

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>				1. CONTRACT ID CODE N/A	PAGE OF PAGES 1   2
2. AMENDMENT/MODIFICATION NO. 0010		3. EFFECTIVE DATE 18 AUGUST 1999	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)	
6. ISSUED BY LOS ANGELES DISTRICT, COE CESPL-CT-P (S. OLIVER-HALL) 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)			(X)	9A. AMENDMENT OF SOLICITATION NO. DACW09-99-B-0010	
			X	9B. DATED (SEE ITEM 11) 31 AUG 99 (BID OPENING)	
				10A. MODIFICATION OF CONTRACT/ORDER NO. N/A	
				10B. DATED (SEE ITEM 13) N/A	
CODE		FACILITY CODE		N/A	

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 ACKNOWLEDGEMENT 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 ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO 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.)  
 RED ROCK CHANNEL, CLARK COUNTY, NEVADA.

\* Replace the following sections with the revised ones in this Amendment No. 0010:  
 Sections 00010, 00800, 01200, 01440, 02100, 02200, 02222, 02250, 02710, 02720, 02730, 02741, 02831, 05500.

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)	

**RED ROCK CHANNEL, (HUALAPAI WAY TO SAHARA AVENUE), CLARK COUNTY, NEVADA.**  
**IFB NO. DACW09-99-B-0010, Standard Form 30, Amendment #0010 (Continued)**

**Revised Sections**

- § 00010, Solicitation, Offer and Award (SF1442) And Bidding Schedule
- § 00800, Special Contract Requirements
- § 01200, General Requirements
- § 01440, Contractor's Quality Control
- § 02100, Diversion and Control of Water
- § 02200, Excavation
- § 02222, Excavation, Trenching, and Backfilling for Utilities Systems
- § 02250, Fills and Subgrade Preparation
- § 02710, Weephole System
- § 02720, Reinforced Concrete Pipe Stubouts
- § 02730, Manholes
- § 02741, Bituminous Paving for Roads, Streets and Open Storage Areas
- § 02831, Fencing, Chain-Link
- § 05500, Miscellaneous Metals

**Revised drawings**

Description	File Number	Drawing Number
1 Typical Channel Sections	196/426.1	TY-1
2 Typical Channel Sections	196/427.1	TY-2
3 Red Rock Channel Plan: STA 10+00 TO 24+00	196/430.1	SD-1
4 Red Rock Channel Plan: STA 24+00 TO 39+00	196/431.1	SD-2
5 Red Rock Channel Plan: STA 39+00 TO 54+25	196/432.1	SD-3
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7 Red Rock Channel Plan: STA 69+60 TO 84+75	196/434.1	SD-5
8 Red Rock Channel Plan: STA 84+75 TO 100+10	196/435.1	SD-6
9 Red Rock Channel Plan: STA 100+10 TO 115+00	196/436.1	SD-7
10 Red Rock Channel Plan: STA 115+00 TO 129+75	196/437.1	SD-8
11 Red Rock Channel Plan: STA 129+75 TO 142+00	196/438.1	SD-9
12 Red Rock Channel Plan: STA 142+00 TO 145+15.00	196/439.1	SD-10
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SECTION 00010  
SUPPLIES OR SERVICES AND PRICES/COSTS

1. All prices shall include overhead where applicable and profit.
  2. Bids shall be submitted on all items of the Pricing Schedule, otherwise the bid will be considered non-responsive and will be rejected.
  3. The bidders shall distribute his indirect costs (overhead, profit, bond, etc.) over all the items in the Pricing Schedule. The Government will review all submitted Pricing Schedule(s) for any unbalancing of the items. Any submitted Pricing Schedule(s) determined to be unbalanced may be considered nonresponsive and cause the bidder to be ineligible for contract award.
  4. 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.
  5. If a bid or 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 Pricing Schedule must be stated. If it is not stated, the bidder agrees that the lump sum adjustment shall be applied on pro rata basis to every unit price in the Pricing Schedule.
  6. The Lump Sum "LS", line items listed are not "estimated quantity" line items and are not subject to the Variation in Estimated Quantity contract clause.
  7. For the purpose of initial evaluation of bids the following will be utilized in resolving arithmetic discrepancies found on the face of the Pricing 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.
- These correction procedures shall not be used to resolve any ambiguity concerning which bid is low.
8. 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 resolution of arithmetic discrepancies as provided above and the bid will be so reflected on the abstract of bids.
  9. Amount and prices shall be indicated in EITHER WORDS OR FIGURES, not both.
  10. The contract clause S2.232-0027, "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.
  11. Some quantities listed are estimated, the offeror's unit prices must be firm.
  12. The contractor shall furnish all plant, labor, material, equipment, etc., necessary to perform all work in strict accordance with the terms and conditions set forth in the contract to include all attachments thereto.

13. The deadline for questions and/or clarification is 14 days prior to receipt of bids.

14. Bidders are cautioned to check their Pricing Schedule carefully prior to submission. If the Pricing Schedule contains unit prices, they should be extended to the ACTUAL MOUNT AND NOT ROUNDED OFF.

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 or her authority, may take formal action on this contract when a contract action needs to be taken and the Principal Contracting Officer is unavailable.

ABBREVIATIONS:

JB = Job  
LS = Lump Sum  
CY = Cubic Yard  
TN = Ton  
LF = Linear Foot  
EA = Each  
AC = ACRE

**SECTION 00010**  
**SUPPLIES OR SERVICES AND PRICES/COSTS**

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>	<u>UNIT</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
0001	TRAFFIC CONTROL	1.00	JB	LS	\$ _____
0002	DIVERSION AND CONTROL OF WATER	1.00	JB	LS	\$ _____
0003	CLEAR SITE AND REMOVE OBSTRUCTIONS	1.00	JB	LS	\$ _____
0004	EXCAVATION	174,800.00	CY	\$ _____	\$ _____
0005	COMPACTED FILL	10,160.00	CY	\$ _____	\$ _____
0006	CONCRETE, INVERT	6,602.00	CY	\$ _____	\$ _____
0007	CONCRETE, SIDESLOPE	6,360.00	CY	\$ _____	\$ _____
0008	CONCRETE, CUT-OFF WALL	882.00	CY	\$ _____	\$ _____
0009	CONCRETE, WALLS	5,290.00	CY	\$ _____	\$ _____
0010	CONCRETE, TOP SLAB	942.00	CY	\$ _____	\$ _____
0011	CONCRETE APRONS	1.00	JB	LS	\$ _____
0012	CHANNEL TRANSITION STA. 17+00 TO STA. 19+35	1.00	JB	LS	\$ _____
0013	BOX CULVERT STA. 10+00 TO STA. 10+22	1.00	JB	LS	\$ _____
0014	BOX CULVERT STA. 32+00 TO STA. 33+70	1.00	JB	LS	\$ _____
0015	INVERT ACCESS RAMP STA. 41+66.47 TO STA. 43+18.68	1.00	JB	LS	\$ _____
0016	BOX CULVERT STA. 45+86.54 TO STA. 47+80.54	1.00	JB	LS	\$ _____
0017	BOX CULVERT STA. 50+00.05 TO STA. 50+50.05	1.00	JB	LS	\$ _____
0018	BOX CULVERT STA. 87+00 TO STA. 88+86.32	1.00	JB	LS	\$ _____
0019	BOX CULVERT STA. 129+98.96 TO STA. 140+66.90	1.00	JB	LS	\$ _____
0020	BOX CULVERT STA. 140+66.90 TO STA. 141+16.90	1.00	JB	LS	\$ _____
0021	BOX CULVERT STA. 141+16.90 TO STA. 145+15.00	1.00	JB	LS	\$ _____
0022	7' x 4' RCB STUB, STA. 45+24.70	1.00	JB	LS	\$ _____
0023	SIDE DRAIN, STA. 134+69.29	1.00	JB	LS	\$ _____

RED ROCK CHANNEL  
HUALAPAI WAY TO SAHARA AVENUE

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0024	SIDE DRAIN, STA. 137+05.00	1.00	JB	LS	\$ _____
0025	SIDE DRAIN, STA. 144+24.45	1.00	JB	LS	\$ _____
0026	REINFORCING STEEL	1,122.00	TN	\$ _____	\$ _____
0027	18" RCP, CLASS III	72.00	LF	\$ _____	\$ _____
0028	24" RCP, CLASS III	130.00	LF	\$ _____	\$ _____
0029	24" HDPE PIPE	10.00	LF	\$ _____	\$ _____
0030	TYPE I MANHOLES	5.00	EA	\$ _____	\$ _____
0031	ASPHALTIC CONCRETE PAVEMENT	3,865.00	TN	\$ _____	\$ _____
0032	AGGREGATE BASE COURSE	7,130.00	TN	\$ _____	\$ _____
0033	RIPRAP	1,660.00	TN	\$ _____	\$ _____
0034	WEEPHOLE SYSTEM	1.00	JB	LS	\$ _____
0035	NDOT TYPE "R" PEDESTRIAN RAIL	9,700.00	LF	\$ _____	\$ _____
0036	FLOW MONITORING STATION	1.00	JB	LS	\$ _____
0037	CHAIN LINK FENCE	9,620.00	LF	\$ _____	\$ _____
0038	DOUBLE SWING GATES	7.00	EA	\$ _____	\$ _____
0039	FENCE POST SLEEVES	1.00	JB	LS	\$ _____
0040	INVERT ACCESS LADDERS	1.00	JB	LS	\$ _____
0041	DETOUR WORK @ SAHARA	1.00	JB	LS	\$ _____
0042	REMOVE CIP/CMP AT SAHARA	1.00	JB	LS	\$ _____
0043	PROTECTION OF EXISTING SANITARY SEWER LINE STA. 88+25.65	1.00	JB	LS	\$ _____
0044	PROTECTION OF UTILITIES @ TOWN CENTER DRIVE	1.00	JB	LS	\$ _____
0045	SOIL STABILIZER	18.60	AC	\$ _____	\$ _____

# ENCLOSURE TO AMENDMENT NO. 0010

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# ENCLOSURE TO AMENDMENT NO. 0010

SECTION 00800

## SPECIAL CONTRACT REQUIREMENTS

**Amd 10 1 52.211-10 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984)**

The Contractor shall be required to (a) commence work under this contract within 10 calendar days after the date the Contractor receives the **Notice to Award, which constitutes the Notice to Proceed** (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than 330 calendar days after the contractor receives the **Notice to Award, which constitutes the Notice to Proceed**. The time stated for completion shall include final cleanup of the premises. The Contractor shall be required to achieve the following interim milestones:

- (1) Complete all work from Station 10+00 to Station 10+22 within 60 days of Notice to Proceed.
- (2) Complete all work from Station 45+56 to Station 47+80 within 90 calendar days of Notice to Proceed.
- (3) Complete all work from Station 87+00 to Station 88+86 within 110 calendar days after Notice to Proceed.
- (4) Complete all work from Station 131+50 to Station 139+48 by 7 July 2000.

SEE SECTION 01200 GENERAL REQUIREMENTS FOR DETAILS ASSOCIATED WITH COMPLETION OF WORK FOR THESE FOUR (4) AREAS.

(End of clause)

**Amd 10 2 52.211-12 LIQUIDATED DAMAGES--CONSTRUCTION (APR 1984)**

(a) If the Contractor fails to complete the work within the time specified in the contract, or any extension, the Contractor shall pay to the Government as liquidated damages, the sum of \$1,350.00 for each day of delay. **If the Contractor fails to meet any of the interim milestone deadlines, the Contractor shall pay to the Government as liquidated damages, the sum of \$1,000 for each day of delay.**

(b) If the Government terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the Government in completing the work.

(c) If the Government does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted.

(End of clause)

**3 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 judgement of the Contracting Officer, is justified.

(End of clause)

**4 52.228-12 PROSPECTIVE SUBCONTRACTOR REQUESTS FOR BONDS (OCT 1995)**

## ENCLOSURE TO AMENDMENT NO. 0010

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.

(End of clause)

5 52.228-14 IRREVOCABLE LETTER OF CREDIT (OCT 1997)

(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 at least \$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 at least \$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. \_\_\_\_\_

**ENCLOSURE TO AMENDMENT NO. 0010**

(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 LLC:

(Confirming Financial Institution's Letterhead or Name and Address)

Date \_\_\_\_\_ 19\_\_\_\_\_

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

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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:  
SIGHT DRAFT

\_\_\_\_\_  
(City, State) \_\_\_\_\_, 19\_\_\_\_

\_\_\_\_\_  
(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. \_\_\_\_\_

By: \_\_\_\_\_  
(Beneficiary Agency)  
(End of clause)

6 52.228-15 Performance and Payment Bonds--Construction (SEP 1996)

(a) Definitions. As used in this clause--  
Contract price means the award price of the contract or, for requirements contracts, the price payable for the estimated quantity; or for indefinite-delivery type contracts, the price payable for the specified minimum quantity.

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

(1) Performance Bonds (Standard Form 25):

(i) The penal amount of performance bonds shall be 100 percent of the original contract price.

(ii) The Government may require additional performance bond protection when the contract price is increased. The increase in protection shall generally equal 100 percent of the increase in contract price.

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

(2) Payment Bonds (Standard Form 25-A):

(i) The penal amount of payment bonds shall equal --

(A) 50 percent of the contract price if the contract price is not more than \$1 million;

(B) 40 percent of the contract price if the contract price is more than \$1 million but not more than \$5 million; or

(C) \$2.5 million if the contract price is more than \$5 million.

(ii) If the original contract price is \$5 million or less, the Government may require additional protection if the contract price is increased. The penal amount of the total protection shall meet the

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requirement of subparagraph (b)(2)(i) of this clause.

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

(c) 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) 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.

(End of clause)

7 52.232-33 PAYMENT BY ELECTRONIC FUNDS TRANSFER --CENTRAL CONTRACTOR REGISTRATION  
(MAY 1999)

(a) Method of payment. (1) All payments by the Government under this contract shall be made by electronic funds transfer (EFT), except as provided in paragraph (a)(2) of this clause. As used in this clause, the term "EFT" refers to the funds transfer and may also include the payment information transfer.

(2) In the event the Government is unable to release one or more payments by EFT, the Contractor agrees to either --

(i) Accept payment by check or some other mutually agreeable method of payment; or

(ii) Request the Government to extend the payment due date until such time as the Government can make payment by EFT (but see paragraph (d) of this clause).

(b) Contractor's EFT information. The Government shall make payment to the Contractor using the EFT information contained in the Central Contractor Registration (CCR) database. In the event that the EFT information changes, the Contractor shall be responsible for providing the updated information to the CCR database.

(c) Mechanisms for EFT payment. The Government may make payment by EFT through either the Automated Clearing House (ACH) network, subject to the rules of the National Automated Clearing House Association, or the Fedwire Transfer System. The rules governing Federal payments through the ACH are contained in 31 CFR part 210.

(d) Suspension of payment. If the Contractor's EFT information in the CCR database is incorrect, then the Government need not make payment to the Contractor under this contract until correct EFT information is entered into the CCR database; and any invoice or contract financing request shall be deemed not to be a proper invoice for the purpose of prompt payment under this contract. The prompt payment terms of the contract regarding notice of an improper invoice and delays in accrual of interest penalties apply.

(e) Contractor EFT arrangements. If the Contractor has identified multiple payment receiving points (i.e., more than one remittance address and/or EFT information set) in the CCR database, and the Contractor has not notified the Government of the payment receiving point applicable to this contract, the Government shall make payment to the first payment receiving point (EFT information set or remittance address as applicable) listed in the CCR database.

(f) Liability for uncompleted or erroneous transfers. (1) If an uncompleted or erroneous transfer occurs because the Government used the Contractor's EFT information incorrectly, the Government remains responsible for--

(i) Making a correct payment;

(ii) Paying any prompt payment penalty due; and

(iii) Recovering any erroneously directed funds.

(2) If an uncompleted or erroneous transfer occurs because the

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Contractor's EFT information was incorrect, or was revised within 30 days of Government release of the EFT payment transaction instruction to the Federal Reserve System, and--

(i) If the funds are no longer under the control of the payment office, the Government is deemed to have made payment and the Contractor is responsible for recovery of any erroneously directed funds; or

(ii) If the funds remain under the control of the payment office, the Government shall not make payment, and the provisions of paragraph (d) of this clause shall apply.

(g) EFT and prompt payment. A payment shall be deemed to have been made in a timely manner in accordance with the prompt payment terms of this contract if, in the EFT payment transaction instruction released to the Federal Reserve System, the date specified for settlement of the payment is on or before the prompt payment due date, provided the specified payment date is a valid date under the rules of the Federal Reserve System.

(h) EFT and assignment of claims. If the Contractor assigns the proceeds of this contract as provided for in the assignment of claims terms of this contract, the Contractor shall require as a condition of any such assignment, that the assignee shall register in the CCR database and shall be paid by EFT in accordance with the terms of this clause. In all respects, the requirements of this clause shall apply to the assignee as if it were the Contractor. EFT information that shows the ultimate recipient of the transfer to be other than the Contractor, in the absence of a proper assignment of claims acceptable to the Government, is incorrect EFT information within the meaning of paragraph (d) of this clause.

(i) Liability for change of EFT information by financial agent. The Government is not liable for errors resulting from changes to EFT information made by the Contractor's financial agent.

(j) Payment information. The payment or disbursing office shall forward to the Contractor available payment information that is suitable for transmission as of the date of release of the EFT instruction to the Federal Reserve System. The Government may request the Contractor to designate a desired format and method(s) for delivery of payment information from a list of formats and methods the payment office is capable of executing. However, the Government does not guarantee that any particular format or method of delivery is available at any particular payment office and retains the latitude to use the format and delivery method most convenient to the Government. If the Government makes payment by check in accordance with paragraph (a) of this clause, the Government shall mail the payment information to the remittance address contained in the CCR database.

(End of Clause)

8 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.

(End of clause)

(R 7-603.15 1965 JAN)

(R 1-18.104)

9 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

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Surveys, Auger Borings and Test Borings.

(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 clearances, restrictins, bridge load limits and other limitations affecting transportation and ingress and egress at the site of the work. It shall be the ocntractor's responsibility to construct and maintain, at the contractor's expense, any haul roads required for construction operations.

(d) N/A

(End of clause)  
(R 7-603.25 1965 JAN)

10 52.236-16 I QUANTITY SURVEYS (APR 1984)--ALTERNATE I (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 Contractor shall conduct the original and final surveys and surveys for any periods for which progress payments are requested. All these surveys shall be conducted under the direction of a representative of the Contracting Officer, unless the Contracting Officer waives this requirement in a specific instance. The Government shall make such computations as are necessary to determine the quantities of work performed or finally in place. The Contractor shall make the computations based on the surveys for any periods for which progress payments are requested.

(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.

(End of clause)  
(R 7-603.50(a) 1979 MAR)  
(R 7-603.50(b) 1979 MAR)

11 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

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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 therefor. 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.

(End of clause)

12 52.236-7001 CONTRACT DRAWINGS, MAPS, AND SPECIFICATIONS (DEC 1991)

(a) The Government--

(1) Will provide the Contractor, without charge, Five CD-ROMS (unless otherwise specified) containing contract drawings and specifications except publications incorporated into the technical provisions by reference;

(2) Will furnish additional CD-ROMS on request, for the cost of reproduction; and

(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; and

(4) Be responsible for any errors which might have been avoided by complying with this paragraph (b).

(c) Large scale drawings shall, in general, govern small scale drawings. Figures marked on drawings shall, in general, be followed in preference to scale measurements.

(d) Omissions from the drawings or specifications or the misdescription of details of work which are manifestly necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work, but shall be performed 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	and	Drawing No.
Cover Sheet	196/420		G-1
Index and Sheet Layout	196/421		G-2
Legend, Abbreviations and Symbols	196/422		G-3
Horizontal Control Plan	196/423		C-1
Horizontal Control Plan	196/424		C-2

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Horizontal Control Plan	196/425	C-3
Typical Channel Sections	196/426	TY-1
Typical Channel Sections	196/427	TY-2
Red Rock Channel Plan:	196/430	SD-1
STA 10+00 to 24+00		
Red Rock Channel Plan:	196/431	SD-2
STA 24+00 to 39+00		
Red Rock Channel Plan:	196/432	SD-3
STA 39+00 to 54+25		
Red Rock Channel Plan:	196/433	SD-4
54+25 to 69+60		
Red Rock Channel Plan:	196/434	SD-5
STA 69+60 to 84+75		
Red Rock Channel Plan:	196/435	SD-6
STA 84+75 to 100+10		
Red Rock Channel Plan:	196/436	SD-7
STA 100+10 to 115+00		
Red Rock Channel Plan:	196/437	SD-8
STA 115+00 to 129+75		
Red Rock Channel Plan:	196/438	SD-9
STA 129+75 to 142+00		
Red Rock Channel Plan:	196/439	SD-10
STA 142+00 to 145+15.00		
Red Rock Channel Profile:	196/440	SD-11
STA 10+00 to 24+00		
Red Rock Channel Profile:	196/441	SD-12
STA 24+00 to 39+00		
Red Rock Channel Profile:	196/442	SD-13
STA 39+00 to 54+25		
Red Rock Channel Profile:	196/443	SD-14
STA 54+25 to 69+60		
Red Rock Channel Profile:	196/444	SD-15
STA 69+60 to 84+75		
Red Rock Channel Profile:	196/445	SD-16
STA 84+75 to 100+10		
Red Rock Channel Profile:	196/446	SD-17
STA 100+10 to 115+00		
Red Rock Channel Profile:	196/447	SD-18
Sta 115+00 to 129+75		
Red Rock Channel Profile:	196/448	SD-19
Sta 129+75 to 142+00		
Sahara Confluence Connection	196/449	SD-20
and Red Rock Country Club Confluence		
Red Rock-Beltway Branch	196/450	SD-21
Profile		
R4 Confluence Connection	196/451	SD-22
and Projected R4 Channel Profile by Others		
Red Rock Channel - Desert	196/452	SD-23
Inn Road Lateral Profile		
Red Rock Channel - Storm	196/453	SD-24
Drain Lateral Profiles		
Red Rock Channel - Misc.	196/454	SD-25
Details		
Red Rock Channel-Fence Plan	196/458	F1
Red Rock Channel-Fence Plan	196/459	F2
Red Rock Channel-Fence Plan	196/460	F3
Red Rock Channel-Fence Plan	196/461	F4
Red Rock Channel-Fence Plan	196/462	F5
Red Rock Channel-Fence Plan	196/463	F6
Red Rock Channel-Fence Plan	196/464	F7
Red Rock Channel-Fence Plan	196/465	F8
Red Rock Channel-Fence Plan	196/466	F9
Red Rock Channel -	196/467	F10
Fence Details		
Red Rock Channel-Trapezoidal	196/468	S-1
Channel Typical Section		
Red Rock Channel-Rectangular	196/469	S-2
Channel Typical Section		
Red Rock Channel-Channel	196/470	S-3

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Details		
Red Rock Channel- 7'X4'	196/471	S-4
RCB Intersection Structural Details		
Red Rock Channel-Single	196/472	S-5
Cell Box Channel		
Red Rock Channel -	196/473	S-6
Reinforced Concrete Box Details		
Red Rock Channel -	196/474	S-7
Reinforced Concrete Box Details		
Red Rock Channel -	196/475	S-8
confluence Structure Details		
Red Rock Channel - Junction	196/476	S-9
Structure - STA 141+16.90		
Red Rock Channel -	196/477	S-10
Transition Structure at Existing 96" CIPCP		
Red Rock Channel - Joint	196/478	S-11
Details		
Red Rock Channel -	196/479	S-12
Miscellaneous Details		

(End of clause)

13 52.247-7023 TRANSPORTATION OF SUPPLIES BY SEA (NOV 1995)

(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. However, effective May 1, 1996, the term does not include a supplier, materialman, distributor, or vendor of commercial items or commercial components.

(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) The Contractor shall employ U.S.-flag vessels in the transportation by sea of any supplies to be furnished in the performance of this contract. 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.

(c) 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

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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.

(d) 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.

(e) 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.....			

(f) 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.

(g) The Contractor shall include this clause, including this paragraph (g) in all subcontracts under this contract, which exceed the simplified acquisition threshold in Part 13 of the Federal Acquisition Regulation.  
(End of clause)

14 52.1-4001 CONTRACT ADMINISTRATION DATA

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

Department of the Army  
Los Angeles District, Corps of Engineers

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P.O. Box 532711  
Los Angeles, California 90053-2325  
ATTN: Ms. Tina Davis-Frazier  
Telephone No: Area Code (213) 452-3252

Payment will be made by:

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

Submit Invoices to:

Please refer to Block No. 26 of SF 1442, Solicitation, Offer and Award,  
which will be completed at time of contract award.

15 52.231-4001 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)

**Amd 10** 16 52.232-4001 CONTINUING CONTRACTS (ALTERNATE) (MAR 1995) E FARS 52-232-5002

(a) Funds are not available at the inception of this contract to cover the entire contract price. The sum of \$200,000.00 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.

## ENCLOSURE TO AMENDMENT NO. 0010

(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.

(End of clause)

17 52.236-4001 PLANT AND MATERIAL REMOVAL AFTER CONTRACT TERMINATION (MAR 1996)  
EFARS 52.236-5000

Should this contract be terminated as provided in clause 52.232-5001 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)

18 52.239-4001 YEAR 2000 COMPLIANCE FOR CONSTRUCTION CONTRACTS

a. In accordance with FAR 39.106, the contractor shall ensure that with respect to any design, construction, goods, or services under this contract as well as any subsequent task/delivery orders issued under this

contract (if applicable) all information technology contained therein shall be Year 2000 compliant. Specifically:

b. The contractor shall:

(1) Perform, maintain, and provide an inventory of all major components to include structures, equipment, items, parts, and furnishings under this contract and each task/delivery order which may be affected by the Y2K compliance requirement.

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

19 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.

(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 are normally recovered as an indirect expense and unless the contractor charges these costs directly to contracts, they will be recovered through the indirect expense rate.

(End of Statement)

END OF SECTION 00800

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## 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.

## DEPARTMENT OF COMMERCE (DOC)

DOC PS 1 (1983) Construction and Industrial Plywood

## FEDERAL SPECIFICATIONS (FS)

FS FF-B-575 (Rev C) Bolts, Hexagon and Square

FS FF-N-105 (Rev B; Am 3, Int Am 4; Notice 1) Nails, Brads, Staples and Spikes: Wire, Cut and Wrought

FS FF-N-836 (Rev D; Am 2) Nut, Square, Hexagon, Cap, Slotted, Castle, Knurled, Welding and Single Ball Seat

FS MM-L-751 (Rev H) Lumber; Softwood

FS TT-P-1510 (Rev A, Am 1) Paint, Latex, Exterior for Wood Surfaces, White and Tints

FS TT-P-001984 (Basic) Primer Coating, Latex Base, Exterior (Undercoat for Wood), White and Tints

## 1.2 PROJECT FACILITIES

The Contractor shall construct and/or erect the following project facilities as soon as possible and not less than 15 calendar days after notice to proceed.

## 1.2.1 Construction Signs

The signs shall include the following:

a. Project Signs: One Project Sign at location designated by the Contracting Officer.

b. Warning Signs: Facing approaching traffic on all haul roads crossing under overhead power transmission lines.

c. Hard Hat Signs: Ten hard hat signs at locations directed.

## 1.2.2 Bulletin Board

Bulletin board shall be erected at the Contractor's office.

### 1.2.3 Sanitary Facilities

Suitable sanitary facilities shall be provided and maintained by the Contractor.

## PART 2 PRODUCTS

### 2.1 CONSTRUCTION SIGNS

#### 2.1.1 Materials

##### 2.1.1.1 Lumber

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).

##### 2.1.1.2 Plywood

DOC PS 1, grade A-C, Group 1, exterior type.

##### 2.1.1.3 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.

##### 2.1.1.4 Paints and Oils

Paints shall conform to FS TT-P-001984 for primer and FS TT-E-1510 for finish paint and lettering.

## PART 3 EXECUTION

### 3.1 CONSTRUCTION OF SIGNS

#### 3.1.1 Project and Hard Hat Signs

Constructed as detailed in Figures 1, 1A, 2, 3 and Safety Signs. Decals signs will be furnished by the Contracting Officer.

#### 3.1.2 Warning Signs

Constructed of plywood not less than 1/2 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 24 in. x 48 in., all letters shall be 4 in. in height, and the wording shall be: "WARNING: OVERHEAD TRANSMISSION LINES."

### 3.2 PAINTING SIGNS

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.

### 3.3 PROJECT ENGINEERS'S OFFICE EQUIPMENT

Contractor shall provide computer software (3.5" floppy disc size) to the Contracting Officer for the type of scheduling system to be used and

quantity/fill programs for tracking or estimating bid quantities during construction. Scheduling software must be capable of downloading completely to the COE Standard Data Exchange Format. The Contractor shall utilize a hand held radio system for communication between the Contractor's quality control representative and the Government's quality assurance representative. Radio equipment for the Governments use shall include a hand held radio, two batteries and one charger. The Contractor shall provide Government personnel with the following equipment for the duration of the contract: 1 Cellular telephone with voice mail, 2 nickel cadmium batteries, 1 desk top charger, 1 travel charger, and 400 minutes of air time per month or portion thereof.

#### 3.4 BULLETIN BOARD

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.

#### 3.5 MAINTENANCE AND DISPOSAL OF PROJECT FACILITIES

The Contractor shall maintain the project facilities in good condition throughout the life of the project. Upon completion of work under this contract, the facilities covered under this section will remain the property of the Contractor and shall be removed from the site at his expense.

#### 3.6 UNSATISFACTORY AND SCRAP MATERIAL

Materials characterized as unsatisfactory soil in accordance with Section 02200 EXCAVATION and materials indicated to be removed and not indicated to be salvaged, stored or reinstalled are designated as scrap 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.

#### 3.7 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 notifications 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 CONTRACT CLAUSES of the contract.

#### 3.8 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 such 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.

### 3.9 PUBLIC UTILITIES, NOTICES, AND RESTRICTIONS

#### 3.9.1 General

The approximate location of all railroads, 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.

#### 3.9.2 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.

#### 3.9.3 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.

#### 3.9.4 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.

##### 3.9.4.1 Maintenance of Nevada Power Transmission Poles

Nevada Power Company has a 50 foot wide easement to operate and maintain the

existing transmission poles adjacent to the Red Rock Channel. Nevada Power Company requires 24-hours a day, 7-days a week access to maintain their transmission poles. Although the 50 foot wide Nevada Power Easement has been identified as a Temporary Construction Easement for this project, the Contractor is required to store equipment, tools, materials, excavation, and all other items in such a manner that will allow Nevada Power 24-hour access to maintain their poles.

### 3.9.5 Notices

#### 3.9.5.1 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.

#### 3.9.5.2 Existing Bench Marks and R/W Markers

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

#### 3.9.5.3 Disposal Site

Excess Satisfactory excavated materials not utilized as part of the construction shall be placed in the disposal site indicated on the drawings, Sheet No. C-2 for the Western Segment Las Vegas Beltway Red Rock Channel. The Contractor shall indicate the approximate quantities of material he proposes to place in disposal site. In addition to the above requirements, the Contractor shall notify the Contracting Officer 24 hours in advance of the time he proposes to start operations in the disposal area, and 48 hours in advance of any work which he proposes to do in the disposal area on Saturday, Sunday or legal holidays.

#### 3.9.5.4 Spill Reporting

The Contractor shall notify the Contracting Officer immediately after any spill, 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 procedure.
- g. Disposal location of spill, leak or unauthorized release residue.

### 3.9.5.5 Environmental Assessment Requirement

In order to satisfy the Environmental Assessment for this project, the Contracting Officer is required to have a qualified biologist on site at all times while clearing and grubbing operations are in progress. The biologist will be provided by the government. The Contractor shall notify the Contracting Officer 14 calendar days prior to the start of clearing and grubbing activities so that a biological monitor shall be required to walk immediately in front of the Contractor's clearing and grubbing equipment to survey for the threatened desert tortoise. For scheduling purposes, the Contractor shall coordinate and complete all clearing and grubbing activities within one-four workday period.

### 3.9.6 Restrictions

#### 3.9.6.1 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.

#### 3.9.6.2 Traffic Control Plan

The Contractor shall develop a Traffic Control Plan and obtain an approval from the Clark County Department of Public Works prior to construction. The plan shall include vehicular detour plans, details of truck haul routes, details of roadway restriping and signage for vehicular circulation, and parking details.

#### 3.9.6.3 Existing Roads

The work shall be planned in such a manner that traffic on the existing roads outside actual construction areas and through the construction area shall be maintained at all times. 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. The construction schedule shall be prepared giving full consideration to not impacting and maintaining traffic on existing roads outside and through the construction area. Additional work on the existing roads may be done by others during the life of this contract.

#### 3.9.6.4 Access and Haul Roads

Plans shall be submitted for approval for all proposed access and haul roads, whether within or outside the limits of the construction area, at least 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. Haul roads shall be proposed so that use of existing residential streets and roads are minimized.

#### 3.9.6.5 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 road will 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.

#### 3.9.6.6 Maintenance of Roads

All haul and access roads, within the construction area, including the borrow areas, shall be maintained to provide vehicular access for the Government's vehicles and the Contractor's vehicles and equipment. Road maintenance shall include rock/mud slides, washouts, and any incident which would restrict vehicular/equipment access. Prior to any alterations of any road alignment, the Contractor shall receive an approval from the Contracting Officer. Road maintenance and alterations shall be performed by the Contractor at no additional cost to the Government.

#### 3.9.6.7 Traffic Safety

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 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.

#### 3.9.6.8 Rock and Gravel

Rock and gravel for use on haul roads and other facilities may be obtained from any source with 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.

#### 3.9.6.9 Cooperation with Others

In addition to CONTRACT CLAUSE: OTHER CONTRACTS, agreements shall be made for cooperative use and maintenance of project road directly between the Contractors concerned and shall be subject to approval by the Contracting Officer. No maintenance shall be charged for its use of the roads. During the life of this contract, the Contractor is advised that the activities of other contractors will require access to portions of the Project Limits. These activities are listed at the end of this section under, SPECIAL CONSTRUCTION REQUIREMENTS. The Contractor shall coordinate his activities and cooperate with other contractors as to not delay or interfere with their work.

#### 3.9.6.10 Temporary Culverts

Temporary culverts shall be provided as required for road drainage. Temporary culverts shall be corrugated metal pipe of adequate diameter. Exact locations of the temporary culverts shall be subject to approval by the Contracting Officer.

a. 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.

### 3.9.7 Working Hours

The Contractor shall restrict all construction activities to the following schedule:

Monday thru Friday	6:30 a.m. to 7 p.m.
Saturday	8 a.m. to 7 p.m.

No work will be permitted on Sundays or Federal Holidays without the prior written approval from the Contracting Officer.

### 3.9.8 Construction Water

There are no known developed sources for water at or in the immediate vicinity of the project site. The Contractor shall be responsible for obtaining water for construction purposes at no additional cost to the Government.

### 3.9.9 Lighting

The Contractor shall provide a minimum of 5 foot-candle lighting intensity for all construction areas during the contract performance period.

### 3.9.10 Identification of Vehicles

All the Contractor's vehicles shall display suitable permanent identification.

### 3.9.11 Construction Method 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.

### 3.9.12 Contractor's Equipment

The planned method of transportation and operation of cranes and other heavy equipment to be used in the performance of this contract shall be submitted for approval by the Contracting Officer. The plan shall include the type, size, loadings of equipment, the proposed transportation routes, and work areas to be used on the project.

## 3.10 PUBLIC SAFETY

Attention is directed to the CONTRACT CLAUSE: PERMITS AND RESPONSIBILITIES. The Contractor shall provide temporary fencing, barricades, and/or guards, as required, to provide protection in the interest of public safety. Whenever the contractor's operations create a condition hazardous to the public, he shall furnish at his own expense and without cost to the Government, such flagmen and guards as are necessary to give adequate warning to the public of any dangerous conditions to be encountered and he shall furnish, erect, or maintain such

fences, barricades, lights, signs and other devices as are necessary to prevent accidents and avoid damage or injury to the public. Flagmen and guards, while on duty and assigned to give warning and safety devices shall conform to applicable city, county, and state requirements. Should the Contractor appear

to be neglectful or negligent in furnishing adequate warning and protection measures, the Contracting Officer may direct attention to the existence of a hazard and the necessary warning and protective measures shall be furnished and installed by the Contractor without additional cost to the Government. Should the Contracting Officer point out the inadequacy of warning and protective measures, such action of the Contracting Officer shall not relieve the Contractor from any responsibility for public safety or abrogate his obligation to furnish and pay for those devices. The installation of any general illumination shall not relieve the Contractor of his responsibility for furnishing and maintaining any protective facility.

### 3.11 OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA) STANDARDS

The OCCUPATIONAL SAFETY and HEALTH ACT (OSHA) STANDARDS for CONSTRUCTION (Title 29, Code of Federal Regulations Part 1926 as revised from time to time) and the Corps of Engineers General Safety and Health Requirements Manual, EM 3851-1, are both applicable to this contract. The most stringent requirement of the two standards will be applicable.

#### 3.11.1 Accident Reporting

In accordance with EM 385-1-1, the Contractor shall submit a written summary of worker's compensation claims which have been filled by worker's in connection with work on the project. The summary shall be submitted at the time when the work is approximately 50 percent complete and at project completion. The summary shall include all subcontractors. The Contractor's and subcontractor's compensation insurance carrier shall certify that the summaries are "correct and true".

### 3.12 PERMITS

#### 3.12.1 General

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

#### 3.12.2 Air Pollution Permit (APP)

The Contractor shall obtain an APP from the Clark County Health Department. For further information, contact Ms. Cynthia Mikes at telephone number (702) 383-1276.

#### 3.12.3 National Pollutant Discharge Elimination System (NPDES) Permit

The Contractor shall obtain a NPDES permit from the United States Environmental Protection Agency (USEPA) under the Nation Wide Permit (NWP) program, which requires that a Storm Water Pollution Prevention Plan (SWPPP) shall be prepared and maintained on-site throughout the construction period. A copy of the plan will be submitted to the Contracting Officer. In accordance with the NWP, a minimum of two (2) days prior to the start of construction activities, the Contractor shall submit a Notice of Intent (NOI) with fees to the Nevada

Division of USEPA. The NOI shall be submitted on the standard EPA Form 3510-6 (8-92), and copies shall be provided to the Contracting Officer. For further information, contact Mr. Robb Saunders at telephone number (702) 687-4670.

### 3.13 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. 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. 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 workshop of 1 to 2 days duration would be held periodically throughout the duration of the contract as agreed to by the Contractor and Government.

### 3.14 AS-BUILT DRAWINGS

#### 3.14.1 General

The Contractor shall furnish 3 full size sets of as-built blue-line prints for use in preparation of as-built drawings by the Government. The as-built prints shall be a record of the construction as installed and completed by the Contractor. They shall include all the information shown on the contract set of drawings and a record of all deviations, modifications, or changes from those drawings, however minor, which were incorporated in the work, all additional work not appearing on the contract drawings, and all changes which are made after final inspection of the contract work. In event the Contractor accomplishes additional work which changes the as-built conditions. The requirements for these additional drawings will be the same as for the as-built drawings included in the original submission. The prints shall show the following information, but not be limited thereto:

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

b. The location and dimensions of any changes within the building or structure.

d. Correct grade or alignment of roads, structures, or utilities if any changes were made from contract plans.

e. Correct elevations if changes were made in site grading.

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

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

h. All changes or modifications which results from the final inspection.

### 3.14.2 Options

Where contract drawings or specifications allow options, only the option selected for construction shall be shown on the as-built drawings.

### 3.14.3 Submittal to Contracting Officer for review and approval

Not later than two weeks after acceptance of the project by the Government, the Contractor shall deliver to the Contracting Officer 3 full size sets of blue-line prints marked up to depict as-built conditions. If upon review, the drawings are found to contain errors and/or omissions, they shall be returned to the Contractor for corrections. The Contractor shall complete the corrections and return the drawings to the Contracting Officer within ten (10) calendar days.

## 3.15 DISPOSAL SITES

### 3.15.1 Disposal Site

Excess satisfactory excavated natural material not utilized as part of the construction shall be placed in disposal sites indicated on drawings, Sheet No. C-2 for the Western Segment Las Vegas Beltway Red Rock Channel. The Contractor shall notify the Contracting Officer 24 hours in advance of the time he proposes to start operations in the disposal area, and 48 hours in advance of any work which he proposes to do in the disposal area on Saturday, Sunday or legal holidays. The Contractor shall indicate the approximate quantities of material he proposes to place in Disposal site. Materials characterized as unsatisfactory soil in accordance with Section 02200 EXCAVATION shall become the property of the Contractor and shall be removed from the project site.

## 3.16 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER (ER 415-1-15, 31 OCT 89)

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

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

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

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

MONTHLY ANTICIPATED ADVERSE WEATHER DAYS  
Work Days Based on five (5) Day Work Week

<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>JUN</u>	<u>JUL</u>	<u>AUG</u>	<u>SEP</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>
6	2	2	1	1	0	2	2	1	1	1	3

c. Upon acknowledgement of the Notice to Proceed (NTP) and continuing

throughout the contract, the Contractor will record on the daily CQC report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delay days must prevent work on critical activities for 50 percent or more of the Contractor's scheduled work day. 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 subparagraph b, 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: DEFAULT (FIXED PRICE CONSTRUCTION).

3.17 REQUIRED INSURANCE

The Contractor shall procure and obtain during the entire period of his performance under this contract the following minimum insurance:

a. General Public Liability insurance for bodily injury and property damage with minimum limits of \$1,000,000 combined single limit per occurrence and \$1,000,000 annual aggregate for bodily injury to or death, personal injury and property damage.

b. Automobile Liability insurance for bodily injury and property damage with minimum limits of \$1,000,000 combined single limit for each occurrence and \$1,000,000 annual aggregate.

c. Either Workman's Compensation or Employer's Liability insurance with a minimum limit of \$1,000,000.

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. County of Clark, a political subdivision of the state of Nevada, and Clark County Regional Flood Control District shall be named as additional insured parties and all policies issued in performance of work under this contract.

The Contractor does hereby agree to indemnify, defend, and save harmless Clark County and Regional Flood Control District from loss, damage, liability, costs, or expense to the proportionate extent caused by the Contractor, his employees, agents, or consultants and/or consultants arising out of its performance of this contract, including, but not limited to the negligent acts, errors, omissions, or intentional misconduct of the Contractor, its employees, agents or consultants and/or subconsultants in connection with this contract.

Contractor further does hereby agree, as a precaution to the performance of any work under this contract and as a precaution to any obligation of Clark County to make any payment under this contract, to provide Clark County with a certificate and/or a certificate issued by the State Industrial Insurance

System (SIIS) in accordance with Nevada Revised Statute 616.280. Contractor agrees to maintain required workers compensation throughout the entire term of the contract. If Contractor does not maintain coverage throughout the entire term of the contract, Contractor agrees that Owner may, at any time the coverage is not maintained by Contractor, order the Contractor to stop work, assess liquidated damages as defined herein, suspend the contract, or terminate the contract. For each six month period this contract is in effect, Contractor agrees, prior to the expiration of the six month period, make another written request to SIIS for the provisions of a certificate and notice of lapse in or nonpayment of coverage. If Contractor does not make the request or does not provide the certificate before the expiration of the six month period, Contractor agrees that owner may order the Contractor to stop work, suspend the contract or terminate the contract.

### 3.18 SPECIAL CONSTRUCTION REQUIREMENTS FOR WESTERN SEGMENT LAS VEGAS BELTWAY RED ROCK CHANNEL

#### 3.18.1 General

The Contractor shall restrict his operations and adapt his construction schedule to accommodate the following:

#### 3.18.2 PROJECT LIMITS

The Contractor's work, employee parking, operations, staging, equipment assembly and maintenance, and other on-site activities shall be restricted to actual areas of construction within the Project Limits. The Project Limits of Red Rock Channel are indicated on the drawings, and constitute the maximum limits of the construction area available for Contractor's operations.

The Contractor shall be solely responsible for obtaining agreements with and acquisitions from adjacent land owners, when additional land or access points are required to supplement the Contractor's operational or staging needs. No Channel appurtenances or other public access facilities (either temporary or permanent) shall be constructed beyond the Project Limits.

#### 3.18.3 COORDINATION WITH OTHER CONTRACTORS

The Contractor is advised that the activities of other contractors will require their access to portions of the Project Limits. These include, but are not restricted to:

##### 3.18.3.1 Construction of Beltway Segment 10A Roadway

Construction of the Beltway Segment 10A Interim Beltway Project (which will include two paved lanes in each direction and crossroads embankments at Town Center Drive, Desert Inn Road, and Sahara Avenue) is scheduled to be constructed simultaneously with the Red Rock Channel (Sec 10A Channel). Additional work at the Hualapai crossing is also included in the Segment 10A Interim Beltway Project. Project Limits for the 10A Interim Beltway Project will be essentially the same as the Red Rock Channel project and will also include additional construction areas at the above listed road crossings.

##### 3.18.3.2 Construction of the Western (Las Vegas) Beltway Section 7B, 8 and 9

Construction of the Western (Las Vegas) Beltway Section 7B, 8 and 9 is underway with a current required completion date in the Spring of 2000. The RCB Construction under the Section 9 portion at Hualapai is anticipated to be built during the summer/fall of 1999. The Red Rock Channel Contractor shall fully

coordinate the RCB extension at Hualapai with the Section 9 Contractor and if necessary, construct the Red Rock Channel RCB portion at Hualapai without the Section 9 RCB portion being in place.

#### 3.18.3.3 Construction of the R-4 Channel

Construction of the R-4 Channel contract is anticipated to commence during the spring of 2000. The Red Rock Channel contractor shall coordinate construction activities between the two channel projects after the issuance of a notice to proceed on the R-4 Channel has been issued.

#### 3.18.3.4 Notification of Potential Conflicts

The Contractor will be notified in writing not less than 30 calendar days prior to the date the Notice to Proceed (NTP) will be issued for the Beltway 10A Roadway Project, the R-4 Channel Project, or for the Western Beltway (Sahara to Charleston) Project. The Contractor shall notify the Contracting Officer in writing of any areas of unavoidable conflict that would require the 10A Roadway Project contractor to modify his activities. This does not include the interim completion areas listed below.

#### 3.18.4 ORDER OF CHANNEL CONSTRUCTION

Any continuation of the Contractor's operations in and access to those areas following issuance of the Notice to Proceed for the adjacent contract shall be requested in writing, and shall include:

1. a detailed critical-path scheduling diagram of the activities proposed,
2. a projected date of completion, and
3. a proposed method of coordination between potentially conflicting contract operations.

This information shall be reviewed by the Contracting Officer and if deemed acceptable, shall be approved by the Contracting Officer otherwise interim completions and restrictions listed below shall remain in effect.

##### 3.18.4.1 Storm Runoff

In consideration of the potential for high-volume storm runoff occurring during the period of time when existing runoff patterns are disrupted, but the channel is not yet in service, the order of construction needs to be set to avoid significant erosive damage to elements of the project and existing facilities downstream.

The Contractor shall make all practical efforts to:

1. stage the construction of the channel from downstream to upstream (east to west), and
2. avoid long delays between excavation of the channel (and disruption of existing runoff patterns) and construction of the cast-in-place elements of the channel.

##### 3.18.4.2 Access to the Construction Site.

The Contractor shall anticipate that access to the project site along Hualapai from the north and Desert Inn from the east will be terminated in conjunction with

the Section 10A Roadway project. Construction access to the project site along Town Center Drive, Desert Inn Road and Sahara from the east shall remain available, however, coordination for detour work may be required at various times during the duration of the Red Rock Channel contract. The Red Rock Channel contractor shall be required to submit and receive approval for detour plans at all road crossings along the Red Rock Channel alignment which alter the current traffic flow patterns. Detour (Traffic Control) plans shall be approved by the Contracting Officer and the Clark County Department of Public Works.

#### 3.18.4.3 Construction in the vicinity of Hualapai.

The Red Rock Channel contractor shall fully coordinate their construction efforts with the Section 7B, 8 and 9 Contractor and the Section 10A Roadway Contractor. All work under the Red Rock Channel contract from Sta 10+00 to Sta 10+22 shall be completed within 60 days of the Red Rock Channel contract notice to proceed. If concrete has not reached design strength at the completion of this 60 day construction period, form work shall be left in place so that the other construction contracts may proceed in this area without delay.

#### 3.18.4.4 Construction in the Vicinity of Town Center Drive.

The RCB channel section of the Red Rock Channel at Town Center Drive (Sta 45+56.54 to Sta 47+80.54) to include backfilling of same and permanent asphalt, curb and gutter replacement, shall be completed within 90 calendar days from the Red Rock Channel notice to proceed, so that other construction contracts may proceed in this area without delay. The Town Center Drive improvements shown to be existing on the contract drawings may or may not be completed at time of Notice to Proceed for the Red Rock Channel contract. The Red Rock Channel contractor shall coordinate activities in this area with the Town Center Drive contractor if improvements for same are not yet completed.

#### 3.18.4.5 Construction in the vicinity of Desert Inn.

The RCB channel section of the Red Rock Channel at Desert Inn (Sta 87+00 to Sta 88+86.32) to include backfilling, replacement of the permanent street improvements, and the construction of the side drain stubouts locates at Sta 87+25.44 Left and Sta 87+84.97 Left, complete, shall be completed within 110 calendar days of the Red Rock Channel notice to proceed.

#### 3.18.4.6 Construction in the vicinity of Sarhara Avenue

All channel work under the Red Rock Channel contract between stations 131+50.00 and 139+47.90 shall be completed by July 7, 2000.

#### 3.18.5 Additional Coordination Issues

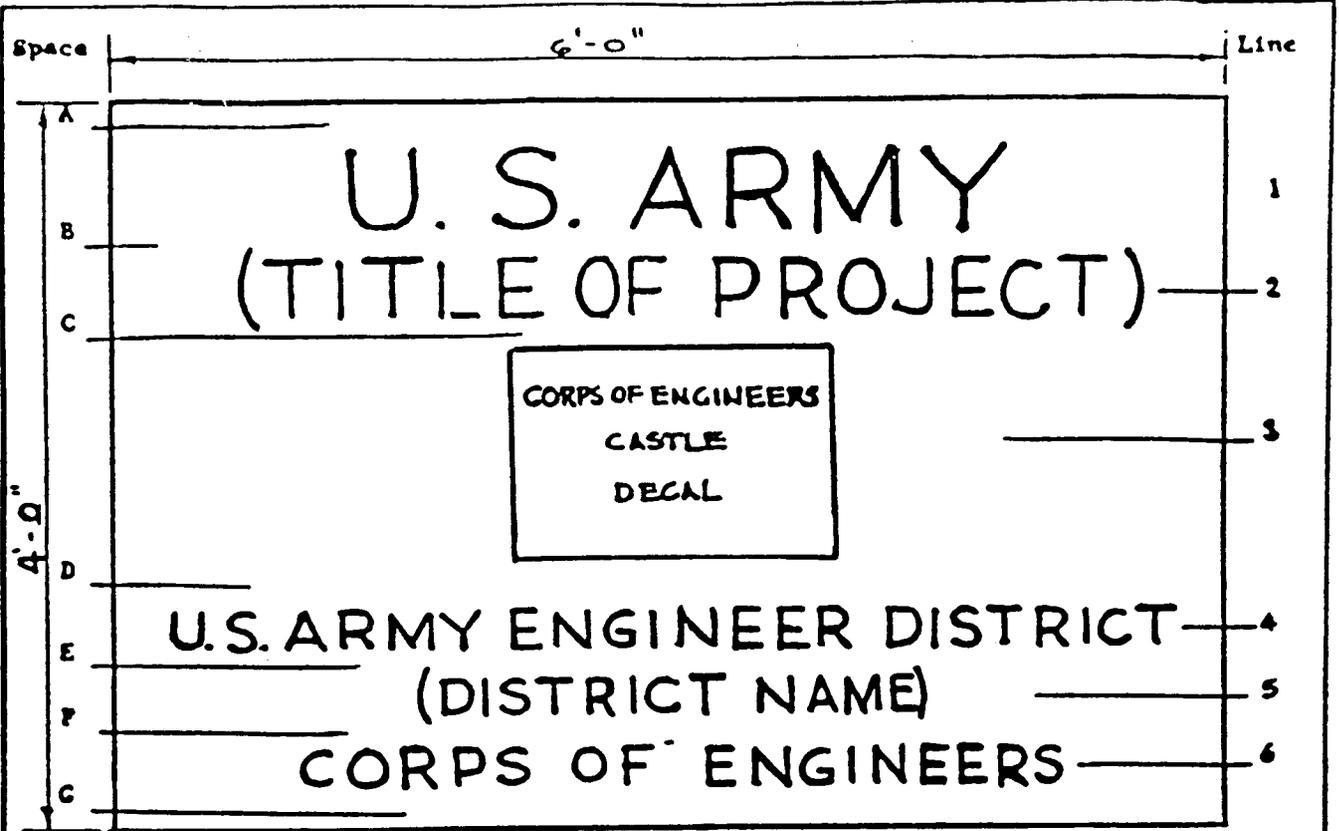
##### 3.18.5.1 Golf Course Drain

The golf course drain for the Red Rock Country Club, identified as a "Structure by Others" in the vicinity of Sta 107+00 of the Red Rock Channel, may be constructed in advance of or during the construction of the Red Rock Channel contract. This golf course drain can be expected to be active during the contract performance period for the Red Rock Channel contract. The Red Rock Channel contractor shall coordinate this other construction/other completed structures into their construction phasing requirements for the construction of the Red Rock Channel.

##### 3.18.5.2 Haul Road Interferences

The Red Rock Channel contractor shall anticipate haul road interferences associated with the construction of Section 10A Roadway project at all road crossings identified above. In addition, other haul road interference may result in conjunction with the construction of the R-4 Channel, the Red Rock County Club golf course drain and/or the Sahara Blvd (Western Beltway) Improvements. Minor haul route realignments or grade approach structures may be required as a result of this other simultaneous or completed work.

-- End of Section --



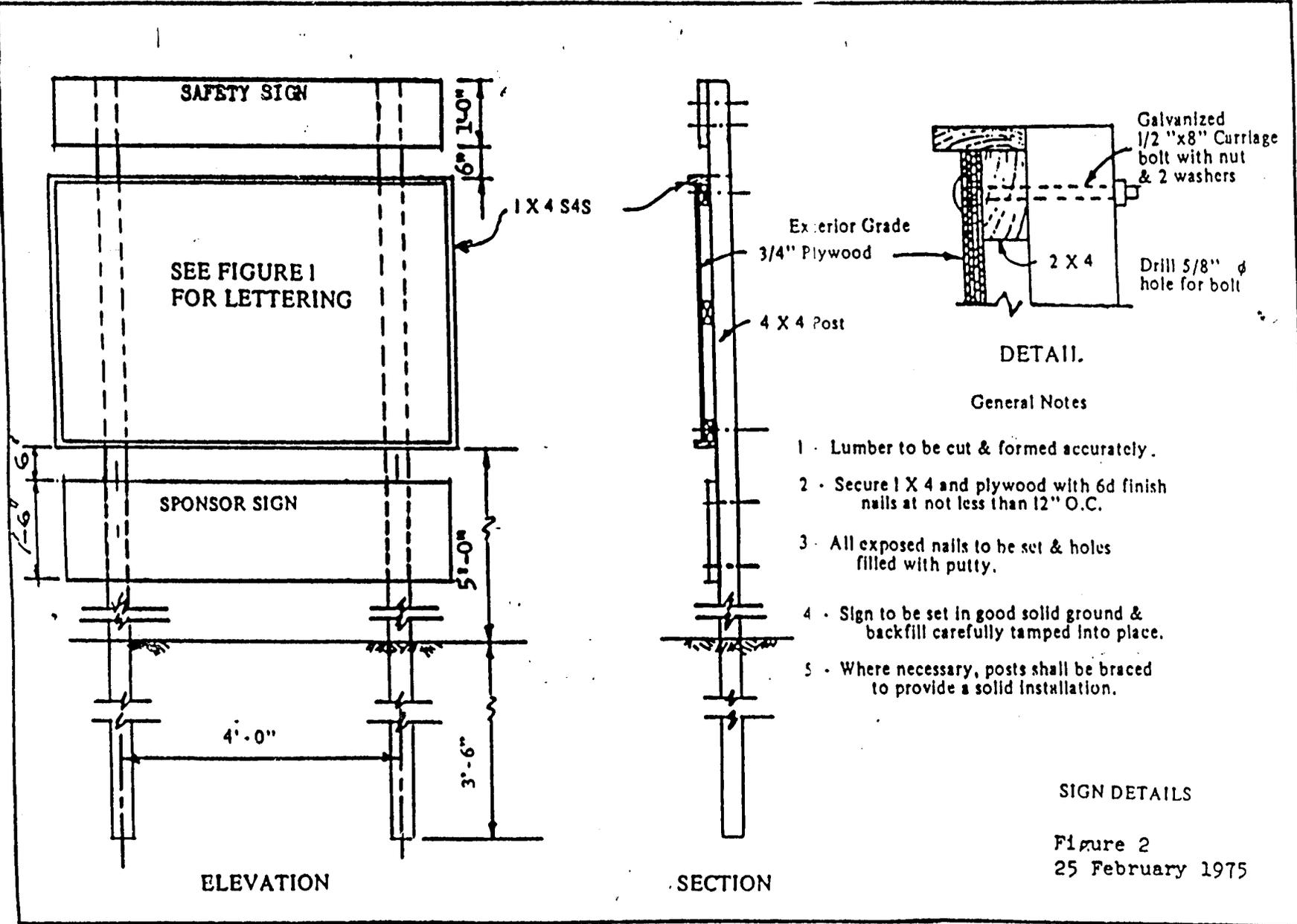
SCHEDULE

<u>Space</u>	<u>Height</u>	<u>Line</u>	<u>Description</u>	<u>Letter Height</u>	<u>Strokes</u>
A	3"	1	U. S. ARMY	5 1/2"	7/8"
B	2"	2	PROJECT NOMENCLATURE	1"	5/8"
C	2"	3	CORPS OF ENGINEERS CASTLE (DECAL)	1 1/2"	—
D	3"	4	U. S. ARMY ENGINEER DISTRICT	2 3/4"	3/8"
E	2"	5	DISTRICT NAME	2 1/4"	1/4"
F	2"	6	CORPS OF ENGINEERS	2 1/2"	3/8"
G	3"				

Lettering Color -- Black

PROJECT SIGN  
(Army-Civil Works)

Figure 1  
14 August 1972



SIGN DETAILS

Figure 2  
25 February 1975

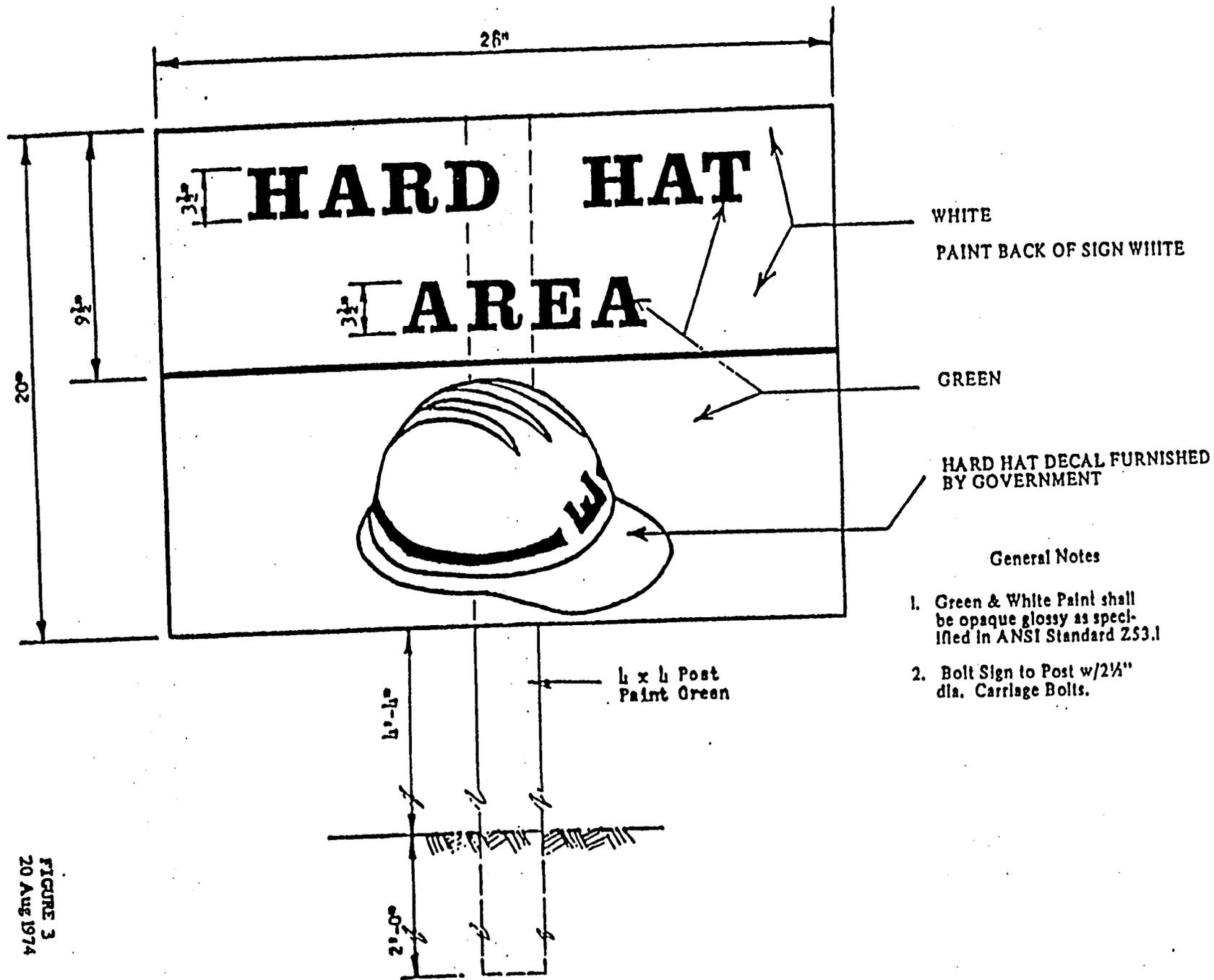


FIGURE 3  
20 Aug 1974

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## SECTION 01440

## 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 D 3740 (1994a) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

ASTM E 329 (1993b) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

## 1.2 PAYMENT

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

## PART 2 PRODUCTS (Not Applicable)

## PART 3 EXECUTION

## 3.1 GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause entitled "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.

## 3.2 QUALITY CONTROL PLAN

## 3.2.1 General

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 entitled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. The Government will consider an interim plan for the first 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.

### 3.2.2 Content of the CQC Plan

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

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

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

c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters will 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 01300 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 will 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 and has separate control requirements. It could be identified by different trades or disciplines, or it could 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 feature under a particular section. This list will be agreed upon during the coordination meeting.

### 3.2.3 Acceptance of Plan

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

### 3.2.4 Notification of Changes

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

## 3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and 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 10 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 General

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

### 3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within his organization at the site of the work who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a graduate engineer, graduate architect, or a graduate of construction management, with a minimum of 3 years construction experience on construction similar to this contract. This CQC System Manager shall be on the site at all times during construction and will be employed by the prime Contractor. The CQC System Manager shall be separate from

the Production Manager or supervisory staff. An alternate for the CQC System Manager will be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate will be the same as for the designated CQC System Manager.

### 3.4.3 CQC Personnel

In addition to CQC personnel specified elsewhere in the contract, the Contractor shall provide as part of the CQC organization specialized personnel to assist the CQC System Manager for the following areas: civil, structural, and materials technician. These individuals may be directly employed by the prime Contractor or be contracted for from outside sources on a contingent basis. The individuals shall be responsible to the CQC System Manager and shall not be an employee or representative of a subcontractor performing work elsewhere under this contract. The individuals shall be physically present at the construction site during work on their areas of responsibility; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan.

#### Experience Matrix

##### Area Qualifications

- |                                  |   |
|----------------------------------|---|
| a. Civil                         | Graduate Civil Engineer with 2 years experience in the type of work being performed on this project or technician with 5 yrs related experience |
| b. Structural                    | Graduate Structural Engineer with 2 yrs experience or person with 5 yrs related Experience  |
| c. Concrete, Pavements and Soils | Materials Technician with 2 yrs experience for the appropriate area   |

### 3.4.4 Additional Requirement

In addition to the above experience and education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management For Contractors".

### 3.4.5 Organizational Changes

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

## 3.5 SUBMITTALS

Submittals shall be made as specified in Section 01300 SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals 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.
- 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 72 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 24 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

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

### 3.6.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon or conceal non-conforming work.

### 3.6.4 Additional Preparatory and Initial Phases

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

## 3.7 TESTS

### 3.7.1 Testing Procedure

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

- a. Verify that testing procedures comply with contract requirements.
- b. Verify that facilities and testing equipment are available and comply with testing standards.
- c. Check test instrument calibration data against certified standards.
- d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
- e. Results of all tests taken, both passing and failing tests, will 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 will 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 will be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

### 3.7.2 Testing Laboratories

#### 3.7.2.1 Capability Check

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

#### 3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of \$675.00 to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

### 3.7.3 On-Site Laboratory

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

### 3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials will be borne by the Contractor. Unless specified otherwise, samples of materials for test verification and acceptance testing by the Government shall be delivered to Quality Assurance Laboratory at an address to be determined. Coordination for each specific test, exact delivery location, and dates will be made through the Area Office.

## 3.8 COMPLETION INSPECTION

### 3.8.1 Punch-Out Inspection

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

### 3.8.2 Pre-Final Inspection

The Government will perform this inspection to verify that the 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 and so notify 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 will be accomplished within the time slated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

### 3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, his superintendent or other primary management person and the contracting Officer's representative will be in attendance at this inspection. Additional Government personnel including, but not limited to, those from Sponsor user groups, and major commands may also be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice will be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and must 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 entitled "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 should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.
- e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
- f. Submittals reviewed, with contract reference, by whom, and action taken.
- g. Off-site surveillance activities, including actions taken.
- h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- i. Instructions given/received and conflicts in plans and/or specifications.
- j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 72 hours after the date(s) 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 seven 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

(Deleted)

### 3.11 CONTRACTOR PROJECT MANAGEMENT SYSTEM.

#### 3.11.1 General

3.11.1.1 The Contractor project Management System is included to assure adequate planning and execution of the work, to assist the Contracting Officer on appraising the reasonableness of the schedule, to evaluate progress of the work, and make progress payments, and to make decisions relative to time and/or cost adjustments which may result from changes in the work.

3.11.1.2 The management system is to be based on a computerized Network Analysis (Critical Path Method) operated by on-site personnel at terminals located in the Contractors's on-site office. On-site management shall be capable of using the system to address all project activities and resources on a real time inactive basis and be capable of rapidly evaluating alternative scenarios which will optimize project management. Evidence of technical expertise of on-site personnel with the proposed computerized Network Analysis System shall be submitted for Contracting Officer's approval prior to on-site work. The Contractor's Scheduling system shall be capable of downloading fully and completely to the Corps of Engineers Standard Data Exchange Format.

3.11.1.3 The Contractor shall resource load all work activities. As a minimum, resource loading shall identify equipment, management, skilled and unskilled labor requirements. The Contractor may at his option decide on greater detail for his own purposes, but if this option is elected, the system must be able to consolidate resources into the above defined categories for use by the Contracting Officer.

3.11.1.4 The Contractor shall incorporate any and all milestone and contract required events which may be specified elsewhere within these specifications. Should milestone events be not specifically identified by the Government within these specifications, the Contractor shall identify at least five percent of the network activities and designate them as milestone activities.

3.11.1.5 The Contractor Project Management System is to be staffed and prepared pursuant of CONTRACT CLAUSE: SCHEDULE FOR CONSTRUCTION CONTRACTS, and CONTRACT CLAUSE: SUPERINTENDENT BY THE CONTRACTOR. In preparing this system the Contractor assume responsibility for conformance with contract requirements, planning, sequencing of work, and determining the construction means and methods.

3.11.2 Submission and Approval. Submission and approval of the system shall be as follows:

3.11.2.1 The complete network system consisting of the detailed network mathematical analysis (including on-site manpower loading schedule) and network logic diagrams shall be submitted for approval within thirty (30) calendar days after receipt of Notice to Proceed. This shall be submitted in assembled hardcopy paper format and software computer disk to allow restoring on Government Computers.

3.11.2.2 The Contractor shall participate in a review and evaluation of the

proposed network logic diagrams and mathematical analysis by the Contracting Officer. Any revisions necessary as a result of this review shall be resubmitted for approval of the Contracting Officer within three (3) calendar days after the conference. The approved schedule shall be used by the Contractor for planning, organizing and directing the work, reporting progress, and requesting payment for work accomplished.

### 3.11.3 Network Modifications.

3.11.3.1 In those cases where the contract performance is delayed due to causes beyond the control of the Contractor, and a time extension may be allowable under one or more of the CONTRACT CLAUSES: CHANGES, or DIFFERING SITE CONDITIONS, or DEFAULT (FIXED PRICE CONSTRUCTION), or SUSPENSION OF WORK, or other applicable clauses, as a proposal in such format as to identify the specific subnet diagram and activities affected.

3.11.3.2 Change order proposals shall include description or listing of all proposed changes to the network, by activity, and demonstrate the effect on the contract required completion date. A complete list of activities changed and subnet of activities affected by the change shall be submitted.

3.11.3.3 Float or slack is defined as the amount of time between the early start date and the late start date, or the early finish date and the late finish date, of any of the activities in the NAS schedule. Float or slack is not time for the exclusive use or benefit of either the Government or the Contractor. Extensions of time for performance may be granted to the extent that equitable time adjustment for the activities affected exceed the total float or where otherwise justified, effect on contract completion can be shown. The contract completion date is fixed, and will be amended only the modifications which include time and are signed by the Contracting Officer.

3.11.3.4 Rapid resolution of change orders and the granting of other time extensions where authorized by the Contracting Officer is a critical part of the overall management system. Implementation of all justified activity and logic changes shall be made and reflected on the next monthly update after approval of the Contracting Officer.

3.11.3.5 If, in the opinion of the Contracting Officer, the current schedule no longer accurately reflects the Contractor's real plan for accomplishing the work, or no longer reflects a viable way of finishing the work on schedule, the Contractor shall be directed to revise the schedule and submit it for approval within seven (7) calendar days of direction.

### 3.11.4 Logic Diagrams and Reports.

#### 3.11.4.1 Logic diagrams.

3.11.4.1.1 Logic diagrams shall show the order and interdependency of activities and sequence in which the work is to be accomplished as planned by the Contractor.

3.11.4.1.2 Detailed networks need not be timed scaled, but drafted to have a continuous flow from left to right, showing how the start of a given activity is dependent on the completion of preceding activities, and how its completion

restricts the start of the following activities.

3.11.4.1.3 An assembled logic diagram of the complete project shall be submitted with the initial NAS, showing each activity identifying numbers, duration, description, with the critical path easily identified. Updated assembled diagrams will be provided as required by logic changes (but not more frequently than the monthly update). The logic diagram shall be plotted on architectural size E paper.

3.11.4.1.4 In addition to the detailed schedule, a summary schedule shall be developed by the Contractor. The summary schedule shall consist of minimum thirty (30) activities and be updated monthly.

#### 3.11.4.2 Reports.

3.11.4.2.1 After the network approval, the Contractor shall review and evaluate the actual progress with the Contracting Officer's representative on a weekly basis, and submit any updated weekly reports three (3) workdays after the meeting.

3.11.4.2.2 Three (3) weekly reports, selected from specific items of the menu will be required, for specified time window of the project (such as the next two weeks). These reports must be flexible in format, allowing generation of reports relating specifically to critical work areas, or areas of particular interest. The Government will identify the subject of the requested reports for the following week at a weekly review meeting. All activities involving the Government that affect progress will be coded to allow to separate report.

3.11.4.2.3 Monthly update reports will be submitted at midmonth showing status and actual start and finish dates of project activities, and will be capable of comparing the current status with the approved base schedule. Each monthly update report shall be uniquely identified and shall be stored on the Contractor's computer until the final pay estimate is processed. The content of the monthly update shall be flexible to show items listed in the menu. The midmonth report shall be used for partial payments.

3.11.4.2.4 A meeting shall be held three (3) workdays before the delivery of the midmonth report to discuss all input data. If the Contractor desires to make changes in his method of operation and scheduling, he shall clearly present the proposed changes.

3.11.4.2.5 A narrative report shall be submitted with midmonth report indicating current and anticipated problems, delaying factors, and conditions that are impacting the Contractor's work effort. An analysis showing the reasons for the delay/gain and their impact upon the current schedule shall be included. When it is apparent the scheduled milestone(s) and completion date(s) will not be met, the Contractor shall propose specific methods he intends to implement to bring the project back on schedule at not cost to the Government. Such measure may include but are not limited to:

- a. Increasing construction manpower in such quantities and crafts as will substantially eliminate the backlog of work effort.
- b. Increasing the number of working hours per shift; shifts per workday;

workdays per week; the amount of construction equipment; or any combination thereof.

c. Rescheduling of activities to achieve maximum practical concurrence of work shifts.

3.11.4.2.6 The Contractor shall implement such procedures as may be necessary for the active participation by his subcontractors in preparing and updating the schedule. Subcontractors shall be provided with schedules which identify the interfaces of their work with the work of others. At minimum, the Contractor shall provide bar graphs to each major subcontractor showing activity times with plots on an Early Start basis. Copies of these schedules shall also be provided to the Contracting Officer. The relationship between subcontractor and interdependency or work shall be managed by the Contractor. When these interdependencies are violated or impaired, the Contractor shall identify the problem, resolve it, and provide the information to the Contracting Officer as part of the monthly report.

### **3.11.5 Forecasting Expenditures.**

The Contracting Officer will provide a spreadsheet to the Contractor showing the different funding categories and their respective categories for each bid item for the total contract amount (see attached FIGURE 1). Each pay period the contractor shall forecast his expenditures for the following 3 pay periods, indicating funding requirements for each category. The updated worksheet (see attached FIGURE 2) shall be submitted with each partial pay estimate (e.g. submitted for the period 15 DEC to 15 JAN will include a forecast of expenditures for the period 15 Jan to 15 APR). Forecasting of expenditures is needed to assure sufficient funding for future progress payments.

### **3.11.6 Payment Requests.**

3.11.6.1 The monthly update report shall be used as a basis for the monthly partial pay estimate. The report will state the cost, actual percent complete, and current value of partially completed or completed work. Subtotals from subnets representing separate areas of construction will be given, along with a grand dollar value of work completed for the project.

3.11.6.2 The first payment shall not be made until the Network Analysis Schedule has been approved by the Contracting Officer. If, in the judgment of the Contracting Officer, The Contractor fails or refuses to provide an approved schedule and other progress or input data specified, the Contractor shall be deemed not to have provided the required information upon which progress payments may be made, and no payment request will be honored.

3.11.6.3 Activities submitted for payment shall be based on the approved network activities and monetary amount. No payment shall be made for activities conducted in deviation of the approved logic.

3.11.6.4 Payment for activities conducted when previously dependent activities have not been completed or accepted due to quality defects shall be restricted at the discretion of the Contracting Officer.

## **3.12 IMPLEMENTATION OF GOVERNMENT RESIDENT MANAGEMENT SYSTEM.**

The Contractor shall utilize a Government furnished CQC Programming Module (A computerized executable file which is DOS based and operates on a minimum of 80386 IBM compatible computers). The Module includes a Daily CQC Reporting System form which must also be used. This form may be in addition to other Contractor desired reporting forms. However, all other such reporting forms shall be consolidated into this one Government specified Daily CQC Report Form. The Contractor will also be required to complete Government-furnished Module elements which includes, but is not limited to, Prime Contractor staffing; letter codes; planned cumulative progress earnings; subcontractor information showing trade, name, address, point-of-contact, and insurance expiration dates; definable features of work; pay activity and activity information; required Quality Control tests tied to individual activities; planned User Schooling tied to specific specification paragraphs and contractor activities; Installed Property Listing, Transfer Property Listing and submittal information relating to specification section, description, activity number, review period and expected procurement period. The sum of all activity values shall equal the contract amount, and all Bid Items, Options and Additives shall be separately identified, in accordance with the "Bidding Schedule". Bid Items may include multiple Activities, but Activities may only be assigned to one such Bid Item. This Module shall be completed to the satisfaction of the Contracting Officer prior to any contract payment (except for Bonds, Insurance and/or Mobilization, as approved by the Contracting Officer) and shall be updated as required.

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

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

### 3.13 NOTIFICATION OF NONCOMPLIANCE

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

-- End of Section -

FIGURE 1  
SAMPLE SPREAD SHEET

SEVEN OAKS DAM, DAM AND APPURTENANCES  
SAN BERNARDINO COUNTY, CALIFORNIA

ITEM #	DESCRIPTION	TOTALS		FED		O.C.		S.B.C.		R.C.
		AMOUNT	%	BE069	%	NON-FED FW090	%	NON-FED FW093	%	NON-FED FW092
1.	MOB & DEMOB	\$1,000,000.00	94.1797	\$941,7917.00	5.1044	\$51,044.00	0.4092	\$4,092.00	0.3067	\$3,067.00
2.	DIV &. CONTROL WA	\$2,000,000.00	94.1797	\$1,883,594.00	5.1044	\$102,088.00	0.4092	\$8,184.00	0.3067	\$6,134.00
3.	CLEAR SITE	\$1,000,000.00	94.1797	\$941,797.00	5.1044	\$51,044.00	0.4092	\$4,092.00	0.3067	\$3,067.00
4.	SCALING	\$2,000,000.00	94.1797	\$1,883,594.00	5.1044	\$102,088.00	0.4092	\$8,184.00	0.3067	\$6,134.00
5.	EXC, FOUND ALLU	\$5,000,000.00	94.1797	\$4,708,985.00	5,1044	\$255,220.00	0.4092	\$20,460.00	0.3067	\$15,335.00
6.	EXC, FOUND ROCK	\$5,000,000.00	94.1797	\$4,708.985.00	5.1044	\$255,220.00	0.4092	\$20,460.00	0.3067	\$15,335.00
						NON-FED VW090		NON-FED VW093		NON-FED VW092
7.	PROTECT-IN-PLACE	\$1,000,000.00			87.6999	\$876,999.00	7.0306	\$70,306.00	5.2695	\$52,695.00
8.	RELOCATE NEWPO	\$2,000,000.00			87.6999	\$1,753,998.00	7.0306	\$140,612.00	5.2695	\$105,390.00

FIGURE 2  
SAMPLE WORKSHEET

SEVEN OAKS DAM, DAM AND APPURTENANCES  
SAN BERNARDINO COUNTY, CALIFORNIA  
EXPENDITURES FORCAST

	JAN 15 - FEB 15	FEB 15 - MAR 15	MAR 15 - APR 15
BEW9	\$5,660,000.00	\$7,540,000.00	\$9,420,000.00
FW090	\$310,000.00	\$410,000.00	\$520,000.00
FW093	\$30,000.00	\$40,000.00	\$50,000.00
FW092	\$20,000.00	\$30,000.00	\$40,000.00
VW090	\$62,000.00	\$53,000.00	\$44,000.00
VW093	\$5,000.00	\$5,000.00	\$4,000.00
VW092	\$4,000.00	\$4,000.00	\$3,000.00

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SECTION 02100

DIVERSION AND CONTROL OF WATER

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PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

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SECTION 02100

DIVERSION AND CONTROL OF WATER

PART 1 GENERAL

1.1 REQUIREMENT

1.1.1 General

All permanent construction shall be carried on in areas free from water. Water in varying quantities may be flowing in natural washes throughout the length of the project, as a result of rainfall or flow from upstream sources. Storm runoff from watersheds can be rapid and, during periods of rain, intermittent freshets may be expected.

Within 10 days after receipt of Notice to Proceed, the Contractor shall submit a diversion and control of water plan showing the method that he proposes to use to divert water from each working area. In addition, the Contractor shall indicate:

- a) The order of work proposed to provide a contiguous flood drainage system during construction.
- b) Related or conflicting items of work necessarily requiring coordination and/or staged construction, particularly involving maintenance of traffic through the area of channel crossing at Desert Inn Road, TownCenter Drive, Sahara Avenue, and construction of the parallel detour road.**
- c) Items of work (either permanent or temporary) required as part of the subsequently scheduled roadway project that could be placed ahead of schedule, and in coordination with the Contractors activities for this project, to help satisfy the required drainage carrying capacity of the flood drainage system during construction of the channel.

The responsibility for damage to any part of the permanent work shall be as set forth in the CONTRACT CLAUSE: PERMITS AND RESPONSIBILITIES. Damage to all work (including temporary construction), utilities, materials, equipment, and plant shall be repaired to the satisfaction of the Contracting Officer at the Contractor's expense, regardless of the cause of such damage.

1.1.2 Diversion Requirements

The Contractor is responsible for the diversion and control of all runoff entering the construction area. The runoff will include water originating from upstream, urban runoff, adjacent drainages; and in addition any and all seepage and groundwater originating within the work. The work site may be inundated because of runoff. The Contractor shall be responsible for protection of work site during times of runoff by his own means and shall be approved by the Contracting Officer.

1.1.3 Drainage Ditches

The location and depth of any drainage ditch to be constructed under this contract shall be subject to the approval of the Contracting Officer. Special precautions shall be taken to avoid impairing the permanent subgrade. Damaged subgrade shall be replaced in accordance with SECTION FILLS AND SUBGRADE PREPARATION by and at the expense of the Contractor.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

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SECTION 02200

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## SECTION 02200

## EXCAVATION

## 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 2487 (1993) Classification of Soils for Engineering Purposes (Unified Soil Classification System)

U.S. ARMY CORPS OF ENGINEERS (COE)

COE EM 385-1-1 Safety and Health Manual

## 1.2 GENERAL

Excavation shall consist of the removal of every type of material encountered in the designated areas or from areas directed. The material to be removed may include but is not limited to hardpan, silt, sand, gravel, cobbles and boulders, cemented silt/sand/gravel/cobbles/boulders with various degrees of cementation, caliche, asphalt, vegetation, trash, and other debris.

Excavation of temporary slopes, as indicated on the drawings, have been designated per soils report prepared by Kleinfelder, project no. 31-300304, dated November 23, 1998 and Kleinfelder letter to VTN Nevada, dated June 1 1999. Unforeseen conditions may dictate that the designated slopes do not necessarily represent the actual slopes to which the excavation must be made to safely perform the work; in such cases, the temporary cut slope shall be made to the actual slope to which the work can be safely performed.

Measurement and payment for excavation will be made in accordance with Section 01250, paragraphs 5.1 and 5.2. Excavation for permanent cuts shall be made to the slope lines indicated. Excavation may require ripping or other rock-excavation techniques, including blasting, and shall be performed in a manner which will not impair the subgrade. Rock or cemented material from required excavation to be used in compacted fills and backfills shall be crushed or otherwise reduced in size to meet gradation requirements (Section 02250: FILLS AND SUBGRADE PREPARATION) prior to placement or stockpiling. Except as otherwise specified, the finish surface of subgrades shall be smooth and shall not vary more than 0.1 foot from indicated grade. Prior to commencing excavation, the Contractor shall submit his plan for excavation to the Contracting Officer. All subgrade excavations will be inspected by the Contracting Officer prior to placement of any fill materials.

## 1.3 BLASTING

Any method used to excavate the channel using explosives shall be subject to the approval by the Contracting Officer.

## 1.3.1 General Requirements

The drilling and blasting program and methods shall be the minimum necessary to break up the rock (caliche) into bulldozer-manageable sized pieces for removal. Only the minimum strength explosive that will accomplish the fracturing will be allowed. If multiple charges are deemed necessary, they will be sequenced to produce good breakage of the rock and reduce airblast (sonic impacts) and ground vibrations to minimal levels. In the design of the

blasting pattern, no blastholes will be permitted within 200 feet of an active tortoise burrow. A qualified desert tortoise ecologist is required to be present during all blasting operations to ensure that there are no occupied burrows and/or to remove tortoises from the surface or burrows within the 200 foot limit. The desert tortoise ecologist will provide a short report with field notes to the Contracting Officer. The desert tortoise ecologist will be provided by the Contractor at his own expense. Additional restrictions may be imposed during the hibernation period (15 November through 15 March) to protect hibernating tortoises, if necessary and directed by the Contracting Officer. The Contractor shall strictly comply with all State and local regulations regarding construction blasting (e.g., Uniform Standard Specifications for Public Works Construction Off-Site Improvements, Clark County Area, Nevada, Third Edition, subsections 107.10, 203.03.03, and 208.03.01, and Engineer Manual (EM) 1110-2-3800, including all notice and reporting requirements). Under no circumstances shall blasting be performed within 100 feet of concrete that has been placed less than seven days. Blasting within 100 feet of concrete older than seven days will be permitted only if approved by the Contracting Officer.

#### 1.3.2 Blasting

Prior to drilling for each blast, unless excepted by the Contracting Officer, the Contractor shall submit on an approved form the pertinent data on the location, depth and area of the blast; diameter, spacing, depth, overdepth, pattern and inclination of blast holes; the type, strength, amount, distribution and powder factor for the explosives used per hole and per blast; the sequence and pattern of delays, and description and purpose of special methods. The loading of holes shall be done in the presence of a Government inspector. Acceptance by the Contracting Officer of blasting data will not relieve the Contractor of his responsibility to produce satisfactory results as set forth in these specifications. Drilling and blasting shall be done only to the depth, amount, and at such locations, with explosives of such quantity, distribution and density that will not produce unsafe or damaged foundation surfaces or damage material beyond the prescribed excavation limits. When a drilling and blasting program results in damage to the excavation, the Contractor will be required to devise and employ methods which will prevent such damage. The revision may include special methods such as presplit and zone blasting, shallow lifts, reduction in size of individual blasts, small diameter blast holes, closely spaced blast holes, reduction of explosives, greater distribution of explosives by use of decking and primacord or variation in density of explosives.

#### 1.3.3 Overshooting

The Contractor shall control the blasting procedures so as not to overshoot. Any material outside the authorized channel cross section on the side slopes which may be shattered or loosened because of blasting shall be removed and/or re-compacted by the Contractor at his expense. Shattered or loosened material below the bottom limits of the required excavation shall be uniformly distributed and compacted or otherwise disposed of in a manner satisfactory to the Contracting Officer. The Contractor shall discontinue any method of blasting which leads to overshooting or is dangerous to the public, destructive of natural or man-made features, or is injurious to wildlife and habitat.

#### 1.3.4 Equipment

The Contractor shall provide suitable vibration monitoring equipment to measure and record the ground motions associated with each blast. The monitoring equipment will be placed to monitor the effects of the blasting at the 200 foot distance.

### 1.3.5 Notifications

The Contractor shall notify each property owner and public utility company having structures or facilities in proximity to the site of the work of his intention to use explosives. Such notice shall be given sufficiently in advance to enable the companies to take such steps as they may deem necessary to protect their property from injury.

### 1.3.6 Qualifications

During blasting operations, the Contractor shall have on site, and in immediate charge of the blasting, a licensed blaster acceptable to the Contracting Officer who has had no less than 3 years of experience in controlled blasting and rock excavation operations. Powder handlers shall have had no less than one year continuous experience in preparation and loading of powder charges.

### 1.3.7 Post-Blast Reports

In addition to the reporting requirements required above, a separate Post-Blast Report of each blast shall be prepared and furnished to the Contracting Officer on an approved form. The report shall indicate the location of the blast by specific stationing, depth of round, pounds of explosives used by type and grade, total number of loaded holes, total pounds per delay, quantity and kind of explosive in each hole, maximum measured blast vibration, and any other blast information directed by the Contracting Officer.

### 1.3.8 Explosives

#### 1.3.8.1 Safety

The contractor shall fully comply with Section 29, Blasting, U. S. Army Corps of Engineers Safety and Health Requirements Manual, EM 3851-1, dated 3 September 1996.

#### 1.3.8.2 Storage

The Contractor shall submit to the Contracting Officer, for approval, drawings showing the location, access to and type of construction of the proposed storage magazine for explosives, and cap house. The explosives storage magazine and other facilities may be located on project lands if a satisfactory location can be found and is approved by the Contracting Officer. The Contractor shall maintain the explosive storage area at his own expense.

## 1.4 PRESERVATION OF PROPERTY

All excavation operations shall be conducted in such a manner that concrete structures, embankments, utilities, roads or other facilities and improvements which are to remain in place permanently will not be subjected to settlement or horizontal movement. The contractor shall furnish and install sheet piling, cribbing, bulkheads, shoring, or whatever means may be necessary to adequately support material carrying such improvements or to support the improvements themselves and shall maintain such means in position until they are no longer needed. Temporary sheet piling, cribbing, bulkheads, shoring or other protective means shall remain the property of the Contractor and when no longer needed, shall be removed from the site. The Contractor shall submit for approval shop drawings showing the proposed method of bracing he intends to use. All shoring and bracing shall be designed so that it is effective to the bottom of the excavation, and shall be based upon calculation of pressures exerted by (and the condition and nature of) the materials to be retained, including surcharge imparted to the to the side of the trench by equipment and stored materials. Removal of shoring shall be performed in such a manner as not to disturb or damage the finished concrete or other facility.

### 1.5 EXCAVATION FOR STRUCTURES

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

### 1.6 EXCAVATION CHANNEL

Channel excavation consists of the removal of all materials within the lines and grades indicated.

### 1.7 REMOVAL OF UNSATISFACTORY SOILS

The removal of soils or materials which are unsatisfactory for the foundation of the channel, or structures may be required in certain areas. Unsatisfactory soils or materials include but are not limited to those materials containing roots and other organic matter, trash, debris and materials classified in ASTM D 2487, as Pt, OH, OL, CH, MH, and materials too wet to support construction equipment. Channel subgrade materials that cannot be brought to 95% compaction after scarification, shall be removed. The Contractor will be required to excavate any such areas to the depth directed and backfill the removal areas with compacted fill conforming to the requirements of SECTION 02250 FILLS AND SUBGRADE PREPARATION.

### 1.8 DISPOSITION AND DISPOSAL OF EXCAVATED MATERIALS

Excavated materials suitable for required fills shall be placed in temporary stockpiles or used directly in the work. Excess excavated (satisfactory) natural material not utilized as part of the construction shall be stockpiled at the disposal site shown on drawing C-2. Materials to be placed in disposal site shall be free from trash, dumped debris and demolition products, and shall consist of no materials suspected of having characteristics of hazardous and/or toxic waste. Materials characterized as unsatisfactory soil including trash, dumped debris and demolition products shall become the property of the Contractor and shall be removed from the project site in accordance with requirements Section 1130 ENVIRONMENTAL PROTECTION and Section 01200 GENERAL REQUIREMENTS. No excavated material or waste of any kind shall be removed beyond the project limits under this contract without the express written authority of the Contracting Officer. Prior to placing material, the approved stockpile area(s) shall be cleared of trash and vegetation. Vegetation shall be removed by grading the existing ground surface to a depth of 6 inches. Any stockpiles shall be placed in a manner to preclude ponding of water. Natural ground surface soils thus removed will then be designated as either:

- i. materials to be salvaged, or
- ii. scrap or unsatisfactory soils

to be treated as specified above and in SECTION 02150 CLEAR SITE AND REMOVE OBSTRUCTIONS.

#### 1.8.1 Hauled Excavated Material

The Contractor shall have a routing plan for haul within the project limits, including removal of required excavated materials and placing fill materials. The haul route plan shall be submitted to the Contracting Officer for approval. The Contractor will be responsible for obtaining all permits and licenses necessary to haul material off-site. The Contractor will provide to the Contracting Officer three copies of the proposed street haul route plan for transport of all excess excavated material.

**1.9 OVERCUT**

Except as otherwise specified or specifically ordered in writing, any overcut or excavation beyond the lines and grades indicated in the plans (or as directed) shall be backfilled with compacted fill conforming to the Section 02250 FILLS AND SUBGRADE PREPARATION, or concrete conforming to the Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE. The Contractor shall expect to overbuild and trim back the compacted fill required to backfill overcuts made at trapezoidal channel sections. All excavating, backfilling, compacting of backfill, and concreting occasioned thereby shall be by the Contractor at no additional cost to the Government. Any overcut under existing or newly constructed channels and structures shall be backfilled with concrete.

2 PRODUCTS (Not Applicable)

3 EXECUTION (Not Applicable)

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## SECTION 02222

## EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS

## 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 422	(1963; R 1990) Particle-Size Analysis of Soils
ASTM D 1556	(1990) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	(1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu.ft.(2,700 kN-m/cu.m.))
ASTM D 2487	(1992) Classification of Soils for Engineering Purposes (Unified Soil Classification System)

## 1.2 DEFINITIONS

## 1.2.1 Degree of Compaction

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

## 1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION: SUBMITTAL DESCRIPTIONS.

## 1.3.1 SD-09, Reports

Field Density Tests; GA. Testing of Backfill Materials; GA.

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

## PART 2 PRODUCTS

## 2.1 MATERIALS

## 2.1.1 Satisfactory Materials

Satisfactory materials shall consist of any material classified by ASTM D 2487 as GW, GP, GM, GC, SW, SP, SM, SC and CL.

### 2.1.2 Unsatisfactory Materials

Unsatisfactory materials shall be materials that do not comply with the requirements for satisfactory materials. Unsatisfactory materials include but are not limited to those materials containing roots and other organic matter, trash, debris, frozen materials, cemented chunks of sand and gravel, caliche and stones larger than 3 inches and materials classified in ASTM D 2487, as CH, PT, OH, MH, and OL. Unsatisfactory materials also include man-made fills, refuse, or backfills from previous construction.

### 2.1.3 Cohesionless and Cohesive Materials

Cohesionless materials shall include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic.

### 2.1.4 Rock

Rock shall consist of boulders measuring 1/2 cubic yard or more and materials that cannot be removed without systematic drilling and blasting such as rock material in ledges, bedded deposits, unstratified masses and conglomerate deposits, and below ground concrete or masonry structures, exceeding 1/2 cubic yard in volume, except that pavements will not be considered as rock.

### 2.1.5 Unyielding Material

Unyielding material shall consist of rock and gravelly soils with stones greater than 3 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.

### 2.1.6 Unstable Material

Unstable material shall consist of materials too wet to properly support the utility pipe, conduit, or appurtenant structure.

### 2.1.7 Select Granular Material

Select granular material shall consist of well-graded sand, gravel, crushed gravel, crushed stone or crushed slag composed of hard, tough and durable particles, and shall contain not more than 10 percent by weight of material passing a No. 200 mesh sieve and no less than 95 percent by weight passing the 1/2 inch sieve. The maximum allowable aggregate size shall be 1/2 inch, or the maximum size recommended by the pipe manufacturer, whichever is smaller.

### 2.1.8 Plastic Marking Tape

Plastic marking tape shall be acid and alkali-resistant polyethylene film, 152 mm (6 inches) wide with minimum thickness of 0.102 mm (0.004 inch). Tape shall have a minimum strength of 12.1 MPa (1750 psi) lengthwise and 10.3 MPa (1500 psi) crosswise. The tape shall be manufactured with integral wires, foil backing or other means to enable detection by a metal detector when the tape is buried up to 3 feet deep. The tape shall be of a type specifically manufactured for marking and locating underground utilities. The metallic core of the tape shall be encased in a protective jacket or provided with other means to protect it from corrosion. Tape color shall be as specified in TABLE 1 and shall bear a continuous printed inscription describing the specific utility.

TABLE 1. Tape Color  
Red: Electric

## PART 3 EXECUTION

## 3.1 EXCAVATION

Excavation shall be performed to the lines and grades indicated. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench equal to 1/2 the depth of the excavation, but in no instance closer than 2 feet. Excavated material not required or not satisfactory for backfill shall be removed from the site. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating therein shall be removed to maintain the stability of the bottom and sides of the excavation. Unauthorized overexcavation shall be backfilled in accordance with paragraph: BACKFILLING AND COMPACTION at no additional cost to the Government.

## 3.1.1 Trench Excavation

The trench shall be excavated as recommended by the manufacturer of the pipe to be installed. Trench walls below the top of the pipe shall be sloped, or made vertical, and of such width as recommended in the manufacturer's installation manual. Where no manufacturer's installation manual is available, trench walls shall be made vertical. Trench walls more than 5 feet high shall be shored, cut back to a stable slope, or provided with equivalent means of protection for employees who may be exposed to moving ground or cave in. Vertical trench walls more than 5 feet high shall be shored. Trench walls which are cut back shall be excavated to at least the angle of repose of the soil. Special attention shall be given to slopes which may be adversely affected by weather or moisture content. The trench width below the top of pipe shall not exceed 600 mm (24 inches) plus pipe outside diameter (O.D.) for pipes of less than 600 mm (24 inches) inside diameter and shall not exceed 900 mm (36 inches) plus pipe outside diameter for sizes larger than 600 mm (24 inches) inside diameter. Where recommended trench widths are exceeded, redesign, stronger pipe, or special installation procedures shall be utilized by the Contractor. The cost of redesign, stronger pipe, or special installation procedures shall be borne by the Contractor without any additional cost to the Government.

## 3.1.1.1 Bottom Preparation

The bottoms of trenches shall be accurately graded to provide uniform bearing and support. The trenched subgrade shall not vary more than 0.5 inches from the indicated grade. Stones of 3 inches or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.

## 3.1.1.2 Removal of Unyielding Material

Where overdepth is not indicated and unyielding material is encountered in the bottom of the trench, such material shall be removed 6 inches below the required grade and replaced with suitable materials as provided in paragraph: BACKFILLING AND COMPACTION.

## 3.1.1.3 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select granular material as provided in paragraph: BACKFILLING AND COMPACTION. When removal of unstable material is required due to the fault or neglect of the Contractor in his performance of the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Government.

### 3.2 BACKFILLING AND COMPACTION

Backfill material shall consist of satisfactory material or select granular material. Backfill shall be moisture conditioned and placed in layers not exceeding 6 inches loose thickness for compaction by hand operated machine compactors, and 8 inches loose thickness for other than hand operated machines. Each layer shall be compacted to at least 90 percent maximum density in accordance with ASTM D 1557.

#### 3.2.1 Trench Backfill

Trenches shall be backfilled to the grade shown.

##### 3.2.1.1 Replacement of Unyielding Material

Unyielding material removed from the bottom of the trench shall be replaced with select granular material.

##### 3.2.1.2 Replacement of Unstable Material

Unstable material removed from the bottom of the trench or excavation shall be replaced with select granular material placed in layers not exceeding 6 inches loose thickness.

##### 3.2.1.3 Bedding and Initial Backfill

Bedding material type and thickness shall be in accordance with the pipe manufacturer recommendation. Initial backfill material shall consist of select granular material and shall be placed and compacted with approved tampers to a height of at least one foot above the utility pipe or conduit. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe.

##### 3.2.1.4 Final Backfill

The remainder of the trench shall be filled with satisfactory material. Backfill material shall be placed and compacted to the final grades shown on drawings:

Backfill shall be deposited in layers of a maximum of 12-inch loose thickness, and compacted to 90 percent maximum density. Compaction by water flooding or jetting will not be permitted. This requirement shall also apply to all other areas not specifically designated above.

#### 3.2.2 Plastic Marking Tape

Warning tapes shall be installed directly above the pipe, at a depth of 12 inches below finished grade unless otherwise shown.

### 3.3 TESTING

Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government.

#### 3.3.1 Testing Facilities

Tests shall be performed by an approved commercial testing laboratory or may be tested by facilities furnished by the Contractor. No work requiring testing will be permitted until the facilities have been inspected and approved by the Contracting Officer. The first inspection shall be at the expense of the Government. Cost

incurred for any subsequent inspection required because of failure of the first inspection will be charged to the Contractor.

### 3.3.2 Testing of Backfill Materials

Characteristics of backfill materials shall be determined in accordance with particle size analysis of soils (ASTM D 422) and moisture-density relations of soils (ASTM D 1557). A minimum of one particle size analysis and one moisture-density relation test shall be performed on each different type of material used for bedding and backfill.

### 3.3.3 Field Density Tests

Tests shall be performed in sufficient numbers to ensure that the specified density is being obtained. A minimum of one field density test per lift of backfill for every 200 feet of installation shall be performed. One moisture density relationship shall be determined for every 500 cubic yards of material used or as required due to material change. Field in-place density shall be determined in accordance with ASTM D 1556. Trenches improperly compacted shall be reopened to the depth directed, then refilled and compacted to the density specified at no additional cost to the Government.

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## SECTION 02250

## FILLS AND SUBGRADE PREPARATION

## 1 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 422 (1963; R 1990) Particle-Size Analysis of Soils

ASTM D 1556 (1990) Density and Unit Weight of Soil in Place by the Sand-Cone Method

ASTM D 1557 (1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup>)

ASTM D 2216 (1992) Laboratory Determination of Water (Moisture) Content of Soil, and Rock

ASTM D 2487 (1992) Classification of Soils for Engineering Purposes Unified Soil Classification System)

ASTM D 2922 (1991) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

ASTM D 4914 (1994) Density of Soil and Rock in Place by the Sand Replacement Method in a Test Pit.

ASTM D 5030 (1994) Density of Soil and Rock in Place by the Water Replacement Method in a Test Pit.

## 1.2 COMPACTION EQUIPMENT

Compaction shall be accomplished by tamping roller, rubber tired roller vibratory compactor or mechanical tampers. All equipment, tools, and machines shall be maintained in satisfactory working condition at all times. Compaction equipment shall be suitable for consistently producing uniform soil densities.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL PROCEDURES:

SD-09 Reports

Field Density Tests; GA.

Treating of Compacted Fill Materials; GA.

Copies of all laboratory and field test reports shall be submitted to the contracting officer within 24 hours of the completion of the tests.

## 1.4 GENERAL REQUIREMENTS FOR COMPACTED FILLS AND COMPACTED BACKFILLS

## 1.4.1 Control

Moisture-density relations shall be established by the Contractor. The soil used for each maximum density test shall be classified in accordance with ASTM D 2487 and shall include a particle size analysis in accordance with ASTM D 422. At least one five point maximum density test shall be made for every 10 field density tests. Field density test shall be performed by the Contractor at the frequency established in paragraph: 1.4.1.2 Field Control, and in such locations to insure that the specified density is being obtained. Moisture-density relations and field densities shall be reported on approved forms. One copy of density data less dry weight determinations shall be provided on the day each test is taken. The completed test reports shall be provided with the Contractor Quality Control Report on the work day following the test.

## 1.4.1.1 Laboratory Control

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

a. The desired amount of mixing water will be added for each compaction test specimen, mixed well, and the mixture will be placed in a container with an airtight cover and allowed to cure for 24 hours. A shorter curing time may be allowed where tests show that shortening the curing time will not affect the results.

## 1.4.1.2 Field Control

Field in-place density shall be determined in accordance with ASTM D 1556. The field moisture content shall be determined in accordance with ASTM D 2216. Determination of in-place densities using the nuclear method (ASTM D 2922) may be used to supplement the sand cone density tests (ASTM D 1556). When ASTM D 2922 is used, the calibration curves shall be checked and adjusted using only the sand cone method as described in ASTM D 1556. When material contain considerable amount of rock or coarse gravel in-place density test method ASTM D 4914 or ASTM D 5030 shall be used. At least one adjacent sand cone test shall be performed for every five nuclear density tests performed. If field density tests determined by the nuclear method vary by more than 0.5 pounds per cubic foot from comparison sand-cone tests, and are consistently high or low, adjustment of the calibration curve is necessary.

## a. In-Place Densities

One test per 1000 cubic yards, for the first 10,000 cubic yards of material and one test for each 2000 cubic yards thereafter, or fraction thereof, shall be made of each lift of fill or backfill areas compacted by other than hand-operated machines. At least one test shall be made in each 2 foot layer of compacted fill or backfill processed as a unit and not less than one test shall be made in each area. One test per 500 cubic yards, or fraction thereof, shall be made of each lift of fill or backfill areas compacted by hand-operated machines. The contractor CQC shall maintain a log of all tests which will updated and submitted to the contracting officer on a weekly basis. The test log shall include: Test number (if retest shall include retest number), date, feature of work, station and offset, weight of wet soil, weight of dry soil, percent of compaction, optimum moisture content, maximum dry unit weight, soil classification, in-place density test methods either sand-cone or nuclear densimeter.

#### 1.4.2 Settling of Fills or Backfills with Water

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

#### 1.4.3 Fill Material

Fill material shall be obtained from the required excavation. Materials considered unsatisfactory for use as compacted fill include but are not limited to those materials containing roots and other organic matter, trash, debris, chunks or clumps of cemented material, and shall contain no stone whose greatest dimension is more than 3/4 the lift thickness. The Contractor shall expect to break-down, crush or otherwise process required excavation for use as fill material due to the cementation of in-situ soils. Materials classified in ASTM D 2487 as MH, CH, Pt, OH, and OL are also considered unsatisfactory for use as compacted fill. Material for compacted fill behind concrete structures shall contain less than 30 percent by weight passing the No. 200 sieve and shall contain no particle larger than 3 inches.

#### 1.4.4 Placement

Fill material shall not be placed against concrete which has not been in place at least 14 days or until the concrete has attained a strength of 2500 PSI when tested in accordance with the Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE. Heavy equipment shall not be operated over pipes and buried structures until at least 2 feet of fill material have been placed and compacted over them. Material from the top of the pipe or buried structure to 2 feet above pipe or buried structure shall be compacted by mechanical tampers or other equipment approved by the Contracting Officer. Compacted fill shall be placed with suitable equipment in horizontal layers which before compaction, shall not exceed 1 foot in depth for rubber-tired or vibratory rollers, 8 inches in depth for tamping rollers, 4 inches in depth when mechanical tampers are used. The Contractor may vary the layer thickness within these limits for most efficient operations. Material containing stones shall be placed in a manner to prevent the stones from striking the concrete structures and to prevent the formation of voids.

#### 1.4.5 Moisture Content

Material shall have a uniform moisture content while being placed and compacted. Water shall be added at the source, if required, or by sprinkling each layer of material during placement. Uniform distribution of moisture shall be obtained by disking, harrowing, or otherwise manipulating the soil during and after time water is added. Material containing an excess of moisture shall be manipulated with suitable implements to facilitate maximum aeration and shall be permitted to dry to the proper consistency before being compacted. Fill shall have a maximum moisture content of not more than 2 percent above optimum and a minimum moisture content of not less than 2 percent below optimum.

#### 1.4.6 Compaction

No layer of fill shall be compacted before the practicable uniform moisture content has been obtained. Scarified areas shall be compacted as specified for the fill placed thereon. Rollers will not be permitted to operate within 1 foot of channel or structure walls or over buried structures until the compacted fill over the top of the structures has reached a depth of 2 feet. Compaction equipment shall be so operated that structures are not damaged nor overstressed during compaction operations. Mechanical tampers shall be used for compaction of fill material adjacent to structures where rolling equipment is impracticable for use in compaction.

## 1.5 COMPACTED FILL, CHANNEL

### 1.5.1 Invert

#### 1.5.1.1 Preparation for Placing

The foundation for the compacted fill to be placed and compacted fill at the channel shall be cleared of all existing obstructions, vegetation and debris. Any trash or debris shall be removed in accordance with Section 02150 CLEAR SITE AND REMOVE OBSTRUCTIONS and Section 02200 EXCAVATION. Unsatisfactory or unstable (too wet) material not meeting the requirements for fill material shall be removed where directed. The existing surfaces for the compacted fill at the channel site shall be scarified to a depth of 6 inches and proofrolled by four passes of the compaction equipment. The subgrade for the channel shall be prepared in accordance with paragraph: SUBGRADE PREPARATION.

#### 1.5.1.2 Compaction

Each layer of the material shall be compacted to not less than 95 percent of maximum density, per ASTM D 1557.

### 1.5.2 Behind Channel Walls

#### 1.5.2.1 Limitations on Equipment

The gross weight of any piece of equipment, or the combined weight of any combinations of equipment coupled together, used to place, moisten and/or compact fill behind channel walls and up to 2 feet above the top of covered sections shall not exceed 35,000 pounds, including dynamic forces produced by vibratory equipment. Equipment used to compact the fill behind the channel walls shall be of such size as to be capable of operating in the area between the cut slope and the channel wall. Compaction equipment will not be required to operate at elevations lower than 2 feet above the top of wall footings. This equipment shall be of such size as to be capable of operating in the area between the cut slope and the channel wall at any point 2 feet above the top of the heel of wall footings.

#### 1.5.2.2 Construction Balance

Fills behind wall on one side of the channel shall not exceed by more than 5 feet the high of the fill behind the opposite channel wall at any time during construction.

#### 1.5.2.3 Compaction

Each layer of fill behind channel walls, shall be compacted to not less than 90 percent of maximum density, per ASTM D 1557. The top 3 feet of the maintenance road adjacent to the channel wall shall be compacted to not less than 95% of maximum density per ASTM D 1557.

#### 1.5.2.4 Trimming

The top of fill adjacent to channel walls shall be trimmed to the lines indicated on the drawings with a tolerance of plus or minus 1 inch. Any material loosened by trimming shall be recompacted and the area moistened and compacted with one pass of a smooth-wheeled roller. Tolerances shall apply after rolling. Fill slopes shall be trimmed to a uniform alignment at the top of the berm and reasonably uniform slope at or outside the lines shown on the drawings.

#### 1.5.2.5 Backfill Against Plywood at Ends of Pipe and Sewer Stubs

3/4" plywood shall be braced or otherwise held flush against the end of the pipe during backfilling. The Contractor shall make sure the plywood is of sufficient size to adequately cover the pipe or sewer stub opening. The Contractor shall attach blocks or shims to roughly fit the inside diameter of the pipe to assure that the plywood is not displaced during backfilling.

#### 1.5.3 Compacted Fill Over Covered Channel

##### 1.5.3.1 General

No fill material shall be placed over the top of the covered channel until all voids at the sides of the covered channel have been filled as described below, and until all caved material has been compacted to the specified density to the top of the roof slab.

##### 1.5.3.2 Material

Materials for filling voids shall be clean sand, free of trash, organic materials, debris, and with 100 percent passing the No. 4 sieve and not more than 10 percent passing the No. 100 sieve.

##### 1.5.3.3 Placement

The first layer of fill over the concrete box section shall be 1 foot in thickness and shall be compacted with a rubber-tired or vibratory roller having a maximum weight of 20,000 pounds. The remainder of the fill shall be deposited in 6 inch layers and compacted with rubber-tired or vibratory rollers, or other approved equipment with a maximum weight of 20,000 pounds until the structure has a cover of at least 2 feet. The remainder of the compacted fill shall be placed as specified in paragraph 1.6 - COMPACTED FILL, CHANNEL of this section.

##### 1.5.3.4 Contractors Option

If the Contractor elects to leave the inside forms and shoring in place, permission will be granted to place fill material 48 hours after concrete has been placed.

##### 1.5.3.5 Compaction

**Each layer of fill on top of the covered channel shall be compacted to not less than 90 percent of maximum density, per ASTM D 1557. Compacted Fill under streets and maintenance roads shall be compacted per paragraph: COMPACTED FILL, ROADWAY.**

#### 1.5.4 Compacted Fill, Roadway

##### 1.5.4.1 Location

**Compacted roadway fill shall consist of fill placed for all streets, maintenance roads, turnarounds, and access ramps construction, and all other fill within all street right-of-ways. Street work includes fill and backfill for streets, curbs, and driveways.**

##### 1.5.4.2 Compaction

Fill shall be compacted to not less than 95 percent of maximum density per ASTM D 1557 for the width of all traveled ways plus three (3) feet on each side thereof.

#### 1.5.4.3 Trimming

All street and maintenance road shoulders and side slopes shall be trimmed to the lines indicated on the drawings with a tolerance of plus or minus 1 inch. Any material loosened by trimming shall be recompacted and the area moistened and compacted with one pass of a smooth-wheeled roller. Tolerances shall apply after rolling. Fill slopes shall be trimmed to a reasonably uniform slope at or outside the lines shown on the drawings.

### 1.6 BACKFILL

#### 1.6.1 Structural Backfill

##### 1.6.1.1 Location

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

##### 1.6.1.2 Material

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

##### 1.6.1.3 Placing

Backfill material shall not be placed against concrete which has not been in place at least 14 days or until the concrete has attained a strength of 2500 PSI when tested in accordance with Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE. Backfill shall be placed in 4 inch layers.

##### 1.6.1.4 Compaction

Compaction shall be not less than 90 percent of maximum density, per ASTM D 1557 unless noted or shown otherwise.

### 1.7 SUBGRADE PREPARATION

#### 1.7.1 Subgrade for Channel

Subgrade preparation for channel shall include subgrade preparation for areas to receive concrete, aggregate base course and/or bituminous paving for streets, access roads, maintenance roads, turnarounds, and invert access ramps. All trash and debris shall be removed in accordance with Section 02150 CLEAR SITE AND REMOVE OBSTRUCTIONS and Section 02200 EXCAVATION. After the channel has been excavated to rough grade, the entire channel invert, invert access ramp, and other area indicated above shall be scarified to a depth of 6 inches, moisture conditioned and proofrolled by 4 passes of the compaction equipment and trimmed to a uniform grade and smoothed with a steel-wheeled roller to make the subgrade ready to receive concrete. If the subgrade is disturbed by the Contractor's operations or is overexcavated, or is soft or yielding, the subgrade shall be restored to grade and compacted to a density of 95 percent of maximum density, per ASTM D 1557. The finished surface of the subgrade shall not be more than 0.5 inch above the indicated grade at any point when tested with a 12 foot straightedge.

**1.8 SOIL STABILIZER**

Soil stabilizer shall be placed on all exposed excavation and fill surfaces after construction is completed. The soil stabilizer shall be a mixture of plaster and natural fiber mulch. The cellulose fiber mulch shall be produced from grinding clean whole wood chips, or fiber produced from ground

newsprint with a labeled ash content not to exceed 7 percent. The plaster shall consist of naturally occurring high purity processed gypsum and additives. The gypsum shall be produced from a mined or quarried source. The gypsum shall be processed to be composed of a crushed dry calcium

sulfate hemihydrate having a purity of not less than 88 percent. The soil stabilizer shall be mixed with color pigments to match existing soil color on site. Color can be matched using the "Davis Colors" chart by SoilTech, Las, Vegas, Nevada, or equal. The gypsum and additives shall be furnished either in bags or bulk and be accompanied by bills of lading and shipping invoices. The shipping invoices for the gypsum shall state the gypsum's purity content, dry weight, and source of manufacture. Processed gypsum that has become partially air set, lumpy, or caked shall not be used. The plaster/cellulose fiber mulch shall be applied at a rate of 6.75 tonnes of plaster mixed with 2.242 tonnes of fiber per hectare. The plaster/cellulose fiber mulch stabilizer shall formulate a protective crustlike barrier within 4 to 8 hours after application. Application of the plaster/cellulose fiber mulch stabilizer will not be permitted when weather conditions are unsuitable for concrete placement in accordance with Section 03301  
CAST-IN-PLACE STRUCTURAL CONCRETE.

- 2 PART 2 PRODUCTS (NOT APPLICABLE)
- 3 PART 3 EXECUTION (NOT APPLICABLE)

-- End of Section --

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## SECTION 02710

## WEEP HOLE SYSTEMS

## 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 C 131	(1996) Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(1992) Standard Test Method Sieve Analysis of Fine and Coarse Aggregates
ASTM D 75	(1987; Standard Practice for Method Sampling Aggregates
ASTM D 123	(1996) Terminology Relating to Textile Material
ASTM D 4632	(1991) Grab Breaking Load and Elongation of Geotextile
ASTM D 4833	(1988) Test Method for Index Puncture Resistance of Geotextiles, Geomembrane, and Related Products

## 1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL PROCEDURES:

SD-14 Samples

Filter Material; FIO.

Specimens identified to indicate the manufacturer, type of material, size and quantity of material, and shipment or lot represented. Each sample of filter material shall be a piece not less than 6-inch x 6-inch.

## PART 2 PRODUCTS

## 2.1 DRAIN MATERIAL

**Drain material shall be durable, hard, tough, and free from adherent coatings.**

The material shall not contain corrosive agents, organic matter, or soft, friable, thin or elongated particles in quantities considered deleterious by the Contracting Officer. Drain material shall consist of gravel, crushed stone, or processed crushed concrete, and shall show a loss in weight of not more than 50 percent when tested in accordance with ASTM C 131, and shall be reasonably well graded within the following limits:

<u>Sieve Size (millimeters)</u>	<u>Percent by Weight Passing</u>
25 mm	100
19 mm	90-100
9.5 mm	20-55
4.75 mm	0-10
150 $\mu$ m	0-4
75 $\mu$ m	0-2

## 2.2 FILTER FABRIC

Filter fabric shall be a nonwoven needle punch pervious sheet of plastic yarn. The filter fabric shall provide an apparent opening size no finer than the No. 100 sieve and no coarser than the No. 50 sieve. The filter fabric shall have a minimum tensile strength of 100 pounds in any principal direction when tested in accordance with ASTM D 4632 grab test method using one inch square jaws and a one foot per minute constant rate of traverse. The filter fabric shall have a 15 percent minimum breaking elongation in any principal direction when tested in accordance with ASTM D 4632. The filter fabric shall have a 50 pound minimum puncture strength when tested in accordance with ASTM D 4833. The filter fabric shall have no seams.

## PART 3 EXECUTION

### 3.1 INSTALLATION

#### 3.1.1 Drain Material

Drain material for weep holes shall be wrapped completely in filter fabric and placed immediately against the wall, covering the opening of the weep hole.

#### 3.1.2 Installation of the Filter Fabric

The filter fabric shall be placed in the manner and at the location indicated. The Contractor shall submit a plan for installation of filter fabric in front of channel weep holes for approval by the Contracting Officer. At the time of installation, the filter fiber shall be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation or storage. The surface to receive the filter fabric shall be prepared to a relatively smooth condition free of obstruction, depressions, debris and soft or low density pockets of material. The filter fabric shall be placed smooth and free of tension, stress, or wrinkles. The filter fabric shall be placed to provide a minimum overlap of 12 inches at each joint. Temporary pinning of the textile to help hold it in place shall be allowed. The temporary pins shall be removed during placement of materials on the fiber fabric to relieve high tensile stress. The filter fabric shall be protected at all times during construction from contamination by surface runoff and any filter fabric so contaminated shall be removed and replaced with uncontaminated filter fabric. Any damage to the filter fabric during its installation or during placement of

drain material or compacted fill shall be replaced by the Contractor at no cost to the Government. The work shall be scheduled so that the covering of the filter fiber with a layer of the specified material is accomplished within 7 days after placement of the filter fabric. Failure to comply shall require replacement of filter fabric. The filter fabric shall be protected from damage prior to and during the placement of drain material or compacted fill by limiting the height of drop to less than 1 foot. Before placement of drain material or compacted fill, the Contractor shall demonstrate that the placement technique will prevent damage to the filter fabric. In no case shall any type of equipment be allowed on the unprotected filter fabric.

### 3.1.3 Shipment and Storage

During all period of shipment and storage, the filter fabric shall be protected from direct sunlight, ultra-violet rays, temperatures greater than 140 degrees Fahrenheit, mud, dirt, dust and debris. To the extend possible shall be maintained wrapped in a heavy duty protective covering.

## 3.2 TESTS

### 3.2.1 Drain Material

#### 3.2.1.1 Points

Points on the individual grading curves obtained from representative samples of the drain material not only shall lie between the boundary limits as defined by smooth curves drawn through the tabulated grading limits plotted on a mechanical-analysis diagram but also shall exhibit no abrupt changes in slope denoting skip grading, scalping of certain sizes, or other irregularities which would be detrimental to the proper functioning of the drain.

#### 3.2.1.2 Sampling and Testing

Sampling and testing of the drain material shall be performed by the Contractor to determine compliance of the installed materials with specified requirements in conformance with ASTM C 131, ASTM C 136, and ASTM D 75. Sampling and testing shall be performed at regular intervals with at least three tests being made for drain materials. The location of after placement tests shall be as directed.

## 3.3 PROTECTION

The Contractor shall take all necessary precautions to avoid damage to the completed subdrainage system from the movement of equipment during placing and compacting operations of fill material.

-- End of Section --

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## SECTION 02720

## REINFORCED CONCRETE PIPE STUBOUTS

## 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 C 76	(1995) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C 655	(1994) Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe
ASTM C 828	(1990; R 1996) Low-Pressure Air Test of Vitrified Clay Pipe Lines
ASTM C 924	(1989; R 1997) Concrete Pipe Sewer Lines by Low-Pressure Air Test Method

UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA NEVADA

NEVADA DEPARTMENT OF TRANSPORTATION STANDARD PLANS FOR ROAD AND BRIDGE CONSTRUCTION

## 1.2 SUBMITTALS.

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL PROCEDURES.

SD-06, Instructions

Placing Pipe; GA.

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

SD-13, Certificates

Pipeline Testing; GA.

Certified copies of test reports demonstrating conformance to applicable pipe specifications, before pipe is installed.

### 1.3 DELIVERY, STORAGE, AND HANDLING OF MATERIALS.

#### 1.3.1 Delivery and Storage.

Materials delivered to site shall be inspected for damage, unloaded, and stored with the minimum of handling. Do not store materials directly on the ground. Inside of pipes and fittings shall be kept free of dirt and debris. Gasket materials and plastic materials shall be protected from exposure to the direct sunlight over extended periods.

#### 1.3.2 Handling.

Materials shall be handled in such a manner as to insure delivery to the trench in sound undamaged condition. Pipe shall be carried to the trench not dragged.

## PART 2 PRODUCTS.

### 2.1 GENERAL.

The reinforced concrete pipe conduit shall be constructed as shown and as specified. Concrete shall conform to the applicable requirements of the section: CAST-IN-PLACE STRUCTURAL CONCRETE. Where pipe is embedded in concrete, the pipe shall be supported in such a manner to hold it rigidly in position while concrete is placed. Earthwork about the conduit shall conform to the applicable requirements of the section: EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS. Specified and/or indicated D-loading is the minimum acceptable, and heavier pipe may be furnished at the option of the Contractor.

### 2.2 Concrete Pipe.

#### 2.2.1 MATERIALS.

Reinforced Concrete Pipe shall conform to the requirements of ASTM C 76, CLASS III. The following additional markings shall be clearly stenciled on the pipe:

Permissible D-load to produce a 0.01-inch crack  
Internal diameter in inches

#### 2.2.2 TESTS FOR PIPE.

Certified copies of test reports, demonstrating conformance to the applicable pipe specifications, shall be furnished the Contracting Officer before installation of the pipe. Strength tests for concrete pipe, as required in the applicable specifications, shall be the three-edge bearing tests.

### 2.3 MISCELLANEOUS MATERIALS.

#### 2.3.1 Concrete.

Unless otherwise specified, concrete and reinforced concrete shall conform to the requirements for 3,000 psi concrete under Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE.

### 2.3.2 Joints.

#### 2.3.2.1 Mortar joints.

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

#### 2.3.2.2 COMPOSITION.

Mortar for joints shall be composed of cement, sand, and water proportioned at the approximate ratio of one part cement to not more than two parts sand. The materials shall conform to the applicable requirements of the section: CAST-IN-PLACE STRUCTURAL CONCRETE.

#### 2.3.2.3 MIXING.

The mortar shall be mixed in a concrete mixer in the manner specified for concrete, or in a watertight mixing box. If mixed in a box, the box shall first be filled with the required amount of sand, the volume of which shall be determined with a one-cubic-foot measuring box. The requisite amount of cement shall then be added and the material dry mixed by turning at least three times with a mortar hoe. Sufficient water shall then be added and the mixing continued until the batch is uniform in color and consistency. Mortar shall show no visible signs of setting and shall be used within a period of 30 minutes after mixing with water. No retempering will be permitted.

## PART 3 EXECUTION.

### 3.1 EXCAVATION FOR PIPE SIDE DRAINS AND DRAINAGE STRUCTURES.

Excavation of trenches and for appurtenances and backfilling for culverts and storm drains shall be in accordance with the applicable portions of Section 02220 EXCAVATION.

### 3.2 BEDDING.

#### 3.2.1 Concrete Pipe.

The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe. Bedding material type and thickness shall be in accordance with the pipe manufacturer recommendations. When no bedding class is specified or recommended by the pipe manufacturer, concrete pipe shall be bedded carefully in a soil foundation accurately shaped and rounded to conform to the lowest one-fourth of the outside portion of circular pipe or to the lower curved portion of pipe arch for the entire length of the pipe or pipe arch. When necessary, the bedding shall be tamped. Bell holes and depressions for joints shall be only of such length, depth, and width as required for properly making the particular type of joint.

### 3.3 Placing and Laying

Pipe and accessories shall be carefully lowered into the trench by means of derrick, ropes, belt slings, or other authorized equipment. Water-line materials shall not be dropped or dumped into the trench. Abrasion of the pipe coating shall be avoided. Except where necessary in making connections with other lines or as authorized by the Contracting Officer, pipe shall be laid with the bells facing in the direction of laying. The full length of each section of pipe shall rest solidly upon the pipe bed, with recesses excavated to accommodate bells, couplings, and joints. Pipe that has the grade or joint disturbed after laying shall be taken up and relaid. Pipe shall not be laid in water or when trench conditions are unsuitable for the work. Water shall be kept out of the trench until joints are complete. When work is not in progress, open ends of pipe, fittings, and valves shall be securely closed so that no trench water, earth, or other substance will enter the pipes or fittings. Where any part of the coating or lining is damaged, the repair shall be made by and at the Contractor's expense in a satisfactory manner. Pipe ends left for future connections shall be valved, plugged, or capped, and anchored, as shown.

### 3.4 Reinforced Concrete Pipe Installation

Reinforced concrete pipe shall be installed in accordance with recommendations of the pipe manufacturer. Before laying reinforced concrete pipe, the outside surface of the spigot and the inside surface of the bell shall be cleaned and an acceptable vegetable-compound lubricant applied to the inside surface of the bell and to the rubber gasket. Where prescribed by the pipe manufacturer, the gasket shall be placed in the groove on the end of the pipe before the pipe is placed in the trench. After the pipe has been forced together, the position of the rubber gasket shall be checked with a feeler gauge in accordance with the pipe manufacturer's recommendations. Tapping of reinforced concrete cylinder pipe shall be done in accordance with the manufacturer's approved recommendations. Where the manufacturer recommends that the taps be made by attaching the rubber-gasketed saddle to the outside of the pipe using U-bolts, the saddle shall be grouted in if necessary, the mortar coating shall be chipped away, even with the hole in the saddle plate. The exposed circumferential wires shall be removed and the cylinder and concrete core drilled out, and the steel saddle and U-bolts shall be protected by concrete encasement.

### 3.5 JOINTS.

#### 3.5.1 Jointing

##### 3.5.1.1 Reinforced Concrete Pipe Requirements

The inside and outside annular spaces between abutting sections of concrete pipe shall be filled with rich cement mortar in accordance with the pipe manufacturer's recommendations. Excess mortar shall be removed from interior annular spaces, leaving a smooth and continuous surface between pipe sections. Exposed portions of steel joint rings shall be protected from corrosion by a metallic coating or by an approved nonmetallic coating. Rubber gaskets shall be handled, lubricated where necessary, and installed in accordance with the pipe manufacturer's recommendations.

### 3.6 SIDE DRAIN.

#### 3.6.1 Side Drain Junction Structures.

Side drain pipes and stubout pipes shall join the outlet channel with junction structures. Construction of junction structures shall be of reinforced concrete complete as shown on the drawings.

### 3.7 PIPELINE TESTING

Lines shall be tested for leakage by low pressure air or water testing or exfiltration tests, as appropriate. Low pressure air testing for vitrified clay pipes shall conform to ASTM C 828. Low pressure air testing for concrete pipes shall conform to ASTM C 924. Low pressure air testing for plastic pipe shall conform to ASTM F 1417. Low pressure air testing procedures for other pipe materials shall use the pressures and testing times prescribed in ASTM C 828 or ASTM C 924, after consultation with the pipe manufacturer. Testing of individual joints for leakage by low pressure air or water shall conform to ASTM C 1103M ASTM C 1103. Prior to exfiltration tests, the trench shall be backfilled up to at least the lower half of the pipe. If required, sufficient additional backfill shall be placed to prevent pipe movement during testing, leaving the joints uncovered to permit inspection. visible leaks encountered shall be corrected regardless of leakage test results. When the water table is 600 mm 2 feet or more above the top of the pipe at the upper end of the pipeline section to be tested, infiltration shall be measured using a suitable weir or other device acceptable to the Contracting Officer. An exfiltration test shall be made by filling the line to be tested with water so that a head of at least 600 mm 2 feet is provided above both the water table and the top of the pipe at the upper end of the pipeline to be tested. The filled line shall be allowed to stand until the pipe has reached its maximum absorption, but not less than 4 hours. After absorption, the head shall be reestablished. The amount of water required to maintain this water level during a 2-hour test period shall be measured. Leakage as measured by the exfiltration test shall not exceed [ 60 liters per mm in diameter per kilometer (250 gallons per inch in diameter per mile) 11250 gallons per inch in diameter per mile of pipeline per day] [ 9 ML per mm in diameter per 100 meters (0.2 gallons per inch in diameter per 100 feet) 0.2 gallons per inch in diameter per 100 feet of pipeline per hour]. When leakage exceeds the maximum amount specified, satisfactory correction shall be made and retesting accomplished. Testing, correcting, and retesting shall be made at no additional cost to the Government.

-- End of Section --



## SECTION 02730

## MANHOLES

## 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 C 94	(1990)	Ready-Mixed Concrete
ASTM C 150	(1989)	Portland Cement
ASTM C 478	(1990b)	Precast Reinforced Concrete Manhole Sections
ASTM C 924	(1989)	Concrete Pipe Sewer Lines by Low-Pressure Air Test Method
ASTM D 2751	(1991)	Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings
ASTM D 3034	(1989)	Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D 3212	(1989)	Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM F 477	(1990)	Elastomeric Seals (Gaskets) for Joining Plastic Pipe

## FEDERAL SPECIFICATIONS (FS)

FS QQ-C-40 (Basic; Am 2: Notice 1) Caulking: Lead Wool and Lead Pig

FS RR-F-621 (Rev E) Frames, Covers, Gratings, Steps, Sump and Catch Basin, Manhole

## NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 49 (1975) Hazardous Chemicals Data

NFPA 325M (1991) Fire Hazard Properties of Flammable Liquids, Gases,  
and Volatile Solids

## 1.2 GENERAL REQUIREMENTS

The construction required herein shall include precast concrete manhole. The Contractor shall replace damaged material and redo unacceptable work at no additional cost to the Government. Excavation and backfilling is specified in Section 02222: EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS. Backfilling shall be accomplished after inspection by the Contracting Officer.

## 1.2.1 Protection of Materials

Before, during, and after installation, fittings shall be protected from any environment that would result in damage or deterioration to the material. The Contractor shall have a copy of the manufacturer's instructions available at the construction site at all times and shall follow these instructions unless directed otherwise by the Contracting Officer.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "=" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300: SUBMITTAL DESCRIPTIONS:

## SD-13 Certificates

Portland Cement; GA; CD/OD.

Certificates of compliance stating the type of cement used in manufacture of concrete pipe, fittings and precast manholes.

## PART 2 PRODUCTS

## 2.1 JOINTS

Joints installation shall comply with the manufacturer's instructions.

## 2.2 FRAMES AND COVERS

Frames and covers shall be cast iron, ductile iron or reinforced concrete. Cast iron frames and covers shall be as indicated and shall conform to FS RRF-621, type as suitable for the application, circular, without vent holes. The frames and covers shall have a combined weight of not less than 400 pounds. Reinforced concrete frames and covers shall be as indicated. The word "Storm Drain" shall be stamped or cast into covers so that it is plainly visible.

## 2.3 STEEL LADDER

A steel ladder shall be provided where the depth of a manhole exceeds 12 feet. The ladder shall not be less than 16 inches in width, with 3 /4 inch diameter rungs spaced 12 inches apart. The two stringers shall be a minimum 3/8 inch thick and 2 inches wide. Ladders and inserts shall be galvanized after fabrication in conformance with ASTM A 123.

## 2.4 CEMENT MORTAR

Cement mortar shall conform to ASTM C 270, Type M with Type II cement.

## 2.4.1 Portland Cement

Portland cement shall conform to ASTM C 150, Type II for concrete used in manholes and type optional with the Contractor for cement used in concrete cradle, concrete encasement, and thrust blocking.

## 2.4.2 Portland Cement Concrete

Portland cement concrete shall conform to ASTM C 94, compressive strength of 4000psi at 28 days, except for concrete cradle and encasement or concrete blocks for manholes. Concrete used for cradle and encasement shall have a compressive strength of 2500 psi minimum at 28 days. Concrete in place shall be protected from freezing and moisture loss for 7 days.

## 2.5 STRUCTURES

## 2.5.1 Precast Reinforced Concrete Manhole Sections

Precast reinforced concrete manhole sections shall conform to ASTM C 478, except that portland cement shall be as specified herein. Joints shall be cement mortar, or an approved mastic or rubber gasket, or an approved combination of these types.

## PART 3 EXECUTION

## 3.1 MANHOLES

## 3.1.1 General

Manholes shall be constructed of precast concrete manhole sections. The invert channels shall be smooth and semicircular in shape conforming to the inside of the adjacent sewer section. Changes in direction of flow shall be made with a smooth curve of as large a radius as the size of the manhole will permit. Changes in size and grade of the channels shall be made gradually and evenly. The invert channels shall be formed directly in the concrete of the manhole base, or shall be built up with brick and mortar, or shall be half tile laid in concrete, or shall be constructed by laying full section sewer pipe through the manhole and breaking out the top half after the surrounding concrete has hardened. Pipe connections shall be made to manhole using water stops, standard  $\theta$ ring joints, special manhole coupling, or shall be made in accordance with the manufacturer's recommendation. The Contractor's proposed method of connection, list of materials selected, and specials required, shall be approved prior to installation. The floor of the manhole outside the channels shall be smooth and shall slope toward the channels not less than 1 inch per foot nor more than 2 inches per foot. Free drop inside the manholes shall not exceed 1 foot 6 inches, measured from the invert of the inlet pipe to the top of the floor of the manhole outside the channels, and drop manholes shall be constructed whenever the free drop would otherwise be greater than 1 foot 6 inches.

### 3.1.2 Steel Ladder

Ladder shall be adequately anchored to the wall by means of steel inserts spaced not more than 6 feet apart vertically, and shall be installed to provide at least 6 inches of space between the wall and the rungs. The wall along the line of the ladder shall be vertical for its entire length.

### 3.1.3 Jointing and Plastering

Mortar joints shall be completely filled and shall be smooth and free from surplus mortar on the inside of the manhole. Mortar and mastic joints between precast rings shall be full-bedded in jointing compound and shall be smoothed to a uniform surface on both the interior and exterior of the manhole. Installation of rubber gasket joints between precast rings shall be in accordance with the recommendations of the manufacturer.

### 3.1.4 Frames and Covers

**Unless otherwise indicated, tops of frames and covers shall be set flush with finished grade in paved areas or from 6 to 9 inches higher than finished grade in unpaved areas.**

## 3.2 CONNECTION TO EXISTING GRAVITY SEWER LINE

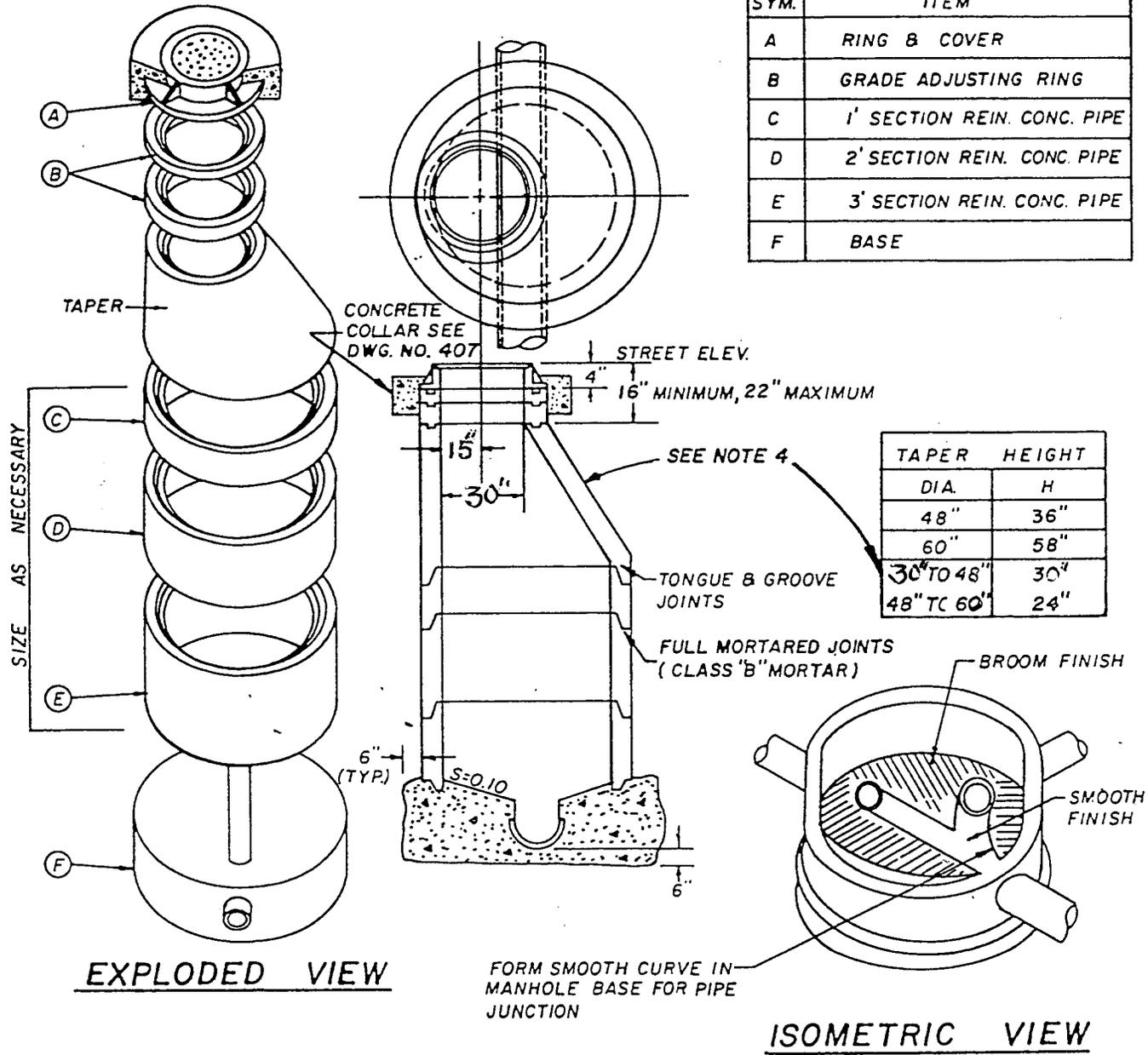
Pipe connection to existing gravity sewer line shall be made in such manner that the finish work will conform as nearly as practicable to the essential applicable requirements specified for new gravity sewer lines, including all necessary concrete work, cutting, and shaping.

## 3.3 CLEANOUTS AND OTHER APPURTENANCES

Cleanouts and other appurtenances shall be installed where shown on the drawings or as directed by the Contracting officer, and shall conform to the detail of the drawings.

-- End of Section--

SYM.	ITEM
A	RING & COVER
B	GRADE ADJUSTING RING
C	1' SECTION REIN. CONC. PIPE
D	2' SECTION REIN. CONC. PIPE
E	3' SECTION REIN. CONC. PIPE
F	BASE



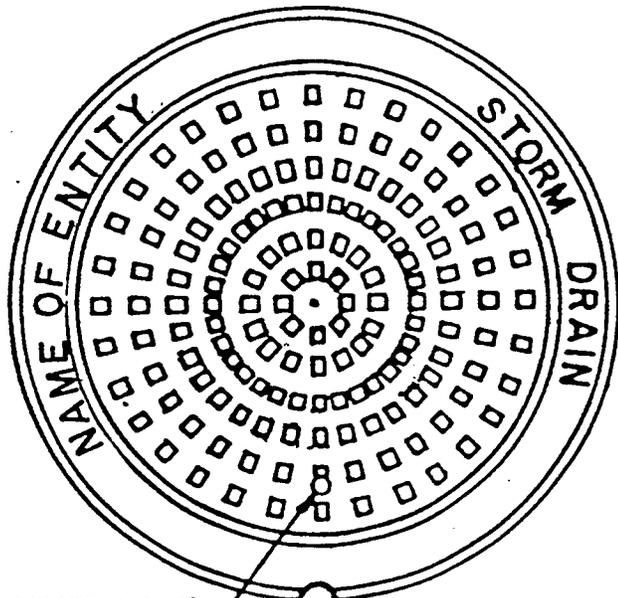
**EXPLODED VIEW**

**ISOMETRIC VIEW**

**NOTES:**

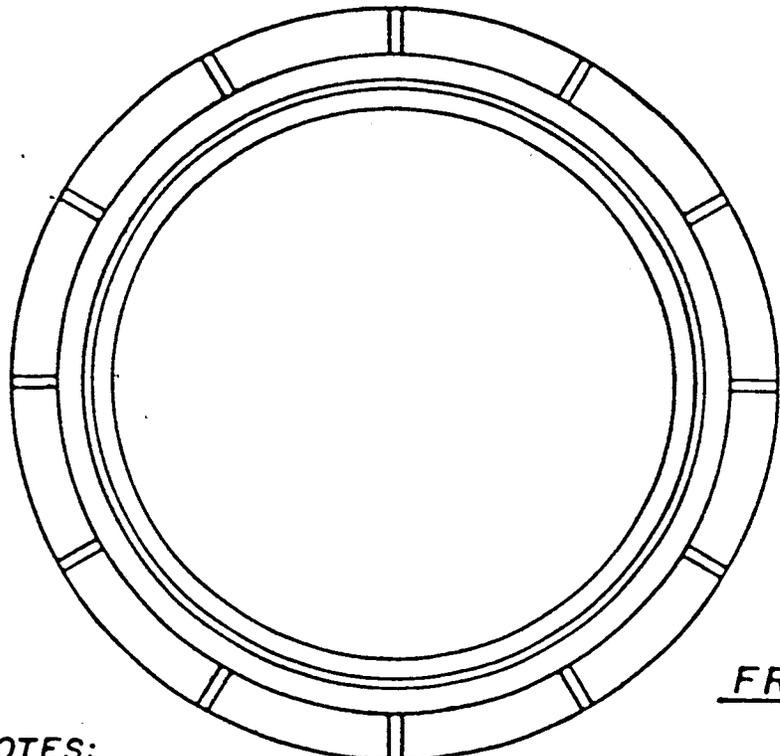
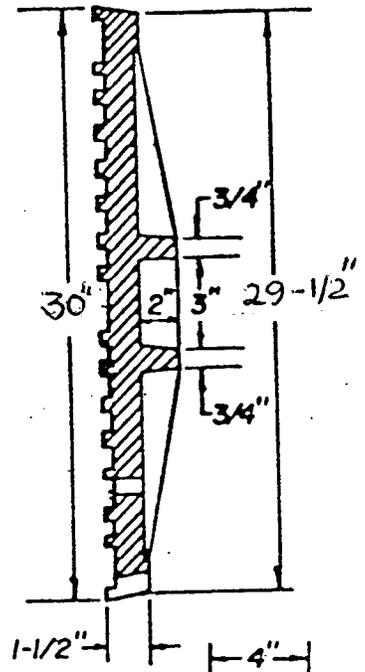
1. IN UNIMPROVED NON-TRAFFIC AREAS, TOP OF MANHOLE SHALL BE 6" TO 9" ABOVE GRADE.
2. PIPES SHALL NOT PROTRUDE MORE THAN 3" INSIDE OF MANHOLE SECTION. CONSTRUCT WATER TIGHT CONNECTION TO MANHOLE.
3. PIPE SECTION LENGTHS ARRANGED TO FIT DEPTH.
4. AN OPTIONAL TWO PIECE 30" TO 48" AND 48" TO 60" CONC MAY BE USED.

SPECIFICATION REFERENCE		UNIFORM STANDARD DRAWINGS CLARK COUNTY AREA		
501	CONCRETE & MORTAR			
609	CATCH BASINS, MANHOLES & INLETS	TYPE I MANHOLE		
		DATE	DWG. NO. 403	PAGE NO. 103

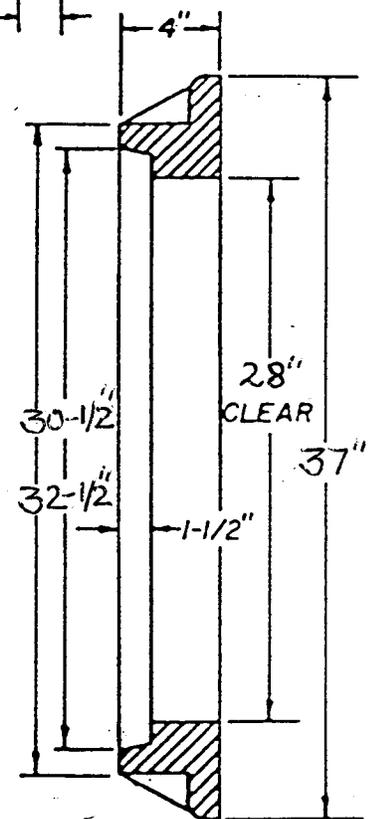


1" DIA. VENT HOLE

COVER



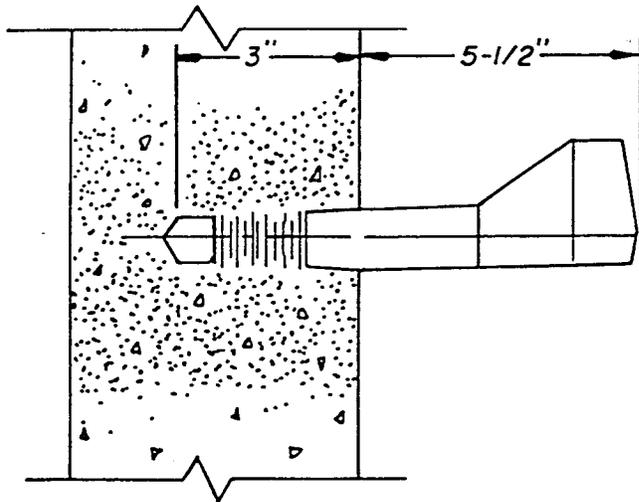
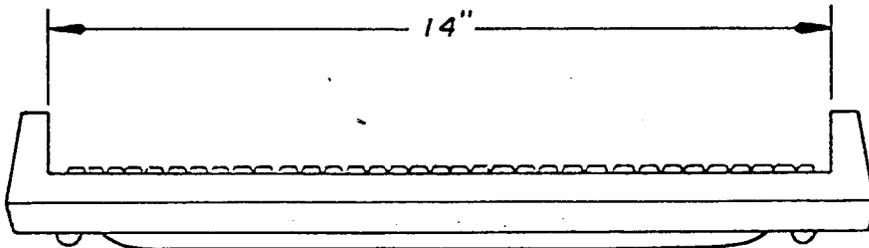
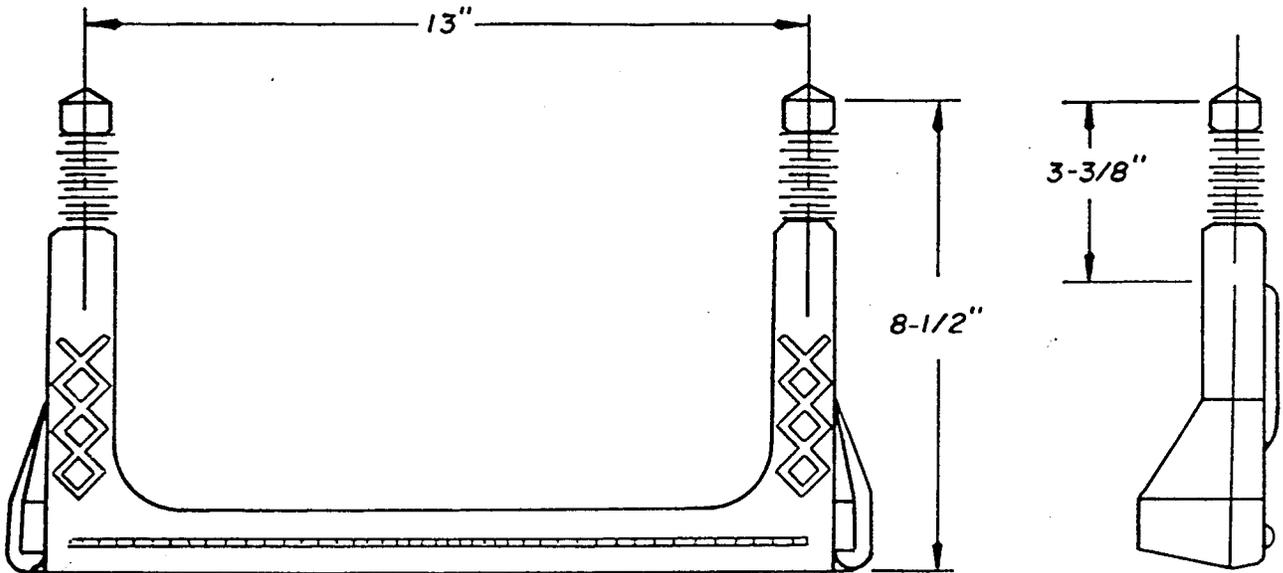
FRAME



NOTES:

1. FRAME AND COVER TO BE ALHAMBRA FOUNDRY COMPANY TYPE A1310 IN ACCORDANCE WITH ASTM A-48, CLASS 30, OR APPROVED EQUAL.
2. CAST IRON SHALL HAVE MINIMUM TENSILE STRENGTH OF 30,000 P.S.I.
3. FRAME AND COVER MACHINED TO FIT.
4. WEIGHT OF FRAME AND COVER 330 LBS. MINIMUM.

SPECIFICATION REFERENCE		UNIFORM STANDARD DRAWINGS CLARK COUNTY AREA		
712	MISCELLANEOUS METALS			
		STANDARD MANHOLE COVER AND RING		
		DATE	DWG. NO. 409	PAGE NO. 109



**NOTES:**

1. MANHOLE STEP SHALL CONFORM TO A.S.T.M. C-478 AND C-497.
2. ALUMINUM STEPS SHALL BE SOLID, MADE FROM MATERIAL IN CONFORMANCE WITH A.S.T.M. B221 (ALLOY 6005-TS).
3. REINFORCED PLASTIC STEPS SHALL BE POLYPROPYLENE PLASTIC, WITH NO. 4 (MIN) DEFORMED STEEL ROD (GRADE 60/A.S.T.M. A-65).
4. STEPS SHALL BE EVENLY SPACED FROM 12" TO 16".

**MANHOLE STEPS**

SPECIFICATION REFERENCE	UNIFORM STANDARD DRAWINGS CLARK COUNTY AREA		
	STANDARD MANHOLE STEPS		
	DATE	DWG. NO. 410	PAGE NO. 110

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DIVISION 02 - SITE CONSTRUCTION

SECTION 02741

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ASTM D 1856	(1995a) Recovery of Asphalt from Solution by Abson Method
ASTM D 2041	(1995) Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D 2172	(1995) Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D 2216	(1992) Laboratory Determination of Water (Moisture) Content of Soil and Rock
ASTM D 3381	(1992) Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D 3515	(1996) Hot-Mixed, Hot-Laid Bituminous Paving Mixtures
ASTM D 4318	(1995) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

STATE OF NEVADA DEPARTMENT OF TRANSPORTATION MATERIALS TESTING  
DIVISION (NDOT)

NDOT T 230C	(Rev C) Method of Test for Determining the Percent of Fractured Faces
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## 1.2 SUBMITTALS

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

### SD-09 Reports

Asphaltic Cement; GA.

Copies of test results.

Gradation and Physical Properties of Aggregates GA.

Copies of test results.

Bituminous Pavement Mix Design; GA.

Copy of mix design selected. Report to be submitted and signed by a Civil Engineer licensed to practice in State of Nevada.

Properties of Bituminous Pavement Mixture GA.

Copies of test results. Report to be submitted and signed by a Civil Engineer licensed to practice in State of Nevada.

Report of Density, Asphalt Content, and Gradation GA.

Copies of test results. Report to be submitted and signed by a Civil Engineer licensed to practice in State of Nevada.

Report of Grade Conformance and Surface Smoothness GA.

Copies of test results. Report to be submitted and signed by a Civil Engineer licensed to practice in State of Nevada.

SD-18 Records

Waybills and Delivery Tickets; GA.

Waybills and delivery tickets, during progress of the work.

### 1.3 PLANT, EQUIPMENT, MACHINES, AND TOOLS

#### 1.3.1 General

The bituminous plant shall be of such capacity to produce the quantities of bituminous mixtures required. Hauling equipment, paving machines, rollers, miscellaneous equipment, and tools shall be provided in sufficient numbers and capacity and in proper working condition to place the bituminous paving mixtures at a rate equal to the plant output.

#### 1.3.2 Mixing Plants

The mixing plant shall be an automatic or semiautomatic controlled commercially manufactured unit designed and operated to consistently produce a mixture within the job-mix formula (JMF). The plant shall have a minimum capacity of 100 tons per hour. Drum mixers shall be prequalified at the production rate to be used during actual mix production. The prequalification tests will include extraction and recovery of the asphalt cement in accordance with ASTM D 2172 and ASTM D 1856. The penetration of the recovered asphalt binder shall not be less than 60 percent of the original penetration, as measured in accordance with ASTM D 5.

#### 1.3.3 Straightedge

The Contractor shall furnish and maintain at the site, in good condition, one 12-foot straightedge for each bituminous paver. Straightedges shall be made available for Government use. Straightedges shall be constructed of aluminum or other lightweight metal and shall have blades of box or box-girder cross section with flat bottom reinforced to ensure rigidity and accuracy. Straightedges shall have handles to facilitate movement on pavement.

### 1.4 WEATHER LIMITATIONS

Unless otherwise directed, bituminous courses shall not be constructed when temperature of the surface of the existing pavement or base course is below 40 degrees F.

### 1.5 PROTECTION OF PAVEMENT

After final rolling, no vehicular traffic of any kind shall be permitted on the pavement until the pavement has cooled to 140 degrees F.

## 1.6 GRADE AND SURFACE-SMOOTHNESS REQUIREMENTS

Finished surface of bituminous courses, when tested as specified below, shall conform to gradeline and elevations shown and to surface-smoothness requirements specified.

### 1.6.1 Plan Grade

The grade of the completed surface shall not deviate more than 0.05 foot from the plan grade.

### 1.6.2 Surface Smoothness

When a 12-foot straightedge is laid on the surface parallel with the centerline of the paved area or transverse from crown to pavement edge, the surface shall vary not more than 1/4 inch from the straightedge.

## 1.7 GRADE CONTROL

Lines and grades shall be established and maintained by means of line and grade stakes placed at site of work in accordance with the Special Contract Requirements. Elevations of bench marks used by the Contractor for controlling pavement operations at the site of work will be determined, established, and maintained by the Government. Finished pavement elevations shall be established and controlled at the site of work by the Contractor in accordance with bench mark elevations furnished by the Contracting Officer.

## 1.8 SAMPLING AND TESTING

### 1.8.1 Aggregates

#### 1.8.1.1 General

Samples of aggregates shall be furnished by the Contractor for approval of aggregate sources and stockpiles prior to the start of production and at times during production of the bituminous mixtures. Times and points of sampling will be designated by the Contracting Officer. Samples will be the basis of approval of specific sources or stockpiles of aggregates for aggregate requirements. Unless otherwise directed, ASTM D 75 shall be used in sampling coarse and fine aggregate, and ASTM C 183 shall be used in sampling mineral filler. All tests necessary to determine compliance with requirements specified herein will be performed by the Contractor.

#### 1.8.1.2 Sources

Sources of aggregates shall be selected well in advance of the time the materials are required in the work. If a previously developed source is selected, evidence shall be submitted 15 days before starting production, indicating that the central-plant hot-mix bituminous pavements constructed with the aggregates have had a satisfactory service record of at least five years under similar climatic and traffic conditions. The Contractor will make such tests and other investigations as necessary to determine whether aggregates meeting requirements specified herein can be produced from proposed sources. If a sample of material from a new source fails to meet specification requirements, the material represented by the sample shall be replaced, and the Contractor will be required to submit new test data on the submitted materials. Approval of the source of aggregate does not relieve

the Contractor of responsibility for delivery at the jobsite of aggregates that meet the requirements specified herein.

#### 1.8.2 Bituminous Materials

Bituminous materials shall be sampled in accordance with ASTM D 140. Tests necessary to determine conformance with requirements specified herein will be performed by the Contractor. Sources where bituminous materials are obtained shall be selected in advance of the time when materials will be required in the work. In addition to initial qualification testing of bituminous materials, samples shall be taken before and during construction when shipments of bituminous materials are received or when necessary to assure some condition of handling or storage has not been detrimental to the bituminous material.

#### 1.8.3 Bituminous Mixtures

Sampling and testing of bituminous mixtures will be performed by the Contractor.

### 1.9 DELIVERY, STORAGE, AND HANDLING OF MATERIALS

#### 1.9.1 Mineral Aggregates

Mineral aggregates shall be delivered to the site of the bituminous mixing plant and stockpiled in such manner as to preclude fracturing of aggregate particles, segregation, contamination, or intermingling of different materials in the stockpiles or cold-feed hoppers. Mineral filler shall be delivered, stored, and introduced into the mixing plant in a manner to preclude exposure to moisture or other detrimental conditions.

#### 1.9.2 Bituminous Materials

Bituminous materials shall be maintained at appropriate temperature during storage but shall not be heated by application of direct flame to walls of storage tanks or transfer lines. Storage tanks, transfer lines, and weigh buckets shall be thoroughly cleaned before a different type or grade of bitumen is introduced into the system. The asphalt cement shall be heated sufficiently to allow satisfactory pumping of the material; however, the storage temperature shall be maintained below 300 degrees F.

#### 1.10 ACCESS TO PLANT AND EQUIPMENT

The Contracting Officer shall have access at all times to all parts of the paving plant for checking adequacy of the equipment in use; inspecting operation of the plant; verifying weights, proportions, and character of materials; and checking temperatures maintained in preparation of the mixtures.

#### 1.11 WAYBILLS AND DELIVERY TICKETS

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

2 PRODUCTS

2.1 BITUMINOUS HOT MIX

Bituminous hot mix shall consist of coarse aggregate, fine aggregate, mineral filler, bituminous material, and approved additives, if required, of the qualities and in the proportions specified and shall conform to the requirements contained in paragraph PROPORTIONING OF MIXTURE.

2.1.1 Aggregates

Aggregates shall consist of stone, crushed stone, crushed gravel, screening, sand, and mineral filler, as required. The portion of materials retained on the No. 4 sieve shall be known as coarse aggregate, the portion passing the No. 4 sieve and retained on the No. 200 sieve as fine aggregate, and the portion passing the No. 200 sieve as mineral filler. Aggregate gradation as determined by ASTM C 117 and ASTM C 136 shall conform to the following (General paving would generally consists of maintenance roads or similar structures and arterial street paving would be high volume traffic roads):

Sieve Size	General Paving Percent Passing (by weight)	Arterial Street Paving Percent Passing (by weight)
1 inch	100	100
3/4 inch	90-100	84-97
1/2 inch	78-94	66-82
3/8 inch	68-84	56-72
No. 4	50-65	35-50
No. 8	30-49	23-28
No. 50	7-25	5-19
No. 200	2-9	2-7

2.1.1.1 Coarse Aggregate

Coarse aggregate shall consist of clean, sound, durable particles meeting the following requirements.

- a. Portion of the material larger than 3/8 inch screen shall contain at least 50 percent of particles for general paving and at least 75 percent of particles for arterial street paving having fractured faces when determined in accordance with NDOT T 230C.
- b. Percentage of loss shall not exceed 45 after 500 revolutions, as determined in accordance with ASTM C 131.

2.1.1.2 Fine Aggregate

Fine aggregate shall have a plasticity index of 6 percent or less and liquid limit of 35 percent or less when tested in accordance with ASTM D 4318.

2.1.1.3 Mineral Filler

Mineral filler shall consist of portland cement conforming to ASTM C 150 or shall be mechanically reduced rock with the following gradation:

<u>Grain size in mm</u>	<u>Percent Finer</u>
-------------------------	----------------------

0.75	75-100
0.05	65-100
0.02	35-65
0.01	26-35
0.005	10-22

Grain size shall be determined in accordance with ASTM D 422.

**2.1.2 Bituminous Material**

**Asphalt cement for use in general paving and arterial street paving shall conform to ASTM D 3381, Table 2, Grade AC-40.**

2.1.3 Additives

The use of additives such as antistripping and antifoaming agents is subject to approval.

2.2 PROPORTIONING OF MIXTURE

2.2.1 Job Mix Formula

The JMF for the bituminous mixture will be prepared by the Contractor and approved by the Contracting Officer. The formula will indicate the percentage of each stockpile and mineral filler, the percentage of each size aggregate, the percentage of bitumen, and the temperature of the completed mixture when discharged from the mixer. Tolerances are given in TABLE I for asphalt content, temperature, and aggregate grading for tests conducted on the mix as discharged from the mixing plant. Bituminous mix that deviates more than 25 degrees F from the JMF shall be rejected. The JMF may be adjusted during construction to improve paving mixtures. Adjustments to the JMF are subject to the approval of the Contracting Officer.

TABLE I. JOB-MIX TOLERANCES

<u>Material</u>	<u>Tolerance, Plus or Minus</u>
Aggregate passing No. 4 sieve or larger	5 percent
Aggregate passing Nos. 8, 16, 30, and 50 sieves	4 percent
Aggregate passing Nos. 100 and 200 sieves	2 percent
Bitumen	0.25 percent
Temperature of mixing	25 degrees F

2.2.2 Test Properties of Bituminous Mixtures

Finished mixture shall meet requirements described below when tested in accordance with ASTM D 1559. All samples will be compacted with 50 blows of specified hammer on each side of sample. When bituminous mixture fails to meet the requirements specified below, the paving operation shall be stopped until the cause of noncompliance is determined and corrected.

2.2.2.1 Stability, Flow, and Voids

Requirements for stability, flow, and voids are shown in TABLES II and III for nonabsorptive and absorptive aggregates, respectively.

TABLE II. NONABSORPTIVE-AGGREGATE MIXTURE

	<u>Wearing Course</u>	<u>Intermediate course</u>
Stability minimum, pounds	500	500
Flow maximum, 1/100-inch units	20	20
Voids total mix, percent (1)	3-5	3-5
Voids filled with bitumen, percent (2)	75-85	65-75

(1) The Contracting Officer may permit deviations from limits specified when gyratory method of design is used to develop the JMF.

(2) The Contracting Officer may permit deviation from limits specified for voids filled with bitumen in the intermediate course in order to stay within limits for percent voids total mix.

TABLE III. ABSORPTIVE-AGGREGATE MIXTURE

	<u>Wearing Course</u>	<u>Intermediate Course</u>
Stability minimum, pounds	500	500
Flow maximum, 1/100-inch units	20	20
Voids total mix, percent (1)	3-5	3-5
Voids filled with bitumen, percent (2)	80-90	70-80

(1) The Contracting Officer may permit deviations from limits specified when gyratory method of design is used to develop the JMF.

(2) The Contracting Officer may permit deviation from limits specified for voids filled with bitumen in the intermediate course in order to stay within limits for percent voids total mix.

a. When the water-absorption value of the entire blend of aggregate does not exceed 2.5 percent as determined in accordance with ASTM C 127 and ASTM C 128, the aggregate is designated as nonabsorptive. The theoretical specific gravity computed from the apparent specific gravity or ASTM D 2041 will be used in computing voids total mix and voids filled with bitumen, and the mixture shall meet requirements in TABLE II.

b. When the water-absorption value of the entire blend of aggregate exceeds 2.5 percent as determined in accordance with ASTM C 127 and ASTM C 128, the aggregate is designated as absorptive. The theoretical specific gravity computed from the bulk-impregnated specific gravity method contained in ASTM D 2041 shall be used in computing percentages of voids total mix and voids filled with bitumen; the mixture shall meet requirements in TABLE III.

#### 2.2.2.2 Stability

The index of retained stability must be greater than 75 percent as determined by ASTM D 1559. When the index of retained stability is less than 75, the aggregate stripping tendencies may be countered by the use of hydrated lime or by treating the bitumen with an approved anti-stripping agent. The hydrated lime is considered as mineral filler and should be

considered in the gradation requirements. The amount of hydrated lime or antistripping agent added to bitumen shall be sufficient, as approved, to produce an index of retained stability of not less than 75 percent. No additional payment will be made to the Contractor for addition of antistripping agent required.

### 3 EXECUTION

#### 3.1 BASE COURSE CONDITIONING

The surface of the base course will be inspected for adequate compaction and surface tolerances specified in paragraph GRADE AND SURFACE-SMOOTHNESS REQUIREMENTS. Unsatisfactory areas shall be corrected.

#### 3.2 PREPARATION OF BITUMINOUS MIXTURES

Rates of feed of aggregates shall be regulated so that the moisture content and temperature of aggregates will be within specified tolerances. Aggregates, mineral filler, and bitumen shall be conveyed into the mixer in proportionate quantities required to meet the JMF. Mixing time shall be as required to obtain a uniform coating of the aggregate with the bituminous material. Temperature of bitumen at time of mixing shall not exceed 150 degrees C. Temperature of aggregate and mineral filler in the mixer shall not exceed 300 degrees F when bitumen is added. Overheated and carbonized mixtures or mixtures that foam shall not be used.

#### 3.3 WATER CONTENT OF AGGREGATES

Drying operations shall reduce the water content of mixture to less than 0.75 percent. The water content test will be conducted in accordance with ASTM D 2216; the weight of the sample shall be at least 500 grams. If the water content is determined on hot bin samples, the water content will be a weighted average based on composition of blend.

#### 3.4 STORAGE OF BITUMINOUS PAVING MIXTURE

Storage shall conform to the applicable requirements of ASTM D 3515; however, in no case shall the mixture be stored for more than 4 hours.

#### 3.5 TRANSPORTATION OF BITUMINOUS MIXTURE

Transportation from paving plant to site shall be in trucks having tight, clean, smooth beds lightly coated with an approved releasing agent to prevent adhesion of the mixture to the truck bodies. Excessive releasing agent shall be drained prior to loading. Each load shall be covered with canvas or other approved material of ample size to protect mixture from weather and to prevent loss of heat. Loads that have crusts of cold, unworkable material or that have become wet will be rejected. Hauling over freshly placed material will not be permitted.

#### 3.6 SURFACE PREPARATION OF UNDERLYING COURSE

Prior to placing of asphaltic pavement, the underlying course shall be cleaned of all foreign or objectionable matter with power brooms and hand brooms.

### 3.7 PRIME COATING

Surfaces of previously constructed base course shall be sprayed with a coat of bituminous material conforming to Section 02748 BITUMINOUS TACK AND PRIME COATS.

### 3.8 TACK COATING

Contact surfaces of previously constructed pavement, curbs, manholes, and other structures shall be sprayed with a thin coat of bituminous material conforming to Section 02748 BITUMINOUS TACK AND PRIME COATS.

### 3.9 PLACING

Bituminous courses shall be constructed only when the base course or existing pavement has no free water on the surface. Bituminous mixtures shall not be placed without ample time to complete spreading and rolling during daylight hours, unless approved satisfactory artificial lighting is provided.

#### 3.9.1 Offsetting Joints

The wearing course shall be placed so that transverse joints in the wearing course shall be offset by at least 2 feet from transverse joints in the underlying course.

#### 3.9.2 General Requirements for Use of Mechanical Spreader

Range of temperatures of mixtures, when dumped into the mechanical spreader, shall be as determined by the Contracting Officer. Mixtures having temperatures less than 225 degrees F when dumped into the mechanical spreader shall not be used. The mechanical spreader shall be adjusted and the speed regulated so that the surface of the course being laid will be smooth and continuous without tears and pulls, and of such depth that, when compacted, the surface will conform to the cross section indicated. Placing with respect to high side with one-way slope shall be as directed. Placing of the mixture shall be as nearly continuous as possible, and speed of placing shall be adjusted, as directed, to permit proper rolling. When segregation occurs in the mixture during placing, the spreading operation shall be suspended until the cause is determined and corrected.

#### 3.9.3 Placing Strips Succeeding Initial Strips

In placing each succeeding strip after initial strip has been spread and compacted as specified below, the screed of the mechanical spreader shall overlap the previously placed strip 2 to 3 inches and be sufficiently high so that compaction produces a smooth dense joint. Mixture placed on the edge of a previously placed strip by the mechanical spreader shall be pushed back to the edge of the strip by use of a lute. Excess mixture shall be removed and wasted.

#### 3.9.4 Handspreading in Lieu of Machine Spreading

In areas where the use of machine spreading is impractical, the mixture shall be spread by hand. Spreading shall be in a manner to prevent segregation. The mixture shall be spread uniformly with hot rakes in a

loose layer of thickness that, when compacted, will conform to required grade, density, and thickness.

### 3.10 COMPACTION OF MIXTURE

Rolling shall begin as soon after placing as the mixture will bear a roller without undue displacement. Delays in rolling freshly spread mixture will not be permitted. After initial rolling, preliminary tests of grade and smoothness shall be made by the Contractor. Deficiencies shall be corrected so that the finished course will conform to requirements for grade and smoothness specified herein. Grade and smoothness will be checked in each section of completed pavement by the Contracting Officer for compliance. After the Contractor is assured of meeting grade and smoothness requirements, rolling shall be continued until all roller marks are eliminated and at least 95 percent of the density of a laboratory-compacted specimen of the same mixture has been obtained. Places inaccessible to rollers shall be thoroughly compacted with hot hand tampers.

#### 3.10.1 Correcting Deficient Areas

Mixtures that become contaminated or are defective shall be removed to the full thickness of the course. Edges of the area to be removed shall be cut so that sides are perpendicular and parallel to the direction of traffic and so that the edges are vertical. Edges shall be sprayed with bituminous materials conforming to Section 02748 BITUMINOUS TACK AND PRIME COATS. Fresh paving mixture shall be placed in the excavated areas in sufficient quantity so that the finished surface will conform to grade and smoothness requirements. Paving mixture shall be compacted to the density specified herein. Skin patching of an area that has been rolled shall not be permitted.

### 3.11 JOINTS

#### 3.11.1 General

Joints between old and new pavements, between successive work days, or joints that have become cold (less than 175 degrees F) shall be made to ensure continuous bond between the old and new sections of the course. All joints shall have the same texture and smoothness as other sections of the course. Contact surfaces of previously constructed pavements coated by dust, sand, or other objectionable material shall be cleaned by brushing or shall be cut back as directed. When directed by the Contracting Officer, the surface against which new material is placed shall be sprayed with a thin, uniform coat of bituminous material conforming to Section 02748 BITUMINOUS TACK AND PRIME COATS. Material shall be applied far enough in advance of placement of a fresh mixture to ensure adequate curing. Care shall be taken to prevent damage or contamination of the sprayed surface.

#### 3.11.2 Transverse Joints

The roller shall pass over the unprotected end of a strip of freshly placed material only when placing is discontinued or delivery of the mixture is interrupted to the extent that the material in place may become cold. In all cases, prior to continuing placement, the edge of previously placed pavement shall be cut back to expose an even vertical surface for full thickness of the course. In continuing placement of a strip, the mechanical spreader shall be positioned on the transverse joint so that sufficient hot

mixture will be spread to obtain a joint after rolling that conforms to the required density and smoothness specified herein.

### 3.12 QUALITY CONTROL

#### 3.12.1 General

Quality Control Testing shall be the responsibility of the Contractor. Testing shall be performed by an acceptable commercial testing laboratory or by the Contractor on approval of the Contracting Officer. Materials shall be tested to establish compliance with the specified requirements. Samples of Bituminous material, unless otherwise specified, shall be in accordance with ASTM D 140. Certificates of compliance shall be furnished. All core holes from which specimens are taken will be patched by the contractor with fresh bituminous mixture, conforming to the specified JMF.

#### 3.12.2 Inspection Details and Frequency of Testing

In addition to other tests specified elsewhere, the Contractor shall perform the following tests on materials as specified hereinafter. At least one set of tests, as described below, shall be completed for each days placement of asphalt.

##### 3.12.2.1 Aggregate Gradation

A test for aggregate gradation for each 500 tons of aggregate produced.

##### 3.12.2.2 Aggregate Moisture Content

A test of aggregate moisture content for each day's production.

##### 3.12.2.3 Asphalt Properties

One determination each for stability, flow, voids total mix, and voids filled with bitumen for every 1000 tons of asphaltic concrete produced.

##### 3.12.2.4 Asphalt Content

One determination of actual asphalt content per 1000 tons of asphaltic concrete produced.

##### 3.12.2.5 Temperature

At least one measurement of asphaltic concrete temperature each hour, in which paving operations are being conducted. Additional tests may be taken as required by the Contracting Officer.

##### 3.12.2.6 Density

At least three cores will be recovered and tested for every 10,000 square feet of pavement, or one day's production, whichever is smaller. Additional tests may be taken as required by the Contracting Officer.

### 3.12.2.7 Thickness

At least three cores will be recovered and tested for every 10,000 square feet of pavement, or one day's production, whichever is smaller. Additional tests may be taken as required by the Contracting Officer.

### 3.12.3 Action Required

#### 3.12.3.1 Aggregate Gradation

When the amount passing any sieve is outside the specification limits, the aggregate shall be immediately resampled and retested. If there is another failure on any sieve, the fact shall immediately be reported to the Contracting Officer, and immediate steps shall be taken to rectify the situation.

#### 3.12.3.2 Aggregate Moisture Content

When the moisture content of the aggregates is outside specification requirements the aggregates shall be immediately resampled and retested. If there is another failure, the fact shall immediately be reported to the Contracting Officer, and immediate steps shall be taken to rectify the situation.

#### 3.12.3.3 Asphalt Properties

If there is a failure in any of the asphalt properties production will cease and the Contracting Officer will be immediately notified. No additional paving will occur until adjustments to the plant and test results confirm that the specified properties are being achieved.

#### 3.12.3.4 Asphalt Content

If there is a failure to meet the specified asphalt content production will cease and the Contracting Officer will be immediately notified. No additional paving will occur until adjustments to the plant and test results confirm that the specified asphalt is being supplied.

#### 3.12.3.5 Temperature

When the temperature of the bituminous mixture is outside specification requirements the mixture shall be immediately resampled and retested. If there is another failure, the fact shall immediately be reported to the Contracting Officer, and immediate steps shall be taken to rectify the situation. In no case will overheated or carbonized mixtures be allowed.

#### 3.12.3.6 Density

When test results indicate lack of compaction additional specimens will be obtained as directed by the Contracting Officer. Based on the test results the Contractor will remove and replace the affected areas of pavement.

#### 3.12.3.7 Thickness

When test results indicate that the finished pavement is 1/4 inch less than the thickness shown on the drawings, additional samples will be taken to determine the extent of defective thickness. The area determined will be

removed and replaced or may be overlaid. The overlay will be a minimum of 1 inch thick and will be placed to duplicate slopes and drainages of the original pavement. No skin patching will be allowed.

#### 3.12.4 Reports

All results of tests conducted at the project site shall be reported as required. During periods requiring protection from weather, reports of pertinent temperatures or other relevant values 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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**Attachments: Chain Link Fence (72" high or less) Drawing No. 252**

**Chain Link Gates Drawing No. 253**

-- End of Table of Contents --

## SECTION 02831

## FENCE, CHAIN-LINK

## PART 1 GENERAL

## 1.1 REFERENCES

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

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 121	(1992a) Zinc-Coated (Galvanized) Steel Barbed Wire
ASTM A 153	(1996) Zinc-Coated (Hot Dip) on Iron and Steel Hardware
ASTM A 176	(1994) Stainless and Heat-Resisting Chromium Steel Plate, Sheet, and Strip
ASTM A 392	(1996) Zinc-Coated Steel Chain-Link Fence Fabric
ASTM A 478	(1995a) Chromium-Nickel Stainless and Heat-Resisting Steel Weaving and Knitting Wire
ASTM A 491	(1996) Aluminum-Coated Steel Chain-Link Fence Fabric
ASTM A 585	(1992) Aluminum-Coated Steel Barbed Wire
ASTM A 666	(1994) Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
ASTM A 780	(1993a) Repair of Damaged and Uncoated Areas of Hot-Dipped Galvanized Coatings
ASTM A 824	(1992) Metallic-Coated Steel Marcellled Tension Wire for Use With Chain Link Fence
ASTM C 94	(1996) Ready-Mixed Concrete
ASTM F 626	(1996) Fence Fittings
ASTM F 883	(1990) Padlocks
ASTM F 900	(1994) Industrial and Commercial Swing Gates
ASTM F 1043	(1995) Strength and Protective Coatings on Metal Industrial Chain-Link Fence Framework
ASTM F 1083	(1996) Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures

ASTM F 1184	(1994) Industrial and Commercial Horizontal Slide Gates
ASTM G 23	(1996) Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials
ASTM G 26	(1995) Operating Light-Exposure Apparatus (Xenon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials
ASTM G 53	(1996) Operating Light- and Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials

## 1.2 SUBMITTALS

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

### SD-13 Certificates

Chain Link Fence; GA.

Statement signed by an official authorized to certify on behalf of the manufacturer attesting that the chain link fence and component materials meet the specified requirements.

## PART 2 PRODUCTS

### 2.1 MATERIALS

Materials shall conform to the following.

#### 2.1.1 Chain Link Fence

##### 2.1.1.1 Fabric

**ASTM A 392, Class 2, zinc-coated steel wire with minimum coating weight of 2.0 ounces of zinc per square foot of coated surface, or ASTM A 491, Type I, aluminum-coated steel wire. Fabric shall be fabricated of 11-gauge wire woven in 2-inch mesh. Fabric height shall be as indicated. The fabric shall be knuckled at both selvages.**

#### 2.1.2 Posts

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

### 2.1.3 Rails and Braces

ASTM F 1083, zinc-coated, Group IA, steel pipe, size NPS 1-1/4. Group IC steel pipe, zinc-coated, shall meet the strength and coating requirements of ASTM F 1043. Group II, formed steel sections, size 42.16 mm (1.66 inch), 1.66 inch, conforming to ASTM F 1043, may be used as braces and rails if Group II line posts are furnished.

### 2.1.4 Accessories

**ASTM F 626. Ferrous accessories shall be zinc or aluminum coated. Truss rods shall be furnished for each terminal post. Truss rods shall be provided with turnbuckles or other equivalent provisions for adjustment. Tie wire for attaching fabric to rails, braces, and posts shall be 11 gauge steel wire and match the coating of the fence fabric. Miscellaneous hardware coatings shall conform to ASTM A 153 unless modified herein.**

### 2.1.5 Collapsible Fence Panel

Collapsible fence panel shall be the type shown on the drawing. Fence panel frames shall be constructed of Class 1 Grade A or B, steel pipe, sizes as shown on the drawing, as specified in FS RR-F-191/3. Fence panel fabric shall be as specified for chain-link fabric and shall be attached to the panel by method standard with the manufacturer except that welding will not be permitted. Material for hinge assembly (bolts, nuts, and steel plates) shall be as indicated on the drawing and as specified in SECTION: MISCELLANEOUS METAL.

### 2.1.6 Concrete

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

## PART 3 EXECUTION

### 3.1 FENCE INSTALLATION

Fence shall be installed per manufacturers instructions and to the lines and grades indicated. The area on either side of the fence line shall be cleared to the extent indicated. Line post shall be spaced equidistant at intervals not exceeding 10 feet. Terminal (corner, gate, and pull) posts shall be set at abrupt changes in vertical and horizontal alignment. Fabric shall be continuous between terminal posts; however, runs between terminal posts shall not exceed 500 feet.

### 3.2 RAILS, BRACES AND TRUSS RODS

#### 3.2.1 Top Rail

Top rail shall be supported at each post to form a continuous brace between terminal posts. Where required, sections of top rail shall be joined using sleeves or couplings that will allow expansion or contraction of the rail. Bottom rail, if required for high security fence, shall be installed as indicated on the drawings.

#### 3.2.2 Bottom Rail

The bottom rail shall be bolted to double rail ends and double rail ends shall be securely fastened to the posts. Bolts shall be peened to prevent easy removal. Bottom rail shall be installed before chain link fabric.

### 3.2.3 Braces and Truss Rods

Braces and truss rods shall be installed as indicated and in conformance with the standard practice for the fence furnished. Horizontal (compression) braces and diagonal truss (tension) rods shall be installed on fences over 6 feet in height. A center brace or 2 diagonal truss rods shall be installed on 12-foot fences. Braces and truss rods shall extend from terminal posts to line posts. Diagonal braces shall form an angle of approximately 40 to 50 degrees with the horizontal. No bracing is required on fences 6 feet high or less if a top rail is installed.

### 3.3 TENSION WIRES

Tension wires shall be installed along the top and bottom of the fence line and attached to the terminal posts of each stretch of the fence. Top tension wires shall be installed within the top 1 foot of the installed fabric. Bottom tension wire shall be installed within the bottom 6 inches of the installed fabric. Tension wire shall be pulled taut and shall be free of sag.

### 3.4 CHAIN-LINK FABRIC

Chain-link fabric shall be installed on the side of the post indicated. Fabric shall be attached to terminal posts with stretcher bars and tension bands. Bands shall be spaced at approximately 15-inch intervals. The fabric shall be installed and pulled taut to provide a smooth uniform appearance free from sag, without permanently distorting the fabric diamond or reducing the fabric height. Fabric shall be fastened to line posts at approximately 15-inch intervals and fastened to tension wires at approximately 24-inch intervals. Fabric shall be cut by untwisting and removing pickets. Splicing shall be accomplished by weaving a single picket into the ends of the rolls to be joined. The bottom of the installed fabric shall be 2 inches (plus or minus 1/2-inch) above the ground.

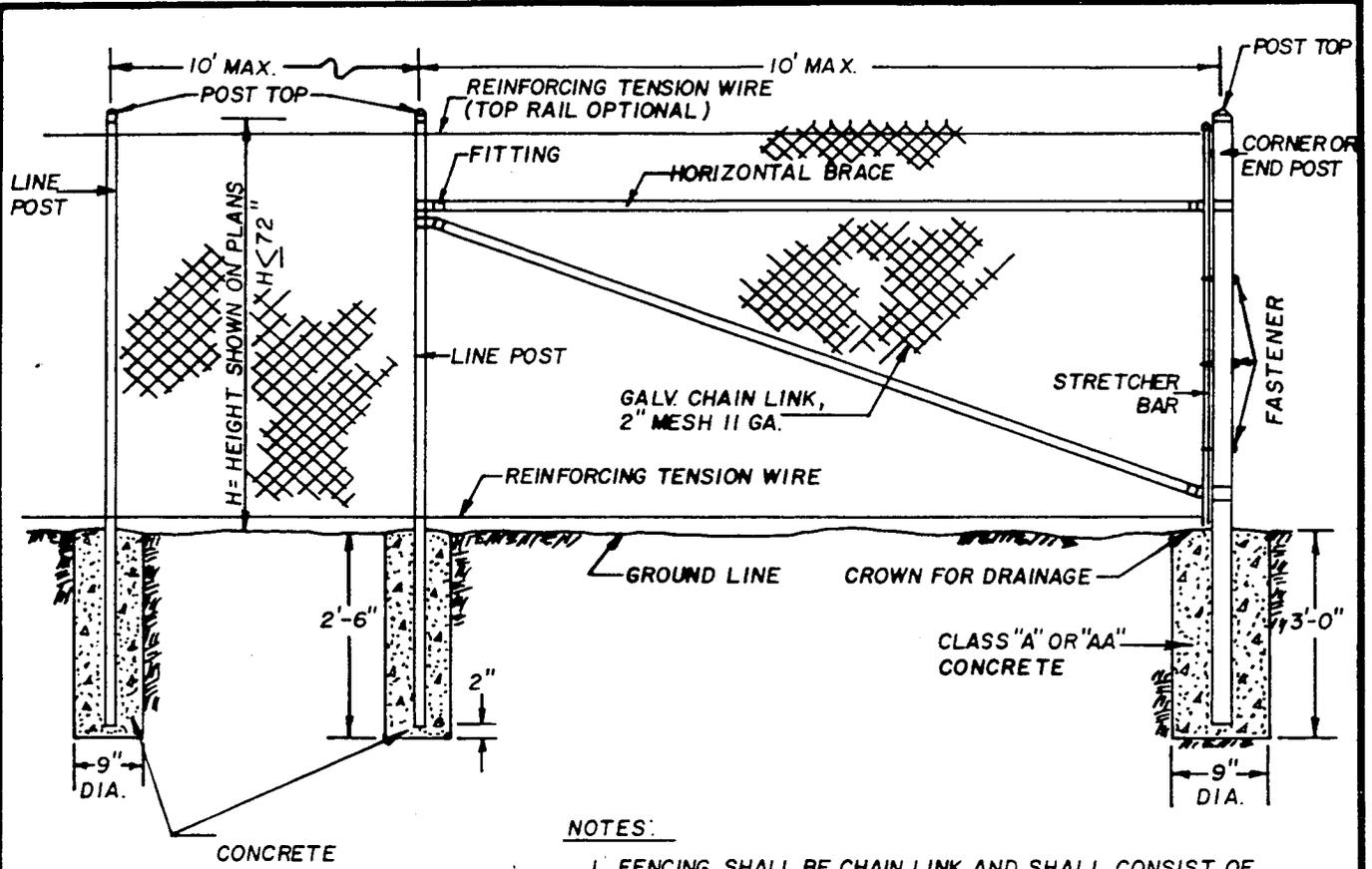
### 3.5 GATES

Gates shall be installed at the location shown. Hinged gates shall be mounted to swing as indicated. Latches, stops, and keepers shall be installed as required.

### 3.6 GROUNDING

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

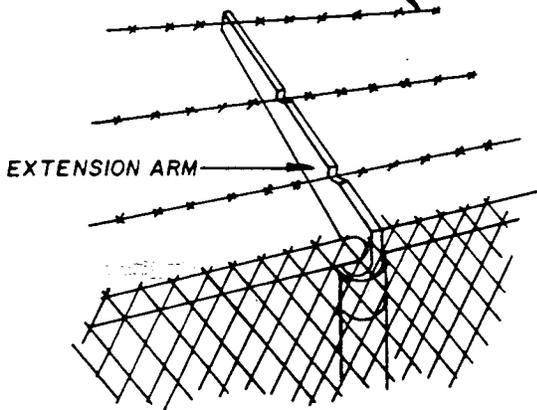
-- End of Section --



**NOTES:**

1. FENCING SHALL BE CHAIN LINK AND SHALL CONSIST OF GALVANIZED CHAIN LINK FABRIC ON STEEL POSTS.
  - (A) ALL POST TOPS SHALL BE FITTED WITH SUITABLE FINIALS.
  - (B) BRACES SHALL BE SPACED APPROXIMATELY 12" BELOW TOP OF TERMINAL POSTS AND SHALL EXTEND FROM END, GATE, OR CORNER POSTS TO FIRST ADJACENT LINE POST.
  - (C) ALL FITTINGS SHALL BE HOT DIPPED GALVANIZED MALLEABLE, CAST IRON, OR PRESSED STEEL.
  - (D) TOP AND BOTTOM SELVAGES OF THE FENCE SHALL HAVE A TWISTED AND BARBED FINISH.
2. BARBED WIRE, EXTENSION ARMS, AND TOP HORIZONTAL RAILS SHALL BE INSTALLED ONLY WHEN SHOWN ON THE PLANS AND/OR CALLED FOR IN THE SPECIAL PROVISIONS.

BARB WIRE (IF SPECIFIED)  
2 STRAND, 12/GA., 4 PT.



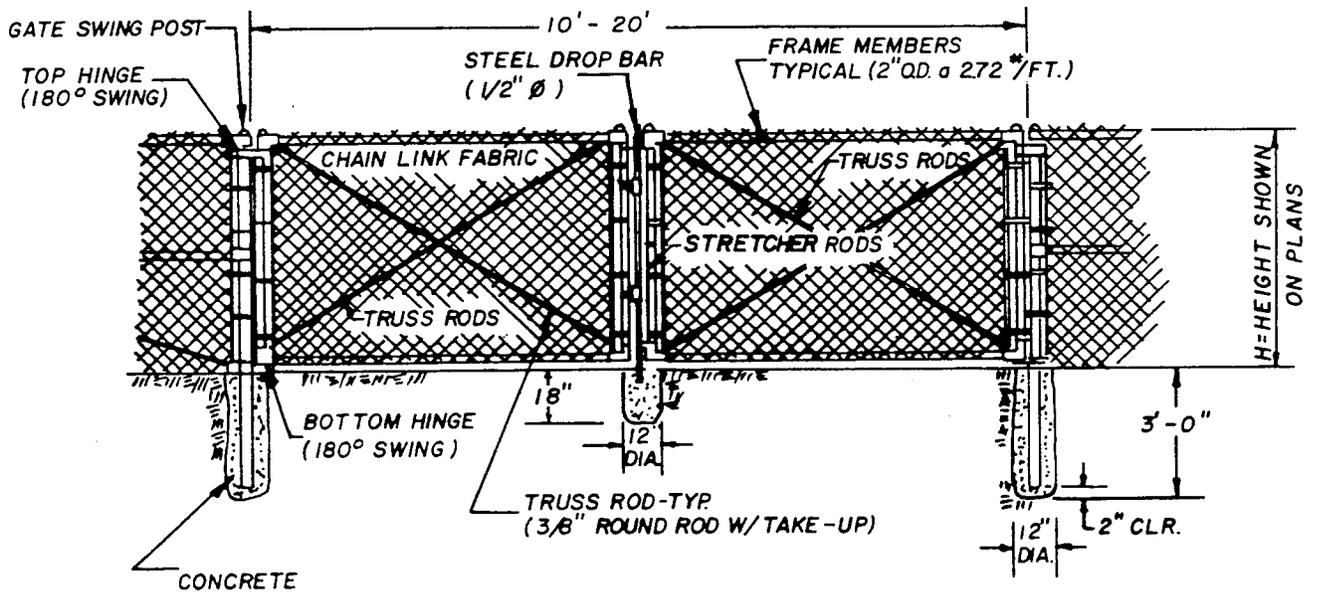
**EXTENSION ARM & BARBED WIRE**

**TABLE I**

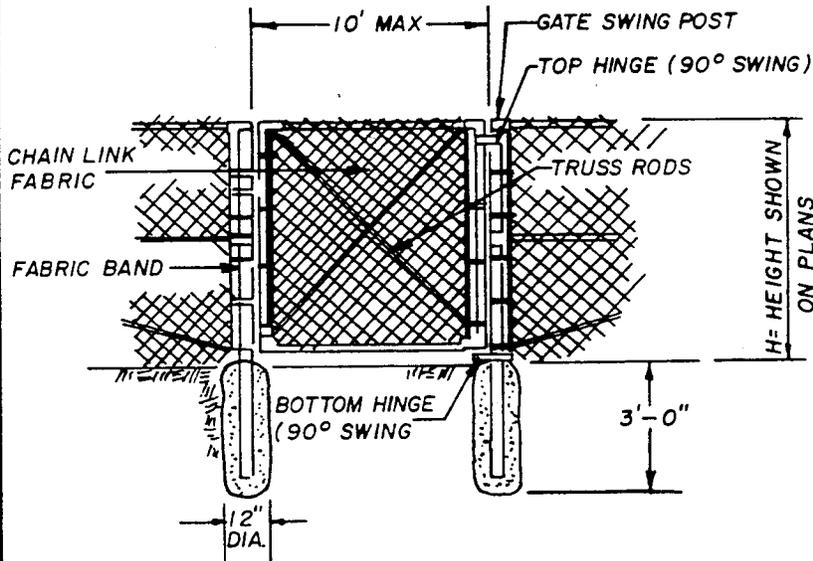
FOR CHAIN LINK FENCE 72" AND LESS

LOCATION	MIN. SIZE	MIN. WEIGHT
END, CORNER & PULL	2.351 O.D.	3.10
LINE	2.00 O.D.	2.72
BRACES	1.630 O.D.	2.27
TOP RAIL	1.630 O.D.	2.27

SPECIFICATION REFERENCE		UNIFORM STANDARD DRAWINGS CLARK COUNTY AREA	
501	CONCRETE	CHAIN LINK FENCE (72" HIGH OR LESS)	
616	FENCING		
		DATE	DWG NO 252
		PAGE NO. 58	



**DOUBLE SWING GATE**



**SINGLE GATE**

GATE SWING POST DIA.	
GATE SIZE	PIPE DIA.
6' AND LESS	3" O.D. - 5.79 LBS./FT.
6'-10'	4" O.D. - 9.10 LBS./FT.

SPECIFICATION REFERENCE		UNIFORM STANDARD DRAWINGS CLARK COUNTY AREA		
501	CONCRETE	<b>CHAIN LINK GATES</b>		
616	FENCING			
		DATE	DWG NO. 253	PAGE NO 59

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DIVISION 05 - METALS

SECTION 05500

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Attachment: Pedestrian Hand Rail - NDOT (Modified) Standard Drawing  
B-25.1.5, dated July 14, 1999.

-- End of Section Table of Contents --

## SECTION 05500

## MISCELLANEOUS METAL

## PART 1 GENERAL

## 1.1 REFERENCES

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

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36	(1994a) Carbon Structural Steel
ASTM A 53	(1995a) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
ASTM A 123	(1989a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 320	(1994a) Alloy Steel Bolting Materials for Low-Temperature Service
ASTM B 32	(1993) Solder Metal
ASTM C 270	(1995) Mortar for unit Masonry
ASTM C 476	(1995) Grout for Masonry

## AMERICAN WELDING SOCIETY (AWS)

AWS D1.1	(1994) Structural Welding Code - Steel
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## FEDERAL SPECIFICATIONS (FS)

FS FF-B-575	(Rev C) Bolts, Hexagon and Square
FS FF-N-836	(Rev D; Am 3) Nut: Square, Hexagon, Cap, Slotted, Castle, Knurled, Welding and Single Ball Seat
FS FF-S-325	(Basic; Int Am 3; Notice 1) Shield, Expansion; Nail, Expansion; and Nail, Drive Screw (Devices, Anchoring, Masonry)
FS QQ-B-750	(Am 2) Bronze, Phosphor; Bar, Plate,
FS QQ-S-763	(Rev E; Am 1) Steel Bars, Wire, Shapes, and Forgings, Corrosion Resisting

## 1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL PROCEDURES:

### SD-04 Drawings

Miscellaneous Metal Items; GA.

Detail drawings indicating material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Detail drawings for the following items: pedestrian hand rail, wall ladder rungs and other miscellaneous metalwork.

## 1.3 GENERAL REQUIREMENTS

The Contractor shall verify all measurements and shall take all field measurements necessary before fabrication. Welding to or on structural steel shall be in accordance with AWS D1.1. Items specified to be galvanized, when practicable and not indicated otherwise, shall be hot-dip galvanized after fabrication. Galvanizing shall be in accordance with ASTM A 123 as applicable. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with the material to which fastenings are applied. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Joints exposed to the weather shall be formed to exclude water.

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 General

Materials indicated on the drawings or required in the work and not covered elsewhere by detailed requirements shall conform to the requirements of this section. In all cases not specifically covered in these specifications, the Contractor shall furnish approved highest grade commercial materials or products which are suitable for the intended use of the item.

#### 2.1.2 Structural Steel

Steel bars, shapes and plates shall conform to ASTM A 36. Galvanized coatings where required, shall conform to ASTM A 123.

#### 2.1.3 Wall ladders Rungs (Galvanized)

Steel bars, shapes and plates shall conform to ASTM A 36. Galvanized coatings shall conform to ASTM A 123.

#### 2.1.4 Steel Pipes

Steel pipe shall conform to ASTM A 53, Grade B, Type E or S, Galvanized,

standard size and weight as indicated on the drawings.

#### 2.1.5 Corrosion-Resisting Steel Bolts and Anchor Bolts

Corrosion-resisting steel bolts and anchor bolts shall conform to FS QQ-S-763, Class 304, Condition A, or the applicable requirements of ASTM A 320, Grade B8.

#### 2.1.6 Bolts

Bolts shall conform to FS FF-B-575. Bolts and anchor bolts shall conform to FS QQ-S-763, Class 304, Condition A, or the applicable requirements of ASTM A 320, Grade B8.

#### 2.1.7 Nuts

Nuts shall conform to FS FF-N-836. Nuts shall be galvanized.

#### 2.1.8 Washers

Washers shall conform to the applicable requirements of FS FF-N-836. Washers shall be galvanized.

#### 2.1.9 Concrete, Mortar and Grout

Cast-In-Place Structural Concrete, mortar and grout shall conform to the requirements of Section 03301 CAST-IN-PLACE STRUCTURAL CONCRETE.

#### 2.1.10 Coil Chain

Coil chain shall be galvanized and shall conform to the requirements of FS RR-C-271, Type 1, Grade C, Class 4. The chain shall be attached with a galvanized connecting link and shall accommodate a snap hook with latch and spring.

#### 2.1.11 Pedestrian Hand Rail

Pedestrian Hand Rail shall be designed to resist a concentrated load of 200 pounds in any direction at any point of the top of the rail or 20 pounds per foot applied horizontally to top of the rail, whichever is more severe.

##### 2.1.11.1 Steel Railing

Steel railing shall be steel pipe conforming to ASTM A 53 or structural tubing conforming to ASTM A 500, Grade A or B of equivalent strength. Steel railing shall be 2 inch nominal size. Railings shall be hot-dip galvanized.

a. Joint posts, rail, and corners shall be fabricated by one of the following methods:

(1) Flush type rail fittings of commercial standard, weld and ground smooth with railing splice locks secured with 3/8 inch hexagonal recessed-head setscrews.

(2) Mitered and welded joints by fitting post to top rail and intermediate rail to post, mitering corners, groove welding joints, and grinding smooth. Railing splices shall be butted and reinforced by a tight fitting interior sleeve not less than 6 inches long.

(3) Railing may be bent at corners in lieu of jointing, provided bends are made in suitable jigs and the pipe is not crushed.

### PART 3 EXECUTION

#### 3.1 WORKMANSHIP

Miscellaneous metalwork shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Steel with welds will not be accepted, except where welding is definitely specified or called for on the drawings. All bolts, nuts, and screws shall be tight. Work shall be accurately set to established lines and elevations and securely fastened in place. Anchorage shall be provided where necessary for fastening miscellaneous metal and wood items securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when approved for concrete; machine and carriage bolts for steel; and lag bolts and screws for wood.

#### 3.2 FINISHING

In general, tolerances for machine-finished surfaces designated by nondecimal dimensions shall be within 1/64 inch. Sufficient machining stock shall be allowed on placing pads to insure true surfaces of solid material. Finished contacts of bearing surfaces shall be true and exact to secure full contact. All drilled holes for bolts shall be accurately located and drilled from templates.

#### 3.3 ZINC COATING (GALVANIZING)

Zinc coatings shall be applied in a manner and of a thickness and quality conforming to ASTM A 123. All exposed ferrous metalwork, except cast-iron and corrosion resistant steel and items to be completely embedded in concrete, shall be galvanized unless other protective coatings are specified. Metalwork shall be galvanized after fabrication. In the event that any portion of galvanized metalwork is abraded or otherwise damaged to the extent that the base metal is exposed, such damaged or abraded portions shall be neatly covered with Grade 50B solder conforming to the requirements of ASTM B 32.

#### 3.4 WELDING

Welding shall conform to the provisions of AWS D1.1. Welders who have not been certified within two years of the date of commencement of work under this contract will not be allowed to perform the work.

#### 3.5 BOLTED CONNECTIONS

Bolt holes shall be reamed normal to the member and shall be truly cylindrical throughout. Unless otherwise specified, holes for bolts shall not be more than 1/16 inch larger than the diameter of the bolt. Cutting bolt holes with a torch will not be permitted without the prior written approval of the Contracting Officer. Materials and parts necessary to complete each item, even though such work is not definitely shown or specified, shall be included. Poor matching of holes for fasteners shall be cause for rejection. Fastenings shall be concealed where practicable.

### 3.6 EXCAVATION

Excavation for concrete-embedded items shall be of the dimensions indicated on the drawings. Holes shall be cleared of loose materials prior to placement of concrete.

### 3.7 PEDESTRIAN HAND RAIL

Pedestrian Hand Rail shall be fabricated with galvanized steel pipe and shall be fabricated in the shop. Care shall be taken to deform pipe without "breaking" the steel. Any pipe deformations that demonstrate visible cracking or weakening may be cause for rejection. The pipe gate components shall be galvanized. Welded, cut, damaged, and deformed areas of galvanizing metal shall be neatly coated with Grade 50B solder conforming to ASTM B 32. The Contractor shall grease pipe thoroughly with grease conforming to FS VV-G-632 immediately after installation of chains at each gate opening. The Contractor shall examine and certify the operation of all pedestrian hand rail not sooner then 30 days after installation.

### 3.8 ATTACHMENT OF PEDESTRIAN HAND RAIL

Splices, where required, shall be made at expansion joints. Removable sections shall be installed as indicated.

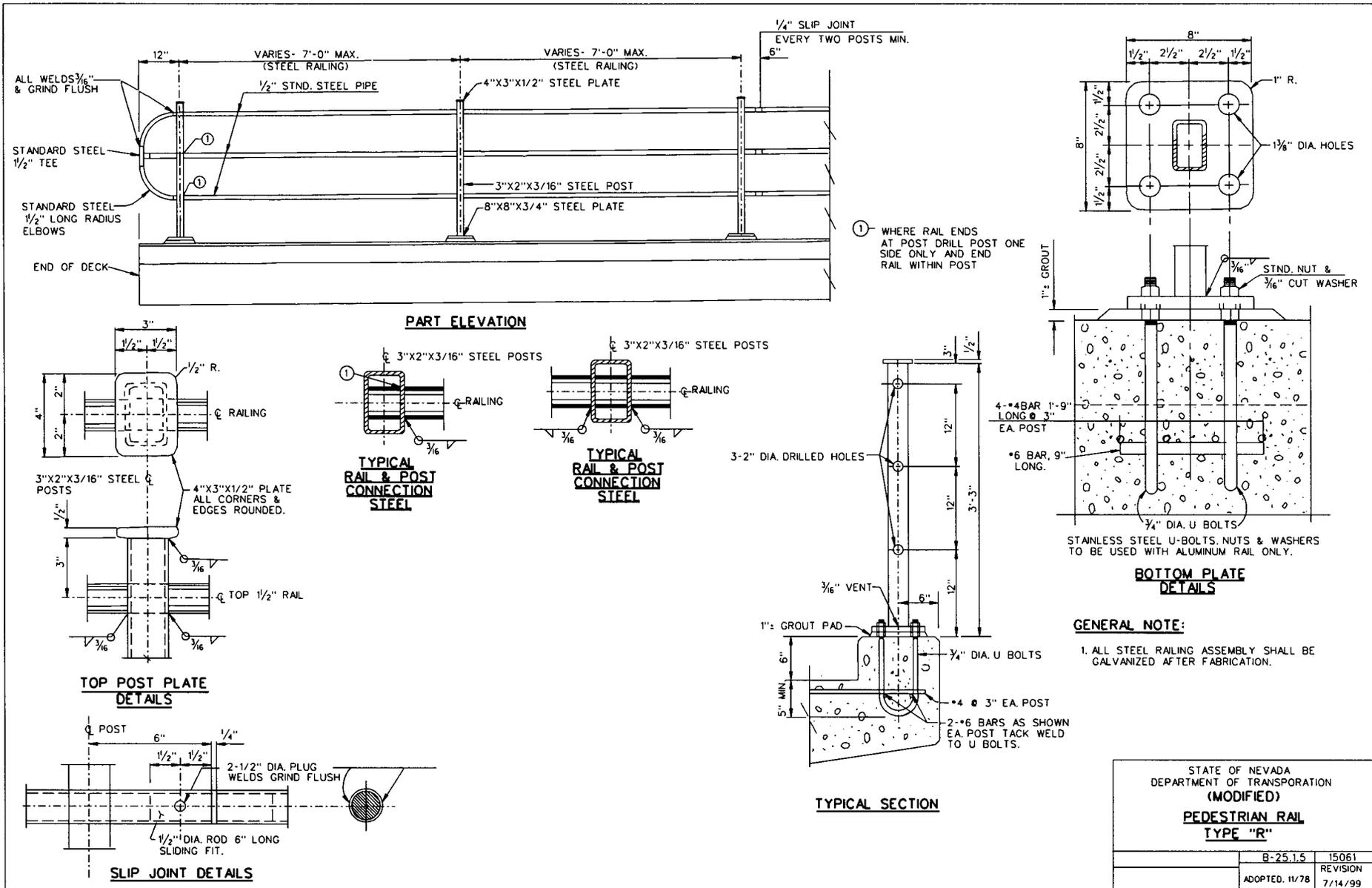
#### 3.8.1 Installation of Pedestrian Hand Rail

Installation shall be as indicated on NDOT Modified Standard Drawing B-25.1.5 located in the back of this section.

#### 3.8.2 Grounding

Pedestrian hand rail, on both sides of channel, shall be grounded at/near the point of power line crossing and at distances not exceeding 150 feet. Ground rods shall be copper clad steel 3/4 inch by 10 foot. Ground conductor shall be No. 8 AWG solid copper wire. The top of the ground rods shall be at least 6 inches below the grade.

-- End of Section --



STATE OF NEVADA DEPARTMENT OF TRANSPORTATION (MODIFIED) <b>PEDESTRIAN RAIL TYPE "R"</b>	
B-25.1.5	15061
ADOPTED, 11/78	REVISION 7/14/99