist operator, stiff legs, Guy derrick or similar type (up to and including 25 ton capacity); Shovel, backhoe, dragline, clamshell operator (over 7 cu. yds., M.R.C.)
GROUP 9: Crane operator (over 25 tons and up to and including 50 tons mrc); Derrick barge operator (over 25 tons up to and including 50 tons mrc); Highline cableway operator; Hoist operator, stiff legs, Guy derrick or similar type (over 25 tons up to and including 50 tons mrc); K-crane operator; Polar crane

operator; Self erecting tower crane operator maximum lifting capacity ten tons
GROUP 10: Crane operator (over 50 tons and up to and including 100 tons mrc); Derrick barge operator (over 50 tons up to and including 100 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 50 tons up to and including 100 tons mrc), Mobile tower crane operator (over 50 tons, up to and including 100 tons M.R.C.); Tower crane operator and tower gantry
GROUP 11: Crane operator (over 100 tons and up to and including 200 tons mrc); Derrick barge operator (over 100 tons up to and including 200 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 100 tons up to and including 200 tons mrc); Mobile tower crane operator (over 100 tons up to and including 200 tons mrc)
GROUP 12: Crane operator (over 200 tons up to and including 300 tons mrc); Derrick barge operator (over 200 tons up to and including 300 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 200 tons, up to and including 300 tons mrc); Mobile tower crane operator (over 200 tons, up to and including 300 tons mrc)
GROUP 13: Crane operator (over 300 tons); Derrick barge operator (over 300 tons); Helicopter pilot; Hoist operator, stiff legs, Guy derrick or similar type (over 300 tons); Mobile tower crane operator (over 300 tons)

TUNNEL CLASSIFICATIONS

GROUP 1: Skiploader (wheel type up to 3/4 yd. without attachment)
GROUP 2: Power-driven jumbo form setter operator
GROUP 3: Dinkey locomotive or motorperson (up to and including 10 tons)
GROUP 4: Bit sharpener; Equipment greaser (grease truck); Slip form pump operator (power-driven hydraulic lifting device for concrete forms); Tugger hoist operator (1 drum); Tunnel locomotive operator (over 10 and up to and including 30 tons)
GROUP 5: Backhoe operator (up to and including 3/4 yd.); Small Ford, Case or similar; Drill doctor; Grouting machine operator; Heading shield operator; Heavy-duty repairperson; Loader operator (Athey, Euclid, Sierra and similar types); Mucking machine operator (1/4 yd., rubber-tired, rail or track type); Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pneumatic heading shield (tunnel); Pumpcrete gun operator; Tractor compressor drill combination operator; Tugger hoist operator (2 drum); Tunnel locomotive operator (over 30 tons)
GROUP 6: Heavy Duty Repairman
GROUP 7: Tunnel mole boring machine operator

ENGI0012D 08/01/2002

	Rates	Fringes
POWER EQUIPMENT OPERATORS:		
DREDGING:		
Leverman	34.65	11.85
Dredge dozer	31.18	11.85
Deckmate	31.07	11.85
Winch operator (stern winch on dredge)	30.52	11.85
Fireman; deckhand and bargeman	29.98	11.85
Barge mate	30.59	11.85

IRON0002E 07/01/2002

	Rates	Fringes
IRONWORKERS:		
Fence erector	25.97	16.29
Ornamental, reinforcing and structural	26.86	16.29

FOOTNOTE: Work at Chocolate Mountains Naval Reserve-Niland additional $3.00 per hour.

LABO0001B 07/01/2002

	Rates	Fringes
BRICK TENDER	21.10	9.57

LABO0002H 07/01/2002

	Rates	Fringes
LABORERS:		
GROUP 1	20.10	9.98
GROUP 2	20.65	9.98
GROUP 3	21.20	9.98
GROUP 4	22.75	9.98
GROUP 5	23.10	9.98
TUNNEL LABORERS:		
GROUP 1	23.01	9.98
GROUP 2	23.33	9.98
GROUP 3	23.79	9.98
GROUP 4	24.48	9.98
GUNITE LABORERS:		
GROUP 1	22.84	12.73
GROUP 2	21.89	12.73
GROUP 3	18.35	12.73

FOOTNOTE: GUNITE PREMIUM PAY:

Workers working from a Bosn'n's Chair or suspended from a rope or cable shall receive 40 cents per hour above the foregoing applicable classification rates.

Workers doing gunite and/or shotcrete work in a tunnel shall receive 35 cents per hour above the foregoing applicable classification rates, paid on a portal-to-portal basis.

Any work performed on, in or above any smoke stack, silo, storage elevator or similar type of structure, when such structure is in excess of 75'-0" above base level and which work must be performed in whole or in part more than 75'-0" above base level, that work performed above the 75'-0" level shall be compensated for at 35 cents per hour above the applicable classification wage rate.

LABORER CLASSIFICATIONS

GROUP 1: Cleaning and handling of panel forms; Concrete screeding for rough strike-off; Concrete, water curing; Demolition laborer, the cleaning of brick if performed by a worker performing any other phase of demolition work, and the cleaning of lumber; Fire watcher, limber, brush loader, piler and debris handler; Flag person; Gas, oil and/or water pipeline laborer; Laborer, asphalt-rubber material loader; Laborer, general or construction; Laborer, general clean-up; Laborer, landscaping; Laborer, jetting; Laborer, temporary water and air lines; Material hose operator (walls, slabs, floors and decks); Plugging, filling of shee bolt holes; Dry packing of concrete;

Railroad maintenance, repair track person and road beds; Streetcar and railroad construction track laborers; Rigging and signaling; Scaler; Slip form raiser; Tar and mortar; Tool crib or tool house laborer; Traffic control by any method; Window cleaner; Wire mesh pulling - all concrete pouring operations
GROUP 2: Asphalt shoveler; Cement dumper (on 1 yd. or larger mixer and handling bulk cement); Cesspool digger and installer; Chucktender; Chute handler, pouring concrete, the handling of the chute from readymix trucks, such as walls, slabs, decks, floors, foundation, footings, curbs, gutters and sidewalks; Concrete curer, impervious membrane and form oiler; Cutting torch operator (demolition); Fine grader, highways and street paving, airport, runways and similar type heavy construction; Gas, oil and/or water pipeline wrapper - pot tender and form person; Guinea chaser; Headerboard person - asphalt; Laborer, packing rod steel and pans; Membrane vapor barrier installer; Power broom sweeper (small); Riprap stonepaver, placing stone or wet sacked concrete; Roto scraper and tiller; Sandblaster (pot tender); Septic tank digger and installer(lead); Tank scaler and cleaner; Tree climber, faller, chain saw operator, Pittsburgh chipper and similar type brush shredder; Underground laborer, including caisson bellower
GROUP 3: Buggymobile person; Concrete cutting torch; Concrete pile cutter; Driller, jackhammer, 2-1/2 ft. drill steel or longer; Dri-pak-it machine; Gas, oil and/or water pipeline wrapper, 6-in. pipe and over, by any method, inside and out; High scaler (including drilling of same); Hydro seeder and similar type; Impact wrench multi-plate; Kettle person, pot person and workers applying asphalt, lay-kold, creosote, lime caustic and similar type materials ("applying" means applying, dipping, brushing or handling of such materials for pipe wrapping and waterproofing); Operator of pneumatic, gas, electric tools, vibrating machine, pavement breaker, air blasting, come-alongs, and similar mechanical tools not separately classified herein; Pipelayer's backup person, coating, grouting, making of joints, sealing, caulking, diapering and including rubber gasket joints, pointing and any and all other services; Rock slinger; Rotary scarifier or multiple head concrete chipping scarifier; Steel headerboard and guideline setter; Tamper, Barko, Wacker and similar type; Trenching machine, hand-propelled
GROUP 4: Asphalt raker, lute person, ironer, asphalt dump person, and asphalt spreader boxes (all types); Concrete core cutter (walls, floors or ceilings), grinder or sander; Concrete saw person, cutting walls or flat work, scoring old or new concrete; Cribber, shorer, lagging, sheeting and trench bracing, hand-guided lagging hammer; Head rock slinger; Laborer, asphalt-rubber distributor boot person; Laser beam in connection with laborers' work; Oversize concrete vibrator operator, 70 lbs. and over; Pipelayer performing all services in the laying and installation of pipe from the point of receiving pipe in the ditch until completion of operation, including any and all forms of tubular material, whether pipe, metallic or non-metallic, conduit and any other stationary type of tubular device used for the conveying of any substance or element, whether water, sewage, solid gas, air, or other product whatsoever and without regard to the nature of material from which the tubular material is fabricated; No-joint pipe and stripping of same; Prefabricated

manhole installer; Sandblaster (nozzle person), water blasting, Porta Shot-Blast
GROUP 5: Blaster powder, all work of loading holes, placing and blasting of all powder and explosives of whatever type, regardless of method used for such loading and placing; Driller: All power drills, excluding jackhammer, whether core, diamond, wagon, track, multiple unit, and any and all other types of mechanical drills without regard to the form of motive power; Toxic waste removal

TUNNEL LABORER CLASSIFICATIONS

GROUP 1: Batch plant laborer; Bull gang mucker, track person; Changehouse person; Concrete crew, including rodder and spreader; Dump person; Dump person (outside); Swamper (brake person and switch person on tunnel work); Tunnel materials handling person
GROUP 2: Chucktender, cabletender; Loading and unloading agitator cars; Nipper; Pot tender, using mastic or other materials (for example, but not by way of limitation, shotcrete, etc.); Vibrator person, jack hammer, pneumatic tools (except driller)
GROUP 3: Blaster, driller, powder person; Chemical grout jet person; Cherry picker person; Grout gun person; Grout mixer person; Grout pump person; Jackleg miner; Jumbo person; Kemper and other pneumatic concrete placer operator; Miner, tunnel (hand or machine); Nozzle person; Operating of troweling and/or grouting machines; Powder person (primer house); Primer person; Sandblaster; Shotcrete person; Steel form raiser and setter; Timber person, retimber person, wood or steel; Tunnel Concrete finisher
GROUP 4: Diamond driller; Sandblaster; Shaft and raise work

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Nozzle person and rod person
GROUP 2: Gun person
GROUP 3: Rebound person

LABO0783I 08/07/2002

	Rates	Fringes
PLASTERER TENDER	23.00	10.17
PLASTER CLEAN-UP LABORER	20.45	10.17

LABO0882B 01/01/2002

	Rates	Fringes
ASBESTOS REMOVAL LABORER	20.97	7.65

SCOPE OF WORK: Includes site mobilization, initial site cleanup, site preparation, removal of asbestos-containing material and toxic waste, encapsulation, enclosure and disposal of asbestos-containing materials and toxic waste by hand or with equipment or machinery; scaffolding, fabrication of temporary wooden barriers and assembly of decontamination stations.

LABO1184A 07/01/2002

	Rates	Fringes
LABORERS - STRIPING:		
GROUP 1	20.65	8.42
GROUP 2	21.50	8.42
GROUP 3	23.82	8.42
GROUP 4	26.02	8.42

LABORERS - STRIPING CLASSIFICATIONS

GROUP 1: Protective coating, pavement sealing, including repair and filling of cracks by any method on any surface in parking lots, game courts and playgrounds; carstops; operation of all related machinery and equipment; equipment repair technician
GROUP 2: Traffic surface abrasive blaster; pot tender - removal of all traffic lines and markings by any method (sandblasting, waterblasting, grinding, etc.) and preparation of surface for coatings. Traffic control person: controlling and directing traffic through both conventional and moving lane closures; operation of all related machinery and equipment
GROUP 3: Traffic delineating device applicator: Layout and application of pavement markers, delineating signs, rumble and traffic bars, adhesives, guide markers, other traffic delineating devices including traffic control. This category includes all traffic related surface preparation (sandblasting, waterblasting, grinding) as part of the application process. Traffic protective delineating system installer: removes, relocates, installs, permanently affixed roadside and parking delineation barricades, fencing, cable anchor, guard rail, reference signs, monument markers; operation of all related machinery and equipment; power broom sweeper
GROUP 4: Striper: layout and application of traffic stripes and markings; hot thermo plastic; tape traffic stripes and markings, including traffic control; operation of all related machinery and equipment

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LABO1184E 07/01/2002

	Rates	Fringes
SLURRY SEAL WORK		
LABORERS:		
Group 1	21.66	8.42
Group 2	22.86	8.42
Group 3	24.72	8.42
Group 4	26.32	8.42

GROUP 1 - Traffic Control Person & Serviceman; including work of installing and protecting utility covers, traffic delineating devices, posting of no parking and notifications for public convenience, surface cleaning by any method, repair and filing of cracks by any means, and other work not directly connected with the application of slurry seal.
GROUP 2 - Squeegeeman (finish); Traffic control person.
GROUP 3 - Applicator operator (line driver); Power broom sweeper operator; Operation of all related machinery and equipment; Shuttleman
GROUP 4 - Mix operator

PAIN0036A 07/01/2002

	Rates	Fringes
Work on service stations and and car washes; Small new commercial work (defined as construction up to and including 3 stories in height, such as small shopping centers, small stores, small office buildings and small food		

establishments); Small
new industrial work
(defined as light metal
buildings, small warehouses,
small storage facilities and
tilt-up buildings); Repaint
work (defined as repaint of
breweries, commercial
recreational facilities,
hotels which operate
commercial establishments
as part of hotel service,
and sports facilities);
Tenant improvement work
(defined as tenant
improvement work not
included in conjunction with
the construction of the
building, and all repainting
of tenant improvement projects
 PAINTER (including lead abatement) 21.75 5.89
All other work:
 PAINTER 25.02 5.89

 PAIN0036H 10/01/2002

	Rates	Fringes
DRYWALL FINISHERS	26.33	8.48

 PAIN0036R 06/01/2002

	Rates	Fringes
GLAZIERS	29.20	8.45

FOOTNOTE: Additional $1.25 per hour for work in a condo,
 from the third (3rd) floor and up
 Additional $1.25 per hour for work on the outside
 of the building from a swing state or any suspended contrivance,
from the ground up

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 * PAIN1247B 01/01/2003

	Rates	Fringes
SOFT FLOOR LAYER	26.70	6.25

 PLAS0200I 08/07/2002

	Rates	Fringes
PLASTERERS	26.77	6.76

 PLAS0500B 07/01/2002

	Rates	Fringes
CEMENT MASON	23.05	11.56

 PLUM0016A 07/01/2002

	Rates	Fringes
Work on strip malls, light commercial, tenant improvement and remodel work:		
PLUMBER & PIPEFITTER	23.03	8.24

Work on new additions and
remodeling of bars,

restaurant, stores and
commercial buildings not to
exceed 5,000 sq. ft. of floor
space
 PLUMBER & PIPEFITTER 28.92 9.44
All other work:
 PLUMBER & PIPEFITTER 29.81 10.01
Landscape and irrigation work:
 PLUMBER & PIPEFITTER 23.27 9.56
Sewer and storm drain work:
 PLUMBER & PIPEFITTER 20.25 9.75

 PLUM0345A 07/01/2002
 Rates Fringes
LANDSCAPE & IRRIGATION FITTER 23.27 9.56

 ROOF0036B 09/01/2001
 Rates Fringes
ROOFER 24.77 5.40
Duties limited to the
following: Roof removal
of any type of roofing or
roofing material; or spudding,
or sweeping; and/or clean-up;
and/or preload in, or in preparing
the roof for application of
roofing, damp and/or
waterproofing materials
 PREPARER 16.24 1.00
FOOTNOTE: Pitch premium: Work on which employees are exposed to pitch fumes or required to handle pitch, pitch base or pitch impregnated products, or any material containing coal tar pitch, the entire roofing crew shall receive $1.75 per hour "pitch premium" pay.

 SFCA0669B 04/01/2002
 Rates Fringes
SPRINKLER FITTER (FIRE) 28.75 6.05

 SHEE0102G 07/01/2002
 Rates Fringes
INDUSTRIAL
Work on all air pollution control
systems, noise abatement panels,
blow pipe, air-veyor systems,
dust collecting, baghouses,
heating, air conditioning, and
ventilating (other than creature
comfort) and all other industrial
work, including metal insulated
ceilings
 SHEETMETAL WORKER 26.07 15.00
---
 * SHEE0102H 01/01/2003
 Rates Fringes
COMMERCIAL:
Work on all commercial HVAC for

creature comfort and computer
clean rooms, architectural metals,
metal roofing and lagging, over
insulation
SHEET METAL WORKER 29.41 11.97

TEAM0011E 07/01/2002

	Rates	Fringes
TRUCK DRIVERS:		
GROUP 1	21.84	12.84
GROUP 2	21.99	12.84
GROUP 3	22.12	12.84
GROUP 4	22.31	12.84
GROUP 5	22.25	12.84
GROUP 6	22.37	12.84
GROUP 7	22.62	12.84
GROUP 8	22.87	12.84
GROUP 9	23.02	12.84
GROUP 10	23.37	12.84
GROUP 11	23.87	12.84

TRUCK DRIVER CLASSIFICATIONS
GROUP 1: Truck driver
GROUP 2: Driver of vehicle or combination of vehicles - 2 axles; Traffic control pilot car excluding moving heavy equipment permit load; Truck-mounted broom
GROUP 3: Driver of vehicle or combination of vehicles - 3 axles; Boot person; Cement mason distribution truck; Fuel truck driver; Water truck - 2 axle; Dump truck, less than 16 yds. water level; Erosion control driver
GROUP 4: Driver of transit mix truck, under 3 yds.; Dumpcrete truck, less than 6-1/2 yds. water level
GROUP 5: Water truck, 3 or more axles; Truck greaser and tire person ($0.50 additional for tire person); Pipeline and utility working truck driver, including winch truck and plastic fusion, limited to pipeline and utility work; Slurry truck driver
GROUP 6: Transit mix truck, 3 yds. or more; Dumpcrete truck, 6-1/2 yds. water level and over; Vehicle or combination of vehicles - 4 or more axle; Oil spreader truck; Dump truck, 16 yds. to 25 yds. water level
GROUP 7: A Frame, Swedish crane or similar; Forklift driver; Ross carrier driver
GROUP 8: Dump truck, 25 yds. to 49 yds. water level; Truck repair person; Water pull - single engine; Welder
GROUP 9: Truck repair person/welder; Low bed driver, 9 axles or over
GROUP 10: Dump truck - 50 yds. or more water level; Water pull - single engine with attachment
GROUP 11: Water pull - twin engine; Water pull - twin engine with attachments; Winch truck driver - $1.25 additional when operating winch or similar special attachments

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed. With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U. S. Department of Labor
200 Constitution Avenue, N. W.

Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.

END OF GENERAL DECISION

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01200

GENERAL REQUIREMENTS

-- End of Section Table of Contents --

SECTION 01200

GENERAL REQUIREMENTS

PART 1 GENERAL

1.1 REFERENCES

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

ENGINEERING MANUALS (EM)

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

FEDERAL SPECIFICATIONS (FS)

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

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST PS 1	(1983) Construction and Industrial Plywood

1.2 SUBMITTALS

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

SD-01 Preconstruction Submittals

Location of Contractor's Office

SD-02 Shop Drawings

Temporary Access and Haul Roads; G.

1.3 CONSTRUCTION SIGNS

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

1.3.1 Construction Signs Shall Meet The Following Material Requirements

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

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

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

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

1.3.2 The Following Construction Signs Shall Be Constructed

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

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

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

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

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

1.3.3 Painting

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

1.3.4 Bulletin Board at the Contractor's Office

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

1.4 LOCATION OF CONTRACTOR'S OFFICE

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

1.5 MAINTENANCE OF PROJECT FACILITIES

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

1.5.1 General

The Contractor shall be responsible for maintaining all project facilities, including the existing Prado Dam Resident Office and the laboratory buildings.

1.5.2 Maintenance Requirements

Maintenance of the project facilities shall include daily janitorial service, including cleaning of tile floors and washing of windows twice a month. Toilet facilities shall be kept clean and sanitary and fully supplied at all times. All janitorial services shall be performed at such a time and in such manner to least interfere with the use of the Government facilities, but only during periods when the building and trailers are occupied. Maintenance includes providing potable bottled water service, trash removal, servicing of sewage tank, monthly air conditioning service, and the payment of monthly billings associated with these utilities and services with the exception of the telephone and power billings. The project facilities shall be kept clear of debris. Trash service shall also be provided (3 cy trash dumpster with weekly pickups). The Contractor shall remove and dispose of all broken test cylinders from the testing laboratory bi-weekly. Any required replacement and/or repairs for the project facilities or grounds shall be performed by the Contractor at no additional cost to the Government. Maintenance shall also include bi-annual pest control service for all buildings and trailers.

1.6 SECURITY GUARD SERVICE

The Contractor shall provide 24 hour a day, seven day a week security guard service for the Prado Dam construction site. The security guard service shall perform hourly checks of various locations throughout the project

site, as directed by the Contracting Officer, to assure overall security and prevent vandalism and theft during non duty hours. A security guard shall be assigned to control the entrance gate to Prado Dam.

1.7 PROTECTION OF EXISTING WORK

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

1.8 PUBLIC UTILITIES, NOTICES, AND RESTRICTIONS

1.8.1 General

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

1.8.2 Relocation or Removal

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

1.8.3 Utilities Not Shown

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

1.8.4 Coordination

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

The Contractor shall be responsible for coordinating their activities with other contractors performing work in the area. This shall include, but is not limited to, coordination with Caltrans and their Contractor for work on the Highway 71 bridge crossing the Santa Ana River and the future expansion of the 71/91 interchange.

The Contractor shall be responsible to coordinate with the United States Geological Survey (USGS) for the removal of instruments within the seismic sheds. The USGS contact for removal of the instruments at Prado Dam is:

Mr. Arnie Acosta
Telephone: (626) 583-7234
Pager: (818) 542-4638

or

Edna Anjal
Telephone: (626) 583-7235

USGS shall be notified a minimum of 30 days prior to the removal of the seismic sheds. The Contractor shall not attempt to remove any of the instruments and associated hardware, however, what remains shall become the property of the contractor for removal and disposal.

1.8.5 Notices

1.8.5.1 Utilities to be Relocated or Protected

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

Southern California Gas Company
Mr. Tim Pearce
Telephone: (213) 244-2269

Southern California Edison Company
Mr. Bob Patterson
Telephone: (909) 930-8432

Santa Ana Watershed Project Authority (For SARI sewer)
Mr. Lee Slate
Telephone (909) 354-4220

1.8.5.2 Telephone Lines

The Contractor shall notify, 60 calendar days prior to permanent installation of all telephone lines.

1.8.5.3 Contractor Shall Notify the Contracting Officer

The Contractor shall notify the Contracting Officer, in writing, not less than 14 days in advance of the date on which he will complete trenching, excavation, fill or rough grading, as applicable, at each location where such completed work is required for temporary or permanent relocations by others. The Contractor shall allow a period of 14 calendar days at each relocation, after which time the Contractor may resume his operations.

1.8.5.4 Existing Bench Marks and R/W Markers

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

1.8.5.5 Spill Reporting

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

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

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

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

d. Nature of exposure to personnel.

e. Containment procedures initiated.

f. Anticipated cleanup and disposal procedures.

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

1.8.6 Restrictions

1.8.6.1 Representatives of Other Agencies

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

1.8.6.2 Working Hours

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

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

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

1.8.6.3 Water for Construction

Reference is made to the clause of the contract entitled "Permits and Responsibilities," which obligates the Contractor to obtain all required licenses and permits for construction, including water for construction. The Contractor shall be responsible for obtaining and paying all costs and fees associated with the acquisition of water for construction. Water rights within the Prado Basin are owned by the Orange County Water District (OCWD). The Contractor shall not intercept existing surface or subsurface flows at any time during the contract performance period. All water from dewatering shall be returned to the streambed. Additionally, water from the water well shown on the drawings to be constructed by this contract can not be used by Contractor for any purpose.

1.9 ROADS AND CULVERTS

1.9.1 Existing Roads

The work shall be planned in such a manner that traffic on the existing roads outside the actual construction areas shall be maintained at all times. Maintenance shall be as specified in paragraph: Maintenance of Roads. The work area shall be examined carefully relative to the order and scope of work to be performed, with respect to the limiting provisions of the plans and specifications. Additional work on the existing roads may be done by others during the life of this contract.

1.9.1.1 Existing Sound Walls

The Contractor is responsible for maintaining required noise levels as stated in 01410 ENVIRONMENTAL PROTECTION.

1.9.2 Temporary Access and Haul Roads

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

1.9.2.1 Haul Road Design References

Design of haul roads shall meet or exceed the requirements of the Corps of Engineers Safety and Health Requirement Manual, Section 30.D (EM 385-1-1). An applicable design guide is the Surface Mine Haulage Road Design Study by Skelly and Loy of Harrisburg, PA, prepared for the Bureau of Mines, Washington, DC, dated June 1976.

1.9.2.2 Haul Road Design

Roads shall be designed for the type of vehicles in use. The maximum sustained grade shall not exceed 10% with an absolute maximum grade of 15% for a distance not to exceed 200 linear feet. Each lane of travel shall provide clearance that is equal to one-half of the widest vehicle in use (a 12 ft. wide vehicle will require a 24 ft. travel lane). The minimum horizontal curve radius shall not be less than 25 ft. on the inside of the curve. Vertical curves shall be a minimum of 100 ft. and be designed with consideration of the change in grades, height of the driver's eyes, height of an object a minimum of 6 inches above the road surface, and required stopping distance. Curve widening, proper cross slopes and superelevations shall be provided as necessary. Road ditches and culverts shall be included to control surface drainage away from erodible areas. Culverts shall be provided along natural water courses intersected by the haul road fill and shall be maintained as specified in paragraph: Culverts. Design shall also include provisions to control runaway vehicles on steep grades such as an escape lane. Design shall be subject to the Contracting Officer's approval.

1.9.3 Public and Private Access Roads

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

1.9.4 Maintenance of Roads

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

1.9.5 Temporary Culverts

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

1.9.5.1 Culvert Maintenance

All culverts within the construction area, including the borrow areas, shall be maintained to provide unrestricted flow through the culverts. Culvert maintenance shall include debris cleaning, repair of failures, and

extension of culverts due to road alterations. Culvert maintenance shall be performed by the Contractor at no additional cost to the Government.

1.10 TRAFFIC SAFETY

1.10.1 Warning Devices

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

1.10.2 Rock and Gravel

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

1.11 WATER CONTAMINATION

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

1.12 SCRAP MATERIAL

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

1.13 ARCHAEOLOGICAL FINDINGS DURING CONSTRUCTION

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

1.14 POST-CONSTRUCTION CLEANUP AND OBLITERATION

The Contractor shall obliterate all signs of temporary construction facilities such as haul roads, access roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other vestiges of construction as directed by the Contracting Officer. Excavation, filling, regrading and plowing of roadways and other construction areas will require the areas to be restored to near natural conditions, which will permit the growth of vegetation thereon. The disturbed areas shall be graded and filled as required, and the areas scarified prior to placement of soil covering for hydroseeding.

1.15 PERMITS

1.15.1 General

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

1.15.1.1 National Pollutant Discharge Elimination System (NPDES) Permit

The project requires an NPDES permit from the California State Water Resources Control Board, Division of Water Quality. The general permit requires development and implementation of Storm Water Pollution Prevention Plan (SWPPP) , which shall be maintained on-site throughout the construction period. Contractor shall comply with the requirements of SECTION 01356: STORM WATER POLLUTION PREVENTION MEASURES. Modifications to the plan as necessary to reflect Contractor's construction methods shall be submitted by the Contractor to the Government for approval.

1.15.2 Encroachment Permit and Traffic Detour Plan

The project has been designed to avoid construction on the shoulder and traveled way of the State Route 71. The Contractor is responsible for obtaining all permits for work on or around the SR 71 roadway. Information for an encroachment permit to implement a closure of the highway shoulder can be obtained at:

Office of Permits
Department of Transportation
464 W. Fourth Street, 6th Floor, MS 619
San Bernardino, CA 92401-1400
(909) 383-4536

Information for a traffic detour plan can be obtained at:

Operations Division
Department of Transportation
464 W. Fourth Street, 6th Floor, MS 619
San Bernardino, CA 92401-1400
(909) 383-5979

1.16 REQUIRED INSURANCE

1.16.1 General

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

1.16.2 Insurance

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

1.16.3 Insurance Policy

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

a. "This insurance shall not be canceled, limited in scope of coverage or non-renewed until after 30 days written notice has been given to (1) Riverside County Flood Control and Water Conservation District, Attn: Steve Thomas, 1995 Market Street, P.O. Box 1033, Riverside, CA 92502-1033, (2) San Bernardino County Flood Control District, Attn: Vana Olsen, 825 East Third Street, San Bernardino, CA 92415-0835, and (3) Orange County Public Facilities and Resources Department, Attn: Herb Nakasone, 300 North Flower Street., P.O. Box 4048, Santa Ana, CA 92702-4048.

b. "All rights of subrogation are hereby waived against the County of Riverside, San Bernardino, and Orange and the members of the Board of Supervisors and elective or appointive officers or employees, when acting within the scope of their employment or appointment, and County Districts and their Board or Commissions which are governed by the County Board of Supervisors".

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

1. The San Bernardino County Flood Control District, County of San Bernardino, Orange County Public Facilities and Resources Department, County of Orange, Riverside County Flood Control and Water Conservation District, and the County of Riverside.

d. "It is agreed that any insurance maintained by the Orange County Public Facilities and Resources Department, and the County of Orange will apply in excess of, and not contribute with, insurance provided by this policy.

LIABILITY INSURANCE

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

1.16.4 Liability Insurance

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

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

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

release or escape of any pollutants;

c. Completed Operations coverage;

d. Products coverage;

e. Broad Form Property Damage coverage;

f. Blanket Contractual coverage.

1.16.5 Fire and Extended Coverage

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

1.16.6 Worker's Compensation

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

1.16.6.1 Procuring of Required Policy

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

1.16.6.2 Contractor Agrees to Indemnify

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

1.17 PROGRESS PAYMENTS

1.17.1 Partial Pay Estimates

Partial pay estimates shall be submitted every month. The following items shall be submitted with the partial pay estimates to ensure prompt payment:

a. Project schedule Narrative and Earnings Monthly update reports as specified in Section 01320 PROJECT SCHEDULE, paragraph: Contractor Prepared Network Analysis System (NAS).

b. Safety report(s) in accordance with OSHA, CALOSHA, and the Corps of Engineers' EM 385-1-1.

c. Updated/current submittal register as specified in Section 01330 SUBMITTAL PROCEDURES, paragraph: Submittal Register (ENG FORM 4288).

d. Quality Control Reports as specified in Section 01451 CONTRACTOR

QUALITY CONTROL, paragraph: Documentation.

e. Updated forcasting of expenditure worksheets as specified in the paragraph below

1.17.2 Forecasting of Future Progress Payments

By July 15th of each year, the Contractor shall give the Contracting Officer the projected monthly earnings for the upcoming fiscal year (fiscal year begins in November). The Contracting Officer will provide a spreadsheet to the Contractor showing the different funding categories and their respective percentages for each bid item for the total contract amount after the issuance of notice to proceed (See attached FIGURE 5). Similar accounting information will be contained in any subsequent contract modification issued for this contract. Each pay period the Contractor shall forecast his expenditures for the following 3 pay periods, indicating the funding requirement for each accounting category. The updated worksheet (see FIGURE 6) shall be submitted with each partial pay estimate (e.g., submittal for partial pay estimate for the period of 15 DEC to 15 JAN will include a forecast of expenditures for the period of 15 JAN to 15 APR). Forecasting of expenditures is needed to assure sufficient funding for future progress payments. If the contractor’s actual earnings for any particular partial pay estimate exceed the funding available for payment due to inaccurate submittal of forecast expenditures, the contracting office can reject the contractor’s invoice as defective, and require the contractor to resubmit the invoice of an amount not exceeding the previously submitted forecast amounts.

1.18 NOTICE OF PARTNERSHIP

The Government intends to encourage the foundation of a cohesive partnership with the Contractor and its subcontractors. This partnership will be structured to draw on the strengths of each organization to identify and achieve reciprocal goals. The objectives are effective and efficient contract performance and intended to achieve completion within budget, on schedule, and in accordance with plans and specifications; and to develop a single cooperative management team focused on the success of the project to mutual benefit of all stakeholders. This partnership would be bilateral in makeup, and participation will be totally voluntary. Any cost associated with effectuating this partnership will be agreed to by both parties and will be shared equally with no change in contract price. An integral aspect of partnering is the resolution of disputes in a timely, professional, and non-adversarial manner through the use of issue clarification and problem solving. Alternate Dispute Resolution (ADR) methodologies will be encouraged in place of more formal dispute resolution procedures. ADR will assist in promoting and maintaining an amicable working relationship to preserve the partnership. ADR is a voluntary, nonbinding procedure available for use by the parties to this contract to resolve any dispute that may arise during performance. To implement this partnership initiative it is anticipated that within 60 days of Notice to Proceed the Contractor's on-site project manager and the Government's Resident Engineer would attend a two day partnership development seminar/team building workshop together with the Contractor's key on-site staff and key Government personnel. Follow-up workshops of 1 to 2 days duration would be held periodically throughout the duration of the contract as agreed to by the Contractor and Government.

1.19 ALTERNATIVE DISPUTES REVIEW PROCESS

In order to assist in the resolution of disputes or claims arising out of this project, this contract clause establishes an Alternative Disputes Review process. A Disputes Review Board will, by mutual agreement of the parties and in accordance with this clause, be established but is not intended to be a substitute for normal negotiated Government and Contractor dispute resolution. The parties shall establish the Board within 90 calendar days after the Notice to Proceed as set forth in Attachment 1. The Disputes Review Board will consider disputes referred to it and will provide non-binding recommendations to assist in the resolution of the differences between the Government and Contractor. The following alternative procedure may be used for dispute resolution. Specific procedures to be followed for disputes referred to the Disputes Review Board are set forth as attachments to this provision.

If the Contractor objects to any oral decision or order of the Contracting Officer or his Authorized Representative(s), the Contractor shall request in writing a written decision or order from the Government. Such request is not considered a dispute for purposes of the Contract Disputes Act.

After receipt of the Government's written decision or order the Contractor shall, if there is an objection to such decision or order, file a written protest with the Government, stating clearly and in detail the basis of the objection. The Government will consider any written protest and make a decision within 15 days from receipt of the written protest either agreeing or disagreeing with the protest. If there is not complete agreement, the matter can either be referred to the Disputes Review Board by mutual agreement of the Government and the Contractor, or the Contractor may request that the Contracting Officer issue a final decision on the matter, from which the contractor may pursue an appeal in accordance with the "Disputes" clause of the contract.

In the event the Government and the Contractor mutually agree to submit the dispute to the Disputes Review Board, the request for review must be instituted within 30 days of the date of receipt of the Government's last decision. Pending review by the Disputes Review Board of a dispute, the Contractor shall diligently proceed with the work as previously directed.

The Contractor and the Government shall each be afforded an opportunity to be heard by the Disputes Review Board and to offer evidence. The Disputes Review Board recommendations toward resolution of a dispute will be given in writing to both the Government and the Contractor within 30 days following conclusion of the proceedings before the Disputes Review Board.

Within 30 days of receiving the Dispute Review Board's recommendations, both the Government and the Contractor shall respond to the other in writing signifying that the dispute is either resolved or remains unresolved. If the Government and the Contractor are able to resolve their dispute, the Government will expeditiously process any required contract modifications. Should the dispute remain unresolved after 30 days following receipt of the Board's recommendations, the Contractor may submit a request for a Contracting Officer's decision under the "Disputes" clause of the contract.

The attached information at the end of this section forms a part of this Special Clause. The Alternative Disputes Review Process (Attachment 1) describes the purpose and function of the Disputes Review Board. The Disputes Review Board Three Party Agreement which sets out the terms between the parties (Attachment 2) must be completed and signed by both parties in accordance with the conditions in that Agreement. The Contract

Disputes Review Board Guidelines (Attachment 3) set forth the objective and responsibility of the Disputes Review Board. These attachments set out all the guidelines for this Special Clause providing an alternative disputes review process.

1.20 AVAILABILITY OF ADDITIONAL INFORMATION

1.20.1 Documentation and Reports

Additional design information and data are available through the Contracting Officer. Specific information available for review include: the Phase II GDM on the Santa Ana River Mainstem - Main Report & Supplemental Environmental Impact Statement, dated Auguts 1988; the Supplemental Final Environmental Impact Statement/Environmental Impact Report for Prado Basin and Vicinity dated November 2001; the Draft Feature Design Memorandum No. 12 Prado Dam Outlet Works; selected as-built drawings from 1938 through 1940; pump test data, and groundwater data. It is emphasized that significant changes have been incorporated into the Plans and Specifications from the designs proposed in the design memorandums. The design memorandums and other data are available for information purposes only and are not a part of the contract documents since they have been superseded by the Plans and Specifications.

1.20.2 Field Investigations

Prior to bid opening, the Contractor may make arrangements to access the site to perform geotechincal investigations on the following conditions:

Coordinate with the Prado Resident Office, Fernando Cano or Bob Garda, 48 hours in advance for access to the site. Access would be limited to standard work hours, Monday through Friday. Submit a hazard analysis and layout of proposed work to the Prado Resident Office for approval prior to commencement of any work.

A Corps of Engineers geologist or one of his representatives will observe the investigations. Contractor shall notify POC Dave Lukesh, (213) 452-3577, 72 hours in advance.

Notify the Corps' Cultural Resources Specialist, Stephen Dibble, (213) 452-3849, 48 hours prior to commencing investigations.

Activities shall not take place or interfere with Endangered Species in standing water or other sensitive locations. As long as the proposed activities occur outside of the active stream channel, and outside of vireo nesting season (which begins March 1), that should satisfy most environmental concerns.

Standard requirements concerning equipment use must also be met (i.e., equipment must be properly tuned and maintained to minimize air pollution, avoid leaks/contamination of soil and groundwater, don't refuel within the river channel, etc.).

Corps Safety Standards EM-385-1-1 shall apply.

1.21 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

This provision specifies the procedure for determination of time extensions for unusually severe weather in accordance with the Contract Clause 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:

(a) 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 anticipation for the project location during any given month.

(b) 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.

1.21.1 Anticipated Adverse Weather Days

The following schedule of monthly anticipated adverse weather delays 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 FIVE (5) DAY WORK WEEK

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
6	4	3	2	1	0	1	1	1	1	2	5

1.21.2 Documentation

Upon acknowledgment of the Notice to Proceed (NTP) and continuing throughout the contract, the Contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actually adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day. The number of actual adverse weather days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in the subparagraph above, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the Contract Clause entitled: DEFAULT (FIXED PRICE CONSTRUCTION).

PART 2 PRODUCTS (NOT APPPLICABLE)

PART 3 EXECUTION (NOT APPPLICABLE)

ALTERNATIVE DISPUTES REVIEW PROCESS - ATTACHMENT 1

DISPUTES REVIEW BOARD

1. Purpose.

The Disputes Review Board is an advisory body which may be created by mutual agreement of the Government and the Contractor for a particular construction project. The Board's function will be to assist in the resolution of claims, disputes or controversy between the Contractor and the Government. Any recommendations made by the Board will be advisory, and will not be binding upon either party.

2. General.

a. Definition. The Disputes Review Board process is a voluntary, expedited procedure, whereby an independent three-party Board is established to evaluate contract disputes and provide recommendations to the Government and its Contractor with the objective of resolving disputes.

b. The Board will consider disputes referred to it, and will furnish recommendations to the Government and Contractor to assist in the resolution of the differences between them. The Board will provide technical expertise to assist and facilitate the resolution of disputes.

3. Board Membership.

a. The Disputes Review Board shall consist of three individuals respected in the field of engineering for their ability and integrity, who are experienced with the processes anticipated to be used to construct the project: one member shall be selected by the Government; one member shall be selected by the Contractor; and, one member shall be selected by these first two members. The first two members shall be mutually acceptable to both the Government and the Contractor. If the two parties are unable to agree on these first two members, the mutual decision to submit disputes to a Disputes Review Board shall be considered terminated.

b. The two members acceptable to the Government and the Contractor will independently select the third member. If the two members are unable to select an acceptable third member, the decision to submit disputes to a Disputes Review Board shall be considered terminated.

c. No member shall have a financial interest in the contract, except for payment for services on the Disputes Review Board. Except for fee-based consulting services on other projects, no Board member shall have been employed by either party within a period of two years prior to award of the contract. No member shall have had substantial prior involvement in the project that could compromise his ability to impartially participate in the Board's activities.

4. Selection of the Disputes Review Board Procedure.

If the parties mutually agree that a Disputes Review Board should be established for work performed under a contract, the Government and the Contractor shall negotiate an agreement with their member within 60 calendar days after execution of the contract. The selection of the Disputes Review Board Alternative Disputes Review procedure for resolution of contract disputes shall be void if the two members are unable to select a third member

within 30 calendar days.

5. Procedure for Submitting Dispute to the Board.

a. If the Contractor objects to any oral decision or order of the Contracting Officer or his Authorized Representative(s), the Contractor shall request in writing a written decision or order from the Government.

b. After receipt of the Government's written decision or order the Contractor shall, if there is an objection to such decision or order, file a written protest with the Government, stating clearly and in detail the basis of the objection. The Government will consider any written protest and make a decision within 15 days from receipt of the written protest either agreeing or disagreeing with the protest. If there is not complete agreement, the matter can either be referred to the Disputes Review Board by mutual agreement of the Government and the Contractor, or the Contractor may request that the Contracting Officer issue a final decision on the matter, from which the Contractor may pursue an appeal in accordance with the "Disputes" clause of the contract.

c. In the event the Government and Contractor mutually agree to submit the dispute to the Disputes Review Board, the request for review must be instituted within 30 days of the date of receipt of the Government's last decision. Pending review of the Disputes Review Board of a dispute, the Contractor shall diligently proceed with the work as previously directed.

d. The Contractor and the Government shall each be afforded an opportunity to be heard by the Disputes Review Board and to offer evidence. The Disputes Review Board shall submit in writing recommendations towards factual (as opposed to legal) resolution of a dispute to both the Government and the Contractor within 30 days following conclusion of the proceedings before the Disputes Review Board.

e. Within 30 days of receiving the Dispute Review Board's factual recommendations, both the Government and the Contractor shall respond to the other in writing signifying that the dispute is either resolved or remains unresolved. If the Government and the Contractor are able to resolve their dispute, the Government will expeditiously process any required contract modifications. Failure of either party to respond within 30 days following the receipt of the Board's recommendations will be deemed acceptance of the Board's recommendations.

f. In appropriate cases the Contractor and the Government may agree that a dispute should be submitted to the Disputes Review Board, but that the dispute only warrants the efforts of one Board Member. In such cases the third Board Member will mediate the dispute without participation of the other two members. Other than submitting the dispute to only the third Board Member, the procedural requirements of the Alternative Disputes Review Board Process as set forth in paragraph 7a-e above will be followed.

6. Board Procedures.

a. The Disputes Review Board will formulate its own rules of operation. In order to keep abreast of construction progress, it is recommended that the members, as a Board, will visit the project at least quarterly, keep a current file and regularly meet with representatives of the Government and the Contractor. More frequent than quarterly site visits shall be as agreed between the Government, the Contractor and the Board. The Board should take these opportunities to make recommendations to either or

both, the Government and the Contractor to facilitate the construction and/or prevent problems from occurring.

b. Should the need arise to appoint a replacement Board member, the replacement member shall be appointed in the same manner as the original Board members were appointed. The selection of a replacement Board member shall begin promptly upon notification of the necessity for a replacement, and shall be completed within 30 calendar days. The Disputes Board Three Party Agreement will be supplemented to indicate changes in Board membership.

c. For further description of work, responsibilities and duties of the Disputes Review Board, and the Government and Contractor's obligations and responsibilities with respect to each other and to the Disputes Review Board, see the "Disputes Board Three Party Agreement" as set forth in attachment 2.

7. Expenses of the Board and Board Members.

Compensation for the Disputes Review Board members, and the expenses of operation of the Board, shall be shared by the Government and Contractor in accordance with the following:

a. The fees and expenses of all three members of the DRB shall be shared equally by the Government and the Contractor. The Contractor shall pay the invoices of all DRB members after approval by both parties. The Government shall reimburse the Contractor for one half of the approved invoices.

b. The Government at its expense will provide administrative services, such as conference facilities and secretarial services, to the Board.

8. Three Party Agreement.

a. The Contractor, the Government and all three members of the Board shall execute the "Disputes Review Board Three Party Agreement" within 30 calendar days following the final selection of the third member.

b. The "Disputes Review Board Three Party Agreement" and the "Contract Disputes Review Board Guidelines" to said Agreement are set forth in attachments 2 and 3.

ALTERNATIVES DISPUTES REVIEW PROCESS - ATTACHMENT 2

THREE PARTY AGREEMENT

THIS THREE PARTY AGREEMENT, made and entered into this _____ day of _____, 200_, between: The United States Army Corps of Engineers, acting through the Contracting Officer of the U.S. Army Engineer District, Los Angeles, hereinafter called the CORPS; the _____ company, hereinafter called the "CONTRACTOR," and the Disputes Review Board, hereinafter called the "BOARD" consisting of three members; _____; _____, and _____-.

WITNESSETH that,

WHEREAS, the CORPS and the CONTRACTOR are now engaged in the construction of the Prado Dam, Embankment, Outlet Works, and Appurtenances in Riverside County, California, under Contract No. DACW09-__-B-____; and

WHEREAS, the contract includes a provision authorizing, upon the mutual agreement of both the CORPS and the CONTRACTOR, the establishment and operation of a "Disputes Review Board" to assist in resolving disputes and claims; and

WHEREAS, the BOARD is composed of three members, one selected by the CORPS, one selected by the CONTRACTOR and the third member selected by these two;

NOW THEREFORE, in consideration of the terms, conditions, covenants and performance contained herein, or attached and incorporated and made a part hereof, the parties agree as follows:

I.

DESCRIPTION OF WORK

In order to assist upon mutual agreement by the CORPS and the CONTRACTOR in the resolution of disputes and claims between the CONTRACTOR and the CORPS, the contract provides for the establishment of a Disputes Review Board. The intent of the BOARD is to fairly and impartially consider any disputes mutually placed before it, and to provide written recommendations for resolution of such disputes to both the CORPS and the CONTRACTOR. The members of the BOARD shall perform all services necessary to participate in the BOARD's actions in accordance with the following Scope of Work.

II.

SCOPE OF WORK

The Scope of Work of the BOARD includes, but is not limited to, the following items of work.

A. Procedures.

Prior to consideration of an appeal, the BOARD shall establish rules that will govern the conduct of its business, and reporting procedures based upon guidelines which are made a part of the Special Clause entitled, "ALTERNATIVE REVIEW DISPUTES PROCESS." The BOARD's factual recommendations, resulting from their consideration of a dispute or claim, shall be furnished

in writing to the CORPS and the CONTRACTOR. The recommendations shall be based on the pertinent contract provisions and facts and circumstances involved in the dispute.

B. Construction Site Visits.

The members as a BOARD shall visit the project site at least quarterly to keep abreast of construction activities and to develop a familiarity for the work in progress. More frequent site visits may be warranted. The frequency, exact time and duration of these visits shall be as mutually agreed between the CORPS, the CONTRACTOR and the BOARD. The Board should take these opportunities to make recommendations to either or both, the Government and the Contractor to facilitate the construction and/or prevent problems from occurring.

C. BOARD Consideration of a Dispute or Claim.

In the event of a claim or dispute, the CORPS and the CONTRACTOR may mutually agree to submit such claim or dispute to the BOARD. Upon receipt by the BOARD of a written claim or dispute, the BOARD shall convene to review and consider the matter. Both the CORPS and the CONTRACTOR shall be given the opportunity to present their evidence at these meetings. It is expressly understood that the BOARD members are to act impartially and independently in consideration of the contract provisions and the facts and conditions surrounding any written claim or dispute presented by the CORPS or the CONTRACTOR. The BOARD's factual recommendations concerning any such claim or dispute are advisory and non-binding upon both the CORPS and the CONTRACTOR.

D. Time and Place of Board Meetings.

The time and location of BOARD meetings shall be determined by the BOARD.

III.

CONTRACTOR RESPONSIBILITY

The CONTRACTOR shall furnish one copy of all pertinent documents it might have, other than those furnished by the CORPS, which are or may become pertinent to the performance of the BOARD. Pertinent documents are any drawings or sketches, calculations, procedures, schedules or estimates or other documents which are used in the performance of the work or in justifying or substantiating the Contractor's position.

IV.

CORPS RESPONSIBILITIES

The CORPS shall furnish the following services and items.

A. Contract Related Documents.

The CORPS Shall furnish the BOARD three copies of the Contract documents, change orders, written instructions issued by the CORPS to the Contractor or other documents pertinent to the performance of the contract and therefore, necessary to the BOARD's work.

B. Coordination and Services.

The CORPS Contracting Officer's Representative for the contract will, in cooperation with the CONTRACTOR, coordinate the operations of the BOARD. The CORPS, acting through the Contracting Officer's Representative, will arrange or provide conference facilities at or near the contract site and provide secretarial and copying services.

C. BOARD Cost Records.

The Board will maintain complete cost records, which will be available for inspection by either party. Shared expenses include the members' wages and travel expense, local lodging and subsistence for the BOARD members, and direct non-salary costs associated with BOARD operations.

V.

COMPENSATION

A. Payment for services of the CORPS and CONTRACTOR appointed members of the BOARD and the third appointed member will be at the rates agreed to between the CORPS and the CONTRACTOR (for the third appointed member) and between each of them and their respective appointed member.

Compensation, travel, and costs, for the BOARD members, and the expenses of operation of the BOARD, shall be shared by the CORPS and the CONTRACTOR in accordance with the following:

a. The CORPS and the CONTRACTOR shall share equally in the BOARD members' wages, expenses, and travel.

b. The CORPS and the CONTRACTOR shall share equally the other reasonable and necessary expenses of the BOARD.

B. Fee - Third Appointed Member.

Payment for services rendered by the third member of the BOARD shall not exceed the daily billing rate of $_____, including travel time. This daily rate includes all direct labor costs, overhead and profit. Travel and subsistence expenses will be reimbursed at the actual cost, but shall not exceed the allowable amounts as provided by the Government's Joint Travel Regulations in effect at the time the expenses are incurred.

C. Direct Non-Salary Costs.

Direct non-salary costs of the BOARD will be reimbursed at the actual cost to the BOARD. These charges may include, but are not limited to; printing, long distance telephone calls, supplies, etc. The billing for non-salary costs, directly identifiable with the project, shall be an itemized listing to the charges supported by the original bills, invoices, expense accounts and miscellaneous supporting data retained by the BOARD members. Copies of the original supporting documents shall be supplied to the parties upon request.

D. Maximum Total Amount Payment.

The maximum total amount payable under this AGREEMENT for the BOARD's fee and travel costs, and the BOARD's direct non-salary costs, shall not exceed $_____, unless a prior supplemental AGREEMENT has been negotiated and executed by the CORPS and the CONTRACTOR.

E. Payments.

The BOARD may submit invoices to the CONTRACTOR for partial payment for work completed by the BOARD not more than once per month during the progress of the work. Such invoices shall be accompanied by a general description of activities performed during the billing period. The value of the work accomplished for partial payment shall be established by the billing from the BOARD members, and itemized direct non-salary costs incurred by the Board. The CONTRACTOR shall pay the invoices of the BOARD after approval by both parties. The CORPS shall reimburse the CONTRACTOR for one half of the approved invoices.

F. Inspection of Cost Records.

The BOARD shall keep available for inspection by representatives of the CORPS for a period of three years after final payment the cost records and accounts pertaining to this AGREEMENT.

VI.

TERMINATION OF AGREEMENT

The parties of this AGREEMENT mutually agree that this AGREEMENT may be terminated at any time by written notice by the CORPS or CONTRACTOR to the other party. BOARD members may withdraw from the BOARD by providing notice. BOARD members may be terminated for cause only by their original appointor. Therefore, the CORPS may only terminate the CORPS appointed member, the CONTRACTOR may only terminate the CONTRACTOR appointed member, and the first two members must agree to terminate the third member.

VII.

LEGAL RELATIONS

The parties hereto mutually understand and agree that the third BOARD member in the performance of any duties on the BOARD is acting in the capacity of an independent Contractor and not as an employee of either the CORPS or the CONTRACTOR. The board members are absolved of any personal or professional liability arising from the activites and recommendations of the BOARD.

VIII.

DISPUTES

Any dispute between the parties hereto, arising out of the work or other terms of this AGREEMENT, which cannot be resolved by negotiation and mutual concurrence between the parties, shall render this AGREEMENT terminated.

IX.

GENERAL

A. Notices.

All notices to be given herein shall be effective upon receipt and shall be in writing and personally delivered or mailed, first class,,postage

prepaid or given by telegram, facsimile or other similar means (followed by a confirmation by mail) to the parties. As the case may be, at the following address or such other address as may hereafter be designated, by the parties:

a. If to the CORPS:

Address to be provided.

b. If to the Contractor:

Address to be provided.

c. If to the BOARD Members:

Address to be provided.

B. Confidentiality.

No BOARD Member shall disclose to any person proprietary or confidential information of the CORPS or the Contractor, except as may be required by law.

In WITNESS WHEREOF, the parties hereto have executed this AGREEMENT as of the day and year first above written.

BOARD MEMBER

By: _____

Title: _____

BOARD MEMBER

By: _____

Title: _____

BOARD MEMBER

By: _____

Title: _____

CONTRACTOR

By: _____

Title: _____

U.S. ARMY CORPS OF ENGINEERS

By: _____

Title: Contracting Officer

ALTERNATIVE DISPUTES REVIEW PROCESS - ATTACHMENT 3

CONTRACT DISPUTES REVIEW BOARD

GUIDELINES

I.

OBJECTIVE

The principal objective of the Disputes Review Board (BOARD) is to provide technical advice to both parties that will assist in the resolution of disputes which would otherwise likely be resolved through the traditional litigative processes. If this objective is achieved, such disputes can be resolved promptly, with minimum expense, and with minimum disruption to the administration and performance of the work. It is not intended for the GOVERNMENT or the CONTRACTOR to default on their normal responsibility to amicably and fairly settle their differences by indiscriminately assigning disputes to the BOARD. It is intended that if mutually agreed to by the parties to constitute a Disputes Review Board for the purpose of attempting to resolve contract disputes, that the mere existence of the BOARD will encourage the CORPS and the CONTRACTOR to resolve potential disputes without the necessity of resorting to the formal appeal procedure under the "Disputes" clause of the contract.

II.

RESPONSIBILITY OF THE BOARD

A. The BOARD will provide technical advice and recommendations concerning controversy between the CONTRACTOR and the CORPS from construction arising under the contract. Primarily, the BOARD will consider interpretation of the plans and/or specifications, delays, acceleration of the work, scheduling, classification of extra work, changed conditions, design changes, and the like. During its regular visits to the job site, the BOARD will encourage the resolution of differences at the job level. The Board should take these opportunities to make recommendations to either or both, the Government and the Contractor to facilitate the construction and/or prevent problems from occurring.

B. During the period when the BOARD is in effect, other than by formal factual recommendations to both the CORPS and the CONTRACTOR, the BOARD will refrain from giving any advice or consultative services to either party. The BOARD members will act in a completely independent manner and will have no consultative or business connections with either party during their tenure as BOARD members.

C. Normally, the third BOARD member selected by the first two will act as Chairman for all activities. However, this may be delegated to another member from time to time.

III.

REGULAR CONSTRUCTION PROGRESS MEETINGS

A. All regular meetings will be held at or near the job site. Each meeting will consist of a round table discussion and a field inspection of the work being performed. The round table discussion will be conducted by a member of

the CORPS and will be attended by selected personnel from the CORPS and the CONTRACTOR. The agenda will generally be as follows:

1. Opening remarks by the CORPS Representative.

2. A description by the CORPS of work accomplished since the last meeting, the current status of the work, schedule-wise, and a forecast for the coming period.

3. An outline, by the CONTRACTOR, of potential problems and a description of proposed solutions.

4. An outline by the CORPS' Contracting Officer, or his authorized representative, as to the status of the work as he views it including potential problems and proposed solutions.

5. A brief description of potential claims or disputes which have surfaced since the last meeting.

6. A summary of the status of past disputes and claims.

B. The CORPS will prepare minutes of all regular meetings and circulate them for revision and/or approval by all concerned.

C. The field inspection will cover all active segments of the work, the BOARD being accompanied by both the CORPS and CONTRACTOR personnel.

D. The Board should take these opportunities to make recommendations to either or both, the Government and the Contractor to facilitate the construction and/or prevent problems from occurring.

IV.

HANDLING OF WRITTEN APPEALS

A. When a written appeal is referred to the BOARD by either party, it shall first decide when to conduct a hearing. For an urgent matter the BOARD should convene at its earliest convenience. All hearings shall commence no later than 30 days following transmittal of a dispute to the BOARD.

B. The BOARD may request that written documentation and arguments from both parties be sent to each individual member for study before the hearing begins.

C. Normally, the hearing will last no more than 2 days, and would be conducted at the job site. However, any location which would be more convenient to all parties and still provide all required facilities and access to necessary documentation would be satisfactory.

D. For hearings, the third member of the BOARD will act as Chairman, or he may appoint one of the other members. The CORPS and the CONTRACTOR shall have representatives at all hearings. The party initiating the dispute to the BOARD will discuss the dispute followed by the other party, each party being allowed equal time. Each party will then be allowed one or more rebuttals until all aspects are thoroughly covered. Each time a person testifies the BOARD members may ask questions, request clarification, or ask for further data. In large or complex cases more than two days of additional hearings may be necessary in order to consider all the evidence presented by both parties. However, no hearing on any single dispute will last for more

than 4 calendar days.

E. After the hearings are concluded, the BOARD shall meet in private and reach a conclusion supported by two or more members. Its factual (as opposed to legal) findings and recommendations, together with its reasons, shall then be submitted as a written report to both the CORPS and the CONTRACTOR within 30 days following completion of the hearings. The Board's recommendations shall be based on the pertinent contract provisions and facts and circumstances involved in the dispute.

F. The BOARD should make every effort to reach a unanimous decision. If this proves impossible, the dissenting member may prepare a minority report.

G. Although both parties should place weight upon the BOARD's recommendations, they are not binding. Either party may request the BOARD to reconsider its recommendation.

H. Position papers or other written material supplied to the BOARD are admissible in a subsequent proceeding unless the submitting party designates that they are submitted for settlement purposes only; in addition, any written report of the BOARD shall be admissible in such subsequent proceedings and each party hereby stipulates to its admissibility; and provided, further that if settlement is reached as a result of the recommendations of the BOARD, any material presented to the BOARD, as well as the recommended settlement, may be used to justify any contract modification which may result from the settlement.

I. It may not be necessary for the BOARD to keep a formal record of its sessions during the consideration of a dispute. This would depend partly upon the nature and magnitude of the dispute and upon the attitude of the parties.

V.

MISCELLANEOUS

It is not desirable to adopt hard and fast rules for the functioning of the BOARD. The entire procedure should be kept flexible so that it can adapt to changing situations. The BOARD should initiate, with the other parties' concurrence, new rules or modifications to old ones whenever this is deemed necessary. It is desirable to keep the hearings informal.

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SECTION 01270

MEASUREMENT AND PAYMENT

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SECTION 01270

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 MOBILIZATION AND PREPARATORY WORK

Payment for Mobilization, and Preparatory Work will be made at the applicable contract price, which payment shall constitute full compensation for mobilization and preparatory work as specified in Special Clauses, paragraph: Payment for Mobilization and Preparatory Work. Contractor shall further comply to all requirements of Section 01200, "Control Requirements" and provide direct control for entire project which shall be included in payment for "Mobilization and Preparatory Work".

1.2 DIVERSION AND CONTROL OF WATER

Payment for Diversion and Control of Water will be made at the applicable contract price, which payment shall constitute full compensation for maintaining the work areas in a dry condition during construction; and providing and maintaining the cofferdam and all other means of seepage control, including dewatering wells. Payment does not include dewatering for the SARI relocation work, for which separate payment is made.

1.3 CLEAR SITE AND REMOVE OBSTRUCTIONS

1.3.1 Payment for Clear Site and Remove Obstructions, Outlet Works, Dam Foundation, Approach Channel and Abutments

Payment for Clear Site and Remove Obstructions, Outlet works, Approach Channel, and Abutments will be made for clearing and grubbing and removal of all obstructions within the areas for the dam foundation, abutments, approach channel, outlet works, and disposal and stockpiling of material. Except as otherwise specified, payment includes all applicable earthwork; removal of debris including miscellaneous structures, fences, waterlines, asphalt roads, and vegetation and cutting and backfilling existing piezometers, protection of existing utilities, disposal of all materials, and maintenance of these cleared areas once initial clearing is accomplished.

1.3.2 Payment for Clear Site and Remove Obstructions, Borrow Area

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

1.3.3 Payment for Demolition of Existing Intake Structure and Access Bridge

Payment for Demolition of Existing Intake Structure and Access Bridge will be made per the contract lump sum price for its demolition, removal and disposal from the site.

1.3.4 Payment for Abandon Existing Outlet Structure

Payment for the Abandon Existing Outlet Structure will be made at the applicable contract lump sum price, which payment shall constitute full compensation for labor, materials including sand backfill, shotcrete plug including reinforcement, drill and epoxy dowels, metallic waterstop, steel sealing plates, reinforced concrete cover slab, and for all equipment and tools required to complete the work.

1.3.5 Existing Embankment

No separate payment will be made for clear and grubbing the existing embankment. Therefore, all costs shall be included in the contract prices for the items to which the work applies.

1.3.6 Disposal Areas and Stockpile Areas

No separate payment will be made for clear and grubbing the disposal and stockpile areas. Therefore, all costs shall be included in the contract prices for the items to which the work applies.

1.4 EXCAVATION

1.4.1 Measurement

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

1.4.2 Payment for Excavation, Outlet Works Sta. 0+00 to Sta. 10+00

Excavation methods and nature of materials encountered in the various types of excavation will not be classified for payment. Payment for Excavation, Outlet Works Sta. 0+00 to Sta. 10+00 will be made at the applicable contract price, which payment constitutes full compensation for excavating, hauling, stockpiling, processing, and disposition of the excavated material. Excavation for the Approach Channel, Pilot Channel, and Wingwalls shall be included in this bid item.

1.4.3 Payment for Excavation, Outlet Works Sta. 10+00 to Sta. 18+13.50

Excavation methods and nature of materials encountered in the various types of excavation will not be classified for payment. Payment for Excavation, Outlet Works Sta. 10+00 to Sta. 18+13.50 will be made at the applicable contract price, which payment constitutes full compensation for excavating, hauling, stockpiling, processing, and disposition of the excavated material. All materials, procedures, and miscellaneous items associated

with the rock reinforcement system of the vertical excavation or protection of the rock from slaking or spalling are included in this unit price.

1.4.4 (Deleted)

1.4.5 Payment for Excavation, Outlet Works Sta. 18+13.50 to Sta. 49+93

Excavation methods and nature of materials encountered in the various types of excavation will not be classified for payment. Payment for Excavation, Outlet Works Sta. 18+13.50 to Sta. 49+93 will be made at the applicable contract price, which payment constitutes full compensation for excavating, hauling, stockpiling, processing, and disposition of the excavated material. Excavation required for the stilling basin wingwalls shall be included in this unit bid price.

1.4.6 Payment for Excavation, Outlet Works Sta. 49+93 to Sta. 54+00

Excavation methods and nature of materials encountered in the various types of excavation will not be classified for payment. Payment for Excavation, Outlet Works Sta. 49+93 to Sta. 54+00 will be made at the applicable contract price, which payment constitutes full compensation for excavating, hauling stockpiling, processing, and disposition of the excavated material. Excavation required for the downstream drop structure, toe protection, and cut off walls shall be included in this unit bid price.

1.4.7 Payment for Excavation, Borrow Areas

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

1.4.8 Payment for Excavation, Removal of Gravel Blanket

Payment for Excavation, Removal of Gravel Blanket will be made at the applicable contract price, which payment constitutes full compensation for excavating, hauling and stockpiling the quantity of gravel that meets the specified gradation of the excavated material.

1.4.9 Payment for Excavation, Removal of Stone Protection

Payment for Excavation, Removal of Stone Protection will be made at the applicable contract price, which payment constitutes full compensation for excavating, hauling and stockpiling the quantity of salvaged stone that meets the gradation for stone for 15-inch grouted stone.

1.4.10 Payment for Excavation, Stripping

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

1.4.11 Payment for Excavation, Toe

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

1.4.12 Payment for Excavation, Existing Embankment Crest

Payment for Excavation, Existing Embankment Crest will be made at the applicable contract price, which payment shall constitute full compensation for excavation of all materials, except existing stone and gravel protection, to the lines and grades and hauling the excavated material to a stockpile, and protection of the existing impervious material integrity and moisture content. Excavation for the embankment key trench shall be included in this bid item.

1.4.13 Excavation Stockpile Areas

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

1.4.14 Stockpiling

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

1.4.15 Disposal

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

1.5 EMBANKMENTS

1.5.1 Measurement

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

1.5.2 Foundation Preparation, Zone II Contact Area

1.5.2.1 Measurement

Foundation preparation required to prepare the exposed rock area foundation in the Zone II contact area shall be measured for payment on the basis of the number of square yards of foundation actually prepared as directed and approved for Zone II placement. Measurement shall be parallel to the slope. Any cleaning required subsequent to foundation approval shall not be measured for payment.

1.5.2.2 Payment

Payment for Foundation Preparation, Zone II Contact Area will be made at the applicable contract price, which payment shall constitute full compensation for all operations in connection therewith, including air cleaning prior to surface treatment and placement of embankment material.

1.5.3 Payment for Embankment, Zone I Material

Payment for Embankment, Zone I Material will be made at the applicable contract price, which payment shall constitute full compensation for obtaining any necessary borrow material, placing, benching the existing embankment, spreading, discing and compacting the fill, complete.

1.5.4 Payment for Embankment, Zone II Material

Payment for Embankment, Zone II Material will be made at the applicable contract price, which payment shall constitute full compensation for obtaining any necessary material from stockpile or borrow, placing, spreading, discing and compacting the fill, complete. Payment for excavating, processing and stockpiling the Zone II material within the designated borrow areas, as specified in section 02212, is included in this bid item.

1.5.5 Payment for Embankment, Transition Zone Material

Payment for Embankment, Transition Zone Material will be made at the applicable contract price, which payment shall constitute full compensation for obtaining any necessary borrow material, placing, benching the existing embankment, spreading, discing and compacting the fill, complete.

1.5.6 Trenches

No separate payment will be made for backfilling trenches for utilities and pipelines. All costs therefore shall be included in the applicable contract prices for the items to which the work applies.

1.5.7 Subgrade Preparation

No separate payment will be made for subgrade preparation and all costs in connection therewith shall be included in the contract prices for items to which the work applies.

1.5.8 Backfill for Directed Overcut

Backfill for directed overcut, except unsatisfactory material, will be measured and paid for under the applicable contract price for the type of fill placed therein. Where there is no applicable contract item, an adjustment in the contract price will be made.

1.5.9 Additional Rolling

1.5.9.1 Measurement

Additional rolling required in addition to the number of passes specified will be measured on the basis of the number of hours during which the rolling equipment, approved for this job, is operated in making additional required passes. In computing the number of hours worked by the rolling equipment, only the time of actual operation will be included. Time lost by rolling equipment on account of refueling, greasing, oiling, breakdowns or replacement of parts will not be measured.

1.5.9.2 Payment

Payment for Additional Rolling will be made at the applicable contract price, which payment shall constitute full compensation for all cost

incidental to additional rolling.

1.6 FILLS AND SUBGRADE PREPARATION

1.6.1 Measurement

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

1.6.2 Payment for Compacted Fill, Levee

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

1.6.3 Payment for Structural Backfill

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

1.6.4 Miscellaneous Fill

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

1.6.5 Payment for Mitigation Fill

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

1.7 SUBDRAINAGE SYSTEM

1.7.1 Measurement

Measurement for Subdrainage System shall be lump sum. Items and other appurtenances not identified shall be considered incidental and no measurement or payment shall be made and shall be considered as included in the applicable contract price for the item to which the work applies and no additional compensation will be allowed.

1.7.2 Payment for Subdrainage System, Outlet Works

Payment for Subdrainage System, Outlet Works will be made at the applicable contract lump sum price for all piping, fittings, collector boxes, cleanouts, gravel material and sand filter, perforated collector pipes, and all miscellaneous items associated with the subdrain system which shall

constitute full compensation for providing subdrainage system, complete in place.

1.8 AGGREGATE BASE COURSE

1.8.1 Measurement

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

1.8.2 Payment for Aggregate Base Course

Payment for Aggregate Base Course will be made at the applicable contract price, which payment shall constitute full compensation for aggregate base course, complete including subgrade preparation.

1.9 ASPHALT CONCRETE PAVEMENT

1.9.1 Measurement

The unit of measurement for the asphalt concrete pavement will be the ton (2,000 pounds). The Contractor shall weigh each load on a certified platform scale and shall furnish the Contracting Officer with duplicate Weigh Master's Certificates showing the actual net weights. One delivery ticket shall be furnished to the plant inspector and one delivery ticket to the inspector. The bituminous mixture shall be weighed after mixing and no deduction will be made for the weight of bituminous material incorporated therein. Asphalt concrete pavement used for the convenience of the Contractor will not be measured for payment.

1.9.2 Payment for Asphalt Concrete Pavement

Payment for Asphalt Concrete Pavement will be made at the applicable contract price, which payment shall constitute full compensation for asphalt concrete surfacing, complete, including tack coat, appurtenant work, and quality control testing. Payment will not include asphalt concrete pavement for which separate payment is provided. Payment will not be made for excessive thickness.

1.10 STONE PROTECTION

1.10.1 Measurement

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

1.10.2 Payment for Stone Protection

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

1.10.3 Payment for Gravel Blanket Protection

Payment for Gravel Blanket Protection will be made at the applicable contract unit prices per ton, which shall constitute full compensation for obtaining and placing the gravel blanket, complete.

1.10.4 Payment for Bedding Material for Stone Protection

Payment for Bedding Material for Stone Protection will be made at the applicable contract unit prices per ton, which shall constitute full compensation for obtaining and placing the bedding material, complete.

1.10.5 Payment for Stone for Grouted Stone Protection

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

1.10.6 Payment for Derrick Stone

Payment for Derrick Stone will be made at the applicable contract unit prices per ton, which shall constitute full compensation for obtaining and placing the stone, complete.

1.11 GROUTING STONE PROTECTION

1.11.1 Measurement

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

1.11.2 Payment for Grouting Stone Protection

Payment for Grouting Stone Protection will be made at the applicable contract price, which payment shall constitute full compensation for materials including Portland Cement, mixing, transporting, placing, finishing, and curing grout used for grouting stone protection complete.

1.12 WATER DISTRIBUTION SYSTEM

1.12.1 Measurement

The pipe work to be performed under these specifications will be listed in the contract items by size or size and class and what other information is necessary for identification. The length of pipe will be the horizontal projection designated by the Engineer.

Items and other appurtenances not identified shall be considered incidental and no measurement or payment shall be made and shall be considered as included in the applicable contract prices for the items to which the work applies and no additional compensation will be allowed.

1.12.2 Payment for Chlorination Equipment

Payment for the chlorination equipment shall include all labor, equipment

and materials for the installation of the dry pellet chlorinator and related equipment required for proper operation, including, but not limited to mounting system, injection piping, chlorine hopper, and pellets.

1.12.3 Payment for Pressurized Water Storage Tank

Payment for the water storage tank shall include all labor, equipment and materials for the installation of the tank including, but not limited to the pressurized tank, mounting plate, bolts, and tank pressure adjustments as required for proper system operation.

1.12.4 Payment for Water System Piping, Valves, and Appurtenances

Payment for water system piping, valves, and appurtenances shall include all labor, equipment and materials required for installation, including, but not limited to, control valves, shutoff valves, check valves, air/vac valves, water meter, pressure switch, pressure gauge, PVC pressure piping and fittings, copper pressure tubing and fittings, PVC and steel drainage piping and fittings, pipe couplings, flange and isolation kits, blow-off assembly, adjustable pipe supports, gravel drainage pit, pipe tape wrap, and related appurtenances from the top of the well casing to a point 5-feet from the Well Slab Foundation.

1.12.5 Payment for Concrete Well Slab Foundation

Payment for the well slab shall include all materials, labor, and equipment required for the installation of the reinforced concrete foundation, as indicated on the plans.

1.12.6 Payment for 3" Diameter PVC Well Discharge Pipe

Payment for 3" Diameter PVC Pipe, will be made at the applicable contract unit price per lineal foot of pipe including 6-inch steel casing, casing insulators, casing seals, Schedule 40 pipe, Schedule 80 pipe, fittings and appurtenances, and trenching, shoring, bedding and backfill, which payment shall constitute full compensation for all work, complete in place.

1.13 WATER WELLS

1.13.1 Measurement

Measurement of pipe work, bore holes, and pumps and appurtenances to be performed under these specifications will be listed in the contract items by size, or size and class or whatever other information is necessary for identification.

Items and other appurtenances not identified shall be considered incidental and no measurement or payment shall be made and shall be considered as included in the applicable contract prices for the items to which the work applies and no additional compensation will be allowed.

1.13.2 Payment for Bore Hole and Well Development

Payment for the 6" well shall be made at the applicable contract lump sum price per well for a given diameter and depth, and shall include all equipment, labor, and materials required to bore the well; install the casing, screening, gravel pack, cement seal, gravel feed tube, well seal, submersible well pump, torque arrestor, discharge piping to the top of the casing, and related fittings and appurtenances; log and test soil samples;

clean and disinfect; and pump test the well.

1.14 OBSERVATION WELLS

1.14.1 Payment for Observation Wells

Payment for Observation Wells will be made at the applicable contract unit price per each, which payment shall constitute full compensation for providing the observation wells including pipe perforated and solid, borehole, casing, gravel pack, seal, concrete cap and steel, locking cover, which shall constitute full compensation for all work, complete in place.

1.15 STORM DRAIN AND DRAINAGE FACILITIES

1.15.1 Payment for 42" Culvert Extension

Payment for the 42" Culvert Extension will be made at the applicable contract lump sum price, which payment shall constitute full compensation for labor, materials including RCP, concrete encasement, inlet and outlet, riprap, excavation, backfill, formwork, concrete, portland cement, steel reinforcement and for all equipment and tools required to complete the work.

1.15.2 Payment for Outlet Works Channel Side Drains

Payment for Outlet Channel Side Drains will be made at the applicable contract lump sum price which shall include all trenching shoring, bedding material, R.C.P. backfill, reinforced concrete outlet and inlet structures, and flap gates, which shall constitute full compensation for providing all work, complete in place.

1.16 ACCUSONIC FLOW METERS

Payment for Accusonic Flow Meters will be made at the applicable contract lump sum price which payment shall constitute full compensation for all labor, materials, equipment and tools required to complete the work as specified in SECTION 13310, including velocity transducer assemblies, acoustic transducer, cables, flowmeter, transmitter, complete in place.

1.17 SAWPA RELOCATION/PROTECTION

1.17.1 Measurement

The pipe work and sanitary sewer facilities to be performed under these specification will be listed in the contract items by size or size and class and whatever other information is necessary for identification. The length of pipe to be paid will be the horizontal projection designated by the engineer.

Payment or other items to complete the work such as manholes and concrete encasement shall be measured and paid for as separate items.

Items and other appurtenances not identified shall be considered incidental and no measurement or payment shall be made and shall be considered as included in the applicable contract prices for the items to which the work applies and no additional compensation will be allowed.

1.17.2 Payment for 60-inch Sewer Pipe Encasement

Payment for 60-inch Sewer Pipe Encasement will be made at the applicable

contract unit price per lineal foot, which shall constitute full compensation for providing all work, complete in place, as shown on the Plans.

1.17.3 Payment for Raising Exist. 48-inch Diameter Precast Concrete Manhole

Payment for raising existing 48-inch diameter precast concrete manhole to new channel grade including new precast concrete manhole rings and top slab, concrete collar, cover, excavation, and backfill will be made at the applicable contract lump sum price, which shall constitute full compensation for providing all work, complete in place, as shown on the Plans.

1.17.4 Payment for SARI Pipeline Reaches IV-A and IV-B Relocation

Payment for construction of approximately 1,030 linear feet of new 48-inch HDPE, SDR-21 SARI Pipeline Reaches IV-A and IV-B Relocation just north of the Prado Dam Existing Outlet Works, including exploratory drilling and geotechnical investigation, pipe, bypassing, shoring, sheeting, dewatering, excavation, bedding, backfill, geotextile fabric including removal of existing interfering 36" and 42" pipeline will be made at the applicable contract lump sum price, which shall constitute full compensation for providing all work, complete in place, as shown on the Plans.

1.17.5 Payment for Abandonment of Existing 60-inch SARI pipeline

Payment for Abandonment of Existing 60-inch steel pipeline in existing outlet works, including: excavation, dewatering, bypassing, concrete plug, concrete slurry, and sand will be made at the applicable contract lump sum price, which shall constitute full compensation for providing all work, complete in place, as shown on the Plans.

1.17.6 Payment for Construction of Dual 48-inch Pipeline in Existing Outlet Structure

Payment for construction of approximately 1,572 linear feet of new 48-inch HDPE pipe SDR-21 in existing Outlet Works to new knife gate valves (approximate existing station 12+84), including; pipe, anchors, concrete encasement and select fill will be made at the applicable contract lump sum price, which shall constitute full compensation for providing all work, complete in place, as shown on the Plans.

1.17.7 Payment for 48-inch PVC Lined RCP, Fittings and Valves

Payment for construction of two Knife gate valves, concrete encasement, excavation, bedding and backfill, and approximately 366 linear feet of RCP piping and welded steel pipe fittings up to approximate Station 16+50 will be made at the applicable contract lump sum price, which shall constitute full compensation for providing all work, complete in place, as shown on the Plans.

1.18 METAL BEAM GUARDRAIL

1.18.1 Measurement

Measurement for Meal Beam Guardrail will be made to the nearest linear foot horizontally along the centerline from end-to-end of the metal guardrail in place.

1.18.2 Payment for Metal Beam Guardrail

Payment for Metal Beam Guardrail will be made at the applicable contract unit price, which payment shall constitute full compensation for the metal beam guardrail, complete, including posts, blocking, reflector assembly, flares, bridge transitions, terminal sections, all required earthwork and painting.

1.19 CHAIN LINK FENCE AND GATES

1.19.1 Measurement

Measurement of Chain Link Fencing will be made to the nearest linear foot horizontally along the centerline from end-to -end of the fence in place. Gates shall be measured per each based upon type.

1.19.2 Payment of Chain Link Fence

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

1.19.3 Payment for Chain Link Fence Gates

Payment for Chain Link Fence Gates will be made at the applicable contract price, which payment shall constitute full compensation for the gates, complete.

1.19.4 Payment for Chain Link Fence with Slats

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

1.19.5 Payment for Pipe Gates

Payment for Pipe Gates will be made at the applicable contract price, which payment shall constitute full compensation for the gates, complete.

1.19.6 Payment for Barbed Wire Fence

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

1.20 SETTLEMENT PLATES

Measurement and Payment for Settlement Plates will be made at the applicable contract unit price per each, which payment shall constitute full compensation for providing the settlement plates, including all required earthwork, pipe and cap, mortar pad, timber posts, and bolts, complete.

1.21 SURVEY MONUMENTS

Measurement and Payment for Survey Monuments will be made at the applicable contract unit price per each, which payment shall constitute full compensation for providing the survey monuments, including all required earthwork, pipe and cap, mortar pad, and bolts, complete.

1.22 STAFF GAGES

Measurement and Payment for Staff Gages will be made at the applicable contract unit price per each, which payment shall constitute full compensation for materials, and installation necessary for the work, complete in place.

1.23 HYDROSEEDING

1.23.1 Measurement and Payment for Hydroseeding

Measurement and Payment for Hydroseeding will be made at the applicable contract unit price per acre, which payment shall constitute full compensation for hydroseeding, complete, including spreading topsoil from stockpiles, furnishing and placing supplemental topsoil, grading, tillage, soil preparation, soil admixtures, fertilizing, seeding, mulching, water and watering operations and maintenance of areas to be seeded.

1.23.2 Hydroseeding Maintenance

Measurement and Payment for Hydroseeding Maintenance will be made at the applicable contract unit price per acre, which payment shall constitute full compensation for maintenance during the seed establishment period of the hydroseeded area for twelve (12) months, including water and all maintenance watering, weeding, trash removal, fertilizing, repairs and reseeding as required by Section 02900: Hydroseeding.

1.24 CONCRETE

1.24.1 Measurement

Measurement of concrete will be made on the basis of the actual volume of concrete per cubic yard within the pay line, of each item as indicated on the drawings. Measurement of concrete placed against the sides of any excavation without the use of intervening forms will be made only within the pay lines of the structure. No deductions will be made for rounded of beveled edges or space occupied by reinforcement, voids or embedded items which are either less than 5 cubic feet in volume or one square foot in cross section. Concrete wasted or used for the convenience of the Contractor will not be included in measurement for payment. No separate measurement will be made for concrete which is placed in structures for which payment is made on a lump sum basis.

1.24.2 Payment for the Government-Designed Mixture Concrete

Payment will be made at the applicable contract price for the various items, which payments shall constitute full compensation for labor, materials, including formwork, (except cement, pozzolan, steel reinforcement, water-reducing admixture, and embedded parts for which other payment is provided), and for all equipment and tools required to complete the work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided.

1.24.2.1 Concrete, Intake Tower Structure - Elev. 545' and below

Payment for the Concrete, Intake Tower Structure - Elev. 545' and below will be made at the applicable contract price, which payment shall constitute full compensation for all concrete placed in the intake tower

structure, Elev.545' and below, complete. Concrete and/or nonshrink grout placed in blockouts where metal work items are shown are incidental to the metalwork items.

1.24.2.2 Concrete, Stilling Basin Invert - Sta.18+13.50 to Sta.21+02.50

Payment for the Concrete, Stilling Basin Invert - Sta.18+13.50 to Sta.21+02.50 will be made at the applicable contract price, which payment shall constitute full compensation for all concrete placed in the stilling basin invert between Sta.18+13.50 and Sta.21+02.50, including the invert and apron slab, complete. Baffle blocks, end sill, and wall elements are not included in this bid item.

1.24.3 Payment for the Contractor-Designed Mixture Concrete

Payment will be made at the applicable contract price for the various items, which payments shall constitute full compensation for labor, materials, including formwork, cement, pozzolan, water-reducing admixture, waterstops (except steel reinforcement for which other payment is provided), and for all equipment and tools required to complete the work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided.

1.24.3.1 Concrete, Intake Tower Structure - Above Elev. 545'

Payment for the Concrete, Intake Tower Structure - Above Elev. 545' will be made at the applicable contract price, which payment shall constitute full compensation for all concrete placed in the intake tower structure above Elev.545', complete. Concrete and/or nonshrink grout placed in blockouts where metal work items are shown are incidental to the metalwork items.

1.24.3.2 Concrete, Stilling Basin

Payment for the Concrete, Stilling Basin will be made at the applicable contract price, which payment shall constitute full compensation for all concrete placed in the stilling basin between Sta.18+13.50 and Sta.21+02.50, excluding concrete for the stilling basin invert for which separate payment is made, complete.

1.24.3.3 Payment for Concrete, Transition Structure

Payment for the Concrete, Transition Structure will be made at the applicable contract price, which payment shall constitute full compensation for labor, materials including formwork, portland cement, waterstops (except steel reinforcement for which other payment is provided), and for all equipment and tools required to complete the work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided.

1.24.3.4 Payment for Concrete, Outlet Conduit

Payment for the Concrete, Outlet Conduit will be made at the applicable contract price, which payment shall constitute full compensation for labor, materials including formwork, portland cement, waterstops (except steel reinforcement for which other payment is provided), and for all equipment and tools required to complete the work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided.

1.24.3.5 Payment for Concrete, Drop Structure Retaining Wall

Payment for the Concrete, Drop Structure Retaining Wall will be made at the applicable contract unit price, which payment shall constitute full compensation for labor, materials including formwork, portland cement, waterstops, earthwork (except steel reinforcement for which other payment is provided), and for all equipment and tools required to complete the work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided. The earthwork included shall be only that earthwork which is located outside the limits of earthwork for which other payment is provided.

1.24.3.6 Payment for Concrete, Outlet Works Sta. 21+02 to Sta. 49+93

Payment for the Concrete, Outlet Works Sta. 21+02 to Sta. 49+93 will be made at the applicable contract unit price, which payment shall constitute full compensation for labor, materials including formwork, portland cement (except steel reinforcement for which other payment is provided), and for all equipment and tools required to complete the work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided. The concrete cut off wall is included in this bid item.

1.24.3.7 Payment for Concrete, Access Road

Payment of Concrete, Access Road will be made at the applicable contract unit price, which payment shall constitute full compensation for labor, materials including formwork, portland cement (except steel reinforcement for which other payment is provided), and for all equipment and tools required to complete the work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided.

1.24.3.8 Payment for Concrete, Stop Log Storage Area

Payment of Concrete, Stop Log Storage Area will be made at the applicable contract unit price, which payment shall constitute full compensation for labor, materials including formwork, portland cement (except steel reinforcement for which other payment is provided), and for all equipment and tools required to complete the work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided.

1.24.3.9 Payment for Double Cable Trash Boom

Payment for the Double Cable Trash Boom will be made at the applicable contract lump sum price, which payment shall constitute full compensation for labor, materials including reinforced concrete anchors, cables, anchorage, connections, pontoons, and for all equipment and tools required to complete the work.

1.24.3.10 Payment for Concrete, Lean Mix Concrete Backfill

Payment for the Concrete, Lean Mix Concrete Backfill will be made at the applicable contract price, which payment shall constitute full compensation for labor, materials including portland cement (except steel reinforcement for which other payment is provided), and for all equipment and tools required to complete the work. Embedded items shall be included in the cost of the concrete except when other payment is specifically provided.

1.24.3.11 Concrete, Float Well Intake

Payment for the Concrete, Float Well Intake will be made at the applicable contract price, which payment shall constitute full compensation for labor, concrete and materials including portland cement (except steel reinforcement and miscellaneous steel for which other payment is provided), earthwork, and for all equipment and tools required to complete the work. The access hatches, steel clean out door, ladders, 18" pipe and 30" pipe are not included in this bid item.

1.25 PORTLAND CEMENT

1.25.1 Measurement

The quantity to be paid for will be the number of hundred weight (100 pounds) of Portland Cement used in Government-designed mixture concrete, paid for on a cubic yard basis unless specifically expected, wasted or used for the convenience of the Contractor. The quantity to be paid for will be determined by multiplying the approved batch weight for Portland Cement by the number of batches or cubic yards of concrete placed within the paylines and divided by 100. No payment under this item will be made for Portland cement in grout, Cement in excess concrete transferred from one placement to another placement of lesser cement content will be paid under the lesser cement content concrete unless over-order and transfer were directed.

1.25.2 Payment

Payment for Portland Cement will be made at the applicable contract price, which payment shall constitute full compensation for providing and storage of Portland cement.

1.26 FLY ASH

1.26.1 Measurement

The quantity to be paid for will be the number of tons (2,000 pounds) of Fly Ash used in Government-designed mixture concrete, paid for on a cubic yard basis unless specifically expected, wasted or used for the convenience of the Contractor. The quantity to be paid for will be determined by multiplying the approved batch weight for Fly Ash by the number of batches or cubic yards of concrete placed within the paylines and divided by 2,000.

1.26.2 Payment

Payment for Fly Ash will be made at the applicable contract price, which payment shall constitute full compensation for providing and storage of fly ash.

1.27 GRANULATED GROUND BLAST FURNACE SLAG

1.27.1 Measurement

The quantity to be paid for will be the number of tons (2,000 pounds) of Granulated Ground Blast Furnace Slag used in Government-designed mixture concrete, paid for on a cubic yard basis unless specifically expected, wasted or used for the convenience of the Contractor. The quantity to be paid for will be determined by multiplying the approved batch weight for Granulated Ground Blast Furnace Slag by the number of batches or cubic yards of concrete placed within the paylines and divided by 2,000.

1.27.2 Payment

Payment for Granulated Ground Blast Furnace Slag will be made at the applicable contract price, which payment shall also constitute full compensation for providing and storage of the Granulated Ground Blast Furnace Slag.

1.28 WATER REDUCING ADMIXTURE

1.28.1 Measurement

The quantity of water reducing admixture used in the Government-designed mixture concrete will be measured by the number of gallons of water reducing admixture placed in the concrete based on the pay line quantity and the approved mix design. Water reducing admixture wasted or used for the convenience of the Contractor will not be included in measurement for payment.

1.28.2 Payment

Payment for Water Reducing Admixture will be made at the applicable contract price, which payment shall also constitute full compensation for providing the water reducing admixture; and furnishing of storage, batching, and recording equipment.

1.29 CONCRETE REINFORCEMENT

1.29.1 Measurement

The quantity of steel reinforcement, placed in concrete as described hereinbefore in paragraph: CONCRETE REINFORCEMENT will be measured on the basis of length of bars placed in accordance with the shop drawings or bar schedules. The measured lengths will be converted to weights for the size of bars listed by the use of the unit weights per linear foot contained in ASTM A 615. Steel in splices (in bars up to an including #11 bars) indicated on the contract drawings where directed or approved will be measured by payment. The unit of weight shall be tons (2,000 pounds). Embedded miscellaneous metal not paid for under other pay items shall be measured and paid for under Bid Item "Miscellaneous Steel and Metalwork."

1.29.2 Payment

Payment for steel reinforcement, embankment will be made at the applicable contract unit price, which payment shall constitute full compensation to provided all reinforcing steel, except concrete reinforcement placed in concrete paid for on a lump sum basis for which separate payment is provided. Payment shall also include temporary support and spacing of the reinforcement.

1.30 STRUCTURAL STEEL

1.30.1 Measurement

The quantity of structural steel items will be measured by weight in tons (2,000) as listed below.

a. Computed weights per fabricated piece or assembly for the various pieces classified or shown on the shop drawings shall be indicated

on the shop drawings submitted for approval. For pieces shown on Contractor-approved shop drawings, the computed weights shall be submitted for approval along with a copy of the Contractor-approved shop drawings. When measurement of complicated shapes can be determined more readily by scale weight per fabricated piece of assembly, certified scale weights may be used when specifically approved. Computed weights for payment will be the net calculated weights based on the dimensions indicated on the shop drawings. The weight of rolled shapes and plates will be computed on the basis of their nominal weights and dimensions. In calculating the net weights, all copes, cuts, and all open holes except rivet and bolt holes will be deducted. No additional weight will be calculated for overweight allowance, protective coatings, allowance of milling, grip length or rivets and bolts, cut washers and butt, groove, and fillet welds. No measurement will be made for material wasted or used for the Contractor's convenience or which is not required. For computing the weight of the structural steel metal work use 0.283 pounds per cubic inch.

b. Structural steel items can be measured by scale weights. Weights will be determined from the manufacturer's published net weights, or when these are not available, from the certified scale weights. Certified scale weights shall be furnished or the weighing shall be done in the presence of the Government. The weights shall be net weights without boxes, crates, containers, or supporting members required for packing or transportation. The weight of material used in additional items authorized for the convenience of the Contractor will be deducted from the scale weight. The weight to be deducted will be calculated using the nominal weight per cubic inch times the measured and/or calculated volumes of the additional items.

1.30.2 Payment for Structural Steel

Payment of Structural Steel will be made at the applicable contract price, which payment shall constitute full compensation for providing the structural steel items listed in STRUCTURAL STEEL AND MISCELLANEOUS METAL including anchors, fasteners, accessories, welding, galvanizing, painting, and inspection, complete.

Item listed in STRUCTURAL STEEL AND MISCELLANEOUS METAL pertaining to regulating outlets slide gates, emergency closure gates, and low-flow bulkheads shall, however, be excluded from payment for structural steel, and which shall be included with the respective items for payment.

1.31 MISCELLANEOUS STEEL AND METALWORK

Payment for miscellaneous steel and metalwork will be made at the applicable contract price, which payment shall constitute full compensation for providing the miscellaneous steel and metalwork items listed in STRUCTURAL STEEL AND MISCELLANEOUS METAL including anchors, fasteners, accessories, welding, galvanizing, painting, and inspection, complete.

1.32 INTERCEPTOR DRAIN

1.32.1 Measurement

Measurement for Interceptor Drain will be made to the nearest linear foot

horizontally along the centerline from end-to-end of the concrete interceptor drain in place.

1.32.2 Payment for Interceptor Drain

Payment for Interceptor Drain will be made at the applicable contract unit price, which payment shall constitute full compensation for furnishing and placing concrete Interceptor Drain, including portland cement (except steel reinforcement for which other payment is provided), complete in place.

1.33 V-DITCH

1.33.1 Measurement

Measurement for V-Ditch will be made to the nearest linear foot horizontally along the centerline from end-to-end of the concrete v-ditch in place.

1.33.2 Payment for V-Ditch

Payment for V-Ditch will be made at the applicable contract unit price, which payment shall constitute full compensation for furnishing and placing concrete V-Ditch, including portland cement, complete in place.

1.34 STRUCTURES

1.34.1 Payment for Control House Access Bridge

Measurement and Payment for Control House Access Bridge will be made at the applicable contract lump sum price which payment shall constitute full compensation for all labor, materials, equipment and tools required to complete the work, including but not limited to structure excavation and backfill, structural concrete, reinforcement, joints seals, elastomeric bearing pads and life railing, in place.

1.34.2 Payment for Stilling Basin Access Road Bridge

Measurement and Payment for Stilling Basin Access Road Bridge will be made at the applicable contract lump sum price which payment shall constitute full compensation for all labor, materials, equipment and tools required to complete the work, including but not limited to precast voided slab units with concrete topping, reinforcing steel, joint seal, concrete barrier, and tubular hand railing, in place.

1.34.3 Payment for Mechanically Stabilized Earth Walls

Measurement and Payment for Mechanically Stabilized Earth Walls will be made at the applicable contract unit price per square foot which payment shall constitute full compensation for all labor, materials, equipment and tools required to complete the work including granular backfill material, leveling pad, concrete, steel reinforcing, soil reinforcing, joint materials, end sections, filter cloth and **face panels complete in place.**

1.34.4 Payment for Generator and Storage Building

Measurement and Payment for Generator and Storage Building will be made at the applicable contract lump sum price which payment shall constitute full compensation for all labor, materials, equipment and tools required to complete the work, including but not limited to structure excavation and

backfill, reinforced concrete walls, footing, floor slabs, lightweight concrete roof over metal deck and steel framing, louvers, and architectural features, in place.

1.34.5 Payment for Gaging Station

Measurement and Payment for Gaging Station will be made at the applicable contract lump sum price including 48-inch diameter gage well, which payment shall constitute full compensation for all labor, materials, equipment and tools required to complete the work, including but not limited to structure excavation and backfill, reinforced masonry walls, footing, floor slab, lightweight concrete roof over metal deck, vents door, and architectural features, in place.

1.35 MSE INSTRUMENTATION

Payment for MSE Instrumentation will be made at the applicable contract lump sum price for all work related to the installation of the instrumentation for the MSE Walls, which shall constitute full compensation for providing all materials, complete in place.

1.36 ELECTRICAL

1.36.1 Payment for Well System Electrical Supply and Distribution

Measurement and Payment for Well System Electrical Supply and Distribution will be made at the applicable contract lump sum price which payment shall constitute full compensation for all labor, materials, and equipment required to complete the work, in place.

1.37 GAGE STATION ELECTRICAL DISTRIBUTION

Payment for Gage Station Electrical Supply and Distribution will be made at the applicable contract lump sum price which payment shall constitute full compensation for all labor, materials, and equipment required to complete the work, in place.

1.38 SEISMIC INSTRUMENTATION

Payment for Seismic Instrumentation will be made at the applicable contract lump sum price which payment shall constitute full compensation for all labor, materials, and equipment required to complete the work, in place, including concrete vault, piping, conduit, earthwork, electrical work and connections and other appurtenant items. Payment does not include the seismic instrument, which will be supplied by others.

1.39 STOP LOGS

Measurement and Payment for Stop Logs will be made at the applicable contract lump sum price which payment shall constitute full compensation for all labor, materials, equipment and tools required to complete the work, including but not limited to structural steel, bolts, fasteners, guides, accessories, seals, welding, painting, and inspection, in place.

1.40 REGULATING OUTLET SLIDE GATES

Payment for Regulating Outlet Slide Gates will be made at the applicable contract price, which payment shall constitute full compensation for furnishing all plant, labor, materials, and equipment; and performing all

work required to design, fabricate, assemble, furnish, paint, install and test regulating outlet service gates, including gate frames (bodies), bonnets, bonnet covers and accessories, hydraulic power system, piping, valving, electrical controls, position indicating equipment, and other appurtenant items to make an operational system as specified in SECTION 11290, HYDRAULIC POWER SYSTEMS FOR REGULATING OUTLET GATES, SECTION 15097, REGULATING OUTLET SLIDE GATES, and SECTION 16051, CONTROL SYSTEM - REGULATING OUTLET GATES.

1.41 EMERGENCY CLOSURE GATES

Payment for Emergency Closure Gates will be made at the applicable contract price, which payment shall constitute full compensation for furnishing all plant, labor, materials, and equipment; and performing all work required to design, fabricate, assemble, furnish, paint, install, and test two (2) 11-foot by 19.67-foot Emergency Closure Gates with two lifting (pick up) beams, and six (6) sets of gate frames, guides, seal seats, storage facilities and accessories as specified in SECTION 15095, EMERGENCY CLOSURE GATES FOR REGULATING OUTLETS.

1.42 LOW-FLOW OUTLET CONTROL VALVES

Payment for Low-Flow Outlet Control Valves will be made at the applicable contract price, which payment shall constitute full compensation for furnishing all plant, labor, materials, and equipment; and performing all work required to design, furnish, paint, and install electric motor operated 36-inch, knife gate valves, operators, and appurtenant equipment in the low flow outlet works as specified in SECTION 15099, LOW FLOW OUTLET KNIFE GATE THROTTLING VALVES AND OPERATORS and SECTION 16052, CONTROL SYSTEM - LOW FLOW OUTLET THROTTLING AND SHUT-OFF VALVES.

1.43 LOW-FOLW OUTLET SHUT-OFF VALVES

Payment for Low-Flow Outlet Shut-Off Valves will be made at the applicable contract price, which payment shall constitute full compensation for furnishing all plant, labor, materials, and equipment; and performing all work required to design, furnish, paint, and install electric motor operated 36-inch, butterfly shutoff valves, operators, and appurtenant equipment in the low flow outlet works as specified in SECTION 15098, BUTTERFLY SHUTOFF VALVE, OPERATORS AND ACCESSORIES, and SECTION 16052, CONTROL SYSTEM - LOW FLOW OUTLET THROTTLING AND SHUT-OFF VALVES.

1.44 LOW-FLOW BULKHEAD

Payment for Low-Flow Bulkhead will be made at the applicable lump sum contract price, which payment shall constitute full compensation for furnishing all plant, labor, materials, and equipment; and performing all work required to design, fabricate, assemble, furnish, paint, install and test the 4-foot by 4-foot Maintenance Bulkhead with lifting (pick up) beam, two sets of gate frames, guides, seal seats, storage facilities and accessories for the low flow outlets as specified in SECTION 15096, MAINTENANCE BULKHEAD FOR LOW FLOW OUTLETS.

1.45 UNDERHUNG CRANE

Payment for Underhung Crane will be made at the applicable contract price, which payment shall constitute full compensation for furnishing all plant, equipment, labor and materials, and performing all work necessary to complete the design and to fabricate, deliver, erect, install, paint, and

test the regulating outlet (RO) gate room underhung bridge crane complete with underhung beams, monorail beam, hoist and controls.

1.46 PIPING SYSTEMS

Payment for Piping Systems will be made at the applicable contract price, which payment shall constitute full compensation for providing all piping, fittings, valves, equipment, and appurtenances necessary to furnish and install the minimum discharge system piping, fill lines for RO water conduits, vent piping, and instrumentation piping, complete.

1.47 PLUMBING

Payment for Plumbing will be made at the applicable contract price, which payment shall constitute full compensation for all plant, labor, equipment, appliances, and materials; and performing all operations in connection with the installation of plumbing of the Control Tower and the Generator and Storage Building, including but not limited to piping, fittings, valves, equipment, and appurtenances, complete as specified under SECTION 15400, PLUMBING, GENERAL PURPOSE. Payment will not be made for items such as the minimum discharge system piping, fill lines for RO water conduits, instrumentation piping, and washroom accessories for which separate payment is provided.

1.48 WASHROOM ACCESSORIES

Payment for Washroom Accessories will be made at the applicable contract price, which payment shall constitute full compensation for furnishing all equipment, labor, and materials, and performing all work necessary to complete the design and to deliver, erect, install, and test the washroom accessories as specified in SECTION 10800, WASHROOM ACCESSORIES. **Architectural features for the control tower are also included in this bid item, such as the framed walls, steel studs, dry wall, and tile work.**

1.49 SEPTIC SYSTEM

Payment for Septic System will be made at the applicable contract price, which payment shall constitute full compensation for all plant, labor, equipment, appliances, and materials; and performing all operations in connection with the installation of the septic system, including septic tank, leach field, piping, connections, and associated earthwork, supports and appurtenant structures to a point 5 feet from the building, where the plumbing system for the Control Tower is terminated, complete as specified under SECTION 15400, PLUMBING, GENERAL PURPOSE and SECTION 02531, SANITARY SEWERS.

1.50 HVAC SYSTEM

Payment for HVAC System will be made at the applicable contract price, which payment shall constitute full compensation for furnishing all plant, labor, materials, and equipment; and performing all work required to design, furnish, install and test the HVAC system and other appurtenant items to make an operational system as specified in SECTION 15950, HEATING, VENTILATING AND AIR CONDITIONING (HVAC) CONTROL SYSTEMS, SECTION 15990, TESTING, ADJUSTING, AND BALANCING OF HVAC SYSTEMS, and SECTION 15995, COMMISSIONING OF HVAC SYSTEMS.

1.51 POWER DISTRIBUTION SYSTEM

Payment for Power Distribution System will be made at the applicable contract price, which payment shall constitute full compensation for all plant, labor, equipment, appliances, and materials; and performing all operations in connection with the installation of the power distribution, lighting, and telephone systems for the Control Tower and Generator and Storage Building, complete as specified in SECTION 16415, ELECTRICAL WORK, INTERIOR. No separate measurement and payment will be made under this bid item for electrical or lighting work for which separate payment is provided.

1.52 GENERATOR SET

Payment for Generator Set will be made at the applicable contract price, which payment shall constitute full compensation for providing the diesel generator set, complete and totally functional, with all necessary ancillary equipment to include air filtration; starting system; generator controls, protection, and isolation; instrumentation; lubrication; fuel system; cooling system; and engine exhaust system as specified in SECTION 16264, DIESEL-GENERATOR SET, STATIONARY 15-300 KW, STANDBY APPLICATIONS.

1.53 FIRE PROTECTION SYSTEM

Payment for Fire Protection System will be made at the applicable contract price, which payment shall constitute full compensation for providing all equipment, accessories, and materials to design, furnish, install and test the central fire alarm system for the Outlet Control House complete and operational as specified in SECTION 13851, FIRE DETECTION AND ALARM SYSTEM and SECTION 13853, CENTRAL FIRE ALARM SYSTEM, DIGITAL ALARM COMMUNICATOR TYPE.

1.54 PASSENGER ELEVATOR

Payment for Passenger Elevator will be made at the applicable contract price, which payment shall constitute full compensation for furnishing all plant, labor, materials, and equipment; and performing all work required to design, furnish, and install the elevator system and other appurtenant items to make an operational system as specified in SECTION 14320, ELEVATORS, ELECTRIC.

1.55 QUALITY ASSURANCE SUPPORT

Measurement and Payment for Contractor furnished Quality Assurance Support will be made at the applicable contract lump sum price which payment shall constitute full compensation for testing personnel, vehicles, equipment and supplies, labor, material and equipment required to provide Quality Assurance. Payment will be made on a percentage complete throughout the duration of the contract.

1.56 AS-BUILT DRAWINGS

Payment for As-built drawings will be made at the applicable contract price, which payment shall constitute full compensation for all costs incurred by the Contractor in the preparation and furnishing of approved as-built drawings in Intergraph Microstation electronic file format and printed hardcopies as specified in SECTION 01702, AS-BUILT DRAWINGS.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

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SECTION 01451

CONTRACTOR QUALITY CONTROL

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SECTION 01451

CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 329	(1998a) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 1110-2-1906	(1986) Laboratory Soils Testing

1.2 PAYMENT

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

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

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

3.2 QUALITY CONTROL PLAN

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

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

3.2.1 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all 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.

3.2.2 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 15 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 the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be an experienced construction person with a minimum of seven (7) years in related work. This CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. The CQC System Manager shall be assigned no other duties and shall be employed by the prime Contractor. An alternate for the CQC System Manager shall be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as for the designated CQC System Manager.

3.4.3 CQC Personnel

In addition to CQC personnel specified elsewhere in the contract, the Contractor shall provide as part of the CQC organization specialized personnel to assist the CQC System Manager for the following areas: mechanical, civil, structural, materials technician. These individuals may be employees of the prime or subcontractor; be responsible to the CQC System Manager; be physically present at the construction site during work on their areas of responsibility; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals shall have no other duties other than quality control .

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
b.	Mechanical	Graduate Mechanical Engineer with 2 yrs experience or person with 5 yrs related experience
d.	Structural	Graduate Structural Engineer with 2 yrs experience or person with 5 yrs related experience

3.4.4 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 and in accordance with Section 01312 RESIDENT MANAGEMENT SYSTEM (RMS). The CQC organization shall be responsible for certifying that all submittals and deliverables are in compliance with the contract requirements.

3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of 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 24 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

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

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

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

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

d. Resolve all differences.

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

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

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

3.6.3 Follow-up Phase

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

3.6.4 Additional Preparatory and Initial Phases

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

3.7 TESTS

3.7.1 Testing Procedure

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

Validation is a process to verify that the laboratory is qualified to perform required tests. Prior to commencing quality control testing each laboratory to be utilized by the Contractor shall be validated for compliance with ASTM E 329, Engineering Manual EM 1110-2-1906, or the project specifications, as applicable. Revalidation is required every two years. In addition, the Government reserves the right to check at any time laboratory equipment in the laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedure and techniques. If the selected laboratory fails the validation inspection, or needs more than one laboratory validated, the Contractor will be assessed a charge of $4,000 to reimburse the Government for each additional laboratory or recheck. Such costs will

be deducted from the contract amount due the Contractor.

3.7.3 Onsite Laboratory

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

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to the Contracting Officer.

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 the District Office and the Local Sponsor 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.

The Contractor shall further keep and furnish to the Contracting Officer accurate logs and records of all operations pertaining to the preparation and excavation procedures. The records shall be submitted daily with the Quality Control Report and shall include the following: The number, size, type and make of all equipment used in the excavated process.

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 SAMPLE FORMS

Sample forms enclosed at the end of this section.

3.11 NOTIFICATION OF NONCOMPLIANCE

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

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01500

QUALITY ASSURANCE

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SECTION 01500

QUALITY ASSURANCE

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	(1999b) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

1.2 QUALITY ASSURANCE TESTING PERSONNEL

The Contractor shall provide all necessary labor to perform quality assurance on-site sampling and laboratory testing. This is separate and in addition to those personnel the Contractor requires for his Quality Control testing requirements. The Contractor shall also provide a suitable number of foreman to act as liaisons between Government supervisors and Contractor's personnel performing quality assurance testing. The foreman shall be responsible for the productivity rates achieved by the technicians and laborers furnished by the Contractor.

1.2.1 Personnel

The Contractor shall continuously furnish a minimum of 1 supervisory laboratory technician, 2 laboratory technicians, and 1 laborer per work shift to perform sampling, testing, data reduction, surveying, volume calculations, and related work under the direct and exclusive supervision of the Contracting Officer for the duration of the contract. If this work force is inadequate, as determined by the Contractor's schedule, to perform all testing and quality assurance work as outlined in the paragraph: Minimum Quality Assurance Test Requirements, then the Contractor shall furnish additional personnel to accomplish this testing. The original acceptance and the continuing acceptability of all Contractor furnished personnel shall at all times be determined only by the Contracting Officer. The relationship existing between the Contractor and these personnel shall be free of coercion or other obligation to the Contractor, and from any conflict of interest, potential conflict of interest or duress as determined by the Contracting Officer. To ensure this end, the Contractor-furnished personnel cannot be terminated or transferred by the Contractor, after acceptance by the Contracting Officer, without just cause and without written permission of the Contracting Officer. The technicians shall each be laboratory testing specialists qualified to perform all sampling, testing and recording, interpreting test results and related work as required by the Government quality assurance program.

1.2.2 Qualifications

Each technicians shall have not less than two (2) years experience, satisfactory to the Contracting Officer, employed in testing laboratories established primarily for sampling, testing and control excavation and placement of soil materials as compacted fill. The supervising laboratory technician shall have 5 years of experience as outlined by ASTM D 3740 and ASTM C 1077 and shall be responsible for ensuring clean, well organized, and responsive testing operations, and prompt accurate test reports. Experience shall include demonstrable understanding and capabilities sufficient to perform all quality assurance and acceptance sampling and testing and related work.

1.2.3 Concrete Inspectors

The supervisory laboratory technician, laboratory technicians, and laborers participating in concrete inspection shall be certified to a minimum Level I Concrete Inspector as specified by the American Concrete Institute (ACI) or other equivalent licensing agency. They shall have a minimum of five years general experience in the practice of concrete inspection. They shall be currently licensed by the ACI or other approving agency for at least two years prior to their employment on the work described herein. Written certification of inspector qualifications, copies of certificates, and employment histories shall be submitted to and approved by the Contracting Officer at least 7 days prior to the commencement of any work requiring concrete inspection. Concrete inspection includes aggregate source development or sampling of materials by the Contractor; selection of sources of cements, pozzolans, and admixtures are not included in this requirement.

1.3 QUALITY ASSURANCE VEHICLES

The Contractor shall furnish **two (2)** vehicles for use by Government personnel during the contract period. **One vehicle shall be a new 7-passenger Chevrolet Blazer 4x4, or equal, and the second vehicle shall be a new 9-passenger Chevrolet Suburban 4x4, or equal, both** equipped with high floatation all terrain tires, automatic transmission, air conditioning, AM/FM radio, heavy duty suspension, and other appropriate options for use in heavy duty off road conditions. Each vehicle shall be equipped with a towing package, which shall include a hitch ball for a 2-inch ball coupler; heavy-duty flasher; automatic transmission cooler; safety chain; mirror for towing; and all weather ball and receiver tube covers. Each vehicle shall also be equipped with a steel shovel and a 5 lb. ABC type fire extinguisher, readily accessible to the driver. The vehicles shall be suitable for the intended purpose and shall remain the property of the Contractor and be removed from the site at the completion of the contract.

1.3.1 Delivery

The Contractor shall deliver the vehicles within thirty (30) days after receipt of the Notice to Proceed.

1.3.2 Licenses and Fees

The Contractor shall be responsible for all vehicles registration fees, licenses, and inspections required by the State of California throughout the contract period. The vehicles shall be licensed for highway use.

1.3.3 Maintenance

Upon delivery of the vehicles, and continuing throughout the duration of the contract, complete maintenance shall be provided for the Quality Assurance vehicles. Quality of services shall be to the normal standards of commercial service stations. Servicing and/or repairs of vehicles shall be started when the vehicle is received at the Contractor's service area and completed with reasonable promptness. Maintenance shall consist of the regular furnishing of gas and oil in the vehicle, washing, steam cleaning, lubrication consisting of 2,000-mile lube, 4,000-mile oil and filter change, or more if recommended by the vehicle manufacturer, tire services and any major or minor repair of body or fenders, transmission, rearend, engine, brakes, steering, front-end, radiator, etc. All necessary parts and supplies, and consumables shall be Contractor-furnished. The vehicles shall be washed and the interior of all vehicles shall be cleaned every week and the motor and undercarriage shall be steam cleaned as directed. Whenever gas or oil is furnished, windshields shall be washed, tires inflated to proper pressure, brake fluid level checked and filled if necessary, and the battery filled to proper levels. Gasoline and oil shall be of the quality recommended by the vehicle manufacturer. The Contractor may elect to contract with a local commercial service station and/or service garage in the immediate local vicinity of the damsite to provide these maintenance services, so long as all of the above required services can be provided. If more than 2 of the Contractor-furnished vehicles are being served at any particular time, the Contractor shall immediately provide a replacement vehicle of equal quality as a replacement. Maintenance shall also include the servicing of the 5 lb. fire extinguishers.

1.3.4 Storage of Vehicles

Open parking space for quality assurance vehicles shall be located convenient to the PradoDam Resident Office complex as approved by the Contracting Officer. The parking area shall be enclosed with a chain link fence approximately 6 feet high with a 10-foot wide lockable gate, accessible at all times. The fenced area shall be of sufficient size to permit ease in the parking of vehicles. Materials for fence and gate need not be new provided they area adequate for the intended use.

1.4 CONTRACTOR FURNISHED LABORATORY TESTING EQUIPMENT AND SUPPLIES

The Contractor shall procure and install equipment; supply and maintain testing laboratories for the exclusive use of the Contracting Officer for purposes of quality assurance/acceptance testing and data reduction. The laboratory buildings shall be equipped, supplied, and be operational within sixty (60) calendar days after receipt of Notice to Proceed. The Contracting Officer will use these facilities to perform government quality assurance laboratory tests, data acquisition, and activities deemed necessary by the Contracting Officer.

1.4.1 Calibration of Equipment

The Contractor shall be responsible for all testing equipment calibration. Calibration of testing equipment shall be performed as recommended by the manufacturer of the equipment, but in no case shall calibration be performed less often than annually.

1.4.2 Sources for Laboratory Testing Equipment

Catalogs of suppliers may be obtained from the following:

(a) Soiltest, 86 Albrecht Drive, Lake Bluff, Illinois

(b) Humboldt Mfg., 7300 W. Agatite Ave., Norridge, Illinois

(c) California Hardware, 13085 E.Temple Ave., City of Industry, CA

(d) Empire Scale Co., 301 South Los Angeles St., Los Angeles, CA

1.5 CONCRETE TESTING EQUIPMENT

The following laboratory equipment shall be provided as part of the Test Laboratory facility for concrete tests. Unless otherwise noted, the catalog number indicated for the equipment is from Soiltest Inc (5th Edition). All equipment supplied shall be of the type and specifications provided from the catalog numbers listed. Alternate equipment may supplied as approved by the Contracting Officer.

QUANTITY	CATALOG NUMBER	DESCRIPTION
4	EI34-6764	3'x2'x8' Concrete curing tanks Conforming to water storage requirements of ASTM C 511
4	EI34-6767/01	Cure tank heaters with circulating pumps
1	VF5-0114-2N	Fume Hood (4 ft.) VWR Scientific Co.
1	VF5-3301-B2	Blower moter for fume hood VWR Scientific Co.
1	VF5--114-A4	"Kemresin" top for fume hood VWR Scientific Co.
1	VFG-2088-00	Base cabinet for 4-ft. fume hood VWR Scientific Co.
1	N/A	Sufficient ducting to extend through the roof of laboratory building VWR Scientific Co.
100		5 gal plastic buckets w/lids
30 cases	EI34-5294	Plastic concrete cylinder molds (6 x 12) with lids 14A Industries
2	EI34-5295	Stripping tools
30 bags	EI34-6102	Capping compound, 50lb bag

1.6 SOIL TESTING EQUIPMENT

The following laboratory equipment shall be provided as part of the Test Laboratory facility for soil tests. Unless otherwise noted, the catalog number indicated for the equipment is from Soiltest Inc (5th Edition). All equipment supplied shall be of the type and specifications provided from

the catalog numbers listed. Alternate equipment may be supplied as approved by the Contracting Officer.

QUANTITY	CATALOG NUMBER	DESCRIPTION
4 pair	EI88-7920	Hi-temp gloves
2	EI88-1040	2100 gram scale Ohaus Empire Scale Co.
36	29816329	Bicuit Pan California Hardware Co.
12	33002817	Plastic Pan California Hardware Co.
12	27840089	Roasting Pan California Hardware Co.
1	EI24-9095/12	Calibration Kit
1		Storage Container 10'x 10'x 20' with double wide doors
4	EI29-3739	Proving Ring Penetrometer

1.7 CONSTRUCTION METHODS OBSERVATION

Any construction method, plant, or piece of equipment used on this contract shall not be considered proprietary, and can be inspected or photographed at any time by the Government, regulatory agencies, or any group approved by the Government.

PART 2 PRODUCTS

PART 3 EXECUTION

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DIVISION 02 - SITE WORK

SECTION 02480

MECHANICALLY STABILIZED EARTH WALLS

PART 1 GENERAL

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SECTION 02480

MECHANICALLY STABILIZED EARTH WALLS

PART 1 GENERAL

PART 1 GENERAL

1.1 GENERAL INFORMATION

This section specifies the materials and construction of mechanically stabilized earth walls in conformance with the lines, grades, details and dimensions shown on the plans and approved design and shop drawings.

1.2 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36	(1997ael) Carbon Structural Steel
ASTM A 53	(1999b) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 82	(1997a) Steel Wire, Plain, for Concrete Reinforcement
ASTM A 123	(2000) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 153	(1998) Zinc-Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 185	(1997) Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
ASTM A 325	(1997) Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A 497	(1997) Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement
ASTM A 570	(1997) Structural Steel, Sheet and Strip, Carbon, Hot-Rolled
ASTM A 572	(1999) High-Strength Low-Alloy Columbium-Vanadium Structural Steel
ASTM A 722	(1995) Uncoated High-Strength Steel Bar

	for Prestressing Concrete
ASTM D 512	Current Manual
ASTM D 516	Current Manual
ASTM D 648	(1998) Deflection Temperature of Plastics Under Flexural Load
ASTM D 698	(1998) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))
ASTM D 1752	(1984; R 1996) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D 3080	Current Manual
ASTM G 51	Current Manual
ASTM G 57	Current Manual

1.3 SYSTEM DESCRIPTION

1.3.1 General

The mechanically stabilized earth wall shall consist of a non-structural leveling pad, precast concrete facing panels, and metal soil reinforcement elements mechanically connected to each facing panel. The wall face panel shall extend up into the coping as shown on the plans. Where walls intersect at an angle, a special vertical corner element panel shall be used. The corner element panel shall cover the joint of the panels that abut the corner, and allow for independent movement of the abutting panels.

Standard facing panels shall have at least two levels of earth reinforcements to stabilize the panels against the rotation. Top and bottom half panels shall have at least one level of earth reinforcement.

1.3.2 Design Requirements

The estimated base width shown on the plans is based on the soil parameters and seismic loading indicated and shall be verified by the wall manufacturer. The design by the wall manufacturer shall effectively retain the earth for the loading conditions and the contours, profile or slope line shown on the plans. Estimated length of soil reinforcement is shown on the plans and shall be verified by the wall manufacturer. Design calculations for all the wall elements shall be **prepared and signed by a professional Civil Engineer registered in the State of California,** experienced in the design of mechanically stabilized earth retaining structures.

1.3.3 Instrumentation Requirements

Two of the four MSE walls are to be instrumented as shown on the plans. The contractor shall enlist the services of a California licensed geotechnical engineer who is experienced in the development, installation and monitoring of similar instrumentation programs.

The contractor's geotechnical engineer shall be responsible for implementation of the instrumentation program based upon the instrumentation plans and these specifications, selection of the measurement gages and monitoring equipment, monitoring the installation of the instruments to ensure compliance with the instrumentation program, recording the initial readings of all strain gages, pressure gages, inclinometers, and transmitting this data to the Contracting Officer. The final instrumentation plan, proposed gages and proposed monitoring equipment shall be submitted to the Contracting Officer for approval, 60 days ahead of the scheduled MSE wall construction.

Contractor shall provide the various instrumentation required at the specified locations for each wall, as shown on the plans. **Instrumentation shall be required for monitoring horizontal and vertical displacements of the wall facing, soil pressures on the facing or on a vertical plane near the facing and the base of the wall, bearing pressures within the earth mass, horizontal displacements in the retained fill, groundwater level, tensile forces in the reinforcement, and soil reinforcement corrosion. Any proposed changes in specified location shall be submitted to and approved by the Contracting Officer.**

The selection of the monitoring instruments **shall** ensure reliable and dependable data of adequate accuracy can be obtained throughout the period specified. Proper installation of instruments is critical to achieving reliable performance and obtaining desired information. **Written Installation procedures shall be prepared by the Contractors Geotechnical Engineer, making use of the manufacturers recommended installation procedures and data sheets. Contractor installed instrumentation shall be coordinated with and approved by the Contracting Officer.**

(Deleted)

The following instrumentation shall be provided:

1.3.3.1 Inspection Elements

Contractor shall provide inspection elements as shown on the plans to determine loss of metal. Elements shall be placed in each wall system at the location shown on the plans to monitor 100-year design life.

Inspection elements shall be fabricated of material representative of the soil reinforcement. A set of inspection elements shall be provided for each wall at the location shown on the plans. Inspection elements shall be provided for inspection at 5 years, 10-years and at 10-year intervals thereafter. Locate inspection wire or strip at **mid-height** of full-face panels.

(Deleted)

1.3.3.2 Strain Gages

The distribution of tension in the reinforcement shall be determined using strain gages. Sixteen reinforcing strips are to be instrumented at each wall. **The number of measuring points to be instrumented along each reinforcing strip shall be as shown on the plans.**

Strain gages shall be oriented to measure strains parallel to the length of the reinforcing strip. Strain gage type shall be compatible with the steel

reinforcing strip or wire to which it is attached. Strain gages shall be capable of measuring strains over a range of ±2,500 micro strain (με) with an accuracy of 1 με.

Precaution shall be taken to eliminate the effects of local bending of the soil reinforcing strip by averaging the readings of two gages, one placed on top and one on the bottom of the strip, or other appropriate means.

Attachment of the strain gages to the reinforcing strips shall be by welding or bonding as recommended by the gage manufacturer. Application of the strain gages to the soil-reinforcing strips shall be undertaken in a clean environment by technicians experienced in this type of work using methods recommended by the strain gage manufacturer. Strain gages shall be applied directly to the steel with the outer layer of zinc galvanizing removed to expose the bare steel. Galvanizing shall be removed by fine grit sand blasting with 27.5 micron aluminum oxide or other appropriate means recommended for the bonding agent used for attachment of the strain gage.

Gages and wiring will be permanently buried within the granular backfill and subject to periods of saturation due to fluctuating water levels. Waterproofing methods shall be suitable for the buried condition with periodic wet and dry soil conditions. Strain gages, solder connections and wiring shall be coated and sealed to prevent moisture infiltration and shall have an in place service life of 50 years. All waterproof coatings shall be applied per the manufacturers recommendations.

Once instrumented reinforcing strips are in place care shall be taken to avoid damage to the strain gages and wiring during backfill and compaction operations. Readings shall be taken on in-place gages after the first 12 inches of fill are in place and compacted to confirm gages are functioning properly prior to placement of additional fill. Any gages not functioning properly shall be replaced or re-installed prior to proceeding with further backfill operations.

1.3.3.3 Load Cells

Load cells shall be installed to provide a measurement of internal lateral and vertical **pressure**, the distribution of facing **pressure**, and the bearing **pressure**. Load cells **shall be total earth pressure cells and** shall be installed in the backfill at the locations shown on the plans. **A minimum of 24 horizontal and 14 vertical pressure cells are required at each wall as shown on the plans.**

Earth pressure cells shall be placed in a 1-inch bed of sand, and covered with 1 inch of sand. The bedding sand shall **meet the specifications for** granular backfill used in the reinforced zone **except 100% shall pass the No. 4 sieve**.

The vertical earth pressure cells, measuring horizontal **pressure** shall be placed in the same fashion as the horizontal cells. The vertical earth pressure cells measuring horizontal **pressure** at the facing shall be seated against the concrete panel and shall be caulked and protected.

Load cells shall consist of a total earth pressure cell made up of stainless steel plates, non-compressible fluid, stainless steel tubing, and strain gage transducer. The strain gage transducer shall be of a type similar to the strain gages used for the soil reinforcements to allow

measurements to be taken with the same measurement equipment.

The load cells and wiring will be permanently buried within the granular backfill and subject to periods of saturation due to fluctuating water levels. Waterproofing methods shall be suitable for the buried condition with periodic wet and dry soil conditions. Load Cells, solder connections and wiring shall be coated and sealed to prevent moisture infiltration and shall have an in place service life of 50 years. All waterproof coatings shall be applied per the manufacturers recommendations.

Once load cells are in place care shall be taken to avoid damage to the load cells and wiring during backfill and compaction operations. Readings shall be taken on in-place load cells after the first 12 inches of fill are in place and compacted to confirm they are functioning properly prior to placement of additional fill. Any gages not functioning properly shall be replaced or re-installed prior to proceeding with further backfill operations.

1.3.3.4 **Settlement Pins**

A settlement **pin** consists of a **2" diameter brass pin with 2½" minimum length stem** attached at various locations of the wall facing. **Reflectorless surveying** methods are used to monitor the magnitude and rate of horizontal and vertical deformation of the surface monuments. **Each settlement pin shall be scribed with a cross (+) in the center of it's face and stamped with consecutive numbers.** An accurate record must be made of the initial location of the plate for reference. **Initial survey data for each pin shall be taken after 5' of fill are placed above the pin location. Initial readings shall be provided to the Contracting Officer.** Settlement indicator **pins** shall be located as shown on the plans.

1.3.3.5 Inclinometers

Inclinometers are tilt-sensing devices for monitoring deformation normal to the axis of a flexible pipe by means of a probe passing along the pipe. The probe contains gravity sensing transducers designed to measure inclination with respect to the vertical. The pipe is installed in a near vertical alignment, so that the inclinometer provides data for defining subsurface horizontal deformation.

An inclinometer system consists of **six** components: a guide casing, a **inclinometer** probe, a **dummy probe,** graduated electrical cable**, portable data recorder and Data Management Software**.

Each component shall be designed for compatibility with the entire inclinometer system and preferably shall be provided by the same manufacturer.

The guide casing shall have a minimum inside diameter of 2.75 inches and shall have four orthogonal grooves longitudinally along the inside of the pipe (full length) that are compatible with the inclinometer probe provided for taking measurements. One set of grooves shall be aligned perpendicular to the face of the Mechanically Stabilized Earth wall. The lower five feet of the guide casing shall be grouted firmly in place in a drilled hole with the tip elevation five feet below the bottom elevation of the wall.

The guide casing may be installed in segments. Minimum length of any segment shall be 10 feet. Couplings used in the guide casing shall be of a sealed type and watertight. After attachment of any guide casing segment

the probe shall be dropped to the bottom of the casing and test readings taken at two foot intervals, beginning at the bottom, to insure there are no restrictions within the inclinometer tube. The protruding portion of guide casing, above the backfill, shall be held in a vertical position about its longitudinal axis. The maximum out of plumb tolerance shall be 1/8 inch per foot and shall be monitored in two vertical planes 90 degrees apart and approximately aligned with the casing grooves. The top of the guide casing shall be sealed with a threaded waterproof cap.

The Inclinometer Probe shall be designed for measurement in English units and have a minimum wheelbase of 24 inches. Angle range of operation shall be a minimum of ± 30 degrees from vertical. The inclinometer probe and data recorder shall have a resolution of 0.0012 inches in 24 inches.

The inclinometer probe shall consist of a stainless steel tube with two sets of hinged wheels. Wheels shall have sealed wheel bearings and be designed to be compatible with the grooves inside the installed casing. The probe tube shall contain two electronic tilt sensors, one aligned in the plane of the wheels and the other 90 degrees to the plane of the wheels.

A Dummy Probe, without instrumentation, shall also be provided for use in testing the casing continuity prior to lowering the instrumented probe. The dummy probe shall have dimensions and wheels identical to the instrumented probe and be provided with 100 foot long 500 pound test pull rope and storage reel. Storage boxes designed for the probe and equipment shall be provided for the instrumented and dummy probes.

The graduated electrical cable shall be a minimum of 100 feet in length and shall include a cable storage reel. Length shall be adequate to take readings in the deepest guide tube.

The cable shall connect to the inclinometer probe and to the portable data recorder. The cable shall be supplied with no splices or surface defects and shall have a rated strength of 480 pounds and a working strength of 120 pounds. Cable shall be graduated with 2 foot marks in a distinct color. Marks at 10 foot increments shall be in a different distinct color from the 2 foot marks. Graduated markings shall be vulcanized into the cable jacket. A pulley assembly shall be provided which clamps to the top of the casing to keep the cable centered in the casing and assist in controlling the depth of the probe.

The portable data recorder shall provide power to the sensors located on the probe and convert the raw electrical signal from the tilt sensors into engineering units. The readings shall be displayed on a digital readout so the operator can check their validity and shall be stored in a built-in solid-state memory, eliminating the need to record data manually.

The data recorder shall be capable of transferring recorded data via a cabled connection to a Windows based Data Management Software residing on either a desktop or laptop personal computer. The data recorders shall be capable of storing data for up to 40 different inclinometer surveys, each with up to 10,000 readings.

The data recorder shall be battery powered and provide 16 hours of operating time with a backup or reserve battery to preserve data in memory for up to 6 months. A 110-volt battery charger shall be included.

The Data Management Software (DMS) shall be a Windows based software capable of transferring readings from the portable data recorder to a

Personal Computer.

The DMS shall process the data to produce displacement plots and reports on the recorded data. The DMS shall be capable of storing the initial and all subsequent readings for any guide casing surveyed, and then prepare incremental or cumulative plots verses depth of the guide casing. The software shall be capable of producing plots in either metric or English units and provide for user defined or automatic scaling of displacement plots. Software shall be able to produce plots for displacements about either axis of the inclinometer casing and correct for spiraled casing when data is acquired with a spiral sensor. Software shall operate in a Windows 95, 98, 2000, ME, NT or XP environment.

Four inclinometers shall be installed in the reinforced earth section at each wall, one right behind the facing panels, one 15 feet behind the facing panels, one 30 feet back from the facing panels**, and one beyond the soil reinforcement. The casing beyond the soil reinforcements may be drilled and grouted in place. This casing may be eliminated at the option of the Contracting Officer**.

Initial readings shall be taken by the Contractor within 48 hours of completing the placement of granular fill behind the wall. Readings shall be taken at 2 foot intervals beginning at the tip of the guide casing. Readings shall be taken in the presence of and transmitted to the Contracting Officer.

1.3.3.6 Observation Wells

Two water observation wells shall be placed at each instrumented wall. Wells shall be constructed per the details in the plans and as specified in Section 02522 of these specifications. Wells shall be placed in vertical segments, similar to the inclinometer casings, to avoid conflict or damage to soil reinforcements.

1.3.3.7 Pre-cast Instrumentation Vault

All electrical instrumentation at each wall shall be wired to a common instrumentation vault located as shown on the plans. The vault shall be pre-cast concrete and sized to accommodate all required wiring and electrical panels necessary for reading the various electrical instrumentation. Pre-cast vaults located at the stilling basin walls shall have an HS20 traffic load rated cover.

1.3.3.8 Instrumentation Wiring

All wiring for electrical instrumentation (strain gages **and** load cells) shall be placed and protected to provide a minimum of 50 years service life. **All wiring shall be rated for direct burial and shall be a continuous run, without splices, from the gage to the instrumentation vault.** The contractor shall develop a gage numbering system that identifies the gage type and location. The numbering system shall be submitted to the Contracting Officer for review and approval. The approved numbering system shall be used at the instrumentation vault to clearly and permanently label each wire or group of wires from each electrical instrument in the wall.

1.3.3.9 Electrical Meters

Upon completing installation of all electronic instrumentation, wiring, the

instrumentation vault**, and recording all initial readings for each instrument,** Contractor shall deliver to the Contracting Officer one complete set of all electronic instruments, meters and probes required to take measurements on all electronic instrumentation. This shall include all instructions, specifications, and manufacturers data for all electrical equipment and gages.

1.3.4 (Deleted)

1.3.5 Safety Factors

The minimum factors of safety shall be as follows:

1.5 against pullout of the reinforcements based on pullout resistance at 0.75 inch deformation for a representative backfill. (i.e. the resulting deformation should not exceed 0.75 inch at 1.5 times the design load). The design stress in the reinforcement shall be 0.55Fy.

1.5 against sliding of the mass

2.0 against bearing capacity failure

1.5 for overall slope stability

For earthquake loading: **1.1** against sliding

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

Shop drawings; G.

The Contractor shall prepare and submit for approval complete shop drawings showing details and materials for the work, reinforcement details, joints between facing units, etc. Elements of fabricated items inadvertently omitted on plans shall be detailed by the fabricator and indicated on the shop drawings.

SD-05 Design Data

Design calculations; G.

Design calculations shall be **prepared, signed and sealed by a Professional Civil Engineer registered in the State of California and** submitted for the wall design including facing panel reinforcement and soil reinforcement.

Instrumentation; G

Description of proposed instrumentation**, along with written installation procedures and manufacturer specification sheets** shall submitted and approved prior to installation.

SD-07 Certificates

Soil Reinforcement and Attachment Devices
Joint Materials

Certified test reports of required material tests shall be submitted prior to the use of the materials in the work.

SD-08 Manufacturer's Instructions

Instructions; G

Manufacturer's recommended instructions for installation.

PART 2 PRODUCTS

2.1 CONCRETE FACING PANELS

Concrete facing panels shall have a minimum thickness of 5 1/2 inches and a minimum concrete cover on reinforcing steel of 1-1/2 inches. Cement shall be Types II or V, low alkali and shall conform to the requirements of ASTM C 150. Concrete shall have a minimum compressive strength of 4,000 psi at 28 days. The maximum water-cement ratio shall be 0.45.

Additives containing chloride shall not be used without the approval of the **Contracting Officer**. Soil reinforcement attachment and lifting devices shall be set in place to the dimensions and tolerances shown on the plans and called out in these specifications.

Joints between facing panels shall be as shown on the drawings.

2.1.1 Testing and Inspection

Acceptability of the precast units shall be determined on the basis of compressive strength tests and visual inspection. The precast units shall be considered acceptable when compressive strength test results indicate conformance to the 28-day requirement. Panels shall be considered acceptable for placement in the wall when the seven-day initial strength equals or exceeds 85 percent of the 28-day requirement.

2.1.2 Casting

The panels shall be cast face down in level forms supported on a flat working surface. Guides shall be used to locate and support soil reinforcement attachment devices set in the back face of the panel. The concrete in each panel unit shall be placed without interruption and shall be consolidated by the use of an approved vibrator, supplemented by such hand tamping as may be necessary to force the concrete into the comers of the forms and to prevent the formation of stone pockets or cleavage planes. Clear form oil or release agent shall be used throughout the casting operation.

2.1.3 Curing

The units shall be cured for a sufficient length of time so that the concrete will develop the specified compressive strength. Any production lot which does not conform to the strength requirements of Section 2.1.7, Compressive Strength, shall be rejected.

2.1.4 Removal of Forms

The forms shall remain in place until they can be removed without damage to the unit.

2.1.5 Concrete Finish

Unless otherwise indicated on the plans or elsewhere in the specifications, the concrete surface for the front face shall have an ordinary steel form finish, and for the rear face an unformed finish. The rear face of the panel shall be free of open pockets of aggregate and surface distortions in excess of 1/4 inch.

2.1.6 Tolerances

All units shall be manufactured within the following tolerances with respect to the dimensions shown on the shop drawings:

a. Soil Reinforcement Attachment Devices Locations -- Lateral position of soil reinforcing attachment devices shall be within one inch. Embedment measured from the back face of the panel shall be within + 1/4 inch, - 1/2 inch.

b. Panel Dimensions -- All panel dimensions shall be within 1/4 inch. All hardware embedded in the panel with the exception of attachment devices shall be within 1/4 inch.

c. Panel Squareness -- Squareness, as detern3ined by the difference between the two diagonals, shall not exceed 1/2 inch.

d. Panel Surface Finish -- Surface defects on smooth-formed surfaces, measured on a length of 5 feet, shall not exceed 1/4 inch. Surface defects on textured-finished surfaces, measured on a length of 5 feet, shall not exceed 5/16 inch.

2.1.7 Compressive Strength

Acceptance of the concrete panels, with respect to compressive strength, shall be determined on the basis of production lots. A production lot is defined as a group of panels that shall be represented by a single set of compressive strength samples and shall consist of not more than 80 panels or a single day's production, whichever is less.

Acceptance of a production lot will be made on the compressive testing as per Section 03305, CONCRETE.

2.1.8 Acceptance Criteria

Precast panels shall be accepted for use in wall construction provided the concrete strength meets or exceeds the minimum compressive strength requirement, the soil reinforcement connection devices and the panel dimensions are within tolerances and any chipping, cracks, honeycomb or other defects are repaired to the satisfaction of the Contracting Officer.

2.1.9 Marking

The date of manufacture, the production lot number, and the piece-mark shall be clearly marked on the side of each panel.

2.1.10 Handling, Storage and Shipping

All units shall be handled, stored and shipped in such a manner to prevent chipping, cracks, fractures and excessive bending stresses. For units found unsatisfactory to the Contracting Officer, they shall be replaced with a new unit at no additional cost to the Government. Panels shall be stored and shipped in stacks, front face down. Firm blocking, of sufficient thickness to prevent the attachment devices from contacting the panel above, shall be located immediately adjacent to the attachment devices. Lifting inserts shall be installed on the top edge of the precast panels to permit lifting at the project site.

2.2 SOIL REINFORCEMENT AND ATTACHMENT DEVICES

All soil reinforcement and attachment devices shall be carefully inspected to insure they are true to size and free from defects that may impair their strength and durability. Soil reinforcement shall either be welded wire mats or ribbed reinforcing strip and shall be galvanized.

Steel reinforcement elements shall be designed to have a corrosion resistance durability to ensure the minimum design life of 100 years. The required sacrificial thickness shall be provided in addition to the required structural reinforcement thickness to compensate for the effects of corrosion.

The galvanization and carbon steel loss rates shall be as follows:

Galvanization Loss	= 15 µm/yr for first 2 years = 4 µm/yr for subsequent years
Carbon Steel Loss	= 12 µm/yr after zinc depletion

2.2.1 Welded Wire Mats

W11 and W20 steel wire shall conform to ASTM A 82. The welded wire mat shall conform to ASTM A 185. D11 and D20 deformed steel wire may be substituted for W11 and W20 steel wire. The welded wire mat utilizing deformed steel wire shall conform to ASTM A 497. Galvanizing shall conform to the requirements of ASTM A 123 such that the corrosion rate is no greater than 1.3 mils/year. Splicing of the welded wire mat along its length shall be by an approved mechanical coupler which will develop the minimum tensile strength of the wire. The coupler at the mat connections shall be a seamless steel sleeve. It shall be applied over the button-headed wires and swaged by means of a hydraulic press. The coupler shall develop the minimum tensile strength of the wire without exceeding a total slip of the wires of 0.25 inch.

The connector plate steel shall conform to ASTM A 36. The connector bolt shall conform to ASTM A 325. The button on the button-headed wires shall conform to the requirements of ASTM A 722.

Pipe for the pipe pin shall conform to ASTM A 53, standard weight, except the weight of the zinc coating per square foot of actual surface shall average not less than 2.0 ounces and no individual specimen shall show less than 1.8 ounces.

Resin bonded cork for horizontal joints shall conform to ASTM D 1752, Type

II with compressive load of not less than 100 psi.

2.2.2 Ribbed Reinforcing Strips

Ribbed reinforcing strips shall be hot rolled from bars to the required shape and dimensions. Ribbed reinforcing strips shall have nominal dimensions of 2 inches wide and 3/16 inch thickness conforming to ASTM A 572, Grade 65. Galvanizing shall conform to the requirements of ASTM A 123. The minimum coating thickness shall be 2 oz/SF.

Tie strips and splice plates shall be shop fabricated of hot rolled steel conforming to the minimum requirements of ASTM A 570, Grade 50. Galvanizing shall conform to the minimum requirements of ASTM A 123 or ASTM A 153. The minimum coating thickness shall be 2 oz/SF.

Fasteners shall consist of hexagonal cap screw bolts and nuts conforming to the minimum requirements of ASTM A 325. Galvanizing shall conform to the minimum requirements of ASTM A 153.

2.3 JOINT MATERIALS

Joint materials shall be installed to the dimensions and thicknesses in accordance with the plans and approved shop drawings.

2.3.1 Joint Cover

Horizontal and vertical joints between panels shall be covered by a geotextile. The geotextile may be either a non-woven needle punched polyester geotextile or a woven monofilament polypropylene geotextile. The geotextile filter fabric shall be attached to the rear of the facing panels with an adhesive prior to backfill placement.

2.4 GRANULAR BACKFILL MATERIAL

The granular backfill material for mechanically stabilized earth retaining structures with metallic soil reinforcement shall consist of material free from organic material and substantially free of shale or other soft, poor durability particles; shall not contain slag aggregate or recycled materials, such as glass, shredded tires, portland cement concrete rubble, asphaltic concrete rubble, or other unsuitable material as determined by the Engineer; and shall meet the following requirements:

Gradation Requirements

Sieve Size	Percentage Passing
6"	100
3"	78 - 100
No. 4	---
No. 30	0 - 60
No. 200	0 - 25

Property Requirements

Test	Requirement	
Sand Equivalent	12 min.	
Plasticity Index	10 max.	
Minimum Resistivity	1000 ohm-cm min.	643 (ASTM G 57)

Property Requirements

Test	Requirement	
Chlorides	100 ppm max.	422 (ASTM D 512)
Sulfates	200 ppm max.	417 (ASTM D 516)
pH	5.5 to 10.0	643 (ASTM G 51)

If 12 percent or less passes the No. 200 sieve and 50 percent or less passes the No. 4 sieve, the Sand Equivalent and Plasticity Index requirements shall not apply.

The friction angle of the granular backfill used in the reinforced fill zone for the internal stability design of the wall shall be 35 degrees. The friction angle shall be determined by the standard direct shear test, (ASTM D 3080), utilizing a sample of the material compacted to 95 percent at optimum moisture content (ASTM D 648). Before construction begins, the material selected shall be subject to approval to conformance with this frictional requirement. Conformance with the test requirements shall be the responsibility of the Contractor.

PART 3 EXECUTION

3.1 FOUNDATION PREPARATION

The foundation for the structure shall be graded level for a width equal to or exceeding the length of the soil reinforcements, or as shown on the plans. Prior to wall construction, the foundation, if not in rock, shall be compacted as directed by the **Contracting Officer**.

At each panel foundation level, concrete leveling pad shall be provided to the design elevations shown on the plans. Allowable elevation to tolerances are +0.01 foot (1/8 inch), and -0.02 foot (1/4 inch), from the design elevation.

3.2 WALL ERECTION

Panels shall be handled by means of lifting devices set into the upper edge of the panels. Panels shall be placed vertically in successive horizontal lifts as backfill placement proceeds. As backfill material is placed behind the panels, the panels shall be maintained in a vertical position. External bracing is required for the initial lift. Vertical and horizontal alignment tolerances shall not exceed 3/4 inch in 10 feet. The overall vertical tolerance of the wall (plumbness from top to bottom) shall not exceed 3/4 inch per 10 feet of wall height.

3.3 PLACEMENT OF SOIL REINFORCEMENT

Prior to placing the first layer of soil reinforcement, backfill shall be placed and compacted in accordance with Section, Backfill Placement.

Soil reinforcement shall be placed normal to the face of the wall. If skewing of the reinforcing strips is required due to obstructions in the reinforced fill, the maximum skew angle shall not exceed 15 degrees from the normal position unless specifically designed.

3.4 BACKFILL PLACEMENT

Backfill material shall be placed and compacted simultaneously with the

erection of the facing panels. Placement and compaction shall be accomplished without distortion of the soil reinforcement or displacement of facing panels. Any wall materials which become damaged or disturbed during backfill placement shall be either removed and replaced at the Contractor's expense or corrected, as directed by the Contracting Officer. Any backfill material placed within the reinforced soil mass which does not meet the requirements of this specification shall be corrected or removed and replaced at the Contractor's expense, as directed by the Contracting Officer.

Backfill shall be compacted to 95 percent of the maximum density as determined by ASTM D 698.

The maximum lift thickness before compaction shall not exceed 10 inches, regardless of the vertical spacing between layers of soil reinforcements. The Contractor shall decrease this lift thickness, if necessary, to obtain the specified density. Prior to placement of the soil reinforcements, the backfill elevation, after compaction, shall be 2 inches above the attachment device elevation from a point approximately 12 inches behind the back face of the panels to the free end of the soil reinforcement, unless otherwise shown on the plans.

Structure backfill at the front of the wall shall be completed prior to backfilling more than 15 feet above the bottom of the lowermost face element. Hand-held or hand-guided compacting equipment shall be used to compact structure backfill material within 3 feet of the facing panels.

At each level of the soil reinforcement, the structure backfill shall be constructed to a plane 0 - 1 foot above the elevation of the soil reinforcement connection, and shall start 3 feet from the back of the face panel and extend for at least the remaining length of soil reinforcement. This grading shall be complete before placing the next layer of soil reinforcement.

3.5 (Deleted)

-- End of Section --

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DIVISION 03 - CONCRETE

SECTION 03305

CAST-IN-PLACE STRUCTURAL CONCRETE

-- End of Section Table of Contents --

SECTION 03305

CAST-IN-PLACE STRUCTURAL CONCRETE

PART 1 GENERAL

1.1 REFERENCES

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

ACI INTERNATIONAL (ACI)

ACI 117/117R	(1990; Errata) Standard Tolerances for Concrete Construction and Materials
ACI 211.1	(1991) Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
ACI 214	(1977; R 1989) Recommended Practice for Evaluation of Strength Test Results of Concrete
ACI 305R	(1991) Hot Weather Concreting
ACI 318/318R	(1995) Building Code Requirements for Structural Concrete and Commentary
ACI 503.2	(1992; R 1997) Standard Specification for Bonding Plastic Concrete to Hardened Concrete with a Multi-Component Epoxy System

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A137.1	(1988) Ceramic Tile

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 31	(1998) Making and Curing Concrete Test Specimens in the Field
ASTM C 33	(1997) Concrete Aggregates
ASTM C 39	(1996) Compressive Strength of Cylindrical Concrete Specimens
ASTM C 40	(1992) Organic Impurities in Fine Aggregates for Concrete
ASTM C 42	(1994) Obtaining and Testing Drilled Cores

	and Sawed Beam of Concrete
ASTM C 94	(1998c) Ready-Mixed Concrete
ASTM C 117	(1995) Materials Finer Than 75 micrometer (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 127	(1988; R 1993) Specific Gravity and Absorption of Course Aggregate
ASTM C 128	(1993) Specific Gravity and Absorption of Fine Aggregate
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 142	(1978; R 1990) Clay Lumps and Friable Particles in Aggregates
ASTM C 143	(1997) Slump of Hydraulic Cement Concrete
ASTM C 150	(1997) Portland Cement
ASTM C 171	(1992) Sheet Materials for Curing Concrete
ASTM C 172	(1997) Sampling Freshly Mixed Concrete
ASTM C 192	(1995) Making and Curing Concrete Test Specimens in the Laboratory
ASTM C 231	(1997e1) Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 309	(1995) Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 494	(1998) Chemical Admixtures for Concrete
ASTM C 535	(1989) Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 566	(1989) Total Moisture Content of Aggregate by Drying
ASTM C 597	(1983; R 1991) Pulse Velocity Through Concrete
ASTM C 618	(1997) Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
ASTM C 803	(1990) Penetration Resistance of Hardened Concrete

ASTM C 805	(1994) Rebound Number of Hardened Concrete
ASTM C 881	(1990) Epoxy-Resin-Base Bonding Systems for Concrete
ASTM C 928	(1992a) Packaged Dry, Rigid-Hardening Cementitious Materials for Concrete Repairs
ASTM C 937	(1980; R 1991) Grout Fluidifier for Preplaced-Aggregate Concrete
ASTM C 989	(1997) Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
ASTM C 1059	(1991) Latex Agents for Bonding Fresh to Hardened Concrete
ASTM C 1064	(1986; R 1993) Temperature of Freshly Mixed Portland Cement Concrete
ASTM C 1077	(1998) Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
ASTM C 1107	(1991a) Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
ASTM D 75	(1987; R 1992) Sampling Aggregates
ASTM D 4791	(1995) Flat or Elongated Particles in Coarse Aggregate

CORPS OF ENGINEERS (COE)

COE EM 1110-2-2000	Engineering and Design - Standard Practice for Concrete
COE ER 1110-1-2002	(1998) Cement, Slag, and Pozzolan Acceptance Testing
COE CRD-C 55	(1995) Within-Batch Uniformity of Freshly Mixed Concrete
COE CRD-C 94	(1995) Specifications for Surface Retarders
COE CRD-C 100	(1975) Method of Sampling Concrete Aggregate and Aggregate Sources, and Selection of Material for Testing
COE CRD-C 104	(1980) Method of Calculation of the Fineness Modulus of Aggregate
COE CRD-C 143	(1962) Specifications for Meters for Automatic Indication of Moisture in Fine Aggregate
COE CRD-C 318	(1979) Cloth, Burlap, Jute (or Kenaf)

COE CRD-C 400	(1963) Requirements for Water for Use in Mixing or Curing Concrete
COE CRD-C 521	(1981) Standard Test Method for Frequency and Amplitude of Vibrators for Concrete

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST HB 44	(1994) NIST Handbook 44: Specifications, Tolerances, and other Technical Requirements for Weighing and Measuring Devices

NATIONAL READY-MIXED CONCRETE ASSOCIATION (NRMCA)

NRMCA CPMB 100	(1990) Concrete Plant Standards

1.2 GOVERNMENT TESTING AND STUDIES

1.2.1 Preconstruction Testing and Mixture-Proportioning Studies

1.2.1.1 Aggregates

The aggregate sources listed in paragraph: MATERIAL SPECIFICATION, have been tested, and at the time testing was performed, these sources were capable of producing materials of the quality and quantity required for this project provided suitable processing is performed. Samples from any source selected consisting of not less than 100 pounds of each size of coarse aggregate and 250 pounds of fine aggregate, taken under the supervision of the Contracting Officer in accordance with COE CRD-C 100, shall be delivered to the US Army Corps of Engineers, Engineering Research and Development Center (ERDC), 3909 Halls Ferry Road, Vicksburg MS, 39180-6199, ATTN:Toy Poole, CEERD-GM-C; within 15 days after notice to proceed. Sampling and shipment of samples shall be at the Contractor's expense. 60 days will be required to complete evaluation of the aggregates. Testing will be performed by the Government in accordance with the applicable COE CRD-C or ASTM test methods. Tests to which aggregate may be subjected are listed in paragraph: MATERIAL SPECIFICATION. The material from the proposed source shall meet the quality requirements of this paragraph to be used for the project. The Government test data and other information on aggregate quality of those sources listed in paragraph: MATERIAL SPECIFICATION, and are available for review in the District Office. Quality assurance testing of aggregates by the Government does not relieve the Contractor of quality control requirements.

1.2.1.2 Cementitious Materials, Admixtures, and Curing Materials

Notify the Contracting Officer of the source, brand name, type, and quantity of all materials (other than aggregates) to be used in the manufacture and curing of the concrete at least 60 days in advance of submitting samples for mixture proportioning studies. The Contractor shall assist the Contracting Officer in obtaining samples of each material. Sampling and testing as determined appropriate will be performed by and at the expense of the Government. If cement or pozzolan are to be obtained from more than one source, the notification shall state the estimated amount of cement or pozzolan to be obtained from each source and the proposed schedule of shipments. When pozzolan other than fly ash is used, it shall be from one source.

1.2.1.3 Materials for Mixture-Proportioning Studies

At least 135 days in advance of the time when placing of concrete is expected to begin, samples of representative materials proposed for this project and meeting all the requirements of this specification shall be delivered to US Army Corps of Engineers, Engineering Research and Development Center (ERDC), 3909 Halls Ferry Road, Vicksburg MS, 39180-6199, ATTN:Toy Poole, CEERD-GM-C, by the Contractor at his expense. Samples of aggregates shall be taken under the supervision of the Contracting Officer in accordance with COE CRD-C 100, accompanied by test reports indicating conformance with grading and quality requirements hereinafter specified. Samples of materials other than aggregates shall be representative of those proposed for the project and shall be submitted accompanied by manufacturer's test reports indicating compliance with applicable specified requirements. Quantities of materials required shall be as follows:

MATERIAL	QUANTITY
1-1/2 inch nominal maximum-size coarse aggregate	7,000 pounds
3/4 inch nominal maximum-size coarse aggregate	8,000 pounds
Fine aggregate	11,000 pounds
Cement	4,000 pounds
Pozzolans	1,500 pounds
Ground Granulated Blast Furnace Slag	4,000 pounds
Chemical Admixtures (each)	5 gallons

Mixture-proportioning studies will be made by the Government at its expense.

1.2.2 Construction Testing by the Government

1.2.2.1 General

The Government will sample and test cementitious materials, admixtures, aggregates, and concrete during construction as considered appropriate to determine compliance with the specifications. The Contractor shall provide facilities and labor as may be necessary for procurement of representative test samples. Samples of aggregates will be obtained at the point of batching in accordance with COE CRD-C 100. Slump will be determined in accordance with ASTM C 143, except the point of sampling will be as directed. Compression test specimens will be made and laboratory cured in accordance with ASTM C 31 and will be tested in accordance with ASTM C 39.

1.2.2.2 Testing Aggregates

Testing performed by the Government will not relieve the Contractor of his responsibility for testing as appropriate for quality control. During construction, aggregates will be sampled for acceptance testing as delivered to the mixer to determine compliance with specification provisions. The Contractor shall provide necessary facilities and labor for the ready procurement of representative samples under Contracting Officer supervision. The Government will test such samples at its expense using appropriate COE CRD-C and ASTM methods.

1.2.2.3 Cementitious Materials

Cementitious materials shall be sampled at the mill, shipping point, or site of the work by the Contracting Officer. If tests prove that a material which has been delivered is unsatisfactory, it shall be promptly removed from the site of the work. Cementitious materials that have not been used within 6 months after being tested will be retested by the Government at the expense of the Contractor when directed.

1.2.2.4 Cement

Cement shall be tested for conformance with ASTM C 150 and the requirements specified herein. The cement will also be evaluated under the guidelines used to establish a qualified cement source as outlined in COE ER 1110-1-2002; Appendix A, Cement Quality Management System. The cement producer will be required to submit samples for physical and chemical testing, as well as historic quality control data. Cement will be sampled and tested by or under the supervision of the Contracting Officer and at the Government's expense. No cement shall be used until notice has been given by the Contracting Officer that test results for chemical and physical requirements as well as all evaluation requirements are satisfactory. In the event of failure, the cement may be resampled and tested at the request of the Contractor and at the Contractor's expense. Cement will be subject to check testing from samples obtained at the source, at transfer points, or at the project site, as scheduled by the Contracting Officer, and such sampling will be by or under the supervision of the Government at its expense. A copy of the mill tests from the cement manufacturer shall be furnished to the Contracting Officer for each lot delivered to the site of the work. The cost of testing cement excess to project requirements or of retesting as a result of failure of tests or change of sources will also be at the Contractor's expense and will be deducted from payments due the Contractor at a rate of $3,200.00 per test. Material not meeting specifications shall be promptly removed from the site of work

1.2.2.5 Pozzolan

The pozzolan shall be tested for conformance with ASTM C 618 and the requirements specified herein. The pozzolan will also be evaluated under the guidelines used to establish a qualified pozzolan source as outlined in COE ER 1110-1-2002; Appendix B, Pozzolan Quality Management System. The pozzolan producer will be required to submit samples for physical and chemical testing, as well as historic quality control data. Pozzolan will be sampled and tested by or under the supervision of the Contracting Officer and at the Government's expense. No pozzolan shall be used until notice has been given by the Contracting Officer that test results for chemical and physical requirements as well as all evaluation requirements are satisfactory. In the event of failure, the pozzolan may be resampled and tested at the request of the Contractor and at the Contractor's expense. Pozzolan will be subject to check testing from samples obtained at the source, at transfer points, or at the project site, as scheduled by the Contracting Officer, and such sampling will be by or under the supervision of the Government at its expense. A copy of the mill tests from the pozzolan manufacturer shall be furnished to the Contracting Officer for each lot delivered to the site of the work. The cost of testing pozzolan excess to project requirements or of retesting as a result of failure of tests or change of sources will also be at the Contractor's expense and will be deducted from payments due the Contractor at a rate of

$3,200.00 per test. Material not meeting specifications shall be promptly removed from the site of work.

1.2.2.6 (Deleted)

1.2.2.7 (Deleted)

1.2.2.8 Ground Granulated Blast-Furnace Slag

Ground Granulated Blast Furnace Slag (GGBFS) shall be tested for conformance with ASTM C 989 and the requirements specified herein. The GGBFS will also be evaluated under the guidelines used to establish a qualified GGBFS source as outlined in COE ER 1110-1-2002; Appendix A, Cement Quality Management System. The GGBFS producer will be required to submit samples for physical and chemical testing, as well as historic quality control data. GGBFS will be sampled and tested by or under the supervision of the Contracting Officer and at the Government's expense. No GGBFS shall be used until notice has been given by the Contracting Officer that test results for chemical and physical requirements as well as all evaluation requirements are satisfactory. In the event of failure, the GGBFS may be resampled and tested at the request of the Contractor and at the Contractor's expense. GGBFS will be subject to check testing from samples obtained at the source, at transfer points, or at the project site, as scheduled by the Contracting Officer, and such sampling will be by or under the supervision of the Government at its expense. A copy of the mill tests from the GGBFS manufacturer shall be furnished to the Contracting Officer for each lot delivered to the site of the work. The cost of testing GGBFS excess to project requirements or of retesting as a result of failure of tests or change of sources will also be at the Contractor's expense and will be deducted from payments due the Contractor at a rate of $3,200.00 per test. Material not meeting specifications shall be promptly removed from the site of work.

1.2.2.9 Chemical Admixtures

The Contractor shall provide satisfactory facilities for ready procurement of adequate test samples. All sampling and testing of a chemical admixture will be by and at the expense of the Government. Tests will be conducted using samples of materials proposed for the project.

1.2.2.10 Concrete Strength

Compressive strength test specimens will be made by the Government and cured in accordance with ASTM C 31 and tested in accordance with ASTM C 39. The strength of the concrete will be considered satisfactory so long as the average of all sets of three consecutive test results equals or exceeds the specified compressive strength f'c and no individual test result falls below the specified strength f'c by more than 500 psi. A "test" is defined as the average of two companion cylinders, or if only one cylinder is tested, the results of the single cylinder test. Additional analysis or testing, including nondestructive testing, taking cores and/or load tests may be required at the Contractor's expense when the strength of the concrete in the structure is considered potentially deficient.

a. Investigation of Low-Strength Test Results - When any strength test of standard-cured test cylinders falls below the specified strength requirement by more than 500 psi or if tests of

field-cured cylinders indicate deficiencies in protection and curing, steps shall be taken to assure that the load-carrying capacity of the structure is not jeopardized. Nondestructive testing in accordance with ASTM C 597, ASTM C 803, or ASTM C 805 may be permitted by the Contracting Officer to estimate the relative strengths at various locations in the structure as an aid in evaluating concrete strength in place or for selecting areas to be cored. Such tests shall not be used as a basis for acceptance or rejection.

b. Testing of Cores - When the strength of concrete in place is considered potentially deficient, cores shall be obtained and tested in accordance with ASTM C 42. At least three representative cores shall be taken from each member or area of concrete in place that is considered potentially deficient. The location of cores will be determined by the Contracting Officer to least impair the performance of the structure. Concrete in the area represented by the core testing will be considered adequate if the average strength of the cores is equal to at least 85 percent of the specified strength requirement and if no single core is less than 75 percent of the specified strength requirement.

c. Load Tests - If the core tests are inconclusive or impractical to obtain or if structural analysis does not confirm the safety of the structure, load tests may be directed by the Contracting Officer in accordance with the requirements of ACI 318/318R. Concrete work evaluated by structural analysis or by results of a load test shall be corrected in a manner satisfactory to the Contacting Officer. All investigations, testing, load tests, and correction of deficiencies will be performed and approved by the Contracting Officer at the expense of the Contractor, except that if all concrete is in compliance with the plans and specifications, the cost of investigations, testing, and load tests will be at the expense of the Government.

1.3 DESIGN REQUIREMENTS

The following requirements are for mixture proportions prepared by the contractor.

1.3.1 Concrete Strength

Minimum specified compressive strength f'c shall be as follows:

COMPRESSIVE STRENGTH (PSI)	STRUCTURE OR PORTION OF STRUCTURE
4,000 @ 28 days*	Intake structure, transition structure, outlet conduit, stilling basin, and parabolic drop structure
4,000 @ 28 days	Bridge elements, precast elements, generator and gaging station building foundation, and structural elements not described below
3,250 @ 28 days	Bridge footings and bridge retaining walls
3,000 @ 28 days	Runout channel, outlet channel, and

COMPRESSIVE STRENGTH (PSI)	STRUCTURE OR PORTION OF STRUCTURE
	concrete not described elsewhere
2,500 @ 28 days	Temporary concrete
1,000 @ 28 days	**Lean mix concrete backfill**

* Concrete used in parts of these structures will be proportioned by the Contracting Officer.

1.3.2 Maximum Water-Cement (W/C) Ratio

Maximum W/C shall be as follows:

WATER-CEMENT RATIO, BY MASS	STRUCTURE OR PORTION OF STRUCTURE
0.45	Intake structure, transition structure, outlet conduit, stilling basin, and parabolic drop structure
0.50	Permanent concrete construction exposed to soils or water not described elsewhere
0.50	Bridge deck slabs, prestressed and precast members, and generator and gaging station building foundation
0.55	Other portions of bridge structures
0.65	Temporary concrete, lean mix concrete and concrete not described elsewhere

These W/C's may cause higher strengths than that required by paragraph: CONCRETE STRENGTH.

1.4 CONSTRUCTION TOLERANCES

1.4.1 General

Level and grade tolerance measurements of slabs shall be made as soon as possible after finishing. When forms or shoring are used, the measurements shall be made prior to removal. Tolerances are not cumulative. The most restrictive tolerance controls. Tolerances shall not extend the structure beyond legal boundaries. Except as specified otherwise, plus tolerance increases the amount or dimension to which it applies, or raises a level alignment and minus tolerance decreases the amount or dimension to which it applied, or lowers a level alignment. A tolerance without sign means plus or minus. Where only one signed tolerance is specified, there is no limit in the other direction. The unformed finished surfaces subject to high-velocity flow (40 fps) shall be finished to meet the tolerances for A-HV surfaces specified in Table, "TOLERANCES FOR FINISHED FORMED CONCRETE SURFACES".

The definitions of the terms used in the following tabulations are used as defined and used in ACI 117/117R. Level and grade tolerance measurements of slabs shall be made as soon as possible after finishing.

TABLE I. CONSTRUCTION TOLERANCES FOR INTAKE STRUCTURE

(a)	Variation of the constructed linear outline from the established position in the plan	20 feet..... 1/2 inch Maximum..... 1 inch	
(b)	Variation in dimensions to individual structure features from established positions	In 80 feet or more.... 1 inch In buried construction And bulkhead faces.... 2 inches	
(c)	Variation from the plumb, from the specified batter, or from the curved surfaces of all structures, including the lines and surfaces of columns, walls, piers, buttresses, arch sections, vertical joint grooves, and visible arises	In any 10 feet. .....2 inch In any 20 feet. .....3/4 inch Maximum..... .. 1-1/4 inches In buried .... construction	Twice the above amounts
(d)	Variation from the level or from the grades indicated ion the drawings in slabs, beams, soffits, horizontal joint grooves, and visible arises	In any 10 feet..... 5/16 inch In any 30 feet or more. 1/2 inch In buried construction.	Twice the above amounts
(e)	Variation in cross-sectional dimensions of columns, beams, wet well walls, and similar members	Minus..... 1/4 inch Plus..... 1/2 inch	
(f)	Variation in the thickness of slabs, walls, arch sections, and similar members	Minus..... 1/4 inch Plus..... 1/2 inch	
(g)	Variation in the sizes and locations of sleeves, floor openings, and wall openings	..... 1/4 inch	
(h)	For watertight joints such as guides and sill areas, variations from the plumb and level	Not greater than 1/8 inch In 10 feet	

TABLE II. TOLERANCES FOR OTHER THAN INTAKE STRUCTURE

(a)	Variation of the constructed linear outline from the established position in the plan	20 feet..... 1/2 inch Maximum..... . 1 inch
(b)	Variation in dimensions to individual structure features from established positions	Maximum..... 1/2 inch In flow areas..... 1/4 inch
(c)	Variation from the plumb, from the specified batter, or from the curved surfaces	In any 10 feet..... 1/2 inch Maximum..... 1 inch
(d)	Variation from the level or from the grades indicated on the	In any 10 feet.....5/16 inch In any 30 feet or more. 1/2 inch

TABLE II. TOLERANCES FOR OTHER THAN INTAKE STRUCTURE

	drawings in slabs, beams, water conveying conduits, soffits, horizontal joint grooves, and visible arises	
(e)	Variation in cross-sectional dimensions of columns, beams, walls, and similar members	Minus..... 1/4 inch Plus..... 1/2 inch
(f)	Variation in the sizes and locations of sleeves and openings in floors, roofs, and walls	..... 1/4 inch

TABLE III. TOLERANCES FOR BRIDGES

(a)	Departure from established alignment	..... 1 inch
(b)	Departure from established grades	..... 1 inch
(c)	Variation in cross-sectional dimensions of columns, piers, slabs, walls, beams, and similar parts	Minus..... 1/4 inch Plus..... 1/2 inch
(d)	Variation in thickness of bridge slabs	Minus..... 1/8 inch Plus..... 1/4 inch
(e)	Footings	
	i. Variation of dimensions in plan	Minus..... 1/2 inch Plus..... 2 inches When formed or plus 3 inches when placed against unformed excavation
	ii. Misplacement of eccentricity	2 percent of the footing width in the direction of misplacement but not more than.....2 inches
	iii. Reduction in thickness	Minus..... .5 percent

1.4.2 Surface Requirements

1.4.2.1 General

The surface requirements for the classes of finish required by paragraph shall be as hereinafter specified. Allowable irregularities are designated "abrupt" or "gradual" for purposes of providing for surface variations. Offsets resulting from displaced, misplaced, or mismatched forms shall be considered "abrupt" irregularities. Irregularities resulting from warping, unplaneness, or similar uniform variations from planeness, or true curvature, shall be considered "gradual" irregularities. "Gradual" irregularities will be checked for compliance with the prescribed limits

with a 5-foot template, consisting of a straight edge for plane surfaces and a shaped template for curved or warped surfaces. In measuring irregularities, the straightedge or template may be placed anywhere on the surface in any direction, with the testing edge held parallel to the intended surface.

Class of Finish	Maximum Irregularities Abrupt, Inches	Gradual, Inches
HV	*	1/8
PV	1/8	1/4
Other	1/4	1/2
Backfill	1	1

* Variation for Class HV finish shall not exceed zero positive and 1/8-inch negative in the direction of flow of the water.

1.4.2.2 Grinding

Grinding of concrete to meet HV surface requirements is acceptable up to a maximum of 10 exposed aggregate particles with any dimension exceeding 1/4-inch in any 1-square-foot area. The required grinding bevel is as follows:

Station	Bevel (Minimum)
9+10 to 21+02.50	1 to 20

Grinding of surfaces is acceptable up to a maximum of 1/2 inch of removed concrete.

1.4.2.3 Prevention of Repeated Failure to Meet Tolerances

When a concrete placement results in concrete (prior to grinding or patching) that does not meet specified tolerances or surface requirements, an outline of all preventative actions such as modifications to forming, placing, or finishing, to be implemented by the Contractor to avoid repeated failures shall be submitted upon request. The Government reserves the right to delay concrete placements until such approved preventive actions have been implemented.

1.4.3 Appearance

Permanently exposed surfaces shall be cleaned, if stained or otherwise discolored, by a method that does not harm the concrete and that is approved by the Contracting Officer.

1.5 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-02 Shop Drawings

Plant Layout, G.

Drawings showing the layout of the plant proposed for use at least 30 days prior to beginning of the plant installation. The drawings shall show the location of the principal components of the construction plant; offices; shop and storage facilities; and storage areas and yards which the Contractor proposes to construct within the project limits. Drawings shall also be furnished showing the general features of the aggregate processing plant; aggregate transporting, storage and reclaiming facilities; coarse aggregate rescreening plant; concrete batching and mixing plant; concrete conveying and placing plant; and worker's hoists. The drawings shall appropriately show the capacity of each major feature of the plant; rated capacity of the aggregate transporting storage and reclaiming facilities; volume of aggregate stored; capacity of cement storage; rated capacity of the concrete batching and mixing plant; rated capacity of the worker's hoists. The size of the mixers and bins and the structural components of the plant shall also be shown. The layout of other construction facilities shall be provided in sufficient detail to demonstrate adequacy of the facility. The plant layout shall show the proposed location of the laboratory and adjacent parking lot with access roads. Drawings showing any changes in plant made during design and erection or after the plant is in operation shall also be submitted. Final drawings will be submitted in a computerized graphics form satisfactory to the Contracting Officer.

Lift Drawings, G.

A lift drawing and bill of materials shall be furnished for each lift of concrete. (Only one lift shall be shown on a drawing). These drawings shall be to scale and shall show all embedded items in sufficient detail for the proper installation and prosecution of the work. All embedded electrical and/or mechanical items shall be identified. The drawings shall not be less than 22 by 34 inches in size and the scale used shall be sufficiently large to clearly show all details of the structure covered by these drawings. A note shall be included on each lift drawing indicating all contract drawings from which the lift drawing was prepared. The contractor shall submit 6 copies of each drawing for review at least 60 days prior to scheduling the lift for placement. Final drawings will be submitted in a computerized graphics form satisfactory to the Contracting Officer.

SD-03 Product Data

Batch Plant, G.

Details and data on the concrete plant shall be submitted within 60 days prior to assembly for review by the Contracting Officer for review for conformance with the requirements of paragraph: EQUIPMENT.

Mixers

The make, type, capacity, and number of the concrete mixers proposed for use shall be submitted 60 days prior to installation for review by the Contracting Officer for conformance with the requirements of paragraph: EQUIPMENT.

Contractor Supplied Mixture Proportions, G.

Concrete mixture proportions for concrete mixtures as indicated hereinafter to be prepared by the Contractor. The concrete mixture quantities of all ingredients per cubic yard and nominal maximum coarse aggregate size that will be used in the manufacture of each quality of concrete shall be stated. Proportions shall indicate the mass of cement, pozzolan or slag when used and water; the mass of aggregates in a saturated surface-dry condition; and the quantities of admixtures. The submission shall be accompanied by test reports from a laboratory complying with ASTM C 1077 which show that proportions thus selected will produce concrete of the qualities indicated. No substitution shall be made in the source or type of materials used in the work without additional tests to show that the quality of the new materials and concrete are satisfactory.

Construction Methods; G.

The method, personnel, and equipment proposed for concrete placement of all concrete monoliths 60 days before placement begins. A separate submittal is required for each area, (such as foundation, tower and gates, downstream conduits, and outlet channel. A complete chronological procedure including forms, bulkheads, reinforcement, waterstops, concrete placement, vibration, finishing, joint cleanup, curing, protection, repair of defects, and Contractor quality control shall be included. The plan for placement of concrete in massive elements shall include information as shown in COE EM 1110-2-2000, Chapter 2, Figure 2. The Government reserves the right to delay concrete placements that do not have or are not in accordance with a construction methods as approved by the Contractor Officer.

SD-05 Design Data

Testing Technicians; G.
Concrete Construction Inspector; G.

The Contractor shall submit statements that the concrete testing technicians and the concrete inspectors meet the requirements of paragraph: TESTS AND INSPECTION.

Equipment for Conveying

The methods and description of the equipment proposed for transporting, handling, and depositing the concrete shall be submitted for review 60 days before concrete placement begins. The data submitted shall include site drawings or sketches with locations of equipment and placement site.

Construction Joint Treatment; G.

The method and equipment proposed for joint cleanup and waste disposal shall be submitted for approval for conformance with paragraph: CONSTRUCTION JOINT TREATMENT.

Curing and Protection; G.

The curing media and methods to be used shall be submitted for approval for conformance with paragraph: CURING AND PROTECTION.

Cold Weather Placing; G.

When concrete is to be placed under cold-weather conditions, a description of the materials and methods proposed for protection of the concrete meeting the requirements of paragraph: COLD WEATHER PROTECTION shall be submitted for approval.

Hot-Weather Placing; G.

When concrete is to be placed under hot-weather conditions, a description of the materials and methods proposed for protection of the concrete meeting the requirements of paragraph: HOT-WEATHER PLACING and FINISHING shall be furnished 60 days in advance of anticipated need date for approval.

Special Temperature-Controlled Concrete

When special temperature controls as specified by paragraph: SPECIAL TEMPERATURE-CONTROLLED CONCRETE are required, all methods and equipment shall be submitted for review and comment 60 days in advance of anticipated date required for use.

SD-07 Certificates

Sheet Curing

If sheet curing is used, a manufacturer's certificate shall be furnished certifying that the materials complies with the requirements of ASTM C 171.

Nonshrink Grout; G.

Descriptive literature of the grout proposed for use containing certified laboratory test results showing that it meets ASTM C 1107 shall be submitted 60 days prior to its use together with a certificate from the manufacturer stating that the grout is suitable for the application or exposure for which it is being considered. In addition, a detailed plan shall be submitted for review, showing equipment and procedures for use in mixing and placing the grout.

Bonding Agents

Descriptive literature and certification shall be submitted in advance of their use showing that the following materials meet the specified standards:

Latex Bonding Agent
Epoxy Resin

Expansive Admixture

Manufacturer's descriptive literature for fluidifier to be used as expansive admixture in block-out concrete with certificate stating that the material meets the requirements of ASTM C 937 shall be submitted 60 days prior to its use.

Color Admixture; G

When color-conditioned concrete is specified, color admixture shall be introduced in the concrete. Color sample shall be available with the Contracting Officer, and the color additive shall be submitted for review and approval 60 days prior its use.

Floor and Wall Tiles; G

Sample of tiles and grout shall be submitted to the Contracting Officer for approval and color selection.

Admixtures; G

Descriptive literature and manufacturer's certificate that the admixture conforms to the requirements of ASTM C 260 or ASTM C 494 as specified hereinafter.

1.6 MATERIAL DELIVERY, STORAGE, AND HANDLING

1.6.1 Cementitious Materials

1.6.1.1 Transportation

When bulk cement, pozzolan, or ground granulated blast-furnace slag is not unloaded from primary carriers directly into weather-tight hoppers at the batching plant, transportation from the railhead, mill, or intermediate storage to the batching plant shall be accomplished in adequately designed weather-tight trucks, conveyors, or other means that will protect the material from exposure to moisture.

1.6.1.2 Storage

Cementitious materials shall be furnished in bulk except that cement used for finishing and patching may be packaged. Immediately upon receipt at the site of the work, all cementitious materials, shall be stored in separate dry, weather-tight, and properly ventilated structures. All storage facilities shall permit easy access for inspection and identification. Sufficient materials shall be in storage to complete any lift of concrete started. In order that cement may not become unduly aged after delivery, the Contractor shall use any cement that has been stored at the site for 60 days or more before using cement of lesser age.

1.6.1.2 Separation of Materials

Separate facilities shall be provided for unloading, transporting, and handling each cementitious material. Separate appropriate storage facilities shall be provided for each type of cement and each source of pozzolan, or slag. The contents of each storage facility shall be plainly marked with a large permanent sign posted near the loading port.

1.6.2 Aggregate Storage

Fine aggregate and each size of coarse aggregate shall be stored in separate size groups adjacent to the batch plant and in such a manner as to prevent the intermingling of size groups or the inclusion of foreign materials in the concrete. Sufficient fine and coarse aggregate shall be maintained at the site at all times to permit continuous placement and completion of any lift of concrete started.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Cementitious Materials

2.1.1.1 Portland Cement

Portland cement shall conform to ASTM C 150, Type II or V, low-alkali. The Contractor shall submit written certification for the heat of hydration limit as stated herein above for each order of cement delivered to the job at least one day prior to the cement delivered on the job site.

Cement in mixtures for the special temperature control concrete, placed in accordance with the Low Heat Mixtures as described in paragraph Special Temperature-Controlled Concrete shall have the heat of hydration **limited to** 70 calories per gram at 7 days.

Cement in mixtures for the special temperature control concrete, placed in accordance with the High Heat Mixtures as described in paragraph Special Temperature-Controlled Concrete need not have the heat of hydration limited to 70 calories per gram at 7 days.

2.1.1.2 Pozzolan

Pozzolan shall conform to ASTM C 618, Class F, with the loss on ignition limited to 6 percent.

2.1.1.3 Ground Granulated Blast-Furnace Slag

Ground granulated blast-furnace slag shall conform to ASTM C 989, Grade 120.

2.1.1.4 Portland Cement for use with the Ground Granulated Blast-Furnace Slag Concrete Mixtures

For those mixtures prepared by the Government, the contractor may be allowed to use an ASTM C 150 Type II, low alkali cement, without the heat of hydration limited to 70 calories per gram at 7 days.

2.1.1.5 Temperature of Cementitious Materials

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

2.1.2 Admixtures

All chemical admixtures furnished as liquids shall be in a solution of suitable viscosity for field use as determined by the Contracting Officer.

2.1.2.1 Accelerating Admixture

Calcium chloride shall not be used. Accelerators shall meet the requirements of ASTM C 494, Type C.

2.1.2.2 Retarding Admixture

A retarding admixture shall meet the requirements of ASTM C 494, Type B, or D, except that the 6-month and 1-year compressive strength tests are

waived. The admixture may be added to the concrete mixture only when approved.

2.1.2.3 Water-Reducing Admixture

Water-reducing admixtures shall conform to ASTM C 494, Type A.

2.1.2.4 Expansive Admixture

Expansive admixture used in block-out concrete shall conform to ASTM C 937.

2.1.2.5 Color Admixture

Color admixture for color-conditioned concrete shall match the color sample available from the Contracting Officer.

2.1.2.6 Air-Entraining Admixture

Air Entraining admixture shall conform to ASTM C 260 and shall consistently entrain the air content in the specified ranges under field conditions.

2.1.3 Curing Materials

2.1.3.1 Sheet Materials

Sheet curing materials shall conform to ASTM C 171, type optional, except polyethylene sheet shall not be used.

2.1.3.2 Membrane-Forming Curing Compound

Membrane-forming curing compound shall conform to ASTM C 309, Type 2, except a styrene acrylate or chlorinated rubber compound meeting ASTM C 309, Class B, requirements may be used for surfaces that are to be painted or are to receive subsequent coatings, or floors that are to receive adhesive applications of resilient flooring. The curing compound selected shall be compatible with any subsequent paint, roofing, coating, or flooring specified.

2.1.3.3 Burlap

Burlap for curing purposes shall conform to COE CRD-C 318.

2.1.4 Water

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

2.1.5 Aggregates

2.1.5.1 Aggregate Composition

Fine aggregate shall consist of natural sand, manufactured sand, or a combination of natural and manufactured sands. Coarse aggregate shall consist of gravel, crushed gravel, crushed stone, or a combination thereof.

2.1.5.2 Quality

Aggregates delivered to the mixer shall be obtained from the specified

sources and shall conform to the requirements of ASTM C 33.

2.1.5.3 Grading

a. Fine Aggregate - The grading of the fine aggregate as delivered to the mixers shall be such that the individual percent retained on any sieve shall not vary more than 3 percent from the percent retained on that sieve in a fixed grading selected by the Contractor with the approval of the Contracting Officer. The fixed grading may be selected at the start of concrete placement and based upon 30 days fine aggregate production or selected after the first 30 days of concrete placement. The minimum individual percent retained on the No. 8 sieve shall be 5 percent and on all smaller sieves shall be 10 percent. In addition to the grading limits, the fine aggregate, as delivered to the mixer, shall have a fineness modulus of not less than 2.25 nor more than 2.85. The grading of the fine aggregate shall also be controlled so that the fineness moduli groups (average of the current test and the previous two tests) of the fine aggregate as delivered to the mixer shall not vary more than 0.10 from the target fineness modulus of the fixed grading selected by the Contractor and approved by the Contracting Officer. The range of each group shall not exceed 0.20. The fineness modulus shall be determined in accordance with COE CRD-C 104. At the option of the Contractor, fine aggregate may be separated into two or more sizes or classifications, but the uniformity of grading of the separate sizes shall be controlled so that they may be combined throughout the job in fixed proportions established during the first 30 days of concrete placement. The selected fixed grading shall be within the following limits, except any individual test result may be outside these limits if within the allowable 3 percent variation from the selected grading.

U.S. STANDARD SIEVE DESIGNATION	PERMISSIBLE LIMITS PERCENT BY WEIGHT, PASSING
3/8-in.	100
No. 4	95 - 100
No. 8	80 - 95
No. 16	60 - 80
No. 30	35 - 60
No. 50	15 - 30
No. 100	5 - 10
No. 200	0 - 5

b. Coarse Aggregate - The coarse aggregate shall be rescreened just prior to delivery to the concrete batch plant bins. The grading of the coarse aggregate within the separate size groups shall conform to the following requirements as delivered to the mixer.

PERCENT BY WEIGHT PASSING INDIVIDUAL SIEVES

U.S. STANDARD SIEVE DESIGNATION	No.4 to 3/4 inch	3/4 inch to 1-1/2 inch
2 inch	-	100
1-1/2 inch	-	90 - 100
1 inch	100	20 - 45

	PERCENT BY WEIGHT PASSING INDIVIDUAL SIEVES	
U.S. STANDARD SIEVE DESIGNATION	No.4 to 3/4 inch	3/4 inch to 1-1/2 inch
3/4 inch	90 - 100	0 - 10
3/8 inch	20 - 55	0 - 5
No. 4	0 - 10	
No. 8	0 - 5	

2.1.5.4 Particle Shape

The quantity of flat and elongated particles in the separate size groups of coarse aggregate, as determined by ASTM D 4791, using a value of 3 for width-thickness ratio and length-width ratio shall not exceed 25 percent in any size group.

2.1.5.5 Moisture Content

The fine aggregate shall not be placed in bins at the batch plant until it is in a stable state of moisture content. A stable moisture content shall be reached when the variation in the percent of total moisture tested in accordance with ASTM C 566 and when sampled at the same location will not be more than 0.5 percent during 1 hour of the 2 hours prior to placing the material in the batch plant bins and the variation in moisture content when sampled at the same location shall not be more than 2.0 percent during the last 8 hour period that the aggregate remains in the stockpile. The coarse aggregate shall be delivered to the mixers with the least amount of free moisture and the least variation in free moisture practicable under the job conditions. Under no conditions shall the coarse aggregate be delivered to the mixer "dripping wet".

2.1.5.6 Commercial Concrete Aggregate Sources

Concrete aggregates may be furnished from any source capable of meeting the quality requirements stated in paragraph: AGGREGATES. The following sources were evaluated during the design phase of the project in 1995 and were found at that time capable of meeting the quality requirements when suitably processed. No guarantee is given or implied that any of the following listed sources are currently capable of producing aggregates that meet the required quality stated in paragraph: AGGREGATES. Test results and conclusions shall be considered valid only for the sample tested and shall not be taken as an indication of the quality of all material from a source nor for the amount of processing required.

a. List of Sources:

Robertsons Redimix, Gypsum Canyon
Sunwest Materials, Lytle Creek
Inland Rock Co., Day Creek

b. Selection of Source - After the award of the contract, the Contractor shall designate in writing only one source or combination of sources from which he proposes to furnish aggregates. Regardless of the source selected, samples for quality-assurance testing shall be provided as required by paragraph: PRECONSTRUCTION TESTING AND MIXTURE-PROPORTIONING STUDIES. If a source for coarse or fine aggregate so designated

by the Contractor does not meet the quality requirements stated in the paragraph: AGGREGATE, the Contractor may not submit for approval other sources but shall furnish the coarse or fine aggregate, as the case may be, from one or a combination of the sources listed at no additional cost to the Government.

2.1.6 Nonshrink Grout

Nonshrink grout for use in setting base plates and machinery shall conform to ASTM C 1107, and shall be a commercial formulation suitable for the application proposed. The Grade of grout shall be as indicated by the manufacturer, for the particular application selected.

2.1.7 Packaged Dry Repair Materials

Packaged dry rapid-hardening cementitious materials for concrete repairs shall be a commercial formulation conforming to ASTM C 928 requiring only the addition of water.

2.1.8 Bonding Agents

Bonding agents shall meet the following requirements.

2.1.8.1 Latex Bonding Agent

Latex agents for bonding fresh to hardened concrete shall conform to ASTM C 1059, Type II.

2.1.8.2 Epoxy Resin

Epoxy resins for use in grouting dowels shall conform to ASTM C 881, Type IV.

2.1.9 Surface Retarder

Surface retarder shall conform to COE CRD-C 94.

2.1.10 Floor and Wall Tiles

Tiles for floor and walls in the toilet room shall be 1" x 1" x 3/8" and shall be standard grade glazed tiles conforming to ANSI A137.1. Specially shaped tiles shall be provided as required at corners, edges, etc.

2.2 MIXTURE PROPORTIONING

2.2.1 Composition

Concrete shall be composed of cementitious materials, water, fine and coarse aggregates, and admixtures. The cementitious materials shall be portland cement, portland cement in combination with pozzolan, or portland cement in combination with ground granulated blast-furnace slag. The admixtures shall be an Air Entraining Admixture, an WRA or an accelerating admixture. A retarding admixture may be used at the request of the Contractor when approved. No other chemical admixtures than those listed above shall be used. For each portion of the structure, mixture proportions shall be selected so that the strength and W/C requirements listed in paragraph: DESIGN REQUIREMENTS are met.

2.2.2 Proportioning Responsibility

The concrete mixtures in the intake structure, below elevation 500 and the stilling basin invert will be proportioned by the Contracting Officer. All other mixtures will be proportioned by the Contractor. Preliminary mixture-proportioning studies or thermal studies which include mixture proportions are available for review in the District Office. Some mixtures, especially those containing higher amounts of pozzolans, may have slow strength gain which may impact form design and form removal time.

2.2.3 Government-Designed Mixtures

Based on preliminary mix design studies the Government-designed mixtures for use in the mass concrete construction will contain the following approximate amounts of cementitious materials. Final mix designs will be determined using the proposed job materials in accordance with paragraph: Materials for Mixture Proportioning Studies.

2.2.3.1 Mixtures Using Type V and/or Type II Cement in Combination with Fly Ash

Mixtures containing Type V and/or Type II cement shall contain approximately 425 lbs of cement and 215 lbs of fly ash per cubic yard.

2.2.3.2 Mixtures Using Type II Cement in Combination with Granulated Ground Blast Furnace Slag (GGBFS) Cement

Mixtures containing Type II cement in combination with GGBFS shall contain approximately 160 lbs of Type II cement and 360 lbs of GGBFS cement per cubic yard.

2.2.4 Control

The proportions of all material entering into each concrete mixture will be furnished to the Contractor. The proportions will be changed by the Contracting Officer as necessary. Adjustments shall be made by the Contractor to the batch weights of aggregates and water as necessary to compensate for free moisture in the aggregates.

2.2.5 Nominal Maximum-Size of Aggregate

The nominal maximum-size of coarse aggregate to be used in the various parts of the work shall be in accordance with the following tabulation except as directed. The NMSA may be changed for sections requiring a special quality of concrete as directed.

FEATURES	NOMINAL MAXIMUM-SIZE AGGREGATE
Sections 7-1/2 in. or less in width or slabs 4 in. or less in thickness or any section with a clear distance between reinforcement less than 2-1/4 in.	3/4 in.
Sections over 7-1/2 in. or slabs at least 4 in. in thickness. However, this size shall not be used in any section in which the clear distance between reinforcement is less than 2-1/4 in.	1-1/2 in.

2.2.6 Slump

The slump shall be determined in accordance with ASTM C 143 and shall be 2 inches **+ 1 inch** for massive features and between 1 and 4 inches for all others except where placement by pump is approved, in which case the slump shall **not exceed 6** inches. In addition, the range of each set of two consecutive tests for each mixture shall be not more than 2 inches. The above specified slump is that required at the forms.

2.2.7 Air Content

The air content by volume shall be determined in accordance with ASTM C 143. When the nominal maximum size of coarse aggregate is 1-1/2 inches or larger, the total air content of the sample measured in accordance with ASTM C 231 shall be between 4 and 7 percent. When the nominal maximum-size coarse aggregate is 3/4 inch, the air content shall be between 5 and 7 percent. The specified air content is that required at the forms.

2.2.8 Contractor Concrete Proportioning

Trial batches and testing requirements for various qualities of concrete specified shall be the responsibility of the Contractor. Samples of aggregates shall be obtained in accordance with the requirements of ASTM D 75. Samples of materials other than aggregate shall be representative of those proposed for the project and shall be accompanied by the manufacturer's test reports indicating compliance with applicable specified requirements. Trial mixtures having proportions, consistencies, and air content suitable for the work shall be made based on methodology described in ACI 211.1, using at least three different water-cement ratios, which will produce a range of strength encompassing those required for the work. The maximum water-cement ratios required in paragraph: MAXIMUM WATER-CEMENT RATIO will be converted to a weight ratio of water to cement plus pozzolan by mass, or GGBF slag by mass equivalency as described in ACI 211.1. In the case where GGBF slag is used, the weight of the slag shall be included in the equations for the term P, which is used to denote the mass of pozzolan. If pozzolan is used in the concrete mixture, the minimum pozzolan content shall be 15 percent of the total cementitious material. Trial mixtures shall be proportioned for maximum permitted slump and air content with due consideration to the approved conveying and placement method. The temperature of concrete in each trial batch shall be reported. For each water-cement ratio, at least three test cylinders for each test age shall be made and cured in accordance with ASTM C 192. They shall be tested at 7 days and at the design age specified in paragraph: DESIGN REQUIREMENTS in accordance with ASTM C 39. From these test results, a curve will be plotted showing the relationship between water-cement ratio and strength.

2.2.9 Required Average Compressive Strength

In meeting the strength requirements specified in paragraph: CONCRETE STRENGTH, the selected mixture proportion shall produce a required average compressive strength f'cr exceeding the specified strength f'c by the amount indicated below.

2.2.9.1 Average Compressive Strength from Test Records

Where a concrete production facility has test records, a standard deviation shall be established in accordance with the applicable provisions of ACI 214. Test records from which a standard deviation is calculated shall represent materials, quality control procedures, and conditions similar to those expected, shall represent concrete produced to meet a specified strength or

strengths (f'c) within 1,000 psi of that specified for proposed work, and shall consist of at least 30 consecutive tests. A strength test shall be the average of the strengths of two cylinders made from the same sample of concrete and tested at 28 days or at another test age designated for determination of f'c. Required average compressive strength f'cr used as the basis for selection of concrete proportions shall be the larger of the equations that follow using the standard deviation as determined above:

f'cr = f'c + 1.34S
f'cr = f'c + 2.33S - 500

Where S = standard deviation

Where a concrete production facility does not have test records meeting the requirements above but does have a record based on 15 to 29 consecutive tests, a standard deviation shall be established as the product of the calculated standard deviation and a modification factor from the following table:

NUMBER OF TESTS*	MODIFICATION FACTOR FOR STANDARD DEVIATION
less than 15	-**
15	1.16
20	1.08
25	1.03
30 or more	1.00

* Interpolate for intermediate numbers of tests.
** Use tabulation in paragraph: DETERMINING REQUIRED AVERAGE STRENGTH

2.2.9.2 Average Compressive Strength without Previous Test Records

When a concrete production facility does not have sufficient field strength test records for calculation of the standard deviation, the required average strength fcr shall be determined as follows: If the specified compressive strength f'c is less than 3,000 psi,

f'cr = f'c + 1,000

If the specified compressive strength f'c is 3,000 to 5,000 psi,

f'cr = f'c + 1,200

If the specified compressive strength f'c is over 5,000 psi,

f'cr = f'c + 1,400

2.2.10 Color-Conditioned Concrete

The dosage rate of the color admixture used shall be as specified by the manufacturer. The proportions of the other admixtures used shall be adjusted as required to provide a workable concrete mix. A vertical sample panel of adequate size shall be made for approval using the contemplated materials and construction techniques.

2.2.11 Lean Mix Concrete Backfill

Lean mix concrete backfill shall be mixtures of cement, pozzolans, aggregates and water generally prepared with the guidance supplied in ACI

Report 229. The mixtures shall be proportioned by the contractor and shall have compressive strengths of 1000 psi at 28 days.

PART 3 EXECUTION

3.1 EQUIPMENT

3.1.1 Capacity

The batching, mixing, conveying, and placing systems shall have a capacity of at least 100 cubic yards per hour.

3.1.2 Batch Plant

Batch plant shall meet the following requirements.

3.1.2.1 Location

The concrete production plant shall be located at the site of the work in a specific location selected by the Contractor.

3.1.2.2 Bins and Silos

Separate bins, compartments, or silos shall be provided for each size or classification of aggregate and for each of the cementitious materials. The compartments shall be of ample size and so constructed that the various materials will be maintained separately under all working conditions. All compartments containing bulk cement, pozzolan, or ground granulated blast-furnace slag shall be separated from each other by a free-draining air space. All filling ports shall be clearly marked with a permanent sign stating the contents.

3.1.2.3 Batching Equipment

a. Batchers - Aggregate shall be weighed in separate weigh batchers with individual scales. Bulk cement and/or other cementitious materials shall each be weighed on a separate scale in a separate weigh batcher. Water shall be measured by weight or by volume. If measured by weight, it shall not be weighed cumulatively with another ingredient. Ice shall be measured separately by weight. Admixtures shall be batched separately and shall be batched by weight or by volume in accordance with the manufacturer's recommendations.

b. Water Batcher - A suitable water-measuring and batching device shall be provided that will be capable of measuring and batching the mixing water within the specified tolerances for each batch. The mechanism for delivering water to the mixers shall be free from leakage when the valves are closed. The filling and discharge valves for the water batcher shall be so interlocked that the discharge valve cannot be opened before the filling valve is fully closed. When a water meter is used, a suitable strainer shall be provided ahead of the metering device.

c. Admixture Dispensers - A separate batcher or dispenser shall be provided for each admixture. Each plant shall be equipped with the necessary calibration devices that will permit convenient checking of the accuracy of the dispensed volume of the particular admixture. The batching or dispensing devices shall be capable of

repetitively controlling the batching of the admixtures to the accuracy specified. Piping for liquid admixtures shall be free from leaks and properly valved to prevent backflow or siphoning. The dispensing system shall include a device or devices that will detect and indicate the presence or absence of the admixture or provide a convenient means of visually observing the admixture in the process of being batched or discharged. Each system shall be capable of ready adjustment to permit varying the quantity of admixture to be batched. Each dispenser shall be interlocked with the batching and discharge operations so that each admixture is added separately to the batch in solution in a separate portion of the mixing water or in fine aggregate in a manner to ensure uniform distribution of the admixtures throughout the batch during the required mixing period. Storage and handling of admixtures shall be in accordance with the manufacturers recommendations.

d. Moisture Control - The plant shall be capable of ready adjustment to compensate for the varying moisture content of the aggregates and to change the weights of the materials being batched. A moisture meter complying with the provisions of COE CRD-C 143 shall be provided for measurement of moisture in the fine aggregate. The sensing element shall be arranged so that the measurement is made near the batcher charging gate of the fine aggregate bin or in the fine aggregate batcher.

e. Scales - Adequate facilities shall be provided for the accurate measurement and control of each of the materials entering each batch of concrete. The weighing equipment and controls shall conform to the applicable requirements of NIST HB 44, except that the accuracy shall be within 0.2 percent of the scale capacity. The Contractor shall provide standard test weights and any other auxiliary equipment required for checking the operating performance of each scale or other measuring device. Tests shall be made at the frequency required in paragraph: TESTS AND INSPECTIONS, and in the presence of a Government quality assurance representative. Each weighing unit shall include a visible indicator that shall indicate the scale load at all stages of the weighing operation and shall show the scale in balance at zero load. The weighing equipment shall be arranged so that the concrete plant operator can conveniently observe the indicators.

f. Operation and Accuracy - The weighing operation of each material shall start automatically when actuated by one or more starter switches and shall end when the designated amount of each material has been reached. These requirements can be met by providing a semiautomatic or automatic batching system as defined by NRMCA CPMB 100. There shall be equipment to permit the selection of 5 preset mixes each by the movement of not more than two switches or other control devices. Cumulative weighing will not be permitted. The weigh batchers shall be so constructed and arranged that the sequence and timing of batcher discharge gates can be controlled to produce a ribboning and mixing of the aggregates, water, admixtures, and cementitious materials as the materials pass through the charging hopper into the mixer. The plant shall include provisions to facilitate the inspection of all operations at all times. Delivery of materials from the batching equipment shall be within the following limits of accuracy:

MATERIAL	PERCENT
Cementitious materials	+ 1
Water	+ 1
Aggregate smaller than 1-1/2 in. size	+ 2
Aggregate larger than 1-1/2 in. size	+ 3
Chemical admixtures	+ 3

g. Interlocks - Batchers and mixers shall be interlocked so that:

(1) The charging device of each batcher cannot be actuated until all scales have returned to zero balance within + 0.2 percent of the scale capacity and each volumetric device has reset to start or has signaled empty.

(2) The charging device of each batcher cannot be actuated if the discharge device is open.

(3) The discharge device of each batcher cannot be actuated if the charging device is open.

(4) The discharge device of each batcher cannot be actuated until the indicated material is within the allowable tolerances.

(5) One admixture is batched automatically with the water.

(6) Each additional admixture is batched automatically with a separate portion of the water or with the fine aggregate.

(7) The mixers cannot be discharged until the required mixing time has elapsed.

h. Recorder - An accurate recorder or recorders shall be provided and shall conform to the following detailed requirements:

(1) The recorder shall produce a graphical or digital record on a single visible chart or tape of the weight or volume of each material in the batchers at the conclusion of the batching cycle. The record shall be produced prior to delivery of the materials to the mixer. After the batchers have been discharged, the recorder shall show the return to empty condition.

(2) A graphical recording or digital printout unit shall be completely housed in a single cabinet that shall be capable of being locked.

(3) The chart or tape shall be so marked that each batch may be permanently identified and so that variations in batch weights of each type of batch can be readily observed. The chart or tape shall be easily interpreted in increments not exceeding 0.5 percent of each batch weight.

(4) The chart or tape shall show time of day at intervals of not more than 15 minutes.

(5) The recorder chart or tape shall become the property of the Government.

(6) The recorder shall be placed in a position convenient for observation by the concrete plant operator and the Government inspector.

(7) The recorded weights or volumes when compared to the weights or volumes actually batched shall be accurate within $\pm$ 2 percent.

i. Batch Counters - The plant shall include devices for automatically counting the total number of batches of all concrete batched and the number of batches of each preset mixture.

j. Rescreening Plant - A rescreening plant shall be located, arranged, and operated in a manner that all coarse aggregate will be routed through the plant and that its operation will ensure delivery to the mixers of graded coarse aggregate free from excessive variation and conforming to the size groups and grading of paragraph: AGGREGATES and with moisture content conforming to the provisions of paragraph: MOISTURE CONTENT. Coarse aggregate may be rescreened and delivered to the batch plant bins one size group at a time or two or more adjacent size groups at a time. Simultaneous rescreening of nonadjacent size groups is not permitted. All material passing the bottom screen of the smallest size of coarse aggregate being screened shall be wasted.

k. Washing Plant - All coarse aggregates shall be washed immediately prior to entering the rescreening plant. The rewashing plant shall contain adequate water nozzles and vibrating screens to remove foreign materials and coatings from aggregate particles. Water used for washing shall meet the requirements of paragraph: WATER.

l. Trial Operation - Not less than 7 days prior to commencement of concrete placing, a test of the batching and mixing plant shall be made in the presence of the Contracting Officer to check operational adequacy. The number of full-scale concrete batches required to be produced in trial runs shall be as directed, will not exceed 20, and shall be proportioned as directed. All concrete produced in these tests shall be wasted or used for purposes other than inclusion in structures covered by this specification. All deficiencies found in plant operation shall be corrected prior to the start of concrete placing operations. No separate payment will be made to the Contractor for labor or materials required by provisions of this paragraph. The Contractor shall notify the Contracting Officer of the trial operation not less than 7 days prior to the start of the trial operation.

m. Protection - The weighing, indicating, recording, and control equipment shall be protected against exposure to dust, moisture, and vibration so that there is no interference with proper operation of the equipment.

3.1.2.4 Laboratory Areas

A room shall be provided in the plant to house the moisture and grading testing equipment for aggregate and to provide working space. Another room shall be provided for testing fresh concrete and for fabricating and initial curing of concrete test specimens in accordance with ASTM C 31. The size, arrangement, and location of these rooms will be subject to approval. The Contractor shall provide electricity, air conditioning, heat, and water as required for use in these laboratory areas. Section 01500 Quality Assurance of these specifications presents requirements for a separate building equipped for a testing laboratory.

3.1.2.5 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. The drawings shall show the locations of the principal components of the construction plant; offices; shop and storage building; 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 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; rated capacity of the concrete transporting and placing plant in cubic yards per hour; and when used rated 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 for review. Two sets of the drawings will be retained and one set will be returned to the Contractor with comments. Final drawings incorporating final comments and any changes made during operation of the plants will be supplied to the Government on drawings in an electronic media format acceptable to the Contracting Officer.

3.1.3 Mixers

Mixers shall be stationary mixers. Each mixer shall combine the materials into a uniform mixture and discharge this mixture without segregation. Mixers shall not be charged in excess of the capacity recommended by the manufacturer on the nameplate. Excessive over-mixing requiring introduction of additional water will not be permitted. The mixers shall be maintained in satisfactory operating condition, and mixer drums shall be kept free of hardened concrete. Mixer blades or paddles shall be replaced when worn down more than 10 percent of their depth when compared with the manufacturer's dimension for new blades. Should any mixer at any time produce unsatisfactory results, its use shall be promptly discontinued until it is repaired or replaced. The size of the batch, the mixing time, the charging sequence, and other factors identified by the contractor shall be adjusted to provide concrete that meets the uniformity limits specified herein. All testing shall be performed in accordance with COE CRD-C 55. When regular testing is performed, the concrete shall meet the limits of any five of the six uniformity requirements. When abbreviated testing is

performed, the concrete shall meet only those requirements listed for abbreviated testing. The initial mixer evaluation test shall be a regular test and shall be performed prior to the start of concrete placement. The concrete proportions used for the evaluation shall contain the largest size aggregate on the project and shall be as directed. Regular testing shall consist of performing all six tests on three batches of concrete. The range for regular testing shall be the average of the ranges of the three batches. Abbreviated testing shall consist of performing the three required tests on a single batch of concrete. The range for abbreviated testing shall be the range for one batch. If more than one mixer is used and all are identical in terms of make, type, capacity, condition, speed of rotation, etc., the results of tests on one of the mixers shall apply to the others, subject to approval. Mixer evaluations shall be performed by the Contractor in accordance with paragraph: MIXER UNIFORMITY. However, the initial evaluation will be performed by the Government. The Contractor shall provide labor and equipment as directed to assist the Government in performing any evaluation made by the Government.

PARAMETER	REGULAR TESTS ALLOWABLE MAXIMUM RANGE FOR AVERAGE OF 3 BATCHES	ABBREVIATED TESTS ALLOWABLE MAXIMUM RANGE FOR 1 BATCH
Unit weight of air-free mortar, lb/cu ft	2.0	2.0
Air content, percent	1.0	---
Slump, inches	1.0	---
Coarse aggregate, percent	6.0	6.0
Compressive strength at 7 days, percent	10.0	10.0
Water content, percent	1.5	---

3.1.4 Sampling Facilities

3.1.4.1 Concrete

The Contractor shall provide suitable facilities and labor for obtaining representative samples of concrete in accordance with ASTM C 172 for Contractor quality control (QC) and Government quality assurance (QA) testing.

3.1.4.2 Coarse Aggregate

Suitable facilities shall be provided for readily obtaining representative samples of coarse aggregate for test purposes immediately prior to the material entering the mixer.

3.1.5 Transporting Equipment

Transporting equipment shall be designed, operated, and maintained so that it does not cause or permit segregation or loss of material. The concrete shall not be dropped vertically more than 5 feet except where suitable equipment is provided to prevent segregation and where specifically

authorized.

3.1.5.1 Buckets

Bottom-dump buckets shall conform to the following requirements: the interior hopper slope shall be not less than 70 degrees from the horizontal; the minimum dimension of the clear gate opening shall be at least five times the nominal maximum size of the aggregate, and the area of the gate opening shall not be less than 2 square feet; the bucket gates shall be grout-tight when closed, shall be of the double clamshell type, and shall be manually, pneumatically, or hydraulically operated; and the gate-opening mechanism shall be designed to close the gates automatically when the control is released or when the air or hydraulic line is broken. If gate actuation is dependent on integral air or hydraulic reservoirs, the capacity of the reservoirs shall be sufficient to open and close the gates three times without recharging the reservoir.

3.1.5.2 Trucks

Truck mixers or agitators used for transporting central-mixed concrete shall conform to the applicable requirements of ASTM C 94. Truck mixers shall not be used to transport concrete with larger than 1-1/2 inch nominal maximum-size aggregate or 2 inch or lower slump. Nonagitating trucks may be used for transporting central-mixed concrete over a smooth road when the hauling time is less than 15 minutes and the slump is less than 3 inches. Bodies of nonagitating trucks shall be smooth, watertight, metal containers specifically designed to transport concrete, shaped with rounded corners to minimize segregation, and equipped with gates that will permit positive control of the discharge of the concrete.

3.1.5.3 Chutes

When concrete can be placed directly from a truck mixer, agitator, or nonagitating truck, the chutes supplied by the truck manufacturer as standard equipment may be used. A discharge deflector shall be used when required by the Contracting Officer. Separate chutes and other similar equipment shall not be permitted for conveying concrete except when specifically approved and in no case shall slump be increased to accommodate their use.

3.1.5.4 Belt Conveyors

Belt conveyors shall be designed and operated to assure a uniform flow of concrete from mixer or delivery truck to final place of deposit without segregation of ingredients or loss of mortar and shall be provided with positive means for preventing segregation of the concrete or loss of mortar at the transfer point(s) and the point of placing. The idler spacing shall not exceed 36 inches. Belt speed shall be a minimum of 300 feet per minute and a maximum of 750 feet per minute. Belt width shall be a minimum of 16 inches if the NMSA is 3 inches or less. The NMSA required in mixture proportions furnished by the Government will not be changed to accommodate the belt width.

3.1.5.5 Pump Placement

Concrete may be conveyed by positive-displacement pump when approved. Pump placement will be approved only for areas where placement by bucket or conveyor is difficult or impractical. The pumping equipment shall be piston or squeeze-pressure type. The pipeline shall be rigid-steel pipe or

heavy-duty flexible hose. Aluminum pipe shall not be used. The inside diameter of the pipe shall be at least 3 times the nominal maximum size of the coarse aggregate in the concrete to be pumped but not less than 4 inches.

3.2 PREPARATION FOR PLACING

3.2.1 Vibrators

An adequate number of vibrators shall be on hand to meet placing requirements, and spare vibrators shall be available to maintain production in the event of breakdown. There shall be adequate air pressure available for air vibrators and adequate voltage for electric vibrators. Vibrators of the proper size, frequency, and amplitude shall be used for the type of work being performed in conformance with the following requirements:

APPLICATION	HEAD DIAMETER INCHES	FREQUENCY VPM	AMPLITUDE INCHES
Thin walls, beams, etc.	1-1/4 - 2-1/2	9,000 - 13,500	0.020 - 0.04
General construction	2 - 3-1/2	8,000 - 12,000	0.025 - 0.05
Heavy sections	3 - 6	7,000 - 10,500	0.030 - 0.06
Mass concrete	5 - 7	5,500 - 8,500	0.040 - 0.08

The frequency and amplitude shall be within the range indicated in the tabulation as determined in accordance with paragraph: TESTS AND INSPECTIONS.

3.2.2 Embedded Items

Before placing concrete, care shall be taken to determine that all embedded items are securely fastened in place as indicated in the drawings or required. Embedded items shall be free of oil and other foreign matter such as loose coatings of rust, paint, and scale. The embedding of wood in concrete will be permitted only when specifically authorized or directed. Any air or water lines or other materials embedded in structures as authorized construction expedients shall conform to the above requirements and upon completion of their use shall be backfilled with concrete or mortar as directed. Welding will not be permitted on embedded or otherwise exposed metals which are in contact with concrete surfaces. Tack welding of or to embedded items will not be permitted.

3.2.3 Concrete on Earth Foundations

Earth foundations upon which concrete is to be placed shall be clean, damp, and free from frost, ice, and standing or running water. Prior to placement of concrete, the earth foundation shall have been satisfactorily compacted in accordance with the provisions of Sections 02212 Embankment or 02250 Fills and Subgrade Preparation, as applicable.

3.2.4 Concrete on Rock Foundations

Rock surfaces upon which concrete is to be placed shall be clean and free from oil, standing or running water, ice, mud, drummy rock, coatings, debris, and loose, semidetached, overhanging, or unsound fragments. Faults or joints shall be cleaned to a satisfactory depth and to firm rock on the sides as directed by the Contracting Officer. Immediately before concrete is placed, all rock surfaces shall be cleaned thoroughly by the use of

air-water jet, high-pressure water jet, or sandblasting as described in paragraph: CONSTRUCTION JOINT TREATMENT. All rock surfaces shall be kept continuously wet for at least 24 hours immediately prior to placing concrete thereon. All approximately horizontal surfaces shall be covered immediately before the concrete is placed with a 1/2 inch layer of mortar composed of the same sand and cementitious materials used in the concrete. The sand-cementitious materials ratio and the water-cementitious material ratio of the mortar shall be approximately the same as those used in the concrete mixture. The mortar shall be covered with concrete before the mortar has reached its initial time of setting.

3.2.5 Construction Joint Treatment

3.2.5.1 Joint Preparation

Concrete surfaces to which other concrete is to be bonded shall be prepared for receiving the next lift or adjacent concrete by cleaning by sandblasting, high-pressure water jet, or air-water cutting. Surface cutting by air-water jets will not be permitted for concrete surfaces congested with reinforcing steel or if they are relatively inaccessible. If, for any other reason, it is considered undesirable to disturb the surface of a lift before it has hardened, the use of sandblasting or high-pressure water jet after hardening will be required. Regardless of the method used, the resulting surface shall be free from all laitance and inferior concrete so that clean, well-bonded coarse aggregate particles are exposed uniformly over the lift surface. Application of the joint treatment method shall be such that the edges of the larger particles of aggregate are not undercut. Where joint preparation occurs more than 2 days prior to placing the next lift or where the work in the area subsequent to the joint preparation causes dirt or debris to be deposited on the surface, the surface shall be cleaned as the last operation prior to placing the next lift. The surface of the construction joint shall be kept continuously wet for the first 12 hours of the 24 hours prior to placing concrete, except that the surface shall be damp with no free water at the time of placement.

3.2.5.2 Air-Water Cutting

Air-water cutting of a construction joint shall be performed at the proper time, generally between 4 and 12 hours after placement and only on horizontal construction joints. This period may be modified if a retarder is used to prolong the setting of the cement at surface of the concrete. The air pressure used in the jet shall be 90 to 110 psi, and the water pressure shall be just sufficient to bring the water into effective influence of the air pressure. When approved a surface retarder complying with the requirements of COE CRD-C 94 may be applied to the surface of the lift to prolong the period of time during which air-water cutting is effective. Prior to receiving approval, the Contractor shall furnish samples of the material to be used and shall demonstrate the method to be used in its application. After cutting, the surface shall be washed and rinsed until the wash water is no longer cloudy. If air-water cutting does not produce acceptable results, the surface shall be prepared by high-pressure water jet or sandblasting.

3.2.5.3 High-Pressure Water Jet

A stream of water under a pressure of not less than 3,000 psi may be used for cleaning. Its use shall be delayed until the concrete is sufficiently hard so that only the surface skin or mortar is removed and there is no

undercutting of coarse-aggregate particles. If the high-pressure water jet is incapable of a satisfactory cleaning, the surface shall be cleaned by sandblasting.

3.2.5.4 Wet Sandblasting

This method of joint preparation may be used when the concrete has reached sufficient strength to prevent undercutting of coarse aggregate particles. The operation shall be continued until all accumulated laitance, coatings, stains, debris, and foreign materials are removed. The surface of the concrete shall then be washed thoroughly to remove all loose material. This method may be used on both horizontal and vertical surfaces.

3.2.5.5 Waste Water Disposal

The method used in disposing of waste water employed in cutting, washing, and rinsing of concrete surfaces shall be such that the waste water does not stain, discolor, or affect exposed surfaces of the structures, or damage the environment of the project area. The method of disposal shall meet all requirements of Section 01430 Environmental Protection.

3.2.6 Form Checkout Card System

A standardized form checkout card system will be used for maintaining the recorded control of the performance of concrete work under this contract. Prior to placing any lift of concrete in any structure, all items of work in the lift including but not limited to foundations, drainage, forms, reinforcing steel, mechanical, electrical, cleanup, and safety requirements will be checked by the Government for compliance with plans, specifications, approved construction methods and approved lift drawings. A final clearance signature on the checkout card must be obtained from the Contracting Officer before commencing placement of concrete in each placement. This checkout method will not relieve any responsibility for ascertaining that all preparatory work and all clearance does not relieve the Contractor of the responsibility for any errors, omissions, or work not meeting the requirements of the plans and specifications. All screeds shall be checked and rechecked as the placement is topped out.

3.3 TRANSPORTING AND PLACING

3.3.1 Transporting

Methods and equipment for conveying and depositing the concrete into the form shall be subject to approval. The capacity of the transporting system shall be sufficient to supply concrete at a rate to prevent cold joints forming during placement. A properly designed and sized elephant trunk and rigid drop chute bottom section which will prevent free-fall within the elephant trunk and rigid drop chute will be used if concrete is to drop more than 5 feet. If concrete is to be placed through installed horizontal or sloping reinforcing bars, the concrete shall discharge into a pipe or elephant trunk that is long enough to extend through the reinforcing bars to within 5 feet of the placing surface. In no case will concrete be discharged to free fall through the reinforcing bars.

3.3.1.1 Transporting by Bucket

There shall be provided indicating and signaling devices for the control of identification of types or classes of concrete as they are mixed and discharged into buckets for transfer to the forms. Each type or class of

concrete shall be visually identified by placing a colored tag or marker on a bucket as it leaves the mixing plant so that the concrete may be positively identified in the forms and placed in the structure in the desired position.

3.3.1.2 Transporting by Pump

The nominal maximum-size coarse aggregate will not be reduced or mixture proportions changed to accommodate a pump except as specifically determined appropriate. The distance and height to be pumped shall not exceed limits recommended by the pump manufacturer. The concrete shall be supplied to the pump continuously. When pumping is completed, concrete remaining in the pipeline shall be ejected without contamination of concrete in place. After each operation the equipment shall be thoroughly cleaned and flushing water shall be wasted outside the forms.

3.3.1.3 Transporting by Belt Conveyor

Methods and equipment for transporting the concrete by belt conveyor into the form shall be subject to approval.

3.3.2 Placing

The capacity of the placing system shall be sufficient to supply concrete at a rate which will prevent cold joints in any placement. Concrete shall be worked into the corners and angles of the forms and around all reinforcement and embedded items without permitting the material to segregate. Concrete shall be deposited as close as possible to its final position in the forms, and in so depositing, there shall be no vertical drop greater than 5 feet except where suitable equipment is provided to prevent segregation and where specifically authorized. Depositing of the concrete shall be so regulated that it will be effectively placed and consolidated in horizontal layers not exceeding 5 feet in thickness with a minimum of lateral movement. The amount of concrete deposited shall be such that it can be readily and thoroughly consolidated and shall not exceed 4 cubic yards in one pile. All concrete-placing equipment and methods shall be subject to approval. Concrete placement will not be permitted when, in the opinion of the Contracting Officer, weather conditions prevent proper placement and consolidation.

Drop chutes, elephant trunks, and/or tremies should be used in walls and columns to prevent free-fall of the concrete and to allow the concrete to be placed through reinforcing steel. They should be moved at short intervals to prevent stacking of concrete. Vibrators should be used to move the mass of concrete through the forms.

Flowable fill placement shall be balanced such that the placement of flowable fill shall not be greater than 5 feet above the placement of any other fill on opposite sides of the structure against which the flowable fill is being placed.

3.3.2.1 Time Interval Between Mixing and Placing

Concrete mixed in stationary mixers and transported by nonagitating equipment shall be placed within 30 minutes after it has been mixed, unless otherwise authorized. When concrete is truck mixed or when a truck mixer or agitator is used for transporting concrete mixed by stationary mixers, the concrete shall be delivered to the site of the work, and discharge shall be completed within 1-1/2 hours after introduction of the cement to

either the water or aggregate.

3.3.2.2 Hot-Weather Placing

The temperature of the concrete when deposited in the forms during hot weather shall not exceed 85 degrees F except as further required by paragraph: TRANSPORTING AND PLACING and Special Temperature Controlled Concrete. An approved retarding admixture may be used in accordance with paragraph: MATERIAL SPECIFICATION to facilitate placing and finishing. Steel forms and reinforcement and conveying and placing equipment shall be cooled if necessary to assist in maintaining specified concrete-placing temperature. The temperature of the fresh concrete shall be measured in accordance with ASTM C 1064.

3.3.2.3 Cold Weather Placing

The temperature of the concrete when deposited in the forms shall not be less than 40 degrees F. The ambient temperature of the placement area and all surfaces to receive concrete shall be above 32 degrees F. Materials entering the mixer shall be free from ice, snow, and frozen lumps. The heating of mixing water or aggregates necessary to keep the concrete temperature above 40 degrees F shall be closely regulated so that the concrete temperature does not exceed 60 degrees F. An accelerator may be used when approved in advance.

3.3.2.4 Special Temperature-Controlled Concrete

Special temperature control is applicable to mass concrete placements in the elements indicated in the table below. Regardless of the requirements specified above, the concrete shall have a temperature not exceeding that specified below and not less than 40 degrees F, when measured at least 20 minutes after mixing. Heating of the mixing water or aggregates will not be permitted until the temperature of the concrete has decreased to 45 degrees F. The materials shall be heated in such a manner that they will be free from ice, snow, and frozen lumps before entering the mixer.

Structural Element	Maximum Placing Temperature (Degrees F)	
	Low Heat Mixtures	High Heat Mixtures
Intake Structure Below Elevation 470 (Sta 9+10 to Sta 10+00)	65	55
Intake Structure Above Elev 470 and Below Elevation 545 (Sta 9+10 to Sta 10+00)	70	60
Stillng Basin Invert Between Sta 18+13.40 and Sta Sta 21+02.50	65	55

The following methods may be used for cooling plastic concrete:

(1) Precooling of aggregates by screening from direct sunlight, spraying with chilled water, and (if required) sending the aggregates through a chilling system just prior to batching.

(2) Using chilled water for mixing or substituting up to 50 percent by weight of ice for mixing water. **Replacement rates greater than 50 percent will require test batches to confirm that mixing and uniformity requirements are met prior to use in the construction. Additionally, test batches to confirm concrete quality will be prepared by the contractor, at no cost to the government, prior to use of concrete with replacement of more than 50 percent of the free water by ice.**

(3) Liquid nitrogen cooling of the concrete mixture by (a) injection of liquid nitrogen into the mixer after completion of batching and mixing, and (b) mixing liquid nitrogen with parts of the aggregate prior to batching and mixing.

3.3.2.5 Concrete Lifts

The depth of concrete placed in each lift will be as shown in the drawings. All concrete shall be deposited in approximately horizontal layers about 1-1/2 feet in thickness in stepped progression at such a rate that the formation of cold joints will be prevented. Slabs shall be placed in one lift, unless 2-1/2 foot or more deep. Where 7-1/2 foot or greater lift depths are permitted, the Contractor shall furnish approved cantilever forms that are jointed or hinged approximately midheight to facilitate placement against surfaces sloping more than 10 degrees from vertical. At the beginning of the placing of a lift, the top half of a hinged or jointed form shall be retracted to such a position that it does not interfere with the operation of buckets placing concrete adjacent to the form. A minimum of five successive horizontal layers in stepped progression shall be used for 7-1/2 foot lifts. Where 5 foot lifts are required, a minimum of three successive horizontal layers in stepped progression shall be used. Each new layer of concrete shall be placed on the oldest exposed layer. The maximum exposed bulkhead face of concrete between adjacent monoliths shall not exceed 40 feet except as otherwise approved.

3.3.2.6 Consolidation

Immediately after placing, each layer of concrete shall be consolidated by internal vibrating equipment. Vibrators shall not be used to cause concrete to flow for significant distances within the forms. Hand spading may be used if necessary together with internal vibration along formed surfaces permanently exposed to view. Form vibrators shall not be used. The vibrator shall be inserted vertically at uniform spacing over the entire area of placement. The distance between insertions shall be approximately 1-1/2 times the radius of action of the vibrator. The vibrator shall penetrate rapidly to the bottom of the layer and at least 6 inches into the preceding unhardened layer if such exists. It shall be held stationary until the concrete is consolidated and then withdrawn slowly. Slabs 8 inches or less in depth shall be consolidated by approved methods.

3.4 FINISHING

3.4.1 Finish Requirements

3.4.1.1 High Velocity Finish

A high velocity (HV) finish shall be required on all concrete surfaces exposed to high velocity flow (40 fps) from Station 9+40 to Station 20+84.50.

3.4.1.2 Permanent View Finish

A permanent view (PV) finish shall be required for all surfaces that do not require HV finish or do not have backfill placed against them as shown.

3.4.2 Unformed Surfaces

3.4.2.1 General

The ambient temperature of spaces adjacent to surfaces being finished shall be not less than 40 degrees F. In hot weather when the rate of evaporation of surface moisture, as determined by use of Figure 2.1.5 of ACI 305R, may reasonably be expected to exceed 0.2 pounds per square foot per hour, provisions for windbreaks, shading, fog spraying, or evaporation retarding film shall be made in advance of placement to prevent plastic shrinkage cracks, and such protective measures shall be taken before, during, and immediately after finishing as operations require. All unformed surfaces of concrete that are not to be covered by additional concrete or backfill shall have a float finish, unless a trowel finish is specified, and shall be true to elevation as shown on the drawings. Surfaces to receive additional concrete or backfill shall be brought to the elevation shown and left true and regular. Exterior surfaces shall be sloped for drainage unless otherwise shown in the drawing or directed. Joints shall be carefully made with a jointing or edging tool. The finished surfaces shall be protected from stains or abrasions. The concrete shall be thoroughly consolidated before finishing operations commence or before leaving it for future concrete or backfill placement.

3.4.2.2 Float Finish

Surfaces to receive a float finish shall be screeded and darbied or bullfloated to bring the surface to the required finish level with no coarse aggregate visible. No water, cement, or mortar shall be added to the surface during the finishing operation. Floating may be performed by use of suitable hand floats or power-driven equipment. Hand floats shall be of aluminum or magnesium. After the water sheen has disappeared, the concrete, while still green but sufficiently hardened to bear a man's weight without deep imprint, shall be floated to a true even plane.

3.4.2.3 Trowel Finish

A hard steel trowel shall be applied to all unformed surfaces requiring HV finish. Concrete surfaces shall first be given a float finish. After surface moisture has disappeared, the surface shall be troweled to a smooth, even, dense finish, free from blemishes, including trowel marks. In lieu of hand finishing, an approved power finishing machine may be used in accordance with the directions of the machine manufacturer. A final hard steel troweling shall be done by hand. Joints shall be carefully made with a jointing or edging tool. The finished surfaces shall be protected from stains or abrasions. Surfaces or edges likely to be injured during the construction period shall be protected from damage.

3.4.2.4 Broom Finish

A broom finish shall be applied as indicated on the drawings. The concrete surface to be broom finished shall first be given a float finish. The surface shall then be broomed with a stiff fiber-bristle broom in a direction transverse to that of the traffic.

3.4.2.5 Bridge Decks

The Contractor shall set elevation control points, to be approved by the Contracting officer, which shall be used to establish the grade and cross section of the concrete deck surface. A tight wood float finish shall be provided on the surface of the bridge deck where excessive surface working will not be permitted. The exposed concrete surfaces shall be broomed in a transverse direction with a fine textured hair push broom to produce a uniform surface texture and eliminate float marks or shall be finished using an alternative method approved by the Contracting Officer achieving a similar surface texture. Brooming, shall be done when the surface is sufficiently set to prevent deep scaring. If directed by the Contracting Officer, a fine spray of water shall be applied to the surface immediately in advance of brooming.

3.4.3 Formed Surface Repair

3.4.3.1 General

Within 4 hours after removal of forms all ridges or lips shall be removed and undesirable local bulging on the surfaces to be permanently exposed shall be remedied. Concrete formwork requirements for the classes of finish specified are covered in SECTION: FORMWORK FOR CONCRETE. Epoxy bonding agent shall be in accordances with ACI 503.2. Latex bonding agent meeting the requirements of ASTM C 1059 may be used instead of epoxy resin if concrete to be patched was placed less than 24 hours previously.

3.4.3.2 High Velocity (HV) Finish

All defective areas (imperfections, voids, honeycomb, rock pockets, bug holes negative surface irregulatories, etc...) shall be repaired as shown below:

SIZE	REMOVAL	PATCHING
1/4 to 1 inch in diameter (and holes left by removal of form tie rods)	Reamed or chipped to a roughened surface	Epoxy bonding agent dry packed mortar
1 inch diameter to 16 square inches	Reamed, chipped or cut to a minimum depth of 3 inches	Epoxy bonding agent dry packed mortar or concrete
Areas exceeding 16 square inches	Dove-tailed saw cuts to a depth of 3 inches in a rectangular pattern and chipped 1 inch past reinforce-ment or 6 inches total	Epoxy bonding agent concrete (saw cuts that extend past corners shall be patched with dry-packed mortar)

NOTES: Grinding to meet tolerance is acceptable only if in accordance with paragraph: Surface Requirements

Patch tolerances are smaller and are critical for HV patch and nearby

concrete stability. The finished patch shall be flush at the edges and it's surface shall not vary by more that 1/16 inch or it shall be removed and redone.

3.4.3.3 Permanent View (PV) Finish

The surfaces of specified exterior formed concrete permanently exposed to view shall meet the following requirements: defective areas, voids, honeycomb, and bug holes which exceed 1/2-inch in diameter and holes left by removal of form tie rods shall be reamed or chipped and filled with dry pack mortar. Defective and unsound concrete areas larger than 36 square inches and deeper than 2 inches shall be outlined by saw cuts at least 1 inch deep in an approved rectangular pattern, the defective concrete removed, and repaired with concrete replacement as specified in paragraph: Material and Procedure for Repairs. The prepared area shall be brush-coated with an approved epoxy resin or with a neat cement grout after dampening and then filled with mortar or concrete.

3.4.3.4 All Other Formed Surfaces

After removal of forms, areas of honeycomb or voids which exceed 4 inches in diameter shall be reamed or chipped and filled with dry pack mortar. Defective and unsound areas larger than 48 square inches and deeper than 2 inches shall be removed by saw cuts in a rectangular pattern and repaired with concrete replacement as specified in paragraph: Material and Procedure for Repairs. The prepared area shall be brush-coated with an approved epoxy resin or with a neat cement grout after dampening and then filled with mortar or concrete.

3.4.3.5 Material and Procedure for Repairs

The cement used in the dry-pack mortar or replacement concrete shall be a blend of the cement utilized for production of project concrete and white portland cement properly proportioned so that the final color of the mortar or concrete will match adjacent concrete. Trial batches shall be utilized to determine the proportions required to match colors. Dry-pack mortar shall consist of 1 part cement to 2-1/2 parts fine aggregate. The fine aggregate shall be that utilized for production of project concrete. The mortar shall be remixed without addition of water until it obtains the stiffest consistency that will permit placing. Mortar shall be thoroughly compacted into the prepared void by tamping, rodding, ramming, etc., and struck off to adjacent concrete. Replacement concrete shall be produced utilizing project materials to meet requirements of the concrete it is replacing, and shall be proportioned by the Contractor and approved by the Contracting Officer. It shall be drier than the usual mixtures and shall be thoroughly compacted into the prepared void by tamping, rodding, ramming, etc., and shall be struck off and finished to adjacent concrete. Forms shall be utilized as required or as directed. Metal tools shall not be used to finish permanent view (PV) surfaces. The repaired areas shall be cured for 7 days. The temperature of the in-situ concrete, adjacent air and replacement mortar or concrete shall be above 50 degrees F during placement, finishing, and curing. Packaged materials meeting the requirements of ASTM C 928 may be used in lieu of dry-pack mortar when approved.

3.4.4 Toilet Room Finish

Tilework shall be laid out to minimize cuts less than one half the tile in size. Wall and floor tiles shall be aligned to give straight uniform grout

lines. Tiles shall be set in portland cement mortar, and grout manufacturer's recommendations shall be followed as to grouting procedures and precautions.

3.5 CURING AND PROTECTION

3.5.1 Curing Time

All concrete shall be cured by one of the following methods or combination of methods for the period of time given below corresponding to the cementing materials used in the concrete:

Type III portland cement	3 days
Type II portland cement	14 days
Portland cement blended with 25 percent or less fly-ash or GGBF slag	14 days
Portland cement blended with more than 25 percent fly-ash or GGBF slag	21 days

Curing shall begin immediately after placing. The Contractor shall have all equipment needed for adequate curing and protection of the concrete on hand and ready to install before actual concrete placement begins. The curing medium and method, or the combination of media and methods used, shall be as approved in accordance with paragraph: SUBMITTALS, SD-08 Statements, submittal item "Curing".

3.5.2 Moist Curing

Horizontal and nearly horizontal surfaces shall be moist cured by ponding, by covering with a minimum uniform thickness of 2 inches of continuously saturated sand, or by covering with saturated nonstaining burlap or cotton mats. Burlap and cotton mats shall be rinsed to remove soluble substances before using. Other surfaces shall be moist cured when approved or directed. Concrete that is moist cured shall be maintained continuously, not periodically, wet for the duration of the entire curing period. Water for curing shall comply with the requirements of the paragraph: WATER. If the water, sand, mats, etc. cause staining or discoloration of permanently exposed concrete surfaces, the surfaces shall be cleaned by a method approved. When wood forms are left in place during curing, the forms shall be kept continuously wet except for sealed insulation curing in cold weather. When steel forms are left in place on vertical surfaces during curing, the forms shall be carefully broken loose from the hardened concrete and curing water continuously introduced into the void. Horizontal construction joints shall be allowed to dry sufficiently to remove free water immediately prior to placing the next lift.

3.5.3 Membrane Curing

3.5.3.1 Materials

Membrane curing may be used on surfaces that are not specified or directed to receive moist curing and that are not to receive a grout-cleaned finish. Membrane-forming curing compound shall not be used on surfaces that contain protruding steel reinforcing, that are heated by free steam, that will have additional concrete bonded to them, or that are to be grout-cleaned. Compound conforming to ASTM C 309, Type 2, Class A, may be used on surfaces that will not be exposed to view when the project is completed. Only

pigmented compound of the styrene acrylate or chlorinated rubber formulation conforming to ASTM C 309, Class B, requirements may be used on surfaces that are to be painted or to receive bituminous roofing or water proofing or floors that are to receive adhesive applications of resilient flooring. The curing compound selected by the Contractor for such use shall be compatible with any subsequent paint, roofing, coating, or flooring specified elsewhere in the contract.

3.5.3.2 Application

The curing compound shall be applied to formed surfaces immediately after the forms are removed. The surfaces shall be thoroughly moistened with water, and the curing compound applied as soon as free water disappears. The curing compound shall be applied to unformed surfaces as soon as free water has disappeared provided steps have been taken when necessary to prevent premature loss of free water due to excessive evaporation as described in paragraph: UNFORMED SURFACES. The curing compound shall be applied in a two-coat continuous operation by motorized power-spraying equipment or pressure-tank equipment operating at a minimum pressure of 75 psi with provisions for continuous agitation. The application equipment shall be approved in advance. Hand-operated pressure applicators ("garden sprayers") shall not be used except in small, isolated areas as approved. The compound shall be applied at a uniform coverage of not more than 400 square feet per gallon for each coat. The second coat shall be applied perpendicular to the first coat. Concrete surfaces that have been subjected to rainfall within 3 hours after the curing compound has been applied shall be resprayed by the method and at the coverage specified. All concrete surfaces on which the curing compound has been applied shall be adequately protected for the duration of the entire curing period from pedestrian and vehicular traffic and from any other influence that will disrupt the continuity of the curing membrane.

3.5.4 Sheet Curing

Sheets shall be used only on horizontal or near horizontal surfaces. The sheets shall comply with the requirements of ASTM C 171, except that polyethylene sheet shall not be used. All surfaces shall be thoroughly wetted and completely covered with waterproof paper, or polyethylene-coated burlap. Covering shall be laid with light-colored side up. Covering shall be lapped not less than 4 inches and taped to form a continuous cover with completely closed joints. The sheet shall be weighted to prevent displacement so that it remains in contact with the concrete during the specified length of curing. Coverings shall be folded down over exposed edges of slabs and secured by approved means. Sheets shall be immediately repaired or replaced if tears or holes appear during the curing period.

3.5.5 Curing Color-Conditioned Concrete

In order to achieve color uniformity proper curing materials as recommended by the color additive manufacturer shall be used.

3.5.6 Protection

No fire or excessive heat shall be permitted near or in direct contact with concrete at any time. No vibratory earth compaction equipment or pile-driving equipment shall be operated within 100 feet horizontally of concrete less than 5 days old. Blasting shall not be permitted within 100 feet horizontally of concrete less than 90 days old. Blasting plans shall be approved by the Contracting Officer. All galleries, conduits, and other

openings through the concrete shall be kept closed or sealed during the entire construction period. The surface of the concrete shall be protected from rain or snow during placing.

3.6 BASE PLATES AND BEARING PLATES

3.6.1 Setting of Plates

After being plumbed and properly positioned, column base plates, bearing plates for beams and similar structural members, and machinery and equipment base plates shall be provided full bearing using Nonshrink grout. The space between the top of the concrete bearing surface and the bottom of the plate shall not be less than 1/24 of the width of the plate or 1/2 inch, whichever is greater. Concrete surfaces shall be clean, free of oil, grease, and laitance, and shall be damp. Metal surfaces shall be clean and free of oil, grease, and rust.

3.6.2 Nonshrink Grout

Nonshrink grout shall conform to the requirement of paragraph: MATERIAL SPECIFICATION. Water content shall be the minimum that will provide a flowable mixture and completely fill the space to be grouted without segregation, bleeding, or reduction of strength.

3.6.2.1 Mixing and Placing

Mixing and placing shall be in conformance with the material manufacturer's instructions and as specified. Ingredients shall be thoroughly dry-mixed before adding water. After adding water, the batch shall be mixed for 3 minutes. Batches shall be sized to allow continuous placement of freshly mixed grout. Grout not used within 30 minutes after mixing shall be discarded. The space between the top of the concrete or masonry bearing surface and the plate shall be filled with the grout. Forms shall be of wood or other suitable material for retaining the grout and shall be removed after the grout has hardened. If Grade "A" grout is used, all surfaces, including top surfaces, shall be formed to provide restraint. The placed grout shall be worked to eliminate voids; however, overworking and breakdown of the initial set shall be avoided. Grout shall not be retempered or subjected to vibration from any source. Where clearances are unusually small, placement shall be made under pressure with a grout pump. Temperature of the grout, and of surfaces receiving the grout, shall be maintained at 65 to 85 degrees F until after setting.

3.6.2.2 Treatment of Exposed Surfaces

Those types of grout containing metallic aggregate, Grade B or C grout, shall, after setting, have exposed surfaces under cut back 1 inch from the edge of the base plate and immediately covered with a thick coat of mortar proportioned by weight of one part portland cement, two parts sand, and sufficient water to make the mixture placeable. The parge coat shall have a smooth, dense finish. The exposed surface of other types of nonshrink grout shall have a smooth, dense finish.

3.6.2.3 Curing

Grout and parge coats shall be cured in conformance with paragraph: CURING AND PROTECTION.

3.7 BLOCK-OUT CONCRETE

3.7.1 Composition and Proportions

Block-out concrete shall be composed of portland cement, water, fine and coarse aggregate, and admixtures. The concrete mixture proportions, including admixture, will be provided by the Contracting Officer. An expansive admixture shall be used to cause the blockout concrete to expand to fit snugly in the space that confines it. The expansive admixture shall conform to the requirements of ASTM C 937 for grout fluidifier. Any block-out concrete not placed within 30 minutes after contact of the cement and admixture shall be wasted. The block-out shall be confined on all sides to provide restraint.

3.7.2 Placing Block-out Concrete

Blockouts shall be provided as shown on the plans for the embedment of gate seal seats, gate guides, bulkhead guides, beams embedded for bulkhead seals, crane rails, and other embedded metalwork as appropriate. Prior to installation of embedded items, the block-outs or recesses shall be cleaned in accordance with applicable requirements of the paragraph on construction joint treatment. After installation of embedded items and prior to placing any forms, all surfaces of the block-outs or recesses and surfaces of items to be embedded shall be thoroughly cleaned of all loose material, oil, grease, and other contaminants which might reduce the bond between the surfaces of the blockouts or recesses and new concrete. Extreme caution shall be exercised in placing block-out concrete to avoid distortion or displacement of the embedded items.

3.8 TESTS AND INSPECTIONS

3.8.1 General

The Contractor shall perform the following inspection and tests as described, and, based upon the results of these inspections and tests, he shall take the action required and submit reports as required. When, in the opinion of the Contracting Officer, the concreting operation is out of control, concrete placement shall cease. The laboratory performing the tests shall be on-site and shall conform with the requirements given in ASTM C 1077. The individuals who sample and test concrete or the constituents of concrete as required in this specification shall have demonstrated a knowledge and ability to perform the necessary test procedures equivalent to the ACI minimum guidelines for certification of Concrete Field Testing Technicians, Grade I. The Government will inspect the laboratory, equipment, and test procedures prior to start of concreting operations and at least once per year thereafter for conformance with ASTM C 1077. The individual who performs the inspection shall have demonstrated a knowledge and ability equivalent to the ACI minimum guidelines for certification of Concrete Construction Inspector, Level II.

3.8.2 Testing and Inspection Requirements

3.8.2.1 Fine Aggregate

a. Grading - At least once during each shift when the concrete plant is operating, there shall be one sieve analysis and fineness modulus determination in accordance with ASTM C 136 , ASTM C 117 and COE CRD-C 104 for the fine aggregate or for each fine aggregate if it is batched in more than one size or classification. The location at which samples are taken may be

selected by the Contractor as the most advantageous for control. However, the Contractor is responsible for delivering fine aggregate to the mixer within specification limits. The results shall be recorded on a sheet on which are also shown the specification limits applicable to the project.

b. Fineness Modulus Control Chart - Results for fineness modulus shall be grouped in sets of three consecutive tests, and the average and range of each group shall be plotted on a control chart. The upper and lower control limits for average shall be drawn 0.10 units above and below the target fineness modulus, and the upper control limit for range shall be 0.20 units above the target fineness modulus.

c. Corrective Action for Fine Aggregate Grading - When the amount passing any sieve is outside the specification limits, the fine aggregate shall be immediately resampled and retested. If there is another failure for any sieve, the fact shall immediately be reported. Whenever a point on the fineness modulus control chart, either for average or range, is beyond one of the control limits, the frequency of testing shall be doubled. If two consecutive points are beyond the control limits, the process shall be considered out of control and concreting shall be stopped. Notify the Contracting Officer, and take immediate steps to rectify the situation. After two consecutive points have fallen within the control limits, testing at the normal frequency may be resumed.

d. Moisture Content Testing - When in the opinion of the Contracting Officer the electric moisture meter is not operating satisfactorily, there shall be at least four tests for moisture content in accordance with ASTM C 566 during each 8-hour period of mixing plant operation. The times for the tests shall be selected randomly within the 8-hour period. An additional test shall be made whenever the slump is shown to be out of control or excessive variation in workability is reported by the placing foreman. When an electric moisture meter is operating satisfactorily, at least two direct measurements of moisture content shall be made per week to check the calibration of the meter. The results of tests for moisture content shall be used to adjust the added water in the control of the batch plant.

e. Moisture Content Corrective Action - Whenever the moisture content of the fine aggregate changes by 0.5 percent or more, the scale settings for the fine-aggregate batcher and water batcher shall be adjusted (directly or by means of a moisture compensation device).

3.8.2.2 Coarse Aggregate

a. Grading - At least once during each shift in which the concrete plant is operating, there shall be a sieve analysis in accordance with ASTM C 136 for each size of coarse aggregate. The location at which samples are taken may be selected by the Contractor as the most advantageous for production control. However, the Contractor shall be responsible for delivering the aggregate to the mixer within specification limits. A test record of samples of aggregate taken at the same locations shall show the results of the current test as well as the average results of the five most recent tests including the current test. The Contractor may adopt limits for control coarser than the specification limits for

samples taken other than as delivered to the mixer to allow for degradation during handling. When facilities are available to test samples five times as large as those required in ASTM C 136, no averaging shall be done.

b. Corrective Action for Grading - When the amount passing any sieve is outside the specification limits, the coarse aggregate shall be immediately resampled and retested. If the second sample fails on any sieve, that fact shall be reported. Where two consecutive averages of five tests (or two consecutive tests where large samples are used) are outside specification limits, the operation shall be considered out of control, and that fact shall be reported, concreting shall be stopped, and immediate steps shall be taken to correct the grading.

c. Coarse Aggregate Moisture Content - A test for moisture content of each size group of coarse aggregate shall be made at least once a shift. When two consecutive readings for smallest size coarse aggregate differ by more than 1.0 percent, frequency of testing shall be increased to that specified previously for fine aggregate.

d. Coarse Aggregate Moisture Corrective Action - Whenever the moisture content of any size of coarse aggregate changes by 0.5 percent or more, the scale setting for the coarse aggregate batcher and the water batcher shall be adjusted to compensate for this.

e. Particle Shape Testing - When directed, a problem exists in connection with aggregate particle shape, tests shall be made in accordance with ASTM D 4791. Testing frequency shall be not less than one per day, when directed.

f. Particle Shape Corrective Action - When testing for particle shape is required, two consecutive failures in the same sieve size shall be immediately reported, who shall determine what corrective action is needed.

g. Material Finer than the No. 200 Sieve - When in the opinion of the Contracting Officer, a problem exists in connection with the cleanliness of aggregate, tests shall be made in accordance with ASTM C 117. Testing frequency shall be as directed.

h. Corrective Action for Material Finer than the No. 200 Sieve - When material finer than the No. 200 sieve exceeds 1.0 percent of the weight of the aggregate finer than 1-1/2 inches or 0.5 percent of the weight of the aggregate coarser than 1-1/2 inches, the Contracting Officer shall be notified and steps, such as washing or other corrective action, shall be initiated immediately.

3.8.2.3 Quality of Aggregates

a. Frequency of Quality Tests - Prior to submitting samples for mixture proportioning studies and 30 days prior to the start of concrete placement, the Contractor shall perform the tests for aggregate quality in the following list. In addition, after the start of concrete placement, the Contractor shall perform tests for aggregate quality in accordance with the following frequency schedule. Samples tested after the start of concrete placement shall be taken immediately prior to entering the concrete mixer.

PROPERTY	FREQUENCY FINE AGGREGATE	COARSE AGGREGATE	TEST
Specific Gravity	Every 3 months	Every 3 months	ASTM C 127 ASTM C 128
Absorption	Every 3 months	Every 3 months	ASTM C 127 ASTM C 128
Clay Lumps and Friable Particles	Every 3 months	Every 3 months	ASTM C 142
Material Finer than the No. 200 Sieve	Every 3 months	Every 3 months	ASTM C 117
Organic Impurities	Annually	Not applicable	ASTM C 40
L.A. Abrasion	Not applicable	Every 6 months	ASTM C 131 ASTM C 535

b. Corrective Action for Aggregate Quality - If the result of a quality test fails to meet the requirements for quality during submittal of samples for mixture-proportioning studies or immediately prior to start of concrete placement, production procedures or materials shall be changed and additional tests shall be performed until the material meets the quality requirements prior to proceeding with either mixture-proportioning studies or starting concrete placement. After concrete placement commences, whenever the result of a test for quality fails the requirements, the test shall be rerun immediately. If the second test fails the quality requirement, the fact shall be reported and immediate steps taken to rectify the situation.

3.8.2.4 Scales

a. Weighing Accuracy - The accuracy of the scales shall be checked by test weights at least once a month for conformance with the applicable requirements of paragraph: EQUIPMENT. Such tests shall also be made as directed whenever there are variations in properties of the fresh concrete that could result from batching errors.

b. Batching and Recording Accuracy - Once a week the accuracy of each batching and recording device shall be checked during a weighing operation by noting and recording the required weight, recorded weight, and the actual weight batched. The Contractor shall confirm that the calibration devices described in paragraph: EQUIPMENT for checking the accuracy of dispensed admixtures, are operating properly.

c. Scales Corrective Action - When either the weighing accuracy or batching accuracy does not comply with specification requirements, the plant shall not be operated until necessary adjustments or repairs have been made. Discrepancies in recording accuracies shall be corrected immediately.

3.8.2.5 Batch-Plant Control

The measurement of all constituent materials including cementitious materials, each size of aggregate, water, and admixtures shall be continuously controlled. The aggregate weights and amount of added water shall be adjusted as necessary to compensate for free moisture in the aggregates. The amount of air-entraining agent shall be adjusted to control air content within specified limits. A report shall be prepared indicating type and source of cement used, type and source of pozzolan or slag used, amount and source of admixtures used, aggregate source, the required aggregate and water weights per cubic yard, amount of water as free moisture in each size of aggregate, and the batch aggregate and water weights per cubic yard for each class of concrete batched during plant operation.

3.8.2.6 Concrete

a. Slump Testing - At least two slump tests shall be made in accordance with ASTM C 143 on each concrete mixture produced during each 8-hour period or less of concrete production each day. Additional tests shall be made when excessive variation in workability is reported. The result of each test for each mixture shall be plotted on a control chart on which the upper and lower limits are set as specified in paragraph: MIXTURE PROPORTIONING. The range shall be plotted on a control chart on which the upper control limit is 2 inches. Samples for slump shall be taken at the mixer, however the Contractor is responsible for delivering the concrete to the placement site at the stipulated slump. If the Contractor's materials or transportation methods cause slump loss between the mixer and the placement, samples shall be taken at the placement site as often as required by the Contracting Officer.

b. Slump Corrective Action - Whenever points on the control chart approach the upper or lower control limits, an adjustment shall be made in the batch weights of water and fine aggregate. The adjustments are to be made so that the total water content does not exceed that amount specified in the mixture proportions provided based on the free water available with the aggregates and that amount of water batched. If the adjustments to the batch weights of water and aggregates do not satisfactorily produce the required slump, the Contracting Officer may adjust the mixture proportions if the fine-aggregate moisture content is stable and within the required limits. When a single slump is outside the control limits, such adjustment is mandatory. As soon as practical after each adjustment, another test shall be made to verify the correctness of the adjustment. Whenever two consecutive individual slump tests, made during a period when there was no adjustment of batch weights, produce a point on the control chart for range above the upper control limits, the slump shall be considered to be out of control, the concreting operation halted, and the additional testing for aggregate moisture content required shall be undertaken, and action taken immediately to correct the problem.

c. Air Content - At least two tests for air content shall be made on randomly selected batches of each concrete mixture produced during each 8 hour period of concrete production. Additional tests shall

be made when excessive variation in workability is reported. Tests shall be made in accordance with ASTM C 231. The average of each set of two tests for each mixture shall be plotted on control charts on which the average percent and upper and lower limits are set in accordance with paragraph MIXTURE PROPORTIONING for each NMSA. The range between two consecutive tests for each mixture shall be plotted on a control chart on which the upper control limit is 3.0 percent. Samples for air content shall normally be taken at the mixer, however the Contractor is responsible for delivering the concrete to the forms at the proper air content. Samples shall be taken at the placement site as often as required, depending on the Contractors delivery method, to determine any air loss.

d. Air Content Corrective Action - Whenever points on the control chart approach the upper or lower control limits, an adjustment should be made in the amount of air-entraining admixture batched. If a single test result is outside the specification limit, immediate adjustment is mandatory. As soon as practical after each adjustment, another test shall be made to verify the correction of the adjustment. Whenever a point falls above the upper control for range, the dispenser shall be calibrated to ensure that it is operating correctly and with good reproducibility. Whenever two consecutive points either for average or range are outside the control limits, the Contracting Officer shall be notified.

3.8.2.7 Inspection Before Placing

Foundation or construction joints, forms, and embedded items shall be inspected by the Contractor in sufficient time prior to each concrete placement in order to certify that they are ready to receive concrete. The results of each inspection shall be reported in writing.

3.8.2.8 Concrete Placement

a. Placing Inspection - The placing foreman shall supervise all placing operations, shall determine that the correct quality of concrete or grout is placed in each location as directed, and shall be responsible for measuring and recording concrete temperatures and ambient temperature hourly during placing operations, weather conditions, time of placement, yardage placed, and method of placement.

b. Placing Corrective Action - The placing foreman shall not permit placing to begin until he has verified that an adequate number of vibrators in working order and with competent operators are available. Placing shall not be continued if any pile of concrete is inadequately consolidated. If any batch of concrete fails to meet the temperature requirements, immediate steps shall be taken to improve temperature controls.

3.8.2.9 Vibrators

a. Vibrator Testing and Use - The frequency and amplitude of each vibrator shall be determined in accordance with COE CRD-C 521 prior to initial use and at least once a month when concrete is being placed. Additional tests shall be made as directed when a

vibrator does not appear to be adequately consolidating the concrete. The frequency shall be determined while the vibrator is operating in concrete with the tachometer being held against the upper end of the vibrator head while almost submerged and just before the vibrator is withdrawn from the concrete. The amplitude shall be determined with the head vibrating in air. Two measurements shall be taken, one near the tip and another near the upper end of the vibrator head, and these results averaged. The make, model, type, and size of the vibrator and frequency and amplitude results shall be reported in writing.

b. Vibrator Corrective Action - Any vibrator not meeting the requirements of paragraph: PREPARATION FOR PLACING shall be immediately removed from service and repaired or replaced.

3.8.2.10 Curing

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

b. Moist Curing Corrective Action - When a daily inspection report lists an area of inadequate moistness, immediate corrective action shall be taken, and the required curing period for those areas shall be extended by one (1) day.

c. Membrane Curing Inspection - No curing compound shall be applied until the Contractor's authorized representative has verified that the compound is properly mixed and ready for spraying. At the end of each operation, he shall estimate the quantity of compound used by measurement of the container and the area of concrete surface covered and compute the rate of coverage in square feet per gallon. He shall note whether or not coverage is uniform.

d. Membrane Curing Corrective Action - When the coverage rate of the curing compound is less than that specified or when the coverage is not uniform, the entire surface shall be sprayed again.

e. Sheet Curing Inspection - At least once each shift and once per day on nonwork days, an inspection shall be made of all areas being cured using sheets. The condition of the covering and the tightness of the laps and tapes shall be noted and recorded.

f. Sheet Curing Corrective Action - When a daily inspection report lists any tears, holes, or laps or joints that are not completely closed, the tears and holes shall promptly be repaired or the sheets replaced, the joints closed, and the required curing period for those areas shall be extended by one (1) day.

3.8.2.11 Cold Weather Protection and Sealed Insulation Curing

At least once each shift and once per day on nonwork days an inspection shall be made of all areas subject to cold weather protection. The protection system shall be inspected for holes, tears, unsealed joints, or other incongruities which could result in damage to the concrete. Special attention shall be taken at edges, corners, and thin sections. Any deficiencies shall be noted, corrected, and reported.

3.8.2.12 Cold Weather Protection Corrective Action

When a daily inspection report lists any holes, tears, unsealed joints, or other incongruities, the deficiency shall be corrected immediately and the period of protection extended for one (1) day.

3.8.2.13 Mixer Uniformity

Prior to the start of concrete placing and once every 3 months when concrete is being placed, or once for every 75,000 cubic yards of concrete placed, whichever results in the longest time, interval uniformity of concrete mixing shall be determined in accordance with paragraph: EQUIPMENT. The initial and every fourth set of tests shall be regular tests performed on three batches of concrete. Intermediate uniformity tests shall be abbreviated tests performed on a single batch of concrete. If the mixer fails the abbreviated test, a regular test shall be immediately performed. Whenever adjustments in a mixer or increased mixing time are required because of failure of a uniformity test, the mixer shall be reevaluated by a regular test after the adjustments have been completed. If the Contractor proposes to reduce a mixing time, a regular test shall be performed to evaluate the proposed time. Additional testing shall be performed when directed when there is visible evidence of possible improper mixer performance. Results of all uniformity tests shall be reported in writing.

3.8.2.14 Mixer Uniformity Corrective Action

When a mixer fails to meet mixer uniformity requirements, either the mixing time shall be increased, batching sequence changed, batch size reduced, or adjustments shall be made to the mixer until compliance is achieved.

3.8.3 Reports

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

-- End of Section --

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SECTION 05120

STRUCTURAL STEEL

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 INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC ASD Manual	(1989) Manual of Steel Construction Allowable Stress Design

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A14.3	(1992) Ladders - Fixed - Safety Requirements

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36	(1997ael) Carbon Structural Steel
ASTM A 48	(1994ael) Gray Iron Castings
ASTM A 53	(1999b) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 123	(2000) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 276	(1998) Stainless Steel Bars and Shapes
ASTM A 307	(1997) Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
ASTM A 312	(1995) Seamless and Welded Austenitic Stainless Steel Pipes
ASTM A 325	(1997) Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A 500	(1999) Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 572	(1999) High-Strength Low-Alloy Columbium-Vanadium Structural Steel
ASTM A 603	(1998) Zinc-Coated Steel Structural Wire

	Rope
ASTM D 395	(1989; R 1994) Rubber Property - Compression Set
ASTM D 412	(1998; Rev. A) Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension
ASTM D 471	(1996) Rubber Property - Effect of Liquids
ASTM D 572	(1988; R 1994) Rubber - Deterioration by Heat and Oxygen
ASTM D 2000	(1999) Rubber Products in Automotive Applications
ASTM D 2240	(1997el) Rubber Property - Durometer Hardness

AMERICAN WELDING SOCIETY (AWS)

AWS A2.4	(1998) Standard Symbols for Welding, Brazing and Nondestructive Examination
AWS A5.1	(1991) Carbon Steel Electrodes for Shielded Metal Arc Welding
AWS A5.4	(1992) Stainless Steel Electrodes for Shielded Metal Arc Welding
AWS D1.1	(2000) Structural Welding Code - Steel

FEDERAL SPECIFICATIONS (FS)

FS FF-B-575C	(1970) Bolts, Hexagon and Square
FS FF-N-836E	(1994) Nut: Square, Hexagon, Cap, Slotted, Castle Knurled, Welding and Single Ball Seat
FS FF-S-85C	(1994) Screw, Cap, Spotted and Hexagon Head
FS FF-S-325	Shield Expansion; Nail, Expansion and Nail, Drive Screw (Devices, Anchoring, and Masonry)
FS FF-W-84A	(1992) Washers, Lock (Spring)
FS FF-W-92B	(1995) Washer, Flat (Plain)
FS FF-W-100C	(1980) Washer, Lock, Teeth
FS RR-G-661	Grating Metal, Bar Type (Floor Except for Naval Vessels)
FS TT-P-86	Paint, Red-Lead-Base, Ready-Mixed

1.2 GENERAL REQUIREMENTS

Structural steel fabrication and erection shall be performed by an organization experienced in structural steel work of equivalent magnitude. The Contractor shall be responsible for correctness of detailing, fabrication, and for the correct fitting of structural members. Connections, for any part of the structure not shown on the contract drawings, shall be considered simple shear connections and shall be designed and detailed in accordance with pertinent provisions of AISC ASD Manual. Substitution of sections or modification of connection details will not be accepted unless approved by the Contracting Officer. AISC ASD Manual shall govern the work. Welding shall be in accordance with AWS D1.1. High-strength bolting shall be in accordance with AISC ASD Manual.

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-02 Shop Drawings

Structural Steel System; G
Structural Connections; G

Shop and erection details including members (with their connections) not shown on the contract drawings. Welds shall be indicated by standard welding symbols in accordance with AWS A2.4.

Miscellaneous Steel and Metalwork; G

Shop drawings of miscellaneous steel items.

SD-03 Product Data

Erection

Prior to erection, erection plan of the structural steel framing describing all necessary temporary supports, including the sequence of installation and removal.

SD-04 Samples

High Strength Bolts and Nuts
Carbon Steel Bolts and Nuts
Nuts Dimensional Style
Washers

Random samples of bolts, nuts, and washers as delivered to the job site if requested, taken in the presence of the Contracting Officer and provided to the Contracting Officer for testing to establish compliance with specified requirements.

SD-05 Design Data

Manufacturer's Data; G.

Manufacturer's data for all anchor systems, including expansion

anchors and epoxy systems shall be submitted for approval prior to commencing the work.

SD-07 Certificates

Rubber Seals and Gaskets

Certificate of compliance that rubber seals and neoprene gaskets and anchors meet the requirements stated in this section.

Mill Test Reports

Certified copies of mill test reports for structural steel, structural bolts, nuts, washers and other related structural steel items, including attesting that the structural steel furnished contains no less than 25 percent recycled scrap steel and meets the requirements specified, prior to the installation.

Welder Qualifications

Certified copies of welder qualifications test records showing qualification in accordance with AWS D1.1.

Fabrication

A copy of the AISC certificate indicating that the fabrication plant meets the specified structural steelwork category.

1.4 STORAGE

Material shall be stored out of contact with the ground in such manner and location as will minimize deterioration.

PART 2 PRODUCTS

2.1 STRUCTURAL STEEL BARS, PLATES AND SHAPES

2.1.1 General

Bars, plates, and shapes for all items except maintenance bulkhead shall conform to ASTM A 36 unless otherwise specified. Bars, plates and shapes for maintenance bulkhead shall conform to ASTM A 572 unless otherwise specified.

2.1.2 Structural Tubing

Structural tubing shall conform to ASTM A 500, Grade B, minimum yield strength 46Ksi, unless otherwise specified.

2.1.3 Steel Pipe

Steel pipe shall conform to ASTM A 53, Type S, Grade B unless otherwise specified. Corrosion-resisting steel pipe shall conform to ASTM A 312.

2.1.4 Pulling Eyes

Eyes shall conform to the requirements of ASTM A 36 and shall be hot-dip galvanized in accordance with ASTM A 123 and shall conform to the details shown on approved manufacturer's drawings.

2.1.5 Corrosion-Resisting Steel (Stainless Steel)

2.1.5.1 Bars, Shapes and Plate

Except as otherwise shown or specified, all plates shown to be corrosion-resisting steel shall conform to the requirements of ASTM A 276, Type 304. Bars, shapes and plates shall be hot-rolled, annealed, and pickled. Bars may be cut from the above-specified plate.

2.1.5.2 Cleaning and Passivating

The steel shall be cleaned and passivated as specified in Section 05501: METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS.

2.1.6 Spring Steel

All springs shall be of a material conforming to the requirements of ASTM A 689, unless otherwise indicated. Physical properties shall be as shown and as approved. Springs shall be heat-treated before and after forming.

2.1.7 Steel Gratings

Steel bar gratings shall conform to the requirements of FS RR-G-661, Type I or Type II, banded. All bar grating shall be of the same type. All grating shall be galvanized unless shown otherwise. Galvanized and repair of damaged galvanized coatings shall be in accordance with SECTION 05501: METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS.

2.1.8 Threaded Bolts, Nuts, Studs, Anchors and Washers

2.1.8.1 General

Unless otherwise indicated, threaded bolts, nuts and studs shall conform to the requirements of FS FF-B-575C Type III, Grade 1. Threaded nuts for general bolting, unless otherwise indicated, shall conform to FS FF-N-836E, Type II, Style 11.

2.1.8.2 Studs

Studs shall be as specified in SECTION 05501: METALWORK FABRICATION, MACHINE WORK AND MISCELLANEOUS PROVISIONS.

2.1.8.3 Corrosion-Resisting Steel

Corrosion-resisting steel for capscrews, bolts, and nuts shall be as shown or shall conform to ASTM A 276. Lock washers specified as corrosion-resisting steel shall be corrosion-resisting steel of good commercial grade.

2.1.8.4 High-Strength Bolts and Nuts

All bolted connections that are indicated or specified to be assembled with high-strength bolts shall be assembled with bolts, nuts and washers, if required, which meet the requirements of ASTM A 325.

2.1.8.5 Capscrews and Nuts

Capscrews shall conform to the requirements of FS FF-S-85C, Type 1, Style

1S, Grade 2. Nuts shall conform to the requirements of FS FF-N-836E, Type II, Style 11, carbon steel unless otherwise indicated. Material for capscrews and nuts for the maintenance bulkhead seal bars shall be 300 series, corrosion-resistant steel.

2.1.8.6 Anchor Bolts

Steel for anchor bolts without heads and with non-standard thread lengths shall conform to the applicable requirements of ASTM A 307, Grade B, with heavy series hexagon nuts, unless otherwise shown.

2.1.8.7 Concrete Anchors

Concrete anchors shall conform to the following average pullout and shear values which are values for 4,000 psi concrete. All concrete anchors shall be epoxy grouted when installed. Data on anchors shall be submitted for Contracting Officer approval.

2.1.8.8 Expansion Anchors

Expansion anchors, if required to be provided by the Contracting Officer, shall conform to the requirements of FS FF-S-325, Group II, Type 4, Group III, Type 1, or Group VIII, Type I, internally threaded, or as shown on approved manufacturer's drawings. Data on anchors shall be submitted for Contracting Officer's approval in the following table format.

Stud Diameter Proof Load Tension Proof Load Shear Safe Working Loads

2.1.8.9 Washers

Spring-type lock washers shall conform to FS FF-W-84A, Class A, Style 2. Flat washers shall conform to FS FF-W-92B, Type A, Grade I, Class A, galvanized. Tooth-type lock washers shall conform to FS FF-W-100C, Type I, Grade B.

2.1.9 Steel Pipe Handrails

2.1.9.1 General

The handrails shall be fabricated and installed as shown. The pipe portions of handrails shall be fabricated from Schedule 40 steel pipe except all posts and standards shall be Schedule 80 steel pipe.

2.1.9.2 Fabrication

Unless otherwise shown, corner fittings shall be provided with inside radius equal to the nominal pipe diameter. Posts, rails, and corners shall be jointed by mitered and welded joints made by fitting posts to top rail and intermediate rail to post, mitering corners, groove welding joints and grinding to a smooth, uniform finish. All exposed welds shall be ground smooth and flush to match and blend with adjoining surfaces. Butt splices shall be reinforced by a tightfitting interior sleeve not less than 6 inches long. Railings may be bent at corners instead of joining if bends are uniformly formed in jigs with circular cross-section of pipe maintained throughout the entire bend.

2.1.9.3 Installation

Railings shall be adjusted prior to securing in place to ensure proper

matching at butt joints and correct alignment throughout their length. Posts shall be plumbed in each direction.

2.1.9.4 Finish

Handrails shall be galvanized after fabrication including pipe, fittings, brackets, fasteners, and other ferrous metal components. Excess zinc shall be filed off for a smooth finish.

2.1.10 Welding Electrodes

2.1.10.1 Steel

Welding electrodes shall meet the requirements of AWS A5.1 for low-hydrogen electrodes, classification numbers as required for the position of welding and the material being welded.

2.1.10.2 Alloy Steel

a. Low-Alloy Steel: Alloy steel welding electrodes shall be as recommended for the application by the manufacturer of the electrodes.

b. Corrosion-Resisting Steel: Welding electrodes shall conform to the requirements of AWS A5.4. Classification number shall be as indicated or recommended by the manufacturer of the electrodes and as approved.

2.1.11 Rubber Seals and Gaskets

2.1.11.1 General

Seals shall be handled and stored in a manner to prevent damage. Seals which have been cut, torn or otherwise damaged shall not be used. Bending or rolling in tighter coils than those in which the seals are packed at the factory shall be avoided. Storage shall be indoors, in original package, and without heavy loading or exposure to oils, chemicals, vapors or ozone. Storage temperatures shall not exceed 100 degrees F. Except for durometer hardness and 300 percent modulus, all rubber seals and gaskets shall meet the requirements set forth below. The durometer hardness of such gaskets and seals, except as specifically otherwise shown, shall meet the requirements set forth herein for seals. For seals of 40 durometer or less hardness, the specified test value of 900 psi (min) for the 300 percent modulus is reduced to 400 psi (min).

2.1.11.2 Rubber Seals

The rubber seals shall be molded only and the material shall be compounded of natural or synthetic polyisoprene or a blend of both and shall contain reinforcing carbon black, zinc oxide, accelerators, antioxidants, vulcanizing agents, and plasticizers. Physical characteristics shall meet the following requirements:

Physical Test	Test Value	Test Method Specification
Tensile Strength	2,500 psi (min)	ASTM D 412
Elongation at Break	450 percent (min)	ASTM D 412
300 Percent Modulus	900 psi (min)	ASTM D 412

Physical Test	Test Value	Test Method Specification
Durometer Hardness, Shore Type A	65 - 70	ASTM D 2240
Compression Set	30 percent (max)	ASTM D 395
Tensile Strength after Aging 48 Hours	80 percent (min) of tensile strength	ASTM D 572

The water absorption test shall be performed with distilled water. The washed specimen shall be blotted dry with filter paper or other absorbent material and suspended by means of small glass rods in the oven at a temperature of 70 ± 2 degrees C for 22 ±1/4 hours. The specimen shall be removed, allowed to cool to room temperature in air, weighed and the weight recorded to the nearest milligram as W1 (W1 defined in ASTM D 471). The immersion temperature shall be 70 degrees ± 1 degree C and the duration of immersion shall be 166 hours.

2.1.11.3 Neoprene Gaskets

Material for neoprene gaskets shall conform to ASTM D 2000, 3BC620A14.

2.1.12 Zinc-Coating (Hot-Dip)

All surfaces from which galvanizing is removed during installation shall be repaired in accordance with SECTION 05501: METALWORK FABRICATION, MACHINE WORK, AND MISCELLANEOUS PROVISIONS.

2.1.13 Miscellaneous Metal Items

Unless noted otherwise on the specification drawings or shown otherwise in these Specifications, all miscellaneous steel items shall conform to ASTM A 36 requirements.

2.1.14 Wire Rope

2.1.14.1 General

Wire rope shall conform to ASTM A 603 unless otherwise specified. Wire rope shall be Fiber Core, 6 x 19, two-operation classification, monitor steel or improved plow steel grade.

2.1.14.2 Fittings

Wire rope fittings shall match wire rope size and shall develop 100 percent of wire rope strength.

2.1.15 Ladders

Ladders shall be galvanized, fixed rail type in accordance with ANSI A14.3.

2.1.16 Roof Hatches

Roof hatches shall be of galvanized steel not less than 14 gauge, with 3 inch beaded flange welded and ground at corners. Roof hatches shall be of the size shown on the plans and shall withstand traffic loading where indicated. Cover and curb shall be insulated with 1 inch thick rigid insulation covered and protected by galvanized steel liner not less than 26 gauge. The curb shall be equipped with an integral metal cap flashing

of the same gauge and metal as the curb, full welded and ground at corners for weathertightness. Scuttle shall be completely assembled with heavy hinges, compression spring operators enclosed in telescopic tubes, positive snap latch with turn handles on inside and outside and neoprene draft seal. Fasteners shall be provided for padlocking on the inside. The cover shall be equipped with an automatic hold-open arm complete with handle to permit one hand release.

2.1.17 Manhole Frame and Cover

Frame and cover to access for bridge bearing pad inspection shall be cast iron conforming with ASTM A 48 Class 35B. Cast iron frame and over shall be circular and shall be of type suitable for the application.

2.1.18 Fall Prevention System

A rigid fall prevention system from manhole access for bridge bearing pad inspection shall consist of carrier rail, telescoping extension, mounting sleeve, clamps, brackets, belt, etc. All components of the system shall be galvanized steel.

PART 3 EXECUTION

3.1 PAINTING

Unless otherwise specified, painting shall conform to SECTION 09940: PAINTING-HYDRAULIC STRUCTURES AND APPURTENANT WORKS, and the applicable specification drawings.

3.2 STRUCTURAL STEEL

3.2.1 General

The items covered under this paragraph include all structural steel items as shown on drawings or as required in these specifications including the following:

1. River outlet slide gates.
2. River outlet slide gate bodies.
3. River outlet slide gate bonnets.
4. River outlet slide gate bonnet covers.
5. River outlet emergency bulkhead gates.
6. River outlet emergency bulkhead guides.
7. River outlet frames and seal seats emergency bulkhead lifting beam.
8. River outlet emergency bulkhead storage latches and accessories.
9. Maintenance bulkheads.
10. Maintenance bulkhead frames, guides and seats.
11. Maintenance bulkhead lifting beam.

12. Maintenance bulkhead storage latches and accessories.

13. Low flow outlet pipes and valves.

14. River outlet trashracks and frames.

15. Low flow outlet trashracks and frames.

16. All other structural items not specifically itemized above.

3.2.2 Trashracks and Frames

3.2.2.1 General

The alignment and dimensions of all gates, bulkheads, guides, and trashracks shall be such that proper operation of bulkheads and trashracks is assured. The guides shall be adjusted to correct position before grouting and concreting. Guides for which close tolerances are specified or required shall be installed in blockouts as shown. Guides for which no blockouts are shown may be installed in surrounding concrete without the use of blockouts, provided that the tolerances specified or shown on the drawings are met. However, to ensure proper installation, such guides may be installed in approved blockouts. Before concreting blockouts, the bulkheads shall be operated through as many raising and lowering cycles as required to assure that no binding occurs.

3.2.2.2 Tests and Trials

After concreting blockouts, bulkheads shall be tested in their appropriate guides to demonstrate that no binding occurs in the guides. All tolerances shown on the drawings or contained in the Specifications shall be met. After testing, any item that does not operate properly or does not meet dimensional tolerances shall be corrected.

3.2.2.3 Rubber Seals and Gaskets

The length of each face of seal shall be molded in one piece or made continuous by factory vulcanizing. Any such vulcanizing joint which has sufficient variation in thickness to impair the sealing functions will be rejected. Cemented splices may be used when shown. Cemented splices shall develop a tensile strength of not less than 50 percent of the unspliced section. All seals shall have been aged for 30 days or more to provide for shrinkage of the material before being assembled and drilled. Bolt holes shall be drilled to match the holes in the structural members. Rubber seals, if attached to structural members in the shop, shall be protected by suitable pads during shipment. Seals shall have molded corners vulcanized to straight sections unless otherwise detailed. Corners shall be molded in one piece, each run extending a minimum of 12 inches plus an additional length so that the splice line will avoid bolt holes in the web portion.

3.3 MISCELLANEOUS STEEL AND METALWORK

All items of miscellaneous steel and metalwork shall be provided as follows:

1. Embedded structural steel frames for openings and covers.

2. Watertight access doors and frames.

3. Roof hatches.

4. Steel pipe handrails.

5. Steel grating.

6. Steel ladders.

7. Embedded guard angles.

8. Hoisting slings and cables.

9. Air vent pipes.

10. Pendant hangers and pendants.

11. Drain and cable pipes.

12. Miscellaneous embedded metals.

13. Crane supports.

14. Manhole frame and cover.

15. Fall prevention system.

16. Float well pipes.

3.4 ANCHOR BOLTS

All anchor bolts shall be furnished and set, true to line and grade, for metalwork and other equipment as shown. Anchor bolts and appurtenances shall be painted with one coat of red paint meeting FS TT-P-86, Type II, immediately after removal of forms unless galvanized.

3.5 EXPANSION ANCHORS

Expansion anchors, wherever permitted by the Contracting Officer or shown on approved shop drawings, shall conform to the applicable provisions stated earlier. The type, class and style shall be at the option of the Contractor except where specifically shown or specified herein. The anchors shall be sized for the nominal bolt size of the equipment or device being attached or suspended except where specifically shown or specified herein. Where the attached or suspended equipment does not bear directly on the concrete, an OG washer or malleable iron washer, lock washer and nut shall be used to provide a constant loading on the anchor. The anchors shall be installed in accordance with the recommendations of the manufacturer. Safe working loads shall be computed at 25 percent of the proof test load.

3.6 CONCRETE ANCHORS

Concrete anchors shall conform to the applicable provisions stated earlier. The type, class and style shall be at the option of the Contractor except where specifically shown or specified herein. The anchors shall be sized for the nominal bolt size of the equipment or device being attached or suspended except where specifically shown or specified herein. Where the attached or suspended equipment does not bear directly on the concrete, an OG washer or malleable iron washer, lock washer and nut shall be used to provide a constant loading on the anchor. The anchors shall be installed

using a polyester resin grout, an epoxy grout, or a cementitious grout in accordance with the recommendation of the manufacturer. Safe working loads shall be computed at 25 percent of the proof test loads. Epoxied anchors shall not be used in suspended applications.

-- End of Section --