Reference: DACW09-85-B-0004

SPECIFICATIONS

for

INDIAN BEND WASH REPAIRS OF SIDE CHANNELS SYSTEM - REACH 4

Property of
Flood Control District of MC Library
Please Return to
3800 W. Durango
Phoenix, AZ 85009

Maricopa County, Arizona

Appropriation: Construction General
Corps of Engineers, Civil
Contributed Funds, Other

Authority: PL 97-276
Energy and Water Development Act

US Army Corps of Engineers
Los Angeles District

A680.518

ENGINEERING DIVISION
LIBRARY

SOLICITATION, OFFER, AND AWARD (Construction, Alteration, or Repair)	1. SOLICITATION NO.	2. TYPE OF SOLICITATION	3. DATE ISSUED	PAGE OF PAGES
	DACW09-85-B-0004	[X] ADVERTISED (IFB) [ ] NEGOTIATED (RFP)	5 Dec 84	1 of 3

IMPORTANT – The "offer" section on the reverse must be fully completed by offeror.

4. CONTRACT NO.	5. REQUISITION/PURCHASE REQUEST NO.	6. PROJECT NO.

7. ISSUED BY CODE
U.S. ARMY ENGINEER DISTRICT,
LOS ANGELES
P.O. Box 2711
Los Angeles, California 90053-2325

8. ADDRESS OFFER TO
U.S. ARMY ENGINEER DISTRICT,
LOS ANGELES
Phoenix Resident Office
2721 North Central Avenue
Phoenix, Arizona 85004

9. FOR INFORMATION CALL: A. NAME SEE INSTRUCTIONS TO BIDDERS B. TELEPHONE NO. (Include area code) (NO COLLECT CALLS)

SOLICITATION

NOTE: In advertised solicitations "offer" and "offeror" mean "bid" and "bidder".

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS (Title, identifying no., date):

INDIAN BEND WASH, REPAIRS OF SIDE CHANNELS SYSTEM - REACH 4, Maricopa County, Arizona.

Work consists primarily of repairs to the interior of reinforced concrete box (pneumatically - place concrete; crack repair; and drypack repair). Other miscellaneous work includes gunite slope protection; landscaping; grouted stone; steel gratings; earthwork; asphalt concrete paving; masonry; stucco; and appurtenant work.

11. The Contractor shall begin performance within One calendar days and complete it within ** calendar days after receiving [ ] award, [X] notice to proceed. This performance period is [X] mandatory, [ ] negotiable. (See ** SPECIAL CLAUSES.)

12A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE AND PAYMENT BONDS? (If "YES," indicate within how many calendar days after award in Item 12B.)	12B. CALENDAR DAYS
[X] YES [ ] NO	One

13. ADDITIONAL SOLICITATION REQUIREMENTS:

A. Sealed offers in original and no copies to perform the work required are due at the place specified in Item 8 by 1:00 PM (hour) local time 3 January 85 (date). If this is an advertised solicitation, offers will be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.

B. An offer guarantee [X] is, [ ] is not required.

C. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.

D. Offers providing less than 60 calendar days for Government acceptance after the date offers are due will be considered nonresponsive and will be rejected.

OFFER *(Must be fully completed by offeror)*

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

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

AMOUNTS ▶ In accordance with attached Bidding Schedule.

18. The offeror agrees (a) to carry out this offer if the Government accepts it by signing Item 31B within the time specified in Item 13D, and (b) to furnish any required performance and payment bonds.

19. ACKNOWLEDGMENT OF AMENDMENTS
(The offeror acknowledges receipt of amendments to the solicitation — give number and date of each)

AMENDMENT NO.										
DATE										

20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER *(Type or print)*	20B. SIGNATURE	20C. OFFER DATE

AWARD *(To be completed by Government)*

21. ITEMS ACCEPTED:

22. AMOUNT	23. ACCOUNTING AND APPROPRIATION DATA
24. SUBMIT INVOICES TO ADDRESS SHOWN IN ▶ *(4 copies unless otherwise specified)* ITEM	25. NEGOTIATED PURSUANT TO ☐ 10 USC 2304(a)( ) ☐ 41 USC 252(c)(
26. ADMINISTERED BY CODE	27. PAYMENT WILL BE MADE BY

CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE

☐ 28. NEGOTIATED AGREEMENT *(Contractor is required to sign this document and return _____ copies to issuing office.)* Contractor agrees to furnish and deliver all items or perform all work, requisitions identified on this form and any continuation sheets for the consideration slated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications or incorporated by reference in or attached to this contract.

☐ 29. AWARD *(Contractor is not required to sign this document.)* Your offer on this solicitation, is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.

30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN *(Type or print)*		31A. NAME OF CONTRACTING OFFICER *(Type or print)*	
30B. SIGNATURE	30C. DATE	31B. UNITED STATES OF AMERICA BY	31C. AWARD DATE

Continuation of Standard Form 1442

20D. (1) IF THE OFFEROR IS A JOINT VENTURER, COMPLETE THE FOLLOWING:

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

NOTE: If a Corporation is participating as a member of a Joint Venture, the Certificate as to Corporate Principal in item (3) below much also be completed and signed.

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

(Name)	(Signature)
(Name)	(Signature)
(Name)	(Signature)

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

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____ (name), certify that I am the _____ Secretary of the corporation named as offeror in the within offer; that _____ (name), who signed said offer on behalf of the corporation, was then _____ (title) of said corporation; that the signature thereto is genuine; and that said contract was duly signed, sealed and attested for and in behalf of said corporation by authority of its governing body.

_____
(Name of Corporation)

(Affix)
(CORPORATE SEAL)

_____
(Secretary)

BIDDING SCHEDULE

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
1.	R.C. BOX REPAIR	1	Job	L.S.	_____
2.	GUNITE REPAIR	4450	Sq. Ft.	_____	_____
3.	RESTROOM REPAIR	1	Job	L.S.	_____
4.	MEDIAN REPAIR AND SIDEWALK MODIFICATION	1	Job	L.S.	_____
5.	GRADING AND SURFACING REPAIR	1	Job	L.S.	_____
6.	LANDSCAPING	1	Job	L.S.	_____
7.	DRILLING				
	FIRST 20 HOLES	20	Each	_____	_____
	OVER 20 HOLES	20	Each	_____	_____
8.	OUTLET WORKS	1	Job	L.S.	_____
9.	ASPHALT CONCRETE PAVEMENT	1	Job	L.S.	_____
10.	FENCING	60	L.F.	L.S.	_____
11.	TELEMETRY BOX	1	Job	L.S.	_____
12.	GAGING STATION	1	Job	L.S.	_____

TOTAL ESTIMATED AMOUNT $_____

NOTE: 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.

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 cost, the application of the lump sum adjustment to each unit price in the bidding schedule must be stated. It it is not stated, the bidder agrees that the lump sum adjustment shall be applied on a pro rata basis to every unit price in the bidding schedule.

Bids shall be submitted on all items of the Bidding Schedule.

Amounts and prices shall be indicated in either figures or words, not both.

INSTRUCTIONS TO BIDDERS

1. SOLICITATION DEFINITIONS--FORMAL ADVERTISING (APR 1984) FAR 52.214-1.

"Advertised," for purposes of this solicitation, includes small business, restricted advertising, and other types of restricted advertising.

"Offer" means "bid" in formal advertising.

"Solicitation" means an invitiation for bids in formal advertising.

2. ACKNOWLEDGEMENT OF AMENDMENTS TO INVITATIONS FOR BIDS (APR 1984) FAR 52.214-3. Bidders shall acknowledge receipt of any amendment to this solicitation (a) by signing and returning the amendment, (b) by identifying the amendment number and date in the space provided for this purpose on the form for submitting a bid, or (c) by letter or telegram. The Government must receive the acknowledgement by the time and at the place specified for receipt of bids.

3. FALSE STATEMENT IN BIDS (APR 1984) FAR 52.214-4. Bidders must provide full, accurate, and complete information as required by this solicitation and its attachments. The penalty for making false statements in bids is prescribed in 18 U.S.C 1001.

4. SUBMISSION OF BIDS (APR 1984) FAR 52.214-5.

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

4.2 Telegraphic bids will not be considered unless authorized by the solicitation; however, bids may be modified or withdrawn by written or telegraphic notice, if such notice is received by the time specified for receipt of bids.

5. DIRECTIONS FOR SUBMITTING BIDS.

5.1 Envelopes containing bids, guarantee, etc., must be sealed, marked, and addressed as follows:

Bid Under Reference No: DACW09-85-B-0004	To: U.S. ARMY ENGINEER DISTRICT, LOS ANGELES Phoenix Resident Office 2721 North Central Avenue Phoenix, Arizona 85004

5.2 Hand carried bids shall be deposited in Room 1030 (South Tower) 2721 North Central Avenue, Phoenix, Arizona, prior to the time and date set for opening of bids or may be delivered to Room 1030 immediately prior to bid opening time.

6. EXPLANATION TO PROSPECTIVE BIDDERS (APR 1984) FAR 52.214-6. Any prospective bidder desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must request it in writing soon enough to allow a reply to reach all prospective bidders before the submission of their bids. Oral explanations or instructions given before the award of a contract will not be binding. Any information given a prospective bidder concerning a solicitation will be furnished promptly to all other prospective bidders as an amendment to the

solicitation, if the information is necessary in submitting bids or if the lack of it would be prejudicial to other prospective bidders.

7. LATE SUBMISSIONS, MODIFICATIONS, AND WITHDRAWALS OF BIDS (APR 1984) FAR 52.214-7.

7.1 Any bid received at the office designated in the solicitation after the exact time specified for receipt will not be considered unless it is received before award is made and it:

7.1.1 Was sent by registered or certified mail not later than the fifth calendar day before the date specified for receipt of bids (e.g., a bid submitted in response to a solicitation requiring receipt of bids by the 20th of the month must have been mailed by the 15th); or

7.1.2 Was sent by mail (or was a telegraphic bid if authorized), and it is determined by the Government that the late receipt was due solely to mishandling by the Government after receipt at the Government installation.

7.2 Any modification or withdrawal of a bid is subject to the same conditions as in paragraph 7.1 above.

7.3 The only acceptable evidence to establish the date of mailing of a late bid, modification, or withdrawal sent either by registered or certified mail is the U.S. or Canadian Postal Service postmark on the wrapper or on the original receipt from the U.S. or Canadian Postal Service. If neither postmark shows a legible date, the bid, modification, or withdrawal shall be processed as if mailed late. "Postmark" means a printed, stamped, or otherwise placed impression (exclusive of a postage meter machine impression) that is readily identifiable without further action as having been supplied and affixed by employees of the U.S. or Canadian Postal Service on the date of mailing. Therefore, bidders should request the postal clerks to place a hand cancellation bull's-eye postmark on both the receipt and the envelope or wrapper.

7.4 The only acceptable evidence to establish the time of receipt at the Government installation is the time/date stamp of that installation on the bid wrapper or other documentary evidence of receipt maintained by the installation.

7.5 Notwithstanding paragraph 7.1 above, a late modification of an otherwise successful bid that makes its terms more favorable to the Government will be considered at any time it is received and may be accepted.

7.6 A bid may be withdrawn in person by a bidder or its authorized representative if, before the exact time set for receipt of bids, the identity of the person requesting withdrawal is established and that person signs a receipt for the bid.

8. PREPARATION OF BIDS-CONSTRUCTION (APR 1984). FAR 52.214-18.

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

8.2 The bid form may require bidders to submit bid prices for one or more items on various bases, including:

(1) Lump sum bidding;
(2) Alternate prices;
(3) Units of construction; or
(4) Any combination of subparagraphs (1) through (3) above.

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

8.4 Alternate bids will not be considered unless this solicitation authorizes their submission.

9. CONTRACT AWARD-FORMAL ADVERTISING-CONSTRUCTION (APR 1984). FAR 52.214-19.

9.1 The Government will award a contract resulting from this solicitation to the responsible bidder whose bid, conforming to the solicitation, will be most advantageous to the Government, price and other factors considered.

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

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

10. BID GUARANTEE (APR 1984). FAR 52.228-1.

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

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

10.3 If the successful bidder, upon acceptance of its bid by the Government within the period specified for acceptance, fails to execute all contractual documents or give a bond(s) as required by the solicitation within the time specified, the Contracting Officer may terminate the contract for default.

10.4 Unless otherwise specified in the bid, the bidder will (1) allow 60 days for acceptance of its bid and (2) give bond within 10 days after receipt of the forms by the bidder.

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

11. AVAILABILITY OF SPECIFICATIONS LISTED IN THE DOD INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) (APR 1984) FAR 52.210-2. Single copies of specifications cited in this solicitation may be obtained by submitting a written request to the supply point listed below. The request must contain the title of the specification, its

number, date, applicable amendment(s), and the solicitation or contract number. In case of urgency, telephone or telegraphic requests are acceptable. Voluntary standards, which are not available to offerors and contractors from Government sources, may be obtained from the organization responsible for their preparation, maintenance, or publication.

Commanding Officer
U.S. Naval Publication and Forms Center
5801 Tabor Avenue
Philadelphia, PA 19120
Telex Number.....834295
Western Union Number....710-670-1685
Telephone Number.....(215) 697-3321

12. AVAILABILITY FOR EXAMINATION OF SPECIFICATIONS, STANDARDS, PLANS, DRAWINGS, DATA ITEM DESCRIPTIONS, AND OTHER PERTINENT DOCUMENTS (JUN 1977). FAR SUP 52.210-7003. The specification, standards, plans, drawings, descriptions, and other pertinent documents cited in this solicitation may be examined at the following locations:

300 North Los Angeles Street
Los Angeles, California 90053-2325

13. EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE. Whenever a contract or modification of contract price is negotiated, the Contractor's cost proposals for equipment ownership and operating expenses shall be determined in accordance with the requirements of paragraph, EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE of the SPECIAL CLAUSES. A copy of EP 1110-1-8 "Construction Equipment Ownership and Operating Expense Schedule" is available for review at Room 7216, 300 North Los Angeles Street, Los Angeles, California.

14. MAGNITUDE OF CONSTRUCTION. The estimated cost of the construction is between $250,000 and $500,000.

15. SMALL BUSINESS AND SMALL DISADVANTAGED BUSINESS SUBCONTRACTING. Bidders are cautioned that failure to comply in good faith with the CONTRACT CLAUSES entitled (1) "Utilization of Small Business Concerns and Small Disadvantaged Business Concerns" and (2) "Small Business and Small Disadvantaged Business Subcontracting Plan (Alternate I)", when applicable, will be a material breach of contract. In order to assist prime contractors in developing a source list of Small and Small Disadvantaged Business Concerns, you are encouraged to contact minority Contractor associations, the Minority Business Development Agency, and the appropriate General Business Service Centers in your Standard Metropolitan Statistical Area, addresses of which may be obtained from:

Write: U.S. Army Engineer District, Los Angeles
ATTN: SPLSD
300 North Los Angeles Street, P.O. Box 2711
Los Angeles, California 90053-2325

Telephone: Alice Tafoya
Small and Disadvantaged Business Utilization Specialist
Area Code (213) 688-5676

16. ADDITIONAL INFORMATION pertaining to these plans and specifications may be obtained by writing or calling (collect calls not accepted) U.S. Army Engineer District, Los Angeles, Attn: Mr G. E. Davis, P. O. Box 2711, Los Angeles, California 90053-2325. Telephone (213) 688-5493.

16.1 All inquiries after bid opening should be directed as specified hereinbefore to: Mr. B. J. Meirowsky. Telephone (213) 688-5660.

17. SITE INSPECTION. Arrangements for visiting the site may be made by contacting: Neil Erwin or Mike Ternak at (602) 582-0653.

18. DRAWINGS. Specifications with half-size drawings will be furnished upon receipt of payment of $10.00 per set. Full-size drawings will be furnished upon receipt of payment of $25.00 per set. If individual plan sheets are requested, they will be furnished at the rate of $0.70 for full-size for each sheet requested, but with a minimum charge of $1.00. The maximum charge shall not exceed the charge for a full set of plans. No refund of the payment for drawings will be made and the drawings need not be returned to the District Engineer. Additional copies of the specifications alone will be furnished an applicant at the rate of $1.00 per copy. Payments will be made by cash, check or money order and delivered to the U.S. Army Engineer District, Los Angeles, 300 North Los Angeles Street, Los Angeles, California. Checks and money orders should be made payable to "FAO, U.S. Army, Los Angeles District".

19. NOTICE OF TOTAL SMALL BUSINESS SET-ASIDE (APR 1984). FAR 52.219-6.

19.1 Definition. "Small business concern", as used in this clause, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the size standards in this solicitation.

19.2 General.

19.2.1 Offers are solicited only from small business concerns. Offers received from concerns that are not small business concerns shall be considered nonresponsive and will be rejected.

19.2.2 Any award resulting from this solicitation will be made to a small business concern.

19.3 Agreement. A manufacturer or regular dealer submitting an offer in its own name agrees to furnish, in performing the contract, only end items manufactured or produced by small business concerns inside the United States, its territories and possessions, the Commonwealth of Puerto Rico, the Trust Territory of the Pacific Islands, or the District of Columbia. However, this requirement does not apply in connection with construction or service contracts.

19.4 Small Business Size Standard. A concern is small if its average annual receipts for its preceding three fiscal years did not exceed $17,000,000.

20. NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (APR 1984). FAR 52.222-23.

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

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

Goals for minority participation for each trade	Goals for female participation for each trade
25.0 to 30.0%	6.9%

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

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

20.4 The Contractor shall provide written notification to the Director, Office of Federal Contract Compliance Programs, within 10 working days following award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the:

(1) Name, address, and telephone number of the subcontractor;
  (i) Employer identification number of the subcontractor;
(2) Estimated dollar amount of the subcontract;
(3) Estimated starting and completion dates of the subcontract; and
(4) Geographical area in which the subcontract is to be performed.

20.5 As used in this Notice, and any contract resulting from this solicitation, the "covered area" is the State of Arizona.

21. BONDS.

21.1 Bid Bonds. Each Bidder shall submit with his bid a Bid Bond (Standard Form 24) with good and sufficient surety or surities acceptable to the Government, or other security as provided in Paragragh: BID GUARANTEE hereinbefore, in the form of twenty percent (20%) of the bid price or $3,000,000, whichever is lesser. The Bid Bond penalty may be expressed in terms of a percentage of the bid price or may be expressed in dollars and cents.

21.2 Performance and Payment Bonds. After the perscribed forms have been presented to the bidder to whom award is made for signature, two bonds, each with good and sufficient surety or sureties acceptable to the Government, shall be furnished; namely a Performance Bond (Standard Form 25) and a Payment Bond (Standard Form 25A). The penal sums of such bonds will be as follows:

21.2.1 Performance Bond. The penal sum shall equal one hundred percent (100%) of the contract price.

21.2.2 Payment Bond.

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

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

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

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

NOTE: For contracts less than $25,000, Bid Bonds, and Performance and Payment Bonds are not required.

22. EQUAL OPPORTUNITY PREAWARD CLEARANCE OF SUBCONTRACTORS (APR 1984). FAR 52.222-28. Notwithstanding the clause of this contract entitled "Subcontractors," the Contractor shall not enter into a first-tier subcontract for an estimated or actual amount of $1 million or more without obtaining in writing from the Contracting Officer a clearance that the proposed subcontractor is in compliance with equal opportunity requirements and therefore is eligible for award.23. Conducted Tour. A tour of thesite will be conducted on 14 December 1984 at 8:00 a.m. and will take about 4 hours to complete. Those wishing to attend the tour should notify Neil Erwin or mike Ternak by telephone at (602) 582-0653 at least two days prior to the above date.

23. CONDUCTED TOUR. A tour of the site will be conducted on 14 December 1984 at 8:00 a.m. and will take about 4 hours to complete. Those wishing to attend the tour should notify Neil Erwin or Mike Ternak by telephone at (602) 582-0653 at least two days prior to the above date.

* * * * *

REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFEROR

1. CERTIFICATE OF INDEPENDENT PRICE DETERMINATION (APR 1984) FAR 52.203-2.

(a) The offeror certifies that-

(1) The prices in this offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other offeror or competitor relating to (i) those prices, (ii) the intention to submit an offer, or (iii) the methods or factors used to calculate the prices offered;

(2) The prices in this offer have not been and will not be knowingly disclosed by the offeror, directly or indirectly, to any other offeror or competitor before bid opening (in the case of a formally advertised solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the offeror to induce any other concern to submit or not to submit an offer for the purpose of restricting competition.

(b) Each signature on the offer is considered to be a certification by the signatory that the signatory-

(1) Is the person in the offeror's organization responsible for determining the prices being offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above or

(2) (i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above _____

(insert full name of person(s) in the offeror's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the offeror's organization);

(ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and

(iii) As an agent, has not personally participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above.

(c) If the offeror deletes or modifies subparagraph (a)(2) above, the offeror must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

2. CONTINGENT FEE REPRESENTATION AND AGREEMENT (APR 1984) FAR 52.203-4.

(a) Representation. The offeror represents that, except for full-time bona fide employees working solely for the offeror, the offeror-

(Note: The offeror must check the appropriate boxes. For interpretation or the representation, including the term "bona fide employee," see Subpart 3.4 of the Federal Acquisition Regulation.)

(1) ☐ has, ☐ has not employed or retained any person or company to solicit or obtain this contract; and

(2) ☐ has ☐ has not paid or agreed to pay to any person or company employed or retained to solicit or obtain this contract any commission, percentage, brokerage, or other fee contingent upon or resulting from the award of this contract.

(b) Agreement. The offeror agrees to provide information relating to the above Representation as requested by the Contracting Officer and, when subparagraph (a)(1) or (a)(2) is answered affirmatively, to promptly submit to the Contracting Officer-

(1) A completed Standard Form 119, Statement of Contingent or Other Fees, (SF119); or

(2) A signed statement indicating that the SF 119 was previously submitted to the same contracting office, including the date and applicable solicitation or contract number, and representing that the prior SF 119 applies to this offer or quotation.

3. TYPE OF BUSINESS ORGANIZATION-FORMAL ADVERTIZING (APR 1984) FAR 52.214-2.

The bidder, by checking the applicable box, represents that it operates as

☐ a corporation incorporated under the laws of the State of _____,
☐ an individual, ☐ a partnership,
☐ a nonprofit organization, or ☐ a joint venture.

4. PARENT COMPANY AND IDENTIFYING DATA (APR 1984) FAR 52.214-8.

(a) A "parent" company, for the purpose of this provision, is one that owns or controls the activities and basic business policies of the bidder. To own the bidding company means that the parent company must own more than 50 percent of the voting rights in that company. A company may control a bidder as a parent even though not meeting the requirement for such ownership if the parent company is able to formulate, determine, or veto basic policy decisions of the offeror through the use of dominant minority voting rights, use of proxy voting or otherwise.

(b) The bidder ☐ is, ☐ is not (check applicable box) owned or controlled by a parent company.

(c) If the bidder checked "is" in paragraph (b) above, it shall provide the following information:

Name and Main Office Address of Parent Company (Include Zip Code)	Parent Company's Employer's Identification Number

(d) If the bidder checked "is not" in paragraph (b) above, it shall insert its own Employer's Identification Number on the following line _____.

5. SMALL BUSINESS CONCERN REPRESENTATION (APR 1984) FAR 52.219-1.

The offeror represents and certifies as part of its offer that it ☐ is, ☐ is not a small business concern and that ☐ all, ☐ not all supplies to be furnished will be manufactured or produced by a small business concern in the United States, its possessions, or Puerto Rico. "Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the size standards in this solicitation.

6. SMALL DISADVANTAGED BUSINESS CONCERN REPRESENTATION (APR 1984) FAR 52.219-2.

(a) Representation. The offeror represents that it ☐ is, ☐ is not a small disadvantaged business concern.

(b) Definitions.

"Asian-Indian American," as used in this provision, means a United States citizen whose origins are in India, Pakistan, or Bangladesh.

"Asian-Pacific American," as used in this provision, means a United States citizen whose origins are in Japan, China, the Phillipines, Vietnam, Korea, Samoa, Guam, The U.S. Trust Territory of the Pacific Islands, the Northern Mariana Islands, Laos, Cambodia, or Taiwan.

"Native Americans," as used in this provision, means American Indians, Eskimos, Aleuts, and native Hawaiians.

"Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria and size standards in 13 CFR 121.

"Small disadvantaged business concern," as used in this provision, means a small business concern that (1) is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged, or publicly owned business having at least 51 percent of its stock owned by one or more socially and economically disadvantaged individuals and (2) has its management and daily business controlled by one or more such individuals.

(c) Qualified groups. The offeror shall presume that socially and economically disadvantaged individuals include Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans, Asian-Indian Americans, and other individuals found to be qualified by the SBA under 13 CFR 124.1.

7. WOMEN-OWNED SMALL BUSINESS REPRESENTATION (APR 1984) FAR 52.219-3.

(a) Representation. The offeror represents that it ☐ is, ☐ is not a women-owned small business concern.

(b) Definitions.

"Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria and size standards in 13 CFR 121.

"Women-owned," as used in this provision, means a small business that is at least 51 percent owned by a woman or women who are U.S. citizens and who also control and operate the business.

8. CERTIFICATION OF NONSEGRATED FACILITIES (APR 1984) FAR 52.222-21.

(a) "Segregated facilities," as used in this provision, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment aréas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise.

(b) By the submission of this offer, the offeror certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to

perform their services at any location under its control where segregated facilities are maintained. The offeror agrees that a breach of this certification is a violation of the Equal Opportunity clause in the contract.

(c) The offeror further agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will-

(1) Obtain identical certifications from proposed subcontractors before the award of subcontracts under which the subcontractor will be subject to the Equal Opportunity clause;

(2) Retain the certifications in the files; and

(3) Forward the following notice to the proposed subcontractors (except if the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR CERTIFICATIONS OF NONSEGREGATED FACILITIES.

A Certification of Nonsegregated Facilities must be submitted before the award of a subcontract under which the subcontractor will be subject to the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

9. PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (APR 1984) FAR 52.222-22.

The offeror represents that-

(a) It ☐ has, ☐ has not participated in previous contract or subcontract subject either to the Equal Opportunity clause of this solicitation, the clause originally contained in Section 310 of Executive Order No. 10925, or the clause contained in Section 201 of Executive Order No. 11114;

(b) It ☐ has, ☐ has not, filed all required compliance reports; and

(c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

10. CLEAN AIR AND WATER CERTIFICATION (APR 1984) FAR 52.223-1.

The Offeror certifies that-

(a) Any facility to be used in the performance of this proposed contract is , is not ☐ listed on the Environmental Protection Agency List of Violating Facilities;

(b) The Offeror will immediately notify the Contracting Officer, before award, of the receipt of any communication from the Administrator, or a designee, of the Environmental Protection Agency, indicating that any facility that the Offeror proposes to use for the performance of the contract is under consideration to be listed on the EPA List of Violating Facilities; and

(c) The Offeror will include a certification substantially the same as this certification, including this paragraph (c), in every nonexempt subcontract.

11. DATA UNIVERSAL NUMBERING SYSTEM (DUNS) NUMBER REPORTING (DEC 1980) FAR SUP 52.204-7004.

In the block with its name and address, the offeror should supply the Data Universal Numbering System (DUNS) Number applicable to that name and address. The DUNS Number should be preceded by "DUNS:". If the offeror does not have a DUNS Number, it may obtain one from any DUN and Bradstreet branch office. No offeror should delay the submission of its offer pending receipt of its DUNS Number.

12. PREFERENCE FOR LABOR SURPLUS AREA CONCERNS (APR 1984) FAR 52.220-1.

(a) This acquisition is not set aside for labor surplus area (LSA) concerns. However, the offeror's status as such a concern may affect (1) entitlement to award in case of tie offers or (2) offer evaluation in accordance with the Buy American Act clause of this solicitation. In order to determine whether the offeror is entitled to a preference under (1) or (2) above, the offeror must identify, below, the LSA in which the costs to be incurred on account of manufacturing or production (by the offeror or the first-tier subcontractors) amount to more than 50 percent of the contract price.

_____

_____

(b) Failure to identify the locations as specified above will preclude consideration of the offeror as an LSA concern. If the offeror is awarded a contract as an LSA concern and would not have otherwise qualified for award, the offeror shall perform the contract or cause the contract to be performed in accordance with the obligations of an LSA concern.

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CONTRACT CLAUSES
CONSTRUCTION-INSIDE THE U.S.
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1.1 DEFINITIONS (ALTERNATE I) (1984 APR) (DEVIATION)
FAR 52.202-1 (ECI 7-070 and 7-072)
(The following clause is applicable if the procurement instrument identification number is prefixed by the letters "DACW.")

(a) The term "head of the agency" or "Secretary" as used herein means the Secretary of the Army; and the term "his duly authorized representative" means the Chief of Engineers, Department of the Army, or an individual or board designated by him.

(b) "Contracting Officer" means a person with the authority to enter into, administer, and/or terminate contracts and make related determinations and findings. The term includes certain authorized representatives of the Contracting Officer acting within the limits of their authority as delegated by the Contracting Officer.

(c) The agency board of contract appeals having jurisdiction over all appeals from final decisions of the Contracting Officer under the Contract Disputes Act of 1978 is the Corps of Engineers Board of Contract Appeals, Office of the Chief of Engineers, Pulaski Building, 20 Massachusetts Avenue, N.W., Washington, D.C. 20314.#

1.2 DEFINITIONS (ALTERNATE I) (1984 APR) (DEVIATION)
FAR 52.202-1 (ECI 7-070)
(The following clause is applicable if the procurement instrument identification number is prefixed by the letters "DACA.")

(a) "Head of the agency" (also called "agency head") or "Secretary" means the Secretary (or Attorney General, Administrator, Governor, Chairperson, or other chief official, as appropriate) of the agency, including any deputy or assistant chief official of the agency, and, in the Department of Defense, the Under Secretary and any Assistant Secretary of the Departments of the Army, Navy, and Air Force and the Director and Deputy Director of Defense agencies; and the term "authorized representative" means any person, persons, or board (other than the Contracting Officer) authorized to act for the head of the agency or Secretary.

(b) "Contracting Officer" means a person with the authority to enter into, administer, and/or terminate contracts and make related determinations and findings. The term includes certain authorized representatives of the Contracting Officer acting within the limits of their authority as delegated by the Contracting Officer.

(c) The agency board of contract appeals having jurisdiction over all appeals from final decisions of the Contracting Officer under the Contract Disputes Act of 1978 is the Armed Services Board of Contract Appeals., 200 Stoval Street, Alexandria, Virginia 22332.#

2. OFFICIALS NOT TO BENEFIT (1984 APR) FAR 52.203-1

No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this contract, or to any benefit arising from it. However, this clause does not apply to this contract to the extent that this contract is made with a corporation for the corporation's general benefit.#

3. GRATUITIES (1984 APR) FAR 52.203-3

(a) The right of the Contractor to proceed may be terminated by written notice if, after notice and hearing, the agency head or a designee determines that the Contractor, its agent, or another representative--

(1) Offered or gave a gratuity (e.g., an entertainment or gift) to an officer, official, or employee of the Government; and

(2) Intended, by the gratuity, to obtain a contract or favorable treatment under a contract.

(b) The facts supporting this determination may be reviewed by any court having lawful jurisdiction.

(c) If this contract is terminated under paragraph (a) above, the Government is entitled--

(1) To pursue the same remedies as in a breach of the contract; and

(2) In addition to any other damages provided by law, to exemplary damages of not less than three nor more than ten times the cost incurred by the Contractor in giving gratuities to the person concerned, as determined by the agency head or a designee. (This subparagraph (c)(2) is applicable only if this contract uses money appropriated to the Department of Defense.)

(d) The rights and remedies of the Government provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.#

4. COVENANT AGAINST CONTINGENT FEES (1984 APR) FAR 52.203-5

(a) The Contractor warrants that no person or agency has been employed or retained to solicit or obtain this contract upon an agreement or understanding for a contingent fee, except a bona fide employee or agency. For breach or violation of this warranty, the Government shall have the right to annul this contract without liability or, in its discretion, to deduct from the contract price or consideration, or otherwise recover, the full amount of the contingent fee.

(b) "Bona fide agency," as used in this clause, means an established commercial or selling agency, maintained by a contractor for the purpose of securing business, that neither exerts nor proposes to exert improper influence to solicit or obtain Government contracts nor holds itself out as being able to obtain any Government contract or contracts through improper influence.

"Bona fide employee," as used in this clause, means a person, employed by a contractor and subject to the contractor's supervision and control as to time, place, and manner of performance, who neither exerts nor proposes to exert improper influence to solicit or obtain Government contracts nor holds out as being able to obtain any Government contract or contracts through improper influence.

"Contingent fee," as used in this clause, means any commission, percentage, brokerage, or other fee that is contingent upon the success that a person or concern has in securing a Government contract.

"Improper influence," as used in this clause, means any influence that induces or tends to induce a Government employee or officer to give consideration or to act regarding a Government contract on any basis other than the merits of the matter.#

5. PRIORITIES, ALLOCATIONS, AND ALLOTMENTS (1984 APR) FAR 52.212-8

(The following clause is applicable to rateable contracts.)

The Contractor shall follow the provisions of Defense Materials System Regulation 1 or Defense Priorities System Regulation 1 (see 32A CFR 621-662) and all other applicable regulations and orders of the Office of Industrial Resource Administration, Department of Commerce, in obtaining controlled materials and other products and materials needed to fill this order.#

6. VARIATION IN ESTIMATED QUANTITY (1984 APR) FAR 52.212-11

(The following clause is not applicable to bid items listed in the "Variations in Estimated Quantities--Subdivided Items" clause and also is not applicable to contracts for dredging work which contain the "Variations in Estimated Quantities--Dredging" clause.)

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.#

7. SUSPENSION OF WORK (1984 APR) FAR 52.212-12

(a) The Contracting Officer may order the Contractor, in writing, to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Contracting Officer determines appropriate for the convenience of the Government.

(b) If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Contracting Officer in the administration of this contract, or (2) by the Contracting Officer's failure to act within the time specified in this contract (or within a reasonable time if not specified), an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) necessarily caused by the unreasonable suspension, delay, or interruption, and

the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause including the fault or negligence of the Contractor, or for which an equitable adjustment is provided for or excluded under any other term or condition of this contract.

(c) A claim under this clause shall not be allowed (1) for any costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order), and (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.#

8. AUDIT-FORMAL ADVERTISING (1984 APR) FAR 52.214-26

(The following clause is applicable if this contract is in excess of $100,000.)

(a) **Cost or Pricing Data.** If the Contractor has submitted cost or pricing data in connection with the pricing of any modification to this contract, unless the pricing was based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation, the Contracting Officer or a representative who is an employee of the Government shall have the right to examine and audit all books, records, documents, and other data of the Contractor (including computations and projections) related to negotiating, pricing or performing the modification, in order to evaluate the accuracy, completeness, and currency of the cost or pricing data. In the case of pricing any modification, the Comptroller General of the United States or a representative who is an employee of the Government shall have the same rights.

(b) **Availability.** The Contractor shall make available at its office at all reasonable times the materials described in paragraph (a) above, for examination, audit, or reproduction, until 3 years after final payment under this contract, or for any other period specified in Subpart 4.7 of the Federal Acquisition Regulation (FAR). FAR Subpart 4.7, Contractor Records Retention, in effect on the date of this contract, is incorporated by reference in its entirety and made a part of this contract.

(1) If this contract is completely or partially terminated, the records relating to the work terminated shall be made available for 3 years after any resulting final termination settlement.

(2) Records pertaining to appeals under the Disputes clause or to litigation or the settlement of claims arising under or relating to the performance of this contract shall be made available until disposition of such appeals, litigation, or claims.

(c) The Contractor shall insert a clause containing all the provisions of this clause, including this paragraph (c), in all subcontracts over $10,000 under this contract, altering the clause only as necessary to identify properly the contracting parties and the contracting office under the Government prime contract.#

9. PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA --MODIFICATIONS--FORMAL ADVERTISING (1984 APR) FAR 52.214-27

(The following clause is applicable if this contract is in excess of $500,000.)

(a) This clause shall become operative only for any modification to this contract involving aggregate increases and/or decreases in costs, plus applicable profits, of more than $500,000 except that this clause does not apply to any modification for which the price is--

(1) Based on adequate price competition;

(2) Based on established catalog or market prices of commercial items sold in substantial quantities to the general public; or

(3) Set by law or regulation.

(b) If any price, including profit, negotiated in connection with any modification under this clause, was increased by any significant amount because (1) the Contractor or a subcontractor furnished cost or pricing data that were not complete, accurate, and current as certified in its Certificate of Current Cost or Pricing Data, (2) a subcontractor or prospective subcontractor furnished the Contractor cost or pricing data that were not complete, accurate, and current as certified in the Contractor's Certificate of Current Cost or Pricing Data, or (3) any of these parties furnished data of any description that were not accurate, the price shall be reduced accordingly and the contract shall be modified to reflect the reduction. This right to a price reduction is limited to that resulting from defects in data relating to modifications for which this clause becomes operative under paragraph (a) above.

(c) Any reduction in the contract price under paragraph (b) above due to defective data from a prospective subcontractor that was not subsequently awarded the subcontract shall be limited to the amount, plus applicable overhead and profit markup, by which (1) the actual subcontractor (2) the actual cost to the Contractor, if there was no subcontract, was less than the prospective subcontract cost estimate submitted by the Contractor; provided, that the actual subcontract price was not itself affected by defective cost or pricing data.#

10. SUBCONTRACTOR COST OR PRICING DATA--MODIFICATION--FORMAL ADVERTISING (APR 1984) FAR 52.214-28

(a) The requirements of paragraphs (b) and (c) of this clause shall (1) become operative only for any modification to this contract involving aggregate increases and/or decreases in costs, plus applicable profits, expected to exceed $500,000 and (2) be limited to such modifications.

(b) Before awarding any subcontract expected to exceed $500,000 when entered into, or pricing any subcontract modification involving aggregate increases and/or decreases in costs, plus applicable profits, expected to exceed $500,000, the Contractor shall require the subcontractor to submit cost or pricing data (actually or by specific identification in writing), unless the price is--

(1) Based on adequate completion;

(2) Based on established catalog or market prices of commercial items sold in substantial quantities to the general public; or

(3) Set by law or regulation.

(c) The Contractor shall require the subcontractor to certify in substantially the form prescribed in subsection 15.804-4 of the Federal Acquisition Regulation that, to the best of its knowledge and belief, the data submitted under paragraph (b) above were accurate, complete, and current as of the date of agreement on the negotiated price of the subcontract or subcontract modification.

(d) The Contractor shall insert the substance of this clause, including this paragraph (d), in each subcontract that exceeds $500,000 when entered into.#

11. EXAMINATION OF RECORDS BY COMPTROLLER GENERAL (1984 APR) FAR 52.215-1

(a) This clause applies if this contract exceeds $10,000 and was entered into by negotiation.

(b) The Comptroller General of the United States or a duly authorized representative from the General Accounting Office shall, until 3 years after final payment under this contract or for any shorter period specified in Federal Acquisition Regulation (FAR) Subpart 4.7, Contractor Records Retention, have access to and the right to examine any of the Contractor's directly pertinent books, documents, papers, or other records involving transactions related to this contract.

(c) The Contractor agrees to include in first-tier subcontracts under this contract a clause to the effect that the Comptroller General or a duly authorized representative from the General Accounting Office shall, until 3 years after final payment under the subcontract or for any shorter period specified in FAR Subpart 4.7, have access to and the right to examine any of the subcontractor's directly pertinent books, documents, papers, or other records involving transactions related to the subcontract. "Subcontract," as used in this clause, excludes (1) purchase orders not exceeding $10,000 and (2) subcontracts or purchase orders for public utility services at rates established to apply uniformly to the public, plus any applicable reasonable connection charge.

(d) The periods of access and examination in paragraphs (b) and (c) above for records relating to (1) appeals under the Disputes clause, (2) litigation or settlement of claims arising from the performance of this contract, or (3) costs and expenses of this contract to which the Comptroller General or a duly authorized representative from the General Accounting Office has taken exception shall continue until such appeals, litigation, claims, or exceptions are disposed of.#

12. UTILIZATION OF SMALL BUSINESS CONCERNS AND SMALL DISADVANTAGED BUSINESS CONCERNS (1984 APR) FAR 52.219-8

(a) It is the policy of the United States that small business concerns and small business concerns owned and controlled by socially and economically disadvantaged individuals shall have the maximum practicable opportunity to participate in performing contracts let by any Federal agency.

(b) The Contractor hereby agrees to carry out this policy in the awarding of subcontracts to the fullest extent consistent with efficient contract performance. The Contractor further agrees to cooperate in any studies or surveys as may be conducted by the United

States Small Business Administration or the awarding agency of the United States as may be necessary to determine the extent of the Contractor's compliance with this clause.

(c) As used in this contract, the term "small business concern" shall mean a small business as defined pursuant to section 3 of the Small Business Act and relevant regulations promulgated pursuant thereto. The term "small business concern owned and controlled by socially and economically disadvantaged individuals" shall mean a small business concern--

(1) Which is at least 51 percent owned by one or more socially and economically disadvantaged individuals; or, in the case of any publicly owned business, at least 51 per centum of the stock of which is owned by one or more socially and economically disadvantaged individuals; and

(2) Whose management and daily business operations controlled by one or more of such individuals.

The Contractor shall presume that socially and economically disadvantaged individuals include Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans, Asian-Indian Americans and other minorities, or any other individual found to be disadvantaged by the Administration pursuant to section 8(a) of the Small Business Act.

(d) Contractors acting in good faith may rely on written representations by their subcontractors regarding their status as either a small business concern or a small business concern owned and controlled by socially and economically disadvantaged individuals.#

13. SMALL BUSINESS AND SMALL DISADVANTAGED BUSINESS SUBCONTRACTING PLAN (ALTERNATE I) (1984 APR) FAR 52.219-9

(The following clause is applicable if this contract (1) offers subcontracting possibilities, (2) is expected to exceed $500,000, or $1,000,000 in the case of construction of any public facility, and (3) is required to include the clause in FAR 52.219-8.)

(a) This clause does not apply to small business concerns.

(b) "Commercial product," as used in this clause, means a product in regular production that is sold in substantial quantities to the general public and/or industry at established catalog or market prices. It also means a product which, in the opinion of the Contracting Officer, differs only insignificantly from the Contractor's commercial product.

"Subcontract," as used in this clause, means any agreement (other than one involving an employer-employee relationship) entered into by a Federal Government prime Contractor or subcontractor calling for supplies or services required for performance of the contract or subcontract.

(c) The apparent low bidder, upon request by the Contracting Officer, shall submit a subcontracting plan, where applicable, which addresses separately subcontracting with small business concerns and small disadvantaged business concerns, and which shall be included in and made part of the resultant contract. The subcontracting plan shall be submitted within the time specified by the Contracting Officer. Failure to submit the subcontracting plan shall make the bidder ineligible for the award of a contract.

(d) The offeror's subcontracting plan shall include the following:

(1) Goals, expressed in terms of percentages of total planned subcontracting dollars, for the use of small business concerns and small disadvantaged business concerns as subcontractors. The offeror shall include all subcontracts that contribute to contract performance, and may include a proportionate share of products and services that are normally allocated as indirect costs.

(2) A statement of--

(i) Total dollars planned to be subcontracted;

(ii) Total dollars planned to be subcontracted to small business concerns; and

(iii) Total dollars planned to be subcontracted to small disadvantaged business concerns.

(3) A description of the principal types of supplies and services to be subcontracted, and an identification of the types planned for subcontracting to (i) small business concerns and (ii) small disadvantaged business concerns.

(4) A description of the method used to develop the subcontracting goals in (1) above.

(5) A description of the method used to identify potential sources for solicitation purposes (e.g., existing company source lists, the Procurement Automated Source System (PASS) of the Small Business Administration, the National Minority Purchasing Council Vendor Information Service, the Research and Information Division of the Minority Business Development Agency in the Department of Commerce, or small and small disadvantaged business concerns trade associations.)

(6) A statement as to whether or not the offeror included indirect costs in establishing subcontracting goals, and a description of the method used to determine the proportionate share of indirect costs to be incurred with (i) small business concerns and (ii) small disadvantaged business concerns.

(7) The name of the individual employed by the offeror who will administer the offeror's subcontracting program, and a description of the duties of the individual.

(8) A description of the efforts the offeror will make to assure that small business concerns and small disadvantaged business concerns have an equitable opportunity to compete for subcontracts.

(9) Assurances that the offeror will include the clause in this contract entitled "Utilization of Small Business Concerns and Small Disadvantaged Business Concerns" in all subcontracts that offer further subcontracting opportunities, and that the offeror will require all subcontractors (except small business concerns) who receive subcontracts in excess of $500,000 ($1,000,000 for construction of any public facility), to adopt a plan similar to the plan agreed to by the offeror.

(10) Assurances that the offeror will (i) cooperate in any studies or surveys as may be required, (ii) submit periodic reports in order to allow the Government to determine the extent of compliance by the offeror with the subcontracting plan, (iii) submit Standard Form (SF) 294, Subcontracting Report for Individual Contracts, and/or SF 295, Summary Subcontract Report, in accordance with the instructions on the forms, and (iv) ensure that its subcontractors agree to submit Standard Forms 294 and 295.

(11) A recitation of the types of records the offeror will maintain to demonstrate procedures that have been adopted to comply with the requirements and goals in the plan, including establishing source lists; and a description of its efforts to locate small and small disadvantaged business concerns and award subcontracts to them. The records shall include at least the following (on a plant-wide or company-wide basis, unless otherwise indicated):

(i) Source lists, guides, and other data that identify small and small disadvantaged business concerns.

(ii) Organizations contacted in an attempt to locate sources that are small or small disadvantaged business concerns.

(iii) Records on each subcontract solicitation resulting in an award of more than $100,000, indicating (A) whether small business concerns were solicited and if not, why not, (B) whether small disadvantaged business concerns were solicited and if not, why not, and (C) if applicable, the reason award was not made to a small business concern.

(iv) Records of any outreach efforts to contact (A) trade associations, (B) business development organizations, and (C) conferences and trade fairs to locate small and small disadvantaged business sources.

(v) Records of internal guidance and encouragement provided to buyers through (A) workshops, seminars, training, etc., and (B) monitoring performance to evaluate compliance with the program's requirements.

(vi) On a contract-by-contract basis, records to support award data submitted by the offeror to the Government, including the name, address, and business size of each subcontractor. Contractors having company or division-wide annual plans need not comply with this requirement.

(e) In order to effectively implement this plan to the extent consistent with efficient contract performance, the Contractor shall perform the following functions:

(1) Assist small business and small disadvantaged business concerns by arranging solicitations, time for the preparation of bids, quantities, specifications, and delivery schedules so as to facilitate the participation by such concerns. Where the Contractor's lists of potential small business and small disadvantaged subcontractors are excessively long, reasonable effort shall be made to give all such small business concerns an opportunity to compete over a period of time.

(2) Provide adequate and timely consideration of the potentialities of small business and small disadvantaged business concerns in all "make-or-buy" decisions.

(3) Counsel and discuss subcontracting opportunities with representatives of small and small disadvantaged business firms.

(f) A master subcontracting plan on a plant or division-wide basis which contains all the elements required by (d) above, except goals, may be incorporated by reference as a part of the subcontracting plan required of the offeror by this clause; provided, (1) the master plan has been approved, (2) the offeror provides copies of the approved master plan and evidence of its approval to the Contracting Officer, and (3) goals and any deviations from the master plan deemed necessary by the Contracting Officer to satisfy the requirements of this contract are set forth in the individual subcontracting plan.

(g) (1) If a commercial product is offered, the subcontracting plan required by this clause may relate to the offeror's production generally, for both commercial and noncommercial products, rather than solely to the Government contract. In these cases, the offeror shall, with the concurrence of the Contracting Officer, submit one company-wide or division-wide annual plan.

(2) The annual plan shall be reviewed for approval by the agency awarding the offeror its first prime contract requiring a subcontracting plan during the fiscal year, or by an agency satisfactory to the Contracting Officer.

(3) The approved plan shall remain in effect during the offeror's fiscal year for all of the offeror's commercial products.

(h) Prior compliance of the offeror with other such subcontracting plans under previous contracts will be considered by the Contracting Officer in determining the responsibility of the offeror for award of the contract.

(i) The failure of the Contractor or subcontractor to comply in good faith with (1) the clause of this contract entitled "Utilization of Small Business Concerns and Small Disadvantaged Business Concerns," or (2) an approved plan required by this clause, shall be a material breach of the contract.#

14. UTILIZATION OF WOMEN-OWNED SMALL BUSINESSES (1984 APR)
FAR 52.219-13

(a) "Women-owned small businesses," as used in this clause, means businesses that are at least 51 percent owned by women who are United States citizens and who also control and operate the business.

"Control," as used in this clause, means exercising the power to make policy decisions.

"Operate," as used in this clause, means being actively involved in the day-to-day management of the business.

(b) It is the policy of the United States that women-owned small businesses shall have the maximum practicable opportunity to participate in performing contracts awarded by any Federal agency.

(c) The Contractor agrees to use its best efforts to give women-owned small.businesses the maximum practicable opportunity to participate in the subcontracts it awards to the fullest extent consistent with the efficient performance of its contract.#

15. NOTICE TO THE GOVERNMENT OF LABOR DISPUTES (1984 APR)
FAR 52.222-1

(a) If the Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay the timely performance

of this contract, the Contractor shall immediately give notice, including all relevant information, to the Contracting Officer.

(b) The Contractor agrees to insert the substance of this clause, including this paragraph (b), in any subcontract to which a labor dispute may delay the timely performance of this contract; except that each subcontract shall provide that in the event its timely performance is delayed or threatened by delay by any actual or potential labor dispute, the subcontractor shall immediately notify the next higher tier subcontractor or the prime Contractor, as the case may be, of all relevant information concerning the dispute.#

16. CONVICT LABOR (1984 APR) FAR 52.222-3

The Contractor agrees not to employ any person undergoing sentence of imprisonment in performing this contract except as provided by 18 U.S.C. 4082(c)(2) and Executive Order 11755, December 29, 1973.#

17. DAVIS-BACON ACT (40 U.S.C. 276a to a-7)

(a) **Minimum wages.**

(1) All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalent thereof due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics, subject to the provisions of paragraph (a)(4) of this clause; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in the clause entitled "Apprentices and Trainees". Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein; provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(2) of this clause) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(2) (A) The Contracting Officer shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The Contracting Officer shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the Contracting Officer agree on the classification and wage rate (including the amount designated for fringe benefits, where appropriate), a report of the action taken shall be sent by the Contracting Officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt or will notify the Contracting Officer within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

(C) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and the Contracting Officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the Contracting Officer shall refer the questions, including the views of all interested parties and the recommendation of the Contracting Officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

(D) The wage rate (including fringe benefits, where appropriate) determined pursuant to subparagraphs (a)(2)(B) and (a)(2)(C) of this clause shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(3) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(4) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of costs reasonably anticipated in providing bona fide fringe benefits under a plan or program; provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)#

18. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT--OVERTIME COMPENSATION (40 U.S.C. 327-333)

This contract is subject to the Contract Work Hours and Safety Standards Act and to the applicable rules, regulations, and interpretations of the Secretary of Labor.

(a) **Overtime requirements.** No Contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of eight hours in any calendar day or in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of eight hours in any calendar day or in excess of forty hours in such workweek, whichever is greater.

(b) **Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the provisions set forth in paragraph (a) of this clause, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the provisions set forth in paragraph (a) of this clause, in the sum of $10 for each calendar day for which such individual was required or permitted to work in excess of eight hours or in excess of the standard workweek of forty hours without payment of the overtime wages required by the provisions set forth in paragraph (a) of this clause.

(c) **Withholding for unpaid wages and liquidated damages.** The Contracting Officer shall upon his or her own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any other Federal contract with the same Prime Contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same Prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the provisions set forth in paragraph (b) of this clause.

(d) **Subcontracts.** The Contractor or subcontractor shall insert in any subcontracts the provisions set forth in paragraphs (a) through (d) of this clause and also a clause requiring the subcontractors to include these provisions in any lower tier subcontracts. The Prime Contractor shall be responsible for compliance by any subcontractor or lower tier subcontract with the provisions set forth in paragraphs (a) through (d) of this clause.#

19. APPRENTICES AND TRAINEES

(a) **Apprentices.** Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days or probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, frivolous shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(b) **Trainees.** Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced

by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(c) **Equal employment opportunity.** The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.#

20. PAYROLLS AND BASIC RECORDS

(a) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under paragraph (a)(4) of the clause entitled "Davis-Bacon Act" that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing

apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB control numbers 1215-0140 and 1215-0017.)

(b) (1) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Contracting Officer if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to the Contracting Officer. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under paragraph (a) of this clause. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, D.C. 20402. The Prime Contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB control number 1215-0149.)

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance", signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be maintained under paragraph (a) of this clause and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR Part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification as set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph (b)(2) of this clause.

(4) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(c) The Contractor or subcontractor shall make the records required under paragraph (a) of this clause available for inspection, copying, or transcription by authorized representatives of the Contracting Officer or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.#

21. COMPLIANCE WITH COPELAND ACT REQUIREMENTS

The Contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.#

22. WITHHOLDING OF FUNDS

The Contracting Officer shall upon his or her own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same Prime Contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same Prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages ,required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, the Contracting Officer may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.#

23. SUBCONTRACTS

The Contractor or subcontractor shall insert in any subcontracts the clauses entitled "Davis-Bacon Act","Contract Work Hours and Safety Standards Act--Overtime Compensation", "Apprentices and Trainees", "Payrolls and Basic Records", "Compliance with Copeland Act Requirements", "Withholding", "Subcontracts", "Contract Termination-Debarment", "Disputes Concerning Labor Standards", "Compliance with Davis-Bacon and Related Act Requirements", and "Certification or Eligibility", and such other clauses as the Contracting Officer may, by appropriate instructions, require; and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The Prime Contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses cited above.#

24. CONTRACT TERMINATION; DEBARMENT

A breach of the contract clauses entitled "Davis-Bacon Act", "Contract--Work Hours and Safety Standards Act--Overtime Compensation", "Apprentices and Trainees", "Payrolls and Basic Records", "Compliance with Copeland Act Requirements", "Withholding," "Subcontractors", "Compliance with Davis-Bacon and Related Act Requirements", and "Certification of Eligibility", may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.#

25. DISPUTES CONCERNING LABOR STANDARDS

Disputes arising out of the labor standards provisions of this contract shall not be subject to the general Disputes Clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.#

26. COMPLIANCE WITH DAVIS-BACON AND RELATED ACT REQUIREMENTS

All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.#

27. CERTIFICATION OF ELIGIBILITY

(a) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(b) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(c) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.#

28. EQUAL OPPORTUNITY (1984 APR) FAR 52.222-26

(a) If, during any 12-month period (including the 12 months preceding the award of this contract), the Contractor has been or is awarded nonexempt Federal contracts and/or subcontracts that have an aggregate value in excess of $10,000, the Contractor shall comply with subparagraphs (b)(1) through (11) below. Upon request, the Contractor shall provide information necessary to determine the applicability of this clause.

(b) During performing this contract, the Contractor agrees as follows:

(1) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin.

(2) The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. This shall include, but not be limited to, (i) employment, (ii) upgrading, (iii) demotion, (iv) transfer, (v) recruitment or recruitment advertising, (vi) layoff or termination,

(vii) rates of pay or other forms of compensation, and (viii) selection for training, including apprenticeship.

(3) The Contractor shall post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer that explain this clause.

(4) The Contractor shall, in all solicitations or advertisement for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(5) The Contractor shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, the notice to be provided by the Contracting Officer advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.

(6) The Contractor shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.

(7) The Contractor shall furnish to the contracting agency all information required by Executive Order 11246, as amended, and by the rules, regulations, and orders of the Secretary of Labor, Standard Form 100 (EEO-1), or any successor form, is the prescribed form to be filed within 30 days following the award, unless filed within 12 months preceding the date of award.

(8) The Contractor shall permit access to its books, records, and accounts by the contracting agency or the Office of Federal Contract Compliance Programs (OFCCP) for the purposes of investigation to ascertain the Contractor's compliance with the applicable rules, regulations, and orders.

(9) If the OFCCP determines that the Contractor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts, under the procedures authorized in Executive Order 11246, as amended. In addition, sanctions may be imposed and remedies invoked against the Contractor as provided in Executive Order 11246, as amended, the rules, regulations, and orders of the Secretary of Labor, or as otherwise provided by law.

(10) The Contractor shall include the terms and conditions of subparagraph (b)(1) through (11) of this clause in every subcontract or purchase order that is not exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor.

(11) The Contractor shall take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing these terms and conditions, including sanctions for noncompliance; provided, that if the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of any direction, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

(c) Notwithstanding any other clause in this contract, disputes relative to this clause will be governed by the procedures in 41 CFR 60-1.1.#

29. AFFIRMATIVE ACTION COMPLIANCE REQUIREMENTS FOR CONSTRUCTION (1984 APR) FAR 52.222-27

(a) **Definitions.** "Covered area," as used in this clause, means the geographical area described in the solicitation for this contract.

"Director," as used in this clause, means Director, Office of Federal Contract Compliance Programs (OFCCP), United States Department of Labor, or any person to whom the Director delegates authority.

"Employer identification number," as used in this clause, means the Federal Social Security number used on the employer's quarterly federal tax return, U.S. Treasury Department Form 941.

"Minority," as used in this clause, means--

(1) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

(2) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

(3) Black (all persons having origins in any of the black African racial groups not of Hispanic origin);

(4) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);

(b) If the Contractor, or a subcontractor at any tier, subcontracts a portion of the work involving any construction trade, each such subcontract in excess of $10,000 shall include this clause and the Notice containing the goals for minority and female participation stated in the solicitation for this contract.

(c) If the Contractor is participating in a Hometown Plan (41 CFR 60-4) approved by the U.S. Department of Labor in a covered area, either individually or through an association, its affirmative action obligations on all work in the plan area (including goals) shall comply with the plan for those trades that have unions participating in the plan. Contractors must be able to demonstrate participation in, and compliance with, the provisions of the plan. Each Contractor or subcontractor participating in an approved plan is also required to comply with its obligations under the Equal Opportunity clause, and to make a good faith effort to achieve each goal under the plan in each trade in which it has employees. The overall good-faith performance by other Contractors or subcontractors toward a goal in an approved plan does not excuse any Contractor's or subcontractor's failure to make good-faith efforts to achieve the plan's goals.

(d) The Contractor shall implement the affirmative action procedures in subparagraphs (g)(1) through (16) of this clause. The goals stated in the solicitation for this contract are expressed as percentages of the total hours of employment and training of minority and female utilization that the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for the geographical area where that work is

actually performed. The Contractor is expected to make substantially uniform progress toward its goals in each craft.

(e) Neither the terms and conditions of any collective bargaining agreement, nor the failure by a union with which the Contractor has a collective bargaining agreement, to refer minorities or women shall excuse the Contractor's obligations under this clause, Executive Order 11246, as amended, or the regulations thereunder.

(f) In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

(g) The Contractor shall take affirmative action to ensure equal employment opportunity. The evaluation of the Contractor's compliance with this clause shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully and implement affirmative action steps at least as extensive as the following:

(1) Ensure a working environment free of harassment, intimidation, and coercion at all sites and in all facilities where the Contractor's employees are assigned to work. The Contractor, if possible, will assign two or more women to each construction project. The Contractor shall ensure that foremen, superintendents, and other onsite supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at these sites or facilities.

(2) Establish and maintain a current list of sources for minority and female recruitment. Provide written notification to minority and female recruitment sources and community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

(3) Establish and maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant, referrals of minorities or females from unions, recruitment sources, or community organizations, and the action taken with respect to each individual. If an individual was sent to the union hiring hall for referral and not referred back to the Contractor by the union or, if referred back, not employed by the Contractor, this shall be documented in the file, along with whatever additional actions the Contractor may have taken.

(4) Immediately notify the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred back to the Contractor a minority or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

(5) Develop on-the-job training opportunities and/or participate in training programs for the area that expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs,

especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under subparagraph (g)(2) above.

(6) Disseminate the Contractor's equal employee policy by--

(i) Providing notice of the policy to unions and to training, recruitment and outreach programs, and requesting their cooperation in assisting the Contractor in meeting its contract obligations;

(ii) Including the policy in any policy manual and in collective bargaining agreements;

(iii) Publicizing the policy in the company newspaper, annual report, etc.;

(iv) Reviewing the policy with all management personnel and with all minority and female employees at least once a year; and

(v) Posting the policy on bulletin boards accessible to employees at each location where construction work is performed.

(7) Review, at least annually, the Contractor's equal employment policy and affirmative action obligations with all employees having responsibility for hiring, assignment, layoff, termination, or other employment decisions. Conduct review of this policy with all onsite supervisory personnel before initiating construction work at a job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

(8) Disseminate the Contractor's equal employment policy externally by including it in any advertising in the news media, specifically including minority and female news media. Provide written notification to, and discuss this policy with, other Contractors and subcontractors with which the Contractor does or anticipates doing business.

(9) Direct recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students, and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than 1 month before the date for acceptance of applications for apprenticeship or training by any recruitment source, send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

(10) Encourage present minority and female employees to recruit minority persons and women. Where reasonable, provide after-school, summer, and vacation employment to minority and female youth both on the site and in other areas of the Contractor's work-force.

(11) Validate all tests and other selection requirements where required under 41 CFR 60-3.

(12) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities. Encourage these employees to seek or to prepare for, through appropriate training, etc., opportunities for promotion.

(13) Ensure that seniority practices, job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment-related activities to ensure that the Contractor's obligations under this contract are being carried out.

(14) Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

(15) Maintain a record of solicitations for subcontracts for minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

(16) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's equal employment policy and affirmative action obligations.

(h) The Contractor is encouraged to participate in voluntary associations that may assist in fulfilling one or more of the affirmative action obligations contained in subparagraphs (g)(1) through (16). The efforts of a contractor association, joint contractor-union, contractor-community, or similar group of which the contractor is a member and participant may be asserted as fulfilling one or more of its obligations under subparagraphs (g)(1) through (16), provided the Contractor--

(1) Actively participates in the group;

(2) Makes every effort to ensure that the group has a positive impact on the employment of minorities and women in the industry;

(3) Ensures that concrete benefits of the program are reflected in the Contractor's minority and female workforce participation;

(4) Makes a good-faith effort to meet its individual goals and timetables; and

(5) Can provide access to documentation that demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply is the Contractor's, and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

(i) A single goal for minorities and a separate single goal for women shall be established. The Contractor is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and nonminority. Consequently, the Contractor may be in violation of Executive Order 11246, as amended, if a particular group is employed in a substantially disparate manner.

(j) The Contractor shall not use goals or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

(k) The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts under Executive Order 11246, as amended.

(l) The Contractor shall carry out such sanctions and penalties for violation of this clause and of the Equal Opportunity clause, including suspension, termination, and cancellation of existing subcontracts, as may be imposed or ordered under Executive Order

11246, as amended, and its implementing regulations, by the OFCCP. Any failure to carry out these sanctions and penalties as ordered shall be a violation of this clause and Executive Order 11246, as amended.

(m) The Contractor in fulfilling its obligations under this clause shall implement affirmative action procedures at least as extensive as those prescribed in paragraph (g) above, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of Executive Order 11246, as amended, the implementing regulations, or this clause, the Director shall take action as prescribed in 41 CFR 60-4.8.

(n) The Contractor shall designate a responsible official to--

(1) Monitor all employment-related activity to ensure that the Contractor's equal employment policy is being carried out;

(2) Submit reports as may be required by the Government; and

(3) Keep records that shall at least include for each employee the name, address, telephone number, construction trade, union affiliation (if any), employee identification number, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, separate records are not required to be maintained.

(o) Nothing contained herein shall be construed as a, limitation upon the application of other laws that establish different standards of compliance or upon the requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).#

30. AFFIRMATIVE ACTION FOR SPECIAL DISABLED AND VIETNAM ERA VETERANS (1984 APR) FAR 52.222-35

This clause is applicable pursuant to 41 C.F.R. 60-250, if this contract is for $10,000 or more.)

(a) **Definitions.** "Appropriate office of the State employment service system," as used in this clause, means the local office of the Federal-State national system of public employment offices assigned to serve the area where the employment opening is to be filled, including the District of Columbia, Guam, Puerto Rico, Virgin Islands, American Samoa, and the Trust Territory of the Pacific Islands.

"Openings that the Contractor proposes to fill from within its own organization," as used in this clause, means employment openings for which no one outside the Contractor's organization (including any affiliates, subsidiaries, and the parent companies) will be considered and includes any openings that the Contractor proposes to fill from regularly established "recall" lists.

"Openings that the Contractor proposes to fill under a customary and traditional employer-union hiring arrangement," as used in this clause, means employment openings that the Contractor proposes to fill from union halls, under their customary and traditional employer-union hiring relationship.

"Suitable employment openings," as used in this clause--

(1) Includes, but is not limited to, openings that occur in jobs categorized as--

(i) Production and nonproduction;
(ii) Plant and office;
(iii) Laborers and mechanics;
(iv) Supervisory and nonsupervisory;
(v) Technical; and
(vi) Executive, administrative, and professional positions compensated on a salary basis of less than $25,000 a year; and

(2) Includes full-time employment, temporary employment of over 3 days, and part-time employment, but not openings that the Contractor proposes to fill from within its own organization or under a customary and traditional employer-union hiring arrangement, nor openings in an educational institution that are restricted to students of that institution.

(b) **General.**

(1) Regarding any position for which the employee or applicant for employment is qualified, the Contractor shall not discriminate against the individual because the individual is a special disabled or Vietnam Era veteran. The Contractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified special disabled and Vietnam Era veterans without discrimination based upon their disability or veterans' status in all employment practices such as--

(i) Employment;
(ii) Upgrading;
(iii) Demotion or transfer;
(iv) Recruitment;
(v) Advertising;
(vi) Layoff or termination;
(vii) Rates of pay or other forms of compensation; and
(viii) Selection for training, including apprenticeship.

(2) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor (Secretary) issued under the Vietnam Era Veterans' Readjustment Assistance Act of 1972 (the Act), as amended.

(c) **Listing openings.**

(1) The Contractor agrees to list all suitable employment openings existing at contract award or occurring during contract performance, at an appropriate office of the State employment service system in the locality where the opening occurs. These openings include those occurring at any Contractor facility, including one not connected with performing this contract. An independent corporate affiliate is exempt from this requirement.

(2) State and local government agencies holding Federal contracts of $10,000 or more shall also list all their suitable openings with the appropriate office of the State employment service.

(3) The listing of suitable employment openings with the State employment service system is required at least concurrently with using any other recruitment source or effort and involves the obligations of placing a bona fide job order, including accepting referrals of veterans and nonveterans. This listing does not require hiring any particular job applicant or hiring from any particular

group of job applicants and is not intended to relieve the Contractor from any requirements of Executive orders or regulations concerning nondiscrimination in employment.

(4) Whenever the Contractor becomes contractually bound to the listing terms of this clause, it shall advise the State employment service system, in each state where it has establishments, of the name and location of each hiring location in the State. As long as the Contractor is contractually bound to these terms and has so advised the State system, it need not advise the State system of subsequent contracts. The Contractor may advise the State system when it is no longer bound by this contract clause.

(5) Under the most compelling circumstances, an employment opening may not be suitable for listing, including situations when

(i) the Government's needs cannot reasonably be supplied,

(ii) listing would be contrary to national security, or

(iii) the requirement of listing would not be in the Government's interest.

(d) **Applicability.**

(1) This clause does not apply to the listing of employment openings which occur and are filled outside the 50 states, the District of Columbia, Puerto Rico, Guam, Virgin Islands, American Samoa, and the Trust Territory of the Pacific Islands.

(2) The terms of paragraph (c) above of this clause do not apply to openings that the Contractor proposes to fill from within its own organization or under a customary and traditional employer-union hiring arrangement. This exclusion does not apply to a particular opening once an employer decides to consider applicants outside of its own organization or employer-union arrangement for that opening.

(e) **Postings.**

(1) The Contractor agrees to post employment notices stating (i) the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified special disabled veterans and veterans of the Vietnam era, and (ii) the rights of applicants and employees.

(2) These notices shall be posted in conspicuous places that are available to employees and applicants for employment. They shall be in a form prescribed by the Director, Office of Federal Contract Compliance Programs, Department of Labor (Director), and provided by or through the Contracting Officer.

(3) The Contractor shall notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of the Act, and is committed to take affirmative action to employ, and advance in employment, qualified special disabled and Vietnam Era veterans.

(f) **Noncompliance.** If the Contractor does not comply with the requirements of this clause, appropriate actions may be taken under the rules, regulations, and relevant orders of the Secretary issued pursuant to the Act.

(g) **Subcontracts.** The Contractor shall include the terms of this clause in every subcontract or purchase order of $10,000 or more unless exempted by rules, regulations, or orders of the Secretary. The Contractor shall act as specified by the Director to enforce the terms, including action for noncompliance.#

31. **AFFIRMATIVE ACTION FOR HANDICAPPED WORKERS (1984 APR) FAR 52.222-36**

(Contracts and subcontracts are exempt from the requirements of the following clause with regard to work performed outside the United States by employees who were not recruited within the United States).

(a) **General.**

(1) Regarding any position for which the employee or applicant for employment is qualified, the Contractor shall not discriminate against any employee or applicant because of physical or mental handicap. The Contractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices such as--

(i) Employment;
(ii) Upgrading;
(iii) Demotion or transfer;
(iv) Recruitment;
(v) Advertising;
(vi) Layoff or termination;
(vii) Rates of pay or other forms of compensation; and
(viii) Selection for training, including apprenticeship.

(2) The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor (Secretary) issued under the Rehabilitation Act of 1973 (29 U.S.C. 793) (the Act), as amended.

(b) **Postings.**

(1) The Contractor agrees to post employment notices stating (i) the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified handicapped individuals and (ii) the rights of applicants and employees.

(2) These notices shall be posted in conspicuous places that are available to employees and applicants for employment. They shall be in a form prescribed by the Director, Office of Federal Contract Compliance Programs, Department of Labor (Director), and provided by or through the Contracting Officer.

(3) The Contractor shall notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of Section 503 of the Act and is committed to take affirmative action to employ, and advance in employment, qualified physically and mentally handicapped individuals.

(c) **Noncompliance.** If the Contractor does not comply with the requirements of this clause, appropriate actions may be taken under the rules, regulations and relevant orders of the Secretary issued pursuant to the Act.

(d) **Subcontracts.** The Contractor shall include the terms of this clause in every subcontract or purchase order in excess of $2,500 unless exempted by rules, regulations, or orders of the Secretary. The Contractor shall act as specified by the Director to enforce the terms, including action for noncompliance.#

32. CLEAN AIR AND WATER (1984 APR) FAR 52.223-2

(a) "Air Act," as used in this clause, means the Clean Air Act (42 U.S.C. 7401 et seq.).

"Clean air standards," as used in this clause, means--

(1) Any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, work practices, or other requirements contained in, issued under, or otherwise adopted under the Air Act or Executive Order 11738;

(2) An applicable implementation plan as described in section 110(d) of the Air Act (42 U.S.C. 7410(d));

(3) An approved implementation procedure or plan under section 111(c) or section 111(d) of the Air Act (42 U.S.C. 7411(c) or (d)); or

(4) An approved implementation procedure under section 112(d) of the Air Act (42 U.S.C. 7412(d)).

"Clean water standards," as used in this clause, means any enforceable limitation, control, condition, prohibition, standard, or other requirement promulgated under the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program, as authorized by section 402 of the Water Act (33 U.S.C. 1342), or by local government to ensure compliance with pretreatment regulations as required by section 307 of the Water Act (33 U.S.C. 1317).

"Compliance," as used in this clause, means compliance with--

(1) Clean air or water standards; or

(2) A schedule or plan ordered or approved by a court of competent jurisdiction, the Environmental Protection Agency, or an air or water pollution control agency under the requirements of the Air Act or Water Act and related regulations.

"Facility," as used in this clause, means any building, plant, installation, structure, mine, vessel or other floating craft, location, or site of operations, owned, leased, or supervised by a Contractor or subcontractor, used in the performance of a contract or subcontract. When a location or site of operations includes more than one building, plant, installation, or structure,the entire location or site shall be deemed a facility except when the Administrator, or a designee, of the Environmental Protection Agency, determines that independent facilities are collocated in one geographical area.

"Water Act," as used in this clause, means Clean Water Act (33 U.S.C. 1251 et seq.).

(b) (1) To comply with all the requirements of section 114 of the Clean Air Act (42 U.S.C. 7414) and section 308 of the Clean Water Act (33 U.S.C. 1318) relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in section 114 and section 308 of the Air Act and the Water Act, and all regulations and guidelines issued to implement those acts before the award of this contract;

(2) That no portion of the work required by this prime contract will be performed in a facility listed on the Environmental Protection Agency List of Violating Facilities on the date when this contract was awarded unless and until the EPA eliminates the name of the facility from the listing;

(3) To use best efforts to comply with clean air standards and clean water standards at the facility in which the contract is being performed; and

(4) To insert the substance of this clause into any nonexempt subcontract, including this subparagraph (b)(4).#

33. BUY AMERICAN ACT--CONSTRUCTION MATERIALS (1984 APR) FAR 52.225-5

(a) The Buy American Act (41 U.S.C. 10) provides that the Government give preference to domestic construction material.

"Components," as used in this clause, means those articles, materials, and supplies incorporated directly into construction materials.

"Construction materials," as used in this clause, means articles, materials, and supplies brought to the construction site for incorporation into the building or work.

"Domestic construction material," as used in this clause, means (1) an unmanufactured construction material mined or produced in the United States, or (2) a construction material manufactured in the United States, if the cost of its components mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. Components of foreign origin of the same class or kind as the construction materials determined to be unavailable pursuant to subparagraph 25.202(a)(3) of the Federal Acquisition Regulation (FAR) shall be treated as domestic.

(b) The Contractor agrees that only domestic construction material will be used by the Contractor, subcontractors, materialmen, and suppliers in the performance of this contract, except for foreign construction materials, if any, listed in this contract.

(The foregoing requirements are administered in accordance with Executive Order No. 10582, dated December 17, 1954, as amended, and Subpart 25.2 of the FAR).#

34. AUTHORIZATION AND CONSENT (APR 1984) FAR 52.227-1

(a) The Government authorizes and consents to all use and manufacture, in performing this contract or any subcontract at any tier, of any invention described in and covered by a United States patent (1) embodied in the structure or composition of any article the delivery of which is accepted by the Government under this contract or (2) used in machinery, tools, or methods whose use necessarily results from compliance by the Contractor or a subcontractor with (i) specifications or written provisions forming a part of this contract or (ii) specific written instructions given by the Contracting Officer directing the manner of performance. The entire liability to the Government for infringement of a patent of the United States shall be determined solely by the provisions of the indemnity clause, if any, included in this contract or any subcontract hereunder (including any lower-tier subcontract), and the Government assumes liability for all other infringement to the extent of the authorization and consent hereinabove granted.

(b) The Contractor agrees to include, and require inclusion of, this clause, suitably modified to identify the parties, in all subcontracts at any tier for supplies or services (including construction, architect-engineer services, and materials, supplies, models, samples, and design or testing services expected to exceed $25,000; however, omission of this clause from any subcontract, under or over $25,000, does not affect this authorization and consent.#

35. NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT (APR 1984) FAR 52.227-2

(a) The Contractor shall report to the Contracting Officer, promptly and in reasonable written detail, each notice or claim of patent or copyright infringement based on the performance of this contract of which the Contractor has knowledge.

(b) In the event of any claim or suit against the Government on account of any alleged patent or copyright infringement arising out of the performance of this contract or out of the use of any supplies furnished or work or services performed under this contract, the Contractor shall furnish to the Government, when requested by the Contracting Officer, all evidence and information in possession of the Contractor pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Government except where the Contractor has agreed to indemnify the Government.

(c) The Contractor agrees to include, and require inclusion of, this clause in all subcontracts at any tier for supplies or services (including construction and architect-engineer subcontracts and those for material, supplies, models, samples, or design or testing services) expected to exceed the dollar amount set forth in 13.000 of the Federal Acquisition Regulation (FAR).#

36. PATENT INDEMNITY-CONSTRUCTION CONTRACTS (APR 1984) FAR 52.227-4

Except as otherwise provided, the Contractor agrees to indemnify the Government and its officers, agents, and employees against liability, including costs and expenses, for infringement upon any United States patent (except a patent issued upon an application that is now or may hereafter be withheld from issue pursuant to a Secrecy Order under 35 U.S.C. 181) arising out of performing this contract or out of the use or disposal by or for the account of the Government of supplies furnished or work performed under this contract.#

37. ADDITIONAL BOND SECURITY (1984 APR) FAR 52.228-2

The Contractor shall promptly furnish additional security required to protect the Government and persons supplying labor or materials under this contract if--

(a) Any surety upon any bond furnished with this contract becomes unacceptable to the Government;

(b) Any surety fails to furnish reports on its financial condition as required by the Government; or

(c) The contract price is increased so that the penal sum of any bond becomes inadequate in the opinion of the Contracting Officer.#

38. INSURANCE--WORK ON A GOVERNMENT INSTALLATION (1984 APR) FAR 52.228-5

(The following clause is applicable if the services involved are performed on a Government Installation.)

(a) The Contractor shall, at its own expense, provide and maintain during the entire performance period of this contract at least the kinds and minimum amounts of insurance required in the Schedule or elsewhere in the contract.

(b) Before commencing work under this contract, the Contractor shall certify to the Contracting Officer in writing that the required insurance has been obtained. The policies evidencing required insurance shall contain an endorsement to the effect that any cancellation or any material change adversely affecting the Government's interest shall not be effective (1) for such period as the laws of the State in which this contract is to be performed prescribe or (2) until 30 days after the insurer or the Contractor gives written notice to the Contracting Officer, whichever period is longer.

(c) The Contractor shall insert the substance of this clause, including this paragraph (c), in subcontracts under this contract that require work on a Government installation and shall require subcontractors to provide and maintain the insurance required in the Schedule or elsewhere in the contract. At least 5 days before entry of each such subcontractor's personnel on the Government installation, the Contractor shall furnish (or ensure that there has been furnished) to the Contracting Officer a current certificate of insurance, meeting the requirements of paragraph (b) above, for each such subcontractor.#

39. FEDERAL, STATE, AND LOCAL TAXES (1984 APR) FAR 52.229-3

(a) "Contract date," as used in this clause, means the date set for bid opening or, if this is a negotiated contract or a modification, the effective date of this contract or modification.

"All applicable Federal, State, and local taxes and duties," as used in this clause, means all taxes and duties, in effect on the contract date, that the taxing authority is imposing and collecting on the transactions or property covered by this contract.

"After-imposed Federal tax," as used in this clause, means any new or increased Federal excise tax or duty, or tax that was exempted or excluded on the contract date but whose exemption was later revoked or reduced during the contract period, on the transactions or property covered by this contract that the Contractor is required to pay or bear as the result of legislative, judicial, or administrative action taking effect after the contract date. It does not include social security tax or other employment taxes.

"After-relieved Federal tax," as used in this clause, means any amount of Federal excise tax or duty, except social security or other employment taxes, that would otherwise have been payable on the transactions or property covered by this contract, but which the Contractor is not required to pay or bear, or for which the Contractor obtains a refund or drawback, as the result of legislative, judicial, or administrative action taking effect after the contract date.

(b) The contract price includes all applicable Federal, State, and local taxes and duties.

(c) The contract price shall be increased by the amount of any after-imposed Federal tax, provided the Contractor warrants in writing that no amount for such newly imposed Federal excise tax or duty or rate increase was included in the contract price, as a contingency reserve or otherwise.

(d) The contract price shall be decreased by the amount of after-relieved Federal tax.

(e) The contract price shall be decreased by the amount of any Federal excise tax or duty, except social security or other employment taxes, that the Contractor is required to pay or bear, or does not

obtain a refund of, through the Contractor's fault, negligence, or failure to follow instructions of the Contracting Officer.

(f) No adjustment shall be made in the contract price under this clause unless the amount of the adjustment exceeds $100.

(g) The Contractor shall promptly notify the Contracting Officer of all matters relating to any Federal excise tax or duty that reasonably may be expected to result in either an increase or decrease in the contract price and shall take appropriate action as the Contracting Officer directs.

(h) The Government shall, without liability, furnish evidence appropriate to establish exemption from any Federal, State, or local tax when the Contractor requests such evidence and a reasonable basis exists to sustain the exemption.#

40. PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS (1984 APR) FAR 52.232-5

(a) The Government shall pay the Contractor the contract price as provided in this contract.

(b) The Government shall make progress payments monthly as the work proceeds, or at more frequent intervals as determined by the Contracting Officer, on estimates approved by the Contracting Officer. If requested by the Contracting Officer, the Contractor shall furnish a breakdown of the total contract price showing the amount included therein for each principal category of the work, in such detail as requested, to provide a basis for determining progress payments. In the preparation of estimates the Contracting Officer may authorize material delivered on the site and preparatory work done to be taken into consideration. Material delivered to the Contractor at locations other than the site may also be taken into consideration if--

(1) Consideration is specifically authorized by this contract; and

(2) The Contractor furnishes satisfactory evidence that it has acquired title to such material and that the material will be used to perform this contract.

(c) In making these progress payments, there shall be retained 10 percent of the estimated amount until final completion and acceptance of the contract work. However, if the Contracting Officer finds that satisfactory progress was achieved during any period for which a progress payment is to be made, the Contracting Officer may authorize payment to be made in full without retention of a percentage. When the work is substantially complete, the Contracting Officer shall retain an amount that the Contracting Officer considers adequate protection of the Government and may release to the Contractor all or a portion of any excess amount. Also, on completion and acceptance of each separate building, public work, or other division of the contract, for which the price is stated separately in the contract, payment may be made for the completed work without retention of a percentage.

(d) All material and work covered by progress payments made shall, at the time of payment, become the sole property of the Government, but this shall not be construed as--

(1) Relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or

(2) Waiving the right of the Government to require the fulfillment of all of the terms of the contract.

(e) The Government shall, upon request, reimburse the Contractor for the entire amount of premiums paid for performance and payment bonds (including coinsurance and reinsurance agreements, when applicable) after furnishing evidence of full payment to the surety.

(f) The Government shall pay the amount due the Contractor under this contract after--

(1) Completion and acceptance of all work;

(2) Presentation of a properly executed voucher; and

(3) Presentation of release of all claims against the Government arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. A release may also be required of the assignee if the Contractor's claim to amounts payable under this contract has been assigned under the Assignment of Claims Act of 1940 (31 U.S.C. 203 and 41 U.S.C. 15).#

41. INTEREST (APR 1984) FAR 52.232-17

(a) Notwithstanding any other clause of this contract, all amounts that become payable by the Contractor to the Government under this contract (net of any applicable tax credit under the Internal Revenue Code (26 U.S.C. 1481)) shall bear simple interest from the date due until paid unless paid within 30 days of becoming due. The interest rate shall be the interest rate established by the Secretary of the Treasury as provided in Section 12 of the Contract Disputes Act of 1978 (Public Law 95-563), which is applicable to the period in which the amount becomes due, as provided in paragraph (b) of this clause, and then at the rate applicable for each six-month period as fixed by the Secretary until the amount is paid.

(b) Amounts shall be due at the earliest of the following dates:

(1) The date fixed under this contract.

(2) The date of the first written demand for payment consistent with this contract, including any demand resulting from a default termination.

(3) The date the Government transmits to the Contractor a proposed supplemental agreement to confirm completed negotiations establishing the amount of debt.

(4) If this contract provides for revision of prices, the date of written notice to the Contractor stating the amount of refund payable in connection with a pricing proposal or a negotiated pricing agreement not confirmed by contract modification.

(c) The interest charge made under this clause may be reduced under the procedures prescribed in 32.614-2 of the Federal Acquisition Regulation in effect on the date of this contract.#

42. ASSIGNMENT OF CLAIMS (1984 APR) FAR 52.232-23

(a) The Contractor, under the Assignment of Claims Act, as amended, 31 U.S.C. 203, 41U.S.C. 15 (hereafter referenced to as the "the Act"), may assign its rights to be paid amounts due or to become due as a result of the performance of this contract to a bank, trust company, or other financing institution, including any Federal lending agency. The assignee under such an assignment may thereafter further assign or reassign its right under the original assignment to any type of financing institution described in the preceding sentence.

(b) Any assignment or reassignment authorized under the Act and this clause shall cover all unpaid amounts payable under this contract, and shall not be made to more than one party, except that an

assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in the financing of this contract.

(c) The Contractor shall not furnish or disclose to any assignee under this contract any classified document (including this contract) or information related to work under this contract until the Contracting Officer authorizes such action in writing.#

43. DISPUTES (1984 APR) FAR 52.233-1

(a) This contract is subject to the Contract Disputes Act of 1978 (41 U.S.C. 601-613)(the Act).

(b) Except as provided in the Act, all disputes arising under or relating to this contract shall be resolved under this clause.

(c) "Claim," as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to this contract. A claim arising under a contract, unlike a claim relating to that contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant. However, a written demand or written assertion by the Contractor seeking the payment of money exceeding $50,000 is not a claim under the Act until certified as required by subparagraph (d)(2) below. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim under the Act. The submission may be converted to a claim under the Act, by complying with the submission and certification requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.

(d) (1) A claim by the Contractor shall be made in writing and submitted to the Contracting Officer for a written decision. A claim by the Government against the Contractor shall be subject to a written decision by the Contracting Officer.

(2) For Contractor claims exceeding $50,000, the Contractor shall submit with the claim a certification that--

(i) The claim is made in good faith;

(ii) Supporting data are accurate' and complete to the best of the Contractor s knowledge and belief; and

(iii) The amount requested accurately reflects the contract adjustment for which the Contractor believes the Government is liable.

(3) (i) If the Contractor is an individual, the certification shall be executed by that individual.

(ii) If the Contractor is not an individual, the certification shall be executed by--

(A) A senior company official in charge at the Contractor's plant or location involved; or

(B) An officer or general partner of the Contractor having overall responsibility for the conduct of the Contractor's affairs.

(e) For Contractor claims of $50,000 or less, the Contracting Officer must, if requested in writing by the Contractor, render a decision within 60 days of the request. For Contractor-certified claims over $50,000, the Contracting Officer must, within 60 days, decide the claim or notify the Contractor of the date by which the decision will be made.

(f) The Contracting Officer's decision shall be final unless the Contractor appeals or files a suit as provided in the Act.

(g) The Government shall pay interest on the amount found due and unpaid from (1) the date the Contracting Officer receives the claim (properly certified if required), or (2) the date payment otherwise would be due, if that date is later, until the date of payment. Simple interest on claims shall be paid at the rate, fixed by the Secretary of the Treasury as provided in the Act, which is applicable to the period during which the Contracting Officer receives the claim and then at the rate applicable for each 6-month period as fixed by the Treasury Secretary during the pendency of the claim.

(h) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under the contract, and comply with any decision of the Contracting Officer.#

44. DIFFERING SITE CONDITIONS (1984 APR) FAR 52.236-2

(a) The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Contracting Officer of (1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or (2) unknown physical conditions at the site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the contract.

(b) The Contracting Officer shall investigate the site conditions promptly after receiving the notice. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, an equitable adjustment shall be made under this clause and the contract modified in writing accordingly.

(c) No request by the Contractor for an equitable adjustment to the contract under this clause shall be allowed, unless the Contractor has given the written notice required; provided, that the time prescribed in (a) above for giving written notice may be extended by the Contracting Officer.

(d) No request by the Contractor for an equitable adjustment to the contract for differing site conditions shall be allowed if made after final payment under this contract.#

45. SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK (1984 APR) FAR 52.236-3

(a) The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and roads; (3) uncertainties of weather, river stages, tides, or similar physical conditions at the

site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the Government, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the Government.

(b) The Government assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the Government. Nor does the Government assume responsibility for any understanding reached or representation made concerning conditions which can affect the work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in this contract.#

46. MATERIAL AND WORKMANSHIP (APR 1984) FAR 52.236-5

(a) All equipment, material, and articles incorporated into the work covered by this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. References in the specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of the Contracting Officer, is equal to that named in the specifications, unless otherwise specifically provided in this contract.

(b) The Contractor shall obtain the Contracting Officer's approval of the machinery and mechanical and other equipment to be incorporated into the work. When requesting approval, the Contractor shall furnish to the Contracting Officer the name of he manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the machinery and mechanical and other equipment. When required by this contract or by the Contracting Officer, the Contractor shall also obtain the Contracting Officer's approval of the material or articles which the Contractor contemplates incorporating into the work. When requesting approval, the Contractor shall provide full information concerning the material or articles. When directed to do so, the Contractor shall submit samples for approval at the Contractor's expense, with all shipping charges prepaid. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection.

(c) All work under this contract shall be performed in a skillful and workmanlike manner. The Contracting Officer may require, in writing, that the Contractor remove from the work any employee the Contracting Officer deems incompetent, careless, or otherwise objectionable.#

47. SUPERINTENDENCE BY THE CONTRACTOR (1984 APR) FAR 52.236-6

At all times during performance of this contract and until the work is completed and accepted, the Contractor shall directly superintend the work or assign and have on the work a competent superintendent who is satisfactory to the Contracting Officer and has authority to act for the Contractor.#

48. PERMITS AND RESPONSIBILITIES (1984 APR) FAR 52.236-7

The Contractor shall, without additional expense to the Government, be responsible for obtaining any necessary licenses and permits, and for complying with any Federal, State, and municipal laws, codes, and regulations applicable to the performance of the work. The Contractor shall also be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence, and shall take proper safety and health precautions to protect the work, the workers, the public, and the property of others. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.#

49. OTHER CONTRACTS (1984 APR) FAR 52.236-8

The Government may undertake or award other contracts for additional work at or near the site of the work under this contract. The Contractor shall fully cooperate with the other contractors and with Government employees and shall carefully adapt scheduling and performing the work under this contract to accommodate the additional work, heeding any direction that may be provided by the Contracting Officer. The Contractor shall not commit or permit any action that will interfere with the performance of work by any other contractor or by Government employees.#

50. PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS (1984 APR) FAR 52.236-9

(a) The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this contract. The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.

(b) The Contractor shall protect from damage all existing improvements and utilities (1) at or near the work site and (2) on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.#

51. OPERATIONS AND STORAGE AREAS (1984 APR) FAR 52.236-10

(a) The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the Contracting Officer. The Contractor shall hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.

(b) Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the Government. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.

(c) The Contractor shall, under regulations prescribed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.#

52. USE AND POSSESSION PRIOR TO COMPLETION (1984 APR) FAR 52.236-11

(a) The Government shall have the right to take possession of or use any completed or partially completed part of the work. Before taking possession of or using any work, the Contracting Officer shall furnish the Contractor a list of items of work remaining to be performed or corrected on those portions of the work that the Government intends to take possession of or use. However, failure of the Contracting Officer to list any item of work shall not relieve the Contractor of responsibility for complying with the terms of the contract. The Government's possession or use shall not be deemed an acceptance of any work under the contract.

(b) While the Government has such possession or use, the Contractor shall be relieved of the responsibility for the loss of or damage to the work resulting from the Government's possession or use, notwithstanding the terms of the clause in this contract entitled "Permits and Responsibilities." If prior possession or use by the Government delays the progress of the work or causes additional expense to the Contractor, an equitable adjustment shall be made in the contract price or the time of completion, and the contract shall be modified in writing accordingly.#

53. CLEANING UP (1984 APR) FAR 52.236-12

The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. Before completing the work, the Contractor shall remove from the work and premises any rubbish, tools, scaffolding, equipment, and materials that are not the property of the Government. Upon completing the work, the Contractor shall leave the work area in a clean, neat, and orderly condition satisfactory to the Contracting Officer.#

54. ACCIDENT PREVENTION (ALTERNATE I) (1984 APR) FAR 52.236-13

(a) In performing this contract, the Contractor shall provide for protecting the lives and health of employees and other persons; preventing damage to property, materials, supplies, and equipment; and avoiding work interruptions. For these purposes, the Contractor shall--

(1) Provide appropriate safety barricades, signs, and signal lights;

(2) Comply with the standards issued by the Secretary of Labor at 29 CFR Part 1926 and 29 CFR Part 1910; and

(3) Ensure that any additional measures the Contracting Officer determines to be reasonably necessary for this purpose are taken.

(b) If this contract is with any Department of Defense agency or component, the Contractor shall comply with all pertinent provisions of the U.S. Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, dated April 1981.

(c) The Contractor shall maintain an accurate record of exposure data on all accidents incident to work performed under this contract resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment. The Contractor shall report this data in the manner prescribed by the Contracting Officer.

(d) The Contracting Officer shall notify the Contractor of any noncompliance with these requirements and of the corrective action required. This notice, when delivered to the contractor or the Contractor's representative at the site of the work, shall be deemed sufficient notice of the noncompliance and corrective action required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to take corrective action promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall not base any claim or request for equitable adjustment for additional time or money on any stop order issued under these circumstances.

(e) The Contractor shall be responsible for its subcontractors' compliance with this clause.

(f) Before commencing the work, the Contractor shall--

(1) Submit a written proposal for implementing this clause; and

(2) Meet with representatives of the Contracting Officer to discuss and develop a mutual understanding relative to administration of the overall safety program.#

55. SCHEDULE FOR CONSTRUCTION CONTRACTS (1984 APR) FAR 52.236-15

(a) The Contractor shall, within five days after the work commences on the contract or another period of time determined by the Contracting Officer, prepare and submit to the Contracting Officer for approval three copies of a practicable schedule showing the order in which the Contractor proposes to perform the work, and the dates on which the Contractor contemplates starting and completing the several salient features of the work (including acquiring materials, plant, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. If the

Contractor fails to submit a schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments until the Contractor submits the required schedule.

(b) The Contractor shall enter the actual progress on the chart as directed by the Contracting Officer, and upon doing so shall immediately deliver three copies of the annotated schedule to the Contracting Officer. If, in the opinion of the Contracting Officer, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve its progress, including those that may be required by the Contracting Officer, without additional cost to the Government. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules in chart form as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.

(c) Failure of the Contractor to comly with the requirements of the Contracting Officer under this clause shall be grounds for a determination by the Contracting Officer that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the default terms of this contract.#

56. SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (1984 APR)
FAR 52.236-21

(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, any lower tier subcontractor pursuant to a construction contract, showing in detail (1) the proposed fabrication and assembly of structural elements and (2) the installation (i.e., form, fit, and attachment details) of materials of 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.

(h) This clause shall be included in all subcontracts at any tier.#

57. CHANGES (1984 APR) FAR 52.243-4

(a) The Contracting Officer may, at any time, without notice to the sureties, if any, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract, including changes--

(1) In the specifications (including drawings and designs);

(2) In the method or manner of performance of the work;

(3) In the Government-furnished facilities, equipment, materials, services, or site; or

(4) Directing acceleration in the performance of the work.

(b) Any other written or oral order (which, as used in this paragraph (b), includes direction, instruction, interpretation, or determination) from the Contracting Officer that causes a change shall be treated as a change order under this clause; provided, that the Contractor gives the Contracting Officer written notice stating (1) the date, circumstances, and source of the order and (2) that the Contractor regards the order as a change order.

(c) Except as provided in this clause, no order, statement, or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment.

(d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this contract, whether or not changed by any such order, the Contracting Officer shall make an equitable adjustment and modify the contract in writing. However, except for a "proposal for adjustment" (hereafter referred to as proposal) based on defective specifications, no proposal for any change under paragraph (b) above shall be allowed for any costs incurred more than 20 days before the Contractor gives written notice as required. In the case of defective specifications for which the Government is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with the defective specifications.

(e) The Contractor must submit any proposal under this clause within 30 days after (1) receipt of a written change order under paragraph (a) above or (2) the furnishing of a written notice under paragraph (b) above, by submitting to the Contracting Officer a written statement describing the general nature and amount of the proposal, unless this period is extended by the Government. The statement of proposal for adjustment may be included in the notice under paragraph (b) above.

(f) No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.#

58. SUBCONTRACTS UNDER FIXED-PRICE CONTRACTS (1984 APR)
FAR 52.244-1

(The following clause is applicable if this contract is in excess of $500,000.)

(a) This clause does not apply to firm-fixed-price contracts and fixed-price contracts with economic price adjustment. However, it does apply to subcontracts resulting from unpriced modifications to such contracts.

(b) "Subcontract," as used in this clause, includes but is not limited to purchase orders, and changes and modifications to purchase orders. The Contractor shall notify the Contracting Officer reasonably in advance of entering into any subcontract if the Contractor does not have an approved purchasing system and if the subcontract--

(1) Is to be a cost-reimbursement, time-and-materials, or labor-hour contract estimated to exceed $25,000 including any fee;

(2) Is proposed to exceed $100,000; or

(3) Is one of a number of subcontracts with a single subcontractor, under this contract, for the same or related supplies or services, that in the aggregate are expected to exceed $100,000.

(c) The advance notification required by paragraph (b) above shall include--

(1) A description of the supplies or services to be subcontracted;

(2) Identification of the type of subcontract to be used;

(3) Identification of the proposed subcontractor and an explanation of why and how the proposed subcontractor was selected, including the competition obtained;

(4) The proposed subcontract price and the Contractor's cost or price analysis;

(5) The subcontractor's current, complete, and accurate cost or pricing data and Certificate of Current Cost or Pricing Data, if required by other contract provisions;

(6) The subcontractor's Disclosure Statement or Certificate relating to Cost Accounting Standards when such data are required by other provisions of this contract; and

(7) A negotiation memorandum reflecting--

(i) The principal elements of the subcontract price negotiations;

(ii) The most significant considerations controlling establishment of initial or revised prices;

(iii) The reason cost or pricing data were or were not required;

(iv) The extent, if any, to which the Contractor did not rely on the subcontractor's cost or pricing data in determining the price objective and in negotiating the final price;

(v) The extent, if any, to which it was recognized in the negotiation that the subcontractor's cost or pricing data were not accurate, complete, or current; the action taken by the Contractor and subcontractor; and the effect of any such defective data on the total price negotiated;

(vi) The reasons for any significant difference between the Contractor's price objective and the price negotiated; and

(vii) A complete explanation of the incentive fee or profit plan when incentives are used. The explanation shall identify each critical performance element, management decisions used to quantify each incentive element, reasons for the incentives, and a summary of all trade-off possibilities considered.

(d) The Contractor shall obtain the Contracting Officer's written consent before placing any subcontract for which advance notification is required under paragraph (b) above. However, the Contracting Officer may ratify in writing any such subcontract. Ratification shall constitute the consent of the Contracting Officer.

(e) Even if the Contractor's purchasing system has been approved, the Contractor shall obtain the Contracting Officer's written consent before placing subcontracts that have been selected for special surveillance and so identified in the Schedule of this contract.

(f) Unless the consent or approval specifically provides otherwise, neither consent by the Contracting Officer to any subcontract nor approval of the Contractor's purchasing system shall

constitute a determination (1) of the acceptability of any subcontract terms or conditions, (2) of the acceptability of any subcontract price or of any amount paid under any subcontract, or (3) to relieve the Contractor of any responsibility for performing this contract.

(g) No subcontract placed under this contract shall provide for payment on a cost-plus-a-percentage-of-cost basis, and any fee payable under cost-reimbursement subcontracts shall not exceed the fee limitations in subsection 16.301-4 of the Federal Acquisition Regulation (FAR).

(h) The Government reserves the right to review the Contractor's purchasing system as set forth in FAR Subpart 44.3.#

59.1 GOVERNMENT PROPERTY (FIXED-PRICE CONTRACTS) (1984 APR)
FAR 52.245-2

(The following clause is applicable when Government Property having an acquisition cost in excess of $50,000 is furnished to or acquired by the Contractor.)

(a) **Government-furnished property.**

(1) The Government shall deliver to the Contractor, for use in connection with and under the terms of this contract, the Government-furnished property described in the Schedule or specifications together with any related data and information that the Contractor may request and is reasonably required for the intended use of the property (hereinafter referred to as "Government-furnished property").

(2) The delivery or performance dates for this contract are based upon the expectation that Government-furnished property suitable for use (except for property furnished "as-is") will be delivered to the Contractor at the times stated in the Schedule or, if not so stated, in sufficient time to enable the Contractor to meet the contract's delivery or performance dates.

(3) If Government-furnished property is received by the Contractor in a condition not suitable for the intended use, the Contractor shall, upon receipt of it, notify the Contracting Officer, detailing the facts, and, as directed by the Contracting Officer and at Government expense, either repair, modify, return, or otherwise dispose of the property. After completing the directed action and upon written request of the Contractor, the Contracting Officer shall make an equitable adjustment as provided in paragraph (h) of this clause.

(4) If Government-furnished property is not delivered to the Contractor by the required time, the Contracting Officer shall, upon the Contractor's timely written request, make a determination of the delay, if any, caused the Contractor and shall make an equitable adjustment in accordance with paragraph (h) of this clause.

(b) **Changes in Government-furnished property.**

(1) The Contracting Officer may, by written notice, (i) decrease the Government-furnished property provided or to be provided under this contract, or (ii) substitute other Government-furnished property for the property to be provided by the Government, or to be acquired by the Contractor for the Government, under this contract. The Contractor shall promptly take such action as the Contracting Officer may direct regarding the removal, shipment, or disposal of the property covered by such notice.

(2) Upon the Contractor's written request, the Contracting Officer shall make an equitable adjustment to the contract in accordance with paragraph (h) of this clause, if the Government has agreed in the Schedule to make the property available for performing this contract and there is any--

(i) Decrease or substitution in this property pursuant to subparagraph (b)(1) above; or

(ii) Withdrawal of authority to use this property, if provided under any other contract or lease.

(c) **Title in Government property.**

(1) The Government shall retain title to all Government-furnished property.

(2) All Government-furnished property and all property acquired by the Contractor, title to which vests in the Government under this paragraph (collectively referred to as "Government property"), are subject to the provisions of this clause. Title to Government property shall not be affected by its incorporation into or attachment to any property not owned by the Government, nor shall Government property become a fixture or lose its identity as personal property by being attached to any real property.

(3) Title to each item of facilities, special test equipment, and special tooling (other than that subject to a special tooling clause) acquired by the Contractor for the Government under this contract shall pass to and vest in the Government when its use in performing this contract commences or when the Government has paid for it, whichever is earlier, whether or not title previously vested in the Government.

(4) If this contract contains a provision directing the Contractor to purchase material for which the Government will reimburse the Contractor as a direct item of cost under this contract--

(i) Title to material purchased from a vendor shall pass to and vest in the Government upon the vendor's delivery of such material; and

(ii) Title to all other material shall pass to and vest in the Government upon--

(A) Issuance of the material for use in contract performance;

(B) Commencement of processing of the material or its use in contract performance; or

(C) Reimbursement of the cost of the material by the Government, whichever occurs first.

(d) **Use of Government property.** The Government property shall be used only for performing this contract, unless otherwise provided in this contract or approved by the Contracting Officer.

(e) **Property administration.**

(1) The Contractor shall be responsible and accountable for all Government property provided under this contract and shall comply with Federal Acquisition Regulation (FAR) Subpart 45.5, as in effect on the date of this contract.

(2) The Contractor shall establish and maintain a program for the use, maintenance, repair, protection, and preservation of Government property in accordance with sound industrial practice and the applicable provisions of Subpart 45.5 of the FAR.

(3) If damage occurs to Government property, the risk of which has been assumed by the Government under this contract, the Government shall replace the items or the Contractor shall make such repairs as the Government directs. However, if the Contractor cannot effect such repairs within the time required, the Contractor shall dispose of the property as directed by the Contracting Officer. When any property for which the Government is responsible is replaced or repaired, the Contracting Officer shall make an equitable adjustment in accordance with paragraph (h) of this clause.

(4) The Contractor represents that the contract price does not include any amount for repairs or replacement for which the Government is responsible. Repair or replacement of property for which the Contractor is responsible shall be accomplished by the Contractor at its own expense.

(f) **Access.** The Government and all its designees shall have access at all reasonable times to the premises in which any Government property is located for the purpose of inspecting the Government property.

(g) **Risk of loss.** Unless otherwise provided in this contract, the Contractor assumes the risk of, and shall be responsible for, any loss or destruction of, or damage to, Government property upon its delivery to the Contractor or upon passage of title to the Government under paragraph (c) of this clause. However, the Contractor is not responsible for reasonable wear and tear to Government property or for Government property properly consumed in performing this contract.

(h) **Equitable adjustment.** When this clause specifies an equitable adjustment, it shall be made to any affected contract provision in accordance with the procedures of the Changes clause. When appropriate, the Contracting Officer may initiate an equitable adjustment in favor of the Government. The right to an equitable adjustment shall be the Contractor's exclusive remedy. The Government shall not be liable to suit for breach of contract for--

(1) Any delay in delivery of Government-furnished property;

(2) Delivery of Government-furnished property in a condition not suitable for its intended use;

(3) A decrease in or substitution of Government-furnished property; or

(4) Failure to repair or replace Government property for which the Government is responsible.

(i) **Final accounting and disposition of Government property.** Upon completing this contract, or at such earlier dates as may be fixed by the Contracting Officer, the Contractor shall submit, in a form acceptable to the Contracting Officer, inventory schedules covering all items of Government property (including any resulting scrap) not consumed in performing this contract or delivered to the Government. The Contractor shall prepare for shipment, deliver f.o.b. origin, or dispose of the Government property as may be directed or authorized by the Contracting Officer. The net proceeds of any such disposal shall be credited to the contract price or shall be paid to the Government as the Contracting Officer directs.

(j) **Abandonment and restoration of Contractor's premises.** Unless otherwise provided herein, the Government--

(1) May abandon any Government property in place, at which time all obligations of the Government regarding such abandoned property shall cease; and

(2) Has no obligation to restore or rehabilitate the Contractor's premises under any circumstances (e.g., abandonment, disposition upon completion of need, or upon contract completion). However, if the Government-furnished property (listed in the Schedule or specifications) is withdrawn or is unsuitable for the intended use, or if other Government property is substituted, then the equitable adjustment under paragraph (h) of this clause may properly include restoration or rehabilitation costs.

(k) **Communications.** All communications under this clause shall be in writing.

(l) **Overseas contracts.** If this contract is to be performed outside the United States of America, its territories, or possessions, the words "Government" and "Government-furnished" (wherever they appear in this clause) shall be construed as "United States Government" and "United States Government-furnished", respectively.#

59.2 GOVERNMENT-FURNISHED PROPERTY (SHORT FORM) (1984 APR)
FAR 52.245-4

(The following clause is applicable when Government Property having an acquisition cost of $50,000 or less is furnished to or acquired by the Contractor.)

(a) The Government shall deliver to the Contractor, at the time and locations stated in this contract, the Government-furnished property described in the Schedule or specifications. If that property, suitable for its intended use, is not delivered to the Contractor, the Contracting Officer shall equitably adjust affected provisions of this contract in accordance with the Changes clause when--

(1) The Contractor submits a timely written request for an equitable adjustment; and

(2) The facts warrant an equitable adjustment.

(b) Title to Government-furnished property shall remain in the Government. The Contractor shall maintain adequate property control records in accordance with sound industrial practice and will make such records available for Government inspection at all reasonable times, unless the clause at Federal Acquisition Regulation 52.245-1, Property Records, is included in this contract.

(c) Upon delivery of Government-furnished property to the Contractor, the Contractor assumes the risk and responsibility for its loss or damage, except--

(1) For reasonable wear and tear;

(2) To the extent property is consumed in performing this contract; or

(3) As otherwise provided for by the provisions of this contract.

(d) Upon completing this contract, the Contractor shall follow the instructions of the Contracting Officer regarding the disposition of all Government-furnished property not consumed in performing this contract or previously delivered to the Government. The Contractor shall prepare for shipment, deliver f.o.b. origin, or dispose of the Government property, as may be directed or authorized by the

Contracting Officer. The net proceeds of any such disposal shall be credited to the contract price or shall be paid to the Government as directed by the Contracting Officer.

(e) If this contract is to be performed outside the United States of America, its territories, or possessions, the words "Government" and "Government-furnished" (wherever they appear in this clause) shall be construed as "United States Government" and "United States Government-furnished", respectively.#

60. INSPECTION OF CONSTRUCTION (1984 APR) FAR 52.246-12

(a) **Definition.** "Work" includes, but is not limited to, materials, workmanship, and manufacture and fabrication of components.

(b) The Contractor shall maintain an adequate inspection system and perform such inspection as will ensure that the work called for by this contract conforms to contract requirements. The Contractor shall maintain complete inspection records and make them available to the Government. All work shall be conducted under the general direction of the Contracting Officer and is subject to Government inspection and test at all places and at all reasonable times before acceptance to ensure strict compliance with the terms of the contract.

(c) Government inspections and tests are for the sole benefit of the Government and do not--

(1) Relieve the Contractor of responsibility for providing adequate quality control measures;

(2) Relieve the Contractor of responsibility for damage to or loss of the material before acceptance;

(3) Constitute or imply acceptance; or

(4) Affect the continuing rights of the Government after acceptance of the completed work under paragraph (i) below.

(d) The presence or absence of a Government inspector does not relieve the Contractor from any contract requirement, nor is the inspector authorized to change any term or condition of the specification without the Contracting Officer's written authorization.

(e) The Contractor shall promptly furnish, without additional charge, all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by the Contracting Officer. The Government may charge to the Contractor any additional cost of inspection or test when work is not ready at the time specified by the Contractor for inspection or test, or when prior rejection makes reinspection or retest necessary. The Government shall perform all inspections and tests in a manner that will not unnecessarily delay the work. Special, full size, and performance tests shall be performed as described in the contract.

(f) The Contractor shall, without charge, replace or correct work found by the Government not to conform to contract requirements,unless in the public interest the Government consents to accept the work with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises.

(g) If the Contractor does not promptly replace or correct rejected work, the Government may (1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor or (2) terminate for default the Contractor's right to proceed.

(h) If, before acceptance of the entire work, the Government decides to examine already completed work by removing it or tearing it out, the Contractor, on request, shall promptly furnish all necessary

facilities, labor, and material. If the work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or its subcontractors, the Contractor shall defray the expenses of the examination and of satisfactory reconstruction. However, if the work is found to meet contract requirements, the Contracting Officer shall make an equitable adjustment for the additional services involved in the examination and reconstruction, including, if completion of the work was thereby delayed, an extension of time.

(i) Unless otherwise specified in the contract, the Government shall accept, as promptly as practicable after completion and inspection, all work required by the contract or that portion of the work the Contracting Officer determines can be accepted separately. Acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the Government's rights under any warranty or guarantee.#

61. VALUE ENGINEERING - CONSTRUCTION (1984 APR) FAR 52.248-3

(The following clause is applicable if this contract is in excess of $100,000.)

(a) **General.** The Contractor is encouraged to develop, prepare, and submit value engineering change proposals (VECP's) voluntarily. The Contractor shall share in any instant contract savings realized from accepted VECP's, in accordance with paragraph (f) below.

(b) **Definitions.** "Collateral costs", as used in this clause, means agency costs of operation, maintenance, logistic support, or Government-furnished property.

"Collateral savings", as used in this clause, means those measurable net reductions resulting from a VECP in the agency's overall projected collateral costs, exclusive of acquisition savings, whether or not the acquisition cost changes.

"Contractor's development and implementation costs", as used in this clause, means those costs the Contractor incurs on a VECP specifically in developing, testing, preparing, and submitting the VECP, as well as those costs the Contractor incurs to make the contractual changes required by Government acceptance of a VECP.

"Government costs", as used in this clause, means those agency costs that result directly from developing and implementing the VECP, such as any net increases in the cost of testing, operations, maintenance, and logistic support. The term does not include the normal administrative costs of processing the VECP.

"Instant contract savings", as used in this clause, means the estimated reduction in Contractor cost of performance resulting from acceptance of the VECP, minus allowable Contractor's development and implementation costs, including subcontractors' development and implementation costs (see paragraph (h) below).

"Value engineering change proposal (VECP)" means a proposal that--

(1) Requires a change to this, the instant contract, to implement; and

(2) Results in reducing the contract price or estimated cost without impairing essential functions or characteristics; provided, that it does not involve a change--

(i) In deliverable end item quantities only; or

(ii) To the contract type only.

(c) **VECP preparation.** As a minimum, the Contractor shall include in each VECP the information described in subparagraphs (1) through (7) below. If the proposed change is affected by contractually required configuration management or similar procedures, the instructions in those procedures relating to format, identification, and priority assignment shall govern VECP preparation. The VECP shall include the following:

(1) A description of the difference between the existing contract requirement and that proposed, the comparative advantages and disadvantages of each, a justification when an item's function or characteristics are being altered, and the effect of the change on the end item's performance.

(2) A list and analysis of the contract requirements that must be changed if the VECP is accepted, including any suggested specification revisions.

(3) A separate, detailed cost estimate for (i) the affected portions of the existing contract requirement and (ii) the VECP. The cost reduction associated with the VECP shall take into account the Contractor's allowable development and implementation costs, including any amount attributable to subcontracts under paragraph (h) below.

(4) A description and estimate of costs the Government may incur in implementing the VECP, such as test and evaluation and operating and support costs.

(5) A prediction of any effects the proposed change would have on collateral costs to the agency.

(6) A statement of the time by which a contract modification accepting the VECP must be issued in order to achieve the maximum cost reduction, noting any effect on the contract completion time or delivery schedule.

(7) Identification of any previous submissions of the VECP, including the dates submitted, the agencies and contract numbers involved, and previous Government actions, if known.

(d) **Submission.** The Contractor shall submit VECP's to the Resident Engineer at the worksite, with a copy to the Contracting Officer.

(e) **Government action.**

(1) The Contracting Officer shall notify the Contractor of the status of the VECP within 45 calendar days after the contracting office receives it. If additional time is required, the Contracting Officer shall notify the Contractor within the 45-day period and provide the reason for the delay and the expected date of the decision. The Government will process VECP's expeditiously; however, it shall not be liable for any delay in action upon a VECP.

(2) If the VECP is not accepted, the Contracting Officer shall notify the Contractor in writing, explaining the reasons for rejection. The Contractor may withdraw any VECP, in whole or in part, at any time before it is accepted by the Government. The Contracting Officer may require that the Contractor provide written notification before undertaking significant expenditures for VECP effort.

(3) Any VECP may be accepted, in whole or in part, by the Contracting Officer's award of a modification to this contract citing this clause. The Contracting Officer may accept the VECP, even though an agreement on price reduction has not been reached, by issuing the Contractor a notice to proceed with the change. Until a

notice to proceed is issued or a contract modification applies a VECP to this contract, the Contractor shall perform in accordance with the existing contract. The Contracting Officer's decision to accept or reject all or part of any VECP shall be final and not subject to the Disputes clause or otherwise subject to litigation under the Contract Disputes Act of 1978 (41 U.S.C. 601-613).

(f) **Sharing.**

(1) **Rates.** The Contractor's share of savings is determined by subtracting Government costs from instant contract savings and multiplying the result by (i) 55 percent for fixed-price contracts or (ii) 25 percent for cost-reimbursement contracts.

(2) **Payment.** Payment of any share due the Contractor for use of a VECP on this contract shall be authorized by a modification to this contract to--

(i) Accept the VECP;

(ii) Reduce the contract price or estimated cost by the amount of instant contract savings; and

(iii) Provide the Contractor's share of savings by adding the amount calculated under subparagraph (1) above to the contract price or fee.

(g) **Collateral savings.** If a VECP is accepted, the instant contract amount shall be increased by 20 percent of any projected collateral savings determined to be realized in a typical year of use after subtracting any Government costs not previously offset. However, the Contractor's share of collateral savings shall not exceed (1) the contract's firm-fixed-price or estimated cost, at the time the VECP is accepted, or (2) $100,000, whichever is greater. The Contracting Officer shall be the sole determiner of the amount of collateral savings, and that amount shall not be subject to the Disputes clause or otherwise subject to litigation under 41 U.S.C. 601-613.

(h) **Subcontracts.** The Contractor shall include an appropriate value engineering clause in any subcontract of $50,000 or more and may include one in subcontracts of lesser value. In computing any adjustment in this contract's price under paragraph (f) above, the Contractor's allowable development and implementation costs shall include any subcontractor's allowable development and implementation costs clearly resulting from a VECP accepted by the Government under this contract, but shall exclude any value engineering incentive payments to a subcontractor. The Contractor may choose any arrangement for subcontractor value engineering incentive payments; **provided**, that these payments shall not reduce the Government's share of the savings resulting from the VECP.

(i) **Data.** The Contractor may restrict the Government's right to use any part of a VECP or the supporting data by marking the following legend on the affected parts:

> "These data, furnished under the Value Engineering-Construction clause of contract _____, shall not be disclosed outside the Government or duplicated, used or disclosed, in whole or in part, for any purpose other than to evaluate a value engineering change proposal submitted under the clause. This restriction does not limit the Government's right to use

information contained in these data if it has been obtained or is otherwise available from the Contractor or from another source without limitations."

If a VECP is accepted, the Contractor hereby grants the Government unlimited rights in the VECP and supporting data, except that, with respect to data qualifying and submitted as limited rights technical data, the Government shall have the rights specified in the contract modification implementing the VECP and shall appropriately mark the data. (The terms "unlimited rights" and "limited rights" are defined in Part 27 of the Federal Acquisition Regulation.)#

62. TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE) (SHORT FORM) (1984 APR) FAR 52.249-1

(The following clause is applicable if this contract is not in excess of $100,000.).

The Contracting Officer, by written notice, may terminate this contract, in whole or in part, when it is in the Government's interest. If this contract is terminated, the rights, duties, and obligations of the parties, including compensation to the Contractor, shall be in accordance with Part 49 of the Federal Acquisition Regulation in effect on the date of this contract.#

63. TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE) (ALTERNATE I) (1984 APR) FAR 52.249-2

(The following clause is applicable if this contract is in excess of $100,000.)

(a) The Government may terminate performance of work under this contract in whole or, from time to time, in part if the Contracting Officer determines that a termination is in the Government's interest. The Contracting Officer shall terminate by delivering to the Contractor a Notice of Termination specifying the extent of termination and the effective date.

(b) After receipt of a Notice of Termination, and except as directed by the Contracting Officer, the Contractor shall immediately proceed with the following obligations, regardless of any delay in determining or adjusting any amounts due under this clause:

(1) Stop work as specified in the notice.

(2) Place no further subcontracts or orders (referred to as subcontracts in this clause) for materials, services, or facilities, except as necessary to complete the continued portion of the contract.

(3) Terminate all subcontracts to the extent they relate to the work terminated.

(4) Assign to the Government, as directed by the Contracting Officer, all right, title, and interest of the Contractor under the subcontracts terminated, in which case the Government shall have the right to settle or to pay any termination settlement proposal arising out of those terminations.

(5) With approval or ratification to the extent required by the Contracting Officer, settle all outstanding liabilities and termination settlement proposals arising from the termination of subcontracts; the approval or ratification will be final for purposes of this clause.

(6) As directed by the Contracting Officer transfer title and deliver to the Government (i) the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced or acquired for the work terminated, and (ii) the completed or partially completed plans, drawings, information, and other property that, if the contract had been completed, would be required to be furnished to the Government.

(7) Complete performance of the work not terminated.

(8) Take any action that may be necessary, or that the Contracting Officer may direct, for the protection and preservation of the property related to this contract that is in the possession of the Contractor and in which the Government has or may acquire an interest.

(9) Use its best efforts to sell, as directed or authorized by the Contracting Officer, any property of the types referred to in subparagraph (6) above; provided, however, that the Contractor (i) is not required to extend credit to any purchaser and (ii) may acquire the property under the conditions prescribed by, and at prices approved by, the Contracting Officer. The proceeds of any transfer or disposition will be applied to reduce any payments to be made by the Government under this contract, credited to the price or cost of the work, or paid in any other manner directed by the Contracting Officer.

(c) After expiration of the plant clearance period as defined in Subpart 45.6 of the Federal Acquisition Regulation, the Contractor may submit to the Contracting Officer a list, certified as to quantity and quality, of termination inventory not previously disposed of, excluding items authorized for disposition by the Contracting Officer. The Contractor may request the Government to remove those items or enter into an agreement for their storage. Within 15 days, the Government will accept title to those items and remove them or enter into a storage agreement. The Contracting Officer may verify the list upon removal of the items, or if stored, within 45 days from submission of the list, and shall correct the list, as necessary, before final settlement.

(d) After termination, the Contractor shall submit a final termination settlement proposal to the Contracting Officer in the form and with the certification prescribed by the Contracting Officer. The Contractor shall submit the proposal promptly, but no later than 1 year from the effective date of termination, unless extended in writing by the Contracting Officer upon written request of the Contractor within this 1-year period. However, if the Contracting Officer determines that the facts justify it, a termination settlement proposal may be received and acted on after 1 year or any extension. If the Contractor fails to submit the proposal within the time allowed, the Contracting Officer may determine, on the basis of information available, the amount, if any, due the Contractor because of the termination and shall pay the amount determined.

(e) Subject to paragraph (d) above, the Contractor and the Contracting Officer may agree upon the whole or any part of the amount to be paid because of the termination. The amount may include a reasonable allowance for profit on work done. However, the agreed amount, whether under this paragraph (e) or paragraph (f) below, exclusive of costs shown in subparagraph (f)(3) below, may not exceed the total contract price as reduced by (a) the amount of payments previously made and (2) the contract price of work not terminated. The contract shall be amended, and the Contractor paid the agreed amount.

Paragraph (f) below shall not limit, restrict, or affect the amount that may be agreed upon to be paid under this paragraph.

(f) If the Contractor and the Contracting Officer fail to agree on the whole amount to be paid the Contractor because of the termination of work, the Contracting Officer shall pay the Contractor the amounts determined as follows, but without duplication of any amounts agreed upon under paragraph (e) above:

(1) For contract work performed before the effective date of termination, the total (without duplication of any items) of--

(i) The cost of this work;

(ii) The cost of settling and paying termination settlement proposals under terminated subcontracts that are properly chargeable to the terminated portion of the contract if not included in subdivision (i) above; and

(iii) A sum, as profit on (i) above, determined by the Contracting Officer under 49.202 of the Federal Acquisition Regulation, in effect on the date of this contract, to be fair and reasonable; however, if it appears that the Contractor would have sustained a loss on the entire contract had it been completed, the Contracting Officer shall allow no profit under this subdivision (iii) and shall reduce the settlement to reflect the indicated rate of loss.

(2) The reasonable costs of settlement of the work terminated, including--

(i) Accounting, legal, clerical, and other expenses reasonably necessary for the preparation of termination settlement proposals and supporting data;

(ii) The termination and settlement of subcontracts (excluding the amounts of such settlements); and

(iii) Storage, transportation, and other costs incurred, reasonably necessary for the preservation, protection, or disposition of the termination inventory.

(g) Except for normal spoilage, and except to the extent that the Government expressly assumed the risk of loss, the Contracting Officer shall exclude from the amounts payable to the Contractor under paragraph (f) above, the fair value, as determined by the Contracting Officer, of property that is destroyed, lost, stolen, or damaged so as to become undeliverable to the Government or to a buyer.

(h) The cost principles and procedures of Part 31 of the Federal Acquisition Regulation, in effect on the date of this contract, shall govern all costs claimed, agreed to, or determined under this clause.

(i) The Contractor shall have the right of appeal, under the Disputes clause, from any determination made by the Contracting Officer under paragraph (d), (f), or (k), except that if the Contractor failed to submit the termination settlement proposal within the time provided in paragraph (d) or (k), and failed to request a time extension, there is no right of appeal. If the Contracting Officer has made a determination of the amount due under paragraph (d), (f), or (k), the

Government shall pay the Contractor (1) the amount determined by the Contracting Officer if there is no right of appeal or if no timely appeal has been taken, or (2) the amount finally determined on an appeal.

(j) In arriving at the amount due the Contractor under this clause , there shall be deducted--

(1) All unliquidated advance or other payments to the contractor under the terminated portion of this contract;

(2) Any claim which the Government has against the Contractor under this contract; and

(3) The agreed price for, or the proceeds of sale of, materials, supplies, or other things acquired by the Contractor or sold under the provisions of this clause and not recovered by or credited to the Government.

(k) If the termination is partial, the Contractor may file a proposal with the Contracting Officer for an equitable adjustment of the price(s) of the continued portion of the contract. The Contracting Officer shall make any equitable adjustment agreed upon. Any proposal by the Contractor for an equitable adjustment under this clause shall be requested within 90 days from the effective date of termination unless extended in writing by the Contracting Officer.

(l) (1) The Government may, under the terms and conditions it prescribes, make partial payments and payments against costs incurred by the Contractor for the terminated portion of the contract, if the Contracting Officer believes the total of these payments will not exceed the amount to which the Contractor will be entitled.

(2) If the total payments exceed the amount finally determined to be due, the Contractor shall repay the excess to the Government upon demand, together with interest computed at the rate established by the Secretary of the Treasury under 50 U.S.C. App. 1215(b)(2). Interest shall be computed for the period from the date the excess payment is received by the Contractor to the date the excess is repaid. Interest shall not be charged on any excess payment due to a reduction in the Contractor's termination settlement proposal because of retention or other disposition of termination inventory until 10 days after the date of the retention or disposition, or a later date determined by the Contracting Officer because of the circumstances.

(m) Unless otherwise provided in this contract or by statute, the Contractor shall maintain all records and documents relating to the terminated portion of this contract for 3 years after final settlement. This includes all books and other evidence bearing on the Contractor's costs and expenses under this contract. The Contractor shall make these records and documents available to the Government, at the Contractor's office, at all reasonable times, without any direct charge. If approved by the Contracting Officer, photographs, microphotographs, or other authentic reproductions may be maintained instead of original records and documents.#

64. DEFAULT (FIXED-PRICE CONSTRUCTION) (1984 APR) FAR 52.249-10

(a) If the Contractor refuses or fails to prosecute the work or any separable part, with the diligence that will insure its completion within the time specified in this contract including any extension, or fails to complete the work within this time, the Government may, by written notice to the Contractor, terminate the right to proceed with the work (or the separable part of the work) that has been delayed. In

this event, the Government may take over the work and complete it by contract or otherwise, and may take possession of and use any materials, appliances, and plant on the work site necessary for completing the work. The Contractor and its sureties shall be liable for any damage to the Government resulting from the Contractor's refusal or failure to complete the work within the specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the Government in completing the work.

(b) The Contractor's right to proceed shall not be terminated nor the contractor charged with damages under this clause, if--

(1) The delay in completing the work arises from unforseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include (i) acts of God or of the public enemy, (ii) acts of the Government in either its sovereign or contractual capacity, (iii) acts of another Contractor in the performance of a contract with the Government, (iv) fires, (v) floods, (vi) epidemics, (vii) quarantine restrictions, (viii) strikes, (ix) freight embargoes, (x) unusually severe weather, or (xi) delays of subcontractors or suppliers at any tier arising from unforseeable causes beyond the control and without the fault or negligence of both the Contractor and the subcontractors or suppliers; and

(2) The Contractor, within 10 days from the beginning of any delay (unless extended by the Contracting Officer), notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of delay. If, in the judgment of the Contracting Officer, the findings of fact warrant such action, the time for completing the work shall be extended. The findings of the Contracting Officer shall be final and conclusive on the parties, but subject to appeal under the Disputes clause.

(c) If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been issued for the convenience of the Government.

(d) The rights and remedies of the Government in this clause are in addition to any other rights and remedies provided by law or under this contract.#

65. AUTHORIZED DEVIATIONS IN CLAUSES (1984 APR) FAR 52.252-6

(a) The use in this solicitation or contract of any Federal Acquisition Regulation (48 CFR Chapter 1) clause with an authorized deviation is indicated by the addition of "(DEVIATION)" after the date of the clause.#

66. COMPOSITION OF CONTRACTOR (JAN 1965) FAR SUPP 52.236-7000

If the Contractor hereunder is comprised of more than one legal entity, each such entity shall be jointly and severally liable hereunder.#

67. MODIFICATION OF PROPOSALS - PRICE BREAKDOWN (APR 1968) FAR SUPP 52.236-7001

The Contractor, in connection with any proposal he makes for a contract modification, shall furnish a price breakdown, itemized as required by the Contracting Officer. Unless otherwise directed, the

breakdown shall be in sufficient detail to permit an analysis of all material, labor, equipment, subcontract, and overhead costs, as well as profit, and shall cover all work involved in the modification, whether such work was deleted, added or changed. Any amount claimed for subcontracts shall be supported by a similar price breakdown. In addition, if the proposal includes a time extension, a justification therefore shall also be furnished. The proposal, together with the price breakdown and time extension justification, shall be furnished by the date specified by the Contracting Officer.#

68. CERTIFICATION OF REQUESTS FOR ADJUSTMENT OR RELIEF EXCEEDING $100,000 (FEB 1980) FAR SUPP 52.233-7000

(The following clause is applicable if this contract is expected to exceed $100,000 and the procurement instrument identification number is prefixed by the letters "DACA.")

(a) Any contract claim, request for equitable adjustment to contract terms, request for relief under Public Law 85-804, or other similar request exceeding $100,000 shall bear, at the time of submission, the following certification given by a senior company official in charge at the plant or location involved:

> I certify that the claim is made in good faith, that the supporting data are accurate and complete to the best of my knowledge and belief; and that the amount requested accurately reflects the contract adjustment for which the Contractor believes the Government is liable.
>
> _____
> (Official's Name)
>
> _____
> (Title)

(b) The certification in paragraph (a) requires full disclosure of all relevant facts, including cost and pricing data.

(c) The certification requirement in paragraph (a) does not apply to:

(1) requests for routine contract payments; for example, those for payment for accepted supplies and services, routine vouchers under cost-reimbursement type contracts, and progress payment invoices; and

(2) final adjustments under incentive provisions of contracts.

(d) In those situations where no claim certification for the purposes of Section 813 has been submitted prior to the inception of a contract dispute, a single certification, using the language prescribed by the Contract Disputes Act but signed by a senior company official in charge at the plant or location involved, will be deemed to comply with both statutes.#

NEW DECISION

STATE: Arizona
DECISION NUMBER: AZ83-5102
COUNTY: Maricopa
DATE: Date of Publication
DESCRIPTION OF WORK: Building Projects (does not include single family homes and apartments up to and including 4 stories)

	Basic Hourly Rates	Fringe Benefits
ASBESTOS WORKERS	$18.79	$2.27
BOILERMAKERS	18.86	3.86
BRICKLAYERS: Stonemasons	16.43	2.75
CARPENTERS:		
Carpenters; Saw Filer; Shingler; and Drywall; Hangers	12.935	2.53
Floor Layer and Piledriver	13.28	2.53
Millwrights	14.34	2.55
CEMENT MASONS:		
Cement Masons	12.91	2.40
Concrete Troweling, Sawing and Scoring, Curb and Gutter, Grinding Machine Operator; Clary and similar type of power Screed; Color pigment; Steps; Composition Finisher	13.10	2.40
DRYWALL TAPERS	15.06	1.20
ELECTRICIANS:		
Electricians	17.95	2.14+ 3%
Sound Installers	16.00	2.14+ 3%
ELEVATOR CONSTRUCTORS:		
Mechanics	18.03	2.69+ a
Helpers	12.62	2.69+ a
Probationary Helpers	9.015	
GLAZIERS	15.39	1.78
INSULLATION INSTALLERS	8.57	
IRONWORKERS	16.25	5.02
LABORERS	7.55	
LATHERS	15.61	1.06
LINE CONSTRUCTION:		
Groundmen	12.81	4.20+ 3½%
Equipment Operator; Powdermen, and Mechanics	15.13	4.20+ 3½%

	Basic Hourly Rates	Fringe Benefits
LINE CONSTRUCTION: (Cont'd)		
Linemen, Crane Operator, Sagger, and Pilot	$17.05	$4.20+ 3½%
Cable Splicers	17.56	4.20+ 3½%
PAINTERS:		
Brush and Roller; Sandblaster (Nozzleman); Sheetrock Taper; Floor Coverer; Sandblaster (Pot Tender)	13.54	1.30
Spray; Paperhanger	13.79	1.30
Creosote Applier	13.87	1.30
Swing Stage:		
Brush; Sandblaster	13.94	1.30
Spray	14.19	1.30
Steeplejack	14.40	1.30
Steel and bridge, Brush; Nozzleman and Pot Tender; Steel (steam cleaner); Electric and air tool Operator; Steel Sandblaster	14.47	1.30
Steel and bridge, Spray	14.67	1.30
PLASTERERS	16.34	2.41
PLUMBERS	19.85	3.13
ROOFERS	10.84	2.11
SHEET METAL WORKERS	17.39	3.15
SOFT FLOOR LAYERS	11.10	.92
SPRINKLER FITTERS	18.17	2.83
TILE, MARBLE, and TERRAZZO WORKERS	13.74	2.76
TILE FINISHERS	11.77	1.79
POWER EQUIPMENT OPERATORS		
Group 1	8.75	2.78
Group 2	10.75	2.78
Group 3	11.21	2.78
Group 4	11.76	2.78
Group 5	12.42	2.78
Group 6	13.06	2.78
Group 7	13.44	2.78
Group 8	13.85	2.78
Group 9	14.59	2.78

DECISION NO. AZ83-5102 Page 2

	Basic Hourly Rates	Fringe Benefits
TRUCK DRIVERS:		
Group 1	$10.32	$2.52
Group 2	10.48	2.52
Group 3	10.75	2.52
Group 4	11.18	2.52
Group 5	11.37	2.52
Group 5A	11.61	2.52
Group 6	11.77	2.52
Group 7	12.27	2.52
Group 8	12.905	2.52
Group 8A	13.85	2.52
Group 8B	13.32	2.52

FOOTNOTE:
a. Employer contributes 8% of basic hourly rate for 5 years' service and 6% basic hourly rate for 6 months' to 5 years' service as Vacation Pay Credit. Seven Paid Holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Friday after Thanksgiving; and Christmas Day

GROUP DESCRIPTIONS

POWER EQUIPMENT OPERATORS

Group 1: Air Compressor Operator; Pump Operator; Conveyor Operator; Generator Operator (all); Power Grizzly Operator; Fireman (all); Welding Machine Operator; Tripper Operator; Concrete Mixer Operator, skip type; Highline Cableway Signalman

Group 2: Oiler; Forklift and Roms Carrier Operator; Skiploader, 1½ cu. yd. and less; Pavement Breaker; Roller Operator (except as otherwise classified); Wheel-type Tractor Operator (Ford-Ferguson type); Slurry Seal Machine Operator (driver Moto-paver); Power Sweeper

Group 3: Self-propelled Chip Spreading Machine Conveyor Operator; Dinky Operator, under 20 ton; Elevator Hoist Operator, Husky and similar

Group 4: Motor Crane Driver; Beltcrete Operator; Curing Machine Operator, Boring Bridge and Texture; Cross Tineing and Pipe Float; Straw Blower; Hydrographic Seeder; Hydrographic Mulcher; Jumbo Finishing Machine; Joint Inserter

Group 5: A-Frame Boom Truck or Winch Truck Operator; Grade Checker (excluding Civil Engineer); Multiple Power Concrete Saw Operator; Screed Operator; Stationary Pipe Wrapping and Cleaning Machine Operator; Tugger Operator

Group 6: Aggregate Plant Operator (including crushing, screening, and sand plants, etc.); Asphalt Laydown Machine Operator; Asphalt Plant Mixer Operator; Boring Machine Operator; Concrete Mechanical Tamping, Spreading or Finishing Machine Operator (including Clary, Johnson or similar types); Concrete Pump Operator; Concrete Batch Plant Operator, all types and sizes; Conductor, Brakeman, or Handler; Drilling Machine Operator, all types and sizes except as otherwise classified; Field Equipment Serviceman; Kolman Belt Loader Operator or similar type, with belt width 48" or over; Locomotive Engineer (including Dinky 20 tons weight and over); Moto-paver and similar type equipment Operator; Operating Engineer Rigger; Pneumatic-tired Scraper Operator, up to and including 12 cu. yds. (Turnapull, Euclid, Cat, D.W. Hancock, and similar equipment); Power Jumbo Form Setter Operator; Pressure Grout Machine Operator (as used in heavy engineering construction); Road Oil Mixing Machine Operator; Roller Operator, on all type apshalt pavement; Self-propelled Compactor, with blade; Skip Loader Operator, all types with a rated capacity over 1½ but less than 4 cu. yds.; Slip Form Operator (power driven lifting device for concrete forms); Soil Cement Road Mixing Machine Operator, single pass type; Stationary Central Generating Plant Operator, rated 300 K.W. or more; Surface Heater and Planer Operator; Traveling Pipe-wrapping Machine Operator

POWER EQUIPMENT OPERATORS (Cont'd)

Group 7: Pneumatic-tried Scraper Operator, all sizes and types over 12 cu. yds. MRC (Turnapull, Euclid, Cat, D.W. Hancock and similar equipment); Tractor Operator (Pusher, Bulldozer, Scraper); Trenching Machine Operator

Group 8: Asphalt or Concrete Planing, Rotomill, and Milling Machine Operator; Auto Grade Machine Operator (CMI and similar equipment); Boring Machine Operator (including Mole, Badger and similar type); Concrete Mixer Operator, paving type and Mobile Mixers; Concrete Pump Operator, with boom attached (truck mounted); Crane Operator, Crawler and Pneumatic type under 100 ton capacity MRC; Crawler-type Tractor Operator, with boom attachment or Slope Bar; Derrick Operator; Forklift Operator for hoisting personnel; Gradall Operator; H. D. Mechanic and/or Welder; Helicopter Hoist Operator; Highline Cableway Operator (less than 20 tons rated capacity); Mass Excavator Operator (150 Bucyrus Erie and similar types); Mechanical Hoist Operator (two or more drums); Motor Grader Operator, any type power blade; Motor Grader Operator, with Elevating Grader attachment; Mucking Machine Operator;

Overhead Crane Operator; Piledriver Engineer (portable, stationary or skid rig); Pneumatic-tired Scraper Operator, all sizes and types (Turnapull, Euclid, Cat, D.W. Hancock and similar equipment over 45 cu. yds. MRC); Power driven Ditch Lining or Ditch Trimming Machine Operator; Skip Loader Operator, all types rated capacity 4 cu. yd. but less than 8 cu. yds.; Slip Form Paving Machine Operator (including Gunnert, Zimmerman and similar types); Specialized Power Digger Operator, attached to wheel-type tractor; Tower Crane (or similar type) Operator; Tugger Operator (two or more); Universal Equipment Operator, Shovel, Backhoe, Dragline, Clamshell, etc., up to 8 cu. yds.

Group 9: Crane Operator, Pneumatic or Crawler, 100 ton hoisting capacity and over MRC rating; Helicopter Pilot, FAA qualified, when used in construction work other than executive travel and single casual rental; Highline Cableway Operator, over 20 ton rated capacity and using traveling head and tail tower; Remote-control Earth Moving Equipment Operator; Skip Loader Operator, all types with rated capacity of 8 cu. yds. or more; Universal Equipment Operator, Shovel, Backhoe, Dragline, Clamshell, etc., 8 cu. yds. and over

DECISION NO. AZ83-5102 Page 5

TRUCK DRIVERS

Group 1: Teamsters; Pick-ups; Station Wagon; Man Haul Driver

Group 2: Dump or Flatrack (2 or 3 axle); Water Truck (under 2500 gallons); Buggymobile (1 cu. yd. or less); Bus Driver; Self-propelled Street Sweeper; Shop Greaser

Group 3: Dump or Flatrack (4 axle); Dumptor or Dumpster (less than 7 cu. yds.); Water Truck (2500 gallons but less than 4000 gallons); Tireman

Group 4: Dumptor or Dumpster (7 cu. yds. but less than 16 cu. yds.); Dump or Flatrack (5 axle); Water Truck (4000 gallons and over); Slurry type equipment Driver or Leverman; Vacuum Pump Truck Drivers; Flaherty Spreader or similar type equipment or Leverman; Transit Mix (8 cu. yds. or less mixer capacity); Ambulance Driver

Group 5: Dump or Flatrack (6 axle); Transit Mix (over 8 cu. yds. but less than 10.5 cu. yds.); Rock Truck (i.e. Dart, Euclid and other similar type end dumps, single unit) less than 16 cu. yds.

Group 5A: Oil Tanker or Spreader and/or Bootman, Retortman or Leverman

Group 6: Transit Mix (over 10.5 cu. yds. but less than 14 cu. yds. mixer capacity); Ross Carrier, Fork Lift or Lift Truck; Hydro Lift, Swedish Crane, Iowa 300 and similar types; Concrete Pump (when integral part of transit Mix Truck); Dump or Flatrack (7 axle); Transport Driver (unless axle rating results in higher classification)

Group 7: Dump or Flatrack (8 axle)

Group 8: Off-highway equipment Driver including but not limited to: 2 or 4 wheel power unit, i.e. Cat, DW Series, Euclid, International and similar type equipment, transporting material when top loaded or by external means including pulling Water Tanks, Fuel Tanks or other applications under Teamster Classifications; Rock Trucks (Dart, Euclid, or other similar end dump types) 16 cu. yds. and over; Eject-alls; Dumptor or Dumpster (16 cu. yds. and over); Dump or Flatrack (9 axle)

Group 8A: Heavy-duty Mechanic/Welder; Body and Fender Man

Group 8D: Field Equipment Servicemen or Fuel Truck Driver

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

DECISION NO. AZ83-5102 - Mod. #1
(48 FR 9424 - March 4, 1983)
Maricopa County, Arizona

Change:	Basic Hourly Rates	Fringe Benefits
Carpenters:		
Carpenters; Saw Filer; Shingler; and Drywall; Hangers	$13.665	$2.53
Floor Layer & Piledriver	14.01	2.53
Cement Masons:		
Cement Masons	13.66	2.40
Concrete Troweling, Sawing and Scoring, Curb and Gutter, Grinding Machine Operator; Clary and similar type of power screed; Color pigment; Steos· Composition Finisher	13.86	2.40
Power Equipment Operators		
Group 1	9.31	2.78
Group 2	11.41	2.78
Group 3	11.90	2.78
Group 4	12.47	2.78
Group 5	13.16	2.78
Group 6	13.84	2.78
Group 7	14.23	2.78
Group 8	14.66	2.78
Group 9	15.44	2.78
Truck Drivers:		
Group 1	10.95	2.52
Group 2	11.12	2.52
Group 3	11.40	2.52
Group 4	11.85	2.52
Group 5	12.05	2.52
Group 5A	12.30	2.52
Group 6	12.47	2.52
Group 7	12.99	2.52
Group 8	13.665	2.52
Group 8A	14.65	2.52
Group 8B	14.10	2.52

DECISION NO. AZ83-5103 - Mod. #2 (48 FR 9424 - March 4, 1983) Maricopa County, Arizona	Basic Hourly Rates	Fringe Benefits
Change:		
Electricians:		
Electricians on projects having an electrical contract value of less than $20 million	$16.00	$2.14+ 3%
Electricians on projects having an electrical contract value of $20 million or more	17.95	2.14+ 3%

DECISION NO. AZ83-5102 - Mod. #3 (48 FR 9424-March 4, 1983) Maricopa County, Arizona	Basic Hourly Rates	Fringe Benefits
Change: Mod. #2 published June 3, 1983 should have read Decision No. AZ83-5102 instead of Decision No. AZ83-5103		
Boilermakers	$18.86	$3.96
Bricklayers; Stonemasons	11.50	3.04
Plumbers	21.19	3.38
Sheet Metal Workers	16.50	3.30
Soft Floor Layers	12.46	.92
Power Equipment Operators:		
Group 1	9.31	2.93
Group 2	11.41	2.93
Group 3	11.90	2.93
Group 4	12.47	2.93
Group 5	13.16	2.93
Group 6	13.84	2.93
Group 7	14.23	2.93
Group 8	14.66	2.93
Group 9	15.44	2.93

DECISION NO. AZ83-5102 - Mod. #4
(48 FR 9424 - March 4, 1983)
Maricopa County, Arizona

Change:	Basic Hourly Rates	Fringe Benefits
Plumbers and Pipefitters	$19.84	$3.38
Power Equipment Operators:		
Group 1	9.16	2.93
Group 2	11.26	2.93
Group 3	11.75	2.93
Group 4	12.32	2.93
Group 5	13.01	2.93
Group 6	13.69	2.93
Group 7	14.08	2.93
Group 8	14.51	2.93
Group 9	15.29	2.93

DECISION NO. AZ83-5102 - Mod. #5 (48 FR 9424 - March 4, 1983) Maricopa County, Arizona	Basic Hourly Rates	Fringe Benefits
ADD:		
Landscape Sprinkler Fitter/Installer	$6.65	
Landscape Laborer	4.59	

	Basic Hourly Rates	Fringe Benefits
DECISION NO. AZ83-5102 - MOD. 46 (48 FR 9424 - March 4, 1983 Maricopa County, Arizona		
OMIT:		
Electricians:		
Electricians on projects having an electricial contract value of less than $20 million	$16.00	2.14+ 3%
Electricians on projects having an electrical contract value of $20 million or more	17.95	2.24+ 3%
ADD:		
Electricians	12.18	1.32

MODIFICATIONS P. 1

DECISION #AZ83-5102 MOD#8 (48 FR-9424-March 4, 1983) Maricopa County, Arizona	Basic Hourly Rates	Fringe Benefits
Change:		
Asbestos Workers	$13.00	$3.33

DECISION NO. AZ83-5102 - MOD. #9 (48 FR 9424 - March 4, 1983) Maricopa County, Arizona	Basic Hourly Rates	Fringe Benefits
CHANGE:		
CARPENTERS:		
Carpenters; Saw Filer; Shingler; and Drywall Hangers	14.415	2.80
Floor Layer and Piledriver	14.76	2.80
Millwrights	14.34	2.55
CEMENT MASONS:		
Cement Masons	13.99	3.05
Concrete Troweling, Sawing and Scoring, Curb and Gutter, Grinding Machine Operator; Clary and similar type of power Screed; Color pigment; Steps; Composition Finisher	14.20	3.05
ELEVATOR CONSTRUCTORS:		
Mechanic	17.29	3.00+a
Helpers	12.10	3.00+a
Probationary Helpers	8.645	
POWER EQUIPMENT OPERATORS:		
Group 1	9.75	3.08
Group 2	11.98	3.08
Group 3	12.50	3.08
Group 4	13.10	3.08
Group 5	13.83	3.08
Group 6	14.55	3.08
Group 7	14.97	3.08
Group 8	15.42	3.08
Group 9	16.25	3.08
TRUCK DRIVERS:		
Group 1	11.62	2.67
Group 2	11.80	2.67
Group 3	12.10	2.67
Group 4	12.58	2.67
Group 5	12.79	2.67
Group 5A	13.05	2.67
Group 6	13.23	2.67
Group 7	13.79	2.67
Group 8	14.505	2.67
Group 8A	15.55	2.67
Group 8B	14.96	2.67

DECISION NO. A283-5102 - MOD. #10 (48 FR 9424 - March 4, 1983) Maricopa County, Arizona	Basic Hourly Rates	Fringe Benefits
Change:		
Ironworkers	$16.25	5.44

Reference: DACW09-85-B-0004

SPECIFICATIONS

for

INDIAN BEND WASH REPAIRS OF SIDE CHANNELS SYSTEM - REACH 4

Maricopa County, Arizona

Appropriation: Construction General
Corps of Engineers, Civil
Contributed Funds, Other

Authority: PL 97-276
Energy and Water Development Act

US Army Corps of Engineers
Los Angeles District

PART I

SPECIAL CLAUSES

Index

1. Commencement, Prosecution, and Completion of Work
2. Liquidated Damages
3. Contract Drawings, Maps and Specifications
4. Contractor Submittals
5. Physical Data
6. Salvage Materials and Equipment
7. Layout of Work
8. Damage to Work
9. Performance of Work by Contractor
10. Progress Schedule
11. Time Extension
12. Required Insurance
13. Availability and Use of Utility Services
14. Equipment Ownership and Operating Expense Schedules
15. Identification of Government Furnished Property

1. COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (1965 JAN). The Contractor will be required to commence work under this contract within 5 calendar days after the date of receipt by him of notice to proceed, to prosecute said work diligently, and to complete the entire work ready for use not later than 90 calendar days after the date of receipt of notice-to-proceed except maintenance of seeding and planting. Maintenance of seeding and planting shall be accomplished as soon as practicable and within time limits stated in the Technical Provisions or directed by the Contracting Officer. The time stated for completion shall include final clean-up of the premises.

2. LIQUIDATED DAMAGES (1965 JAN). In case of failure on the part of the Contractor to complete the work within the time fixed in the contract or any extensions thereof, the Contractor shall pay to the Government as liquidated damages, pursuant to the clause of this contract entitled "Termination for Default-Damages for Delay-Time Extensions," the sum of $170.00 for each day of delay.

3. CONTRACT DRAWINGS, MAPS AND SPECIFICATIONS (1965 JAN).

3.1 Ten sets of large scale contract drawings, maps and specifications will be furnished the Contractor without charge, except applicable publications incorporated into the Technical Provisions by reference. Additional sets will be furnished on request at the cost of reproduction. The work shall conform to the following contract drawings and maps, all of which form a part of these specifications and are available in the office of the U.S. Army Engineer District, Los Angeles, 300 North Los Angeles Street, Los Angeles, California.

File No.	Title
259/76	Index to Contract Drawings
77	Project Locations
78	General Plan and Survey Data
79	Collector Channel-Reach 4, Plan and Profile No. 1, Sta. 458+82.00 to Sta. 446+00.00
80	Collector Channel-Reach 4, Plan and Profile No. 2, Sta. 446+00.00 to Sta. 434+94.00
81	Collector Channel-Reach 4, Plan and Profile No. 3, Sta. 434+94.00 to Sta. 422+00.00
82	Collector Channel-Reach 4, Plan and Profile No. 4, Sta. 422+00.00 to Sta. 410+00.00

File No.	Title
83	Collector Channel-Reach 4, Plan and Profile No. 5, Sta. 410+00.00 to Sta. 399+72.00
84	Collector Channel-Reach 4, Cross Sections No. 1
85	Collector Channel-Reach 4, Cross Sections No. 2
86	Side Channel-Camelback Road, Plan and Profile No. 1, Sta. 359+93.03 to Sta. 348+00.00
87	Side Channel-Camelback Road, Plan and Profile No. 2, Sta. 348+00.00 to Sta. 334+00.00
88	Side Channel-Camelback Road, Plan and Profile No. 3, Sta. 334+00.00 to Sta. 320+00.00
89	Side Channel-Camelback Road, Plan and Profile No. 4 Sta. 320+00.00 to Sta. 310+00.00
90	Camelback Road Canal Crossing, Plans, Sections, Elevations and Details, Road Replacement Details
91	Collector Channel - Reach 4, Approach Channel and Transition Structures, Plans, Sections and Details
92	Collector Channel - Reach 4, Junction Structure, Plan and Details Sta. 435+39.00
93	Collector Channel - Reach 4, Junction Structure, Plan and Details Sta. 440+76.29
94	Collector Channel - Reach 4, Grated Inlet Structure Details, Plans and Sections
95	Side Channel - Camelback Road, Collector Channel - Reach 4, Manhole Details
96	Side Channel - Camelback Road, Collector Channel - Reach 4, Sections and Standard Details
97	Side Channel - Camelback Road, Transition and Outlet Structures No. 1, Plans, Sections, and Details
98	Side Channel - Camelback Road, Transition and Outlet Structures No. 2, Plans, Sections and Details
99	Collector Channel - Reach 4 Miscellaneous Steel Details
100	Collector Channel - Reach 4 Utility Relocations No. 1
101	Side Channel - Camelback Road Utility Relocations
102	Side Channel - Camelback Road, Miller Road Sanitary Inverted Siphon Plan, Profile and Details
103	Side Channel - Camelback Road, Miller Road Sanitary Inverted Siphon Details
104	Collector Channel-Reach 4, Landscape Plan and Details, China Inn.
105	Side Channel, Camelback Road, Landscape Plan and Details Plan-I, Sta. 320+00.00 to Sta. 310+00.00
106	Collector Channel-Reach 4, Landscape Plan and Details, Plan II, Sta. 458+31.04 to Sta. 434+94.00
107	Collector Channel-Reach 4, Landscape Plan and Details, Plan III, Sta. 434+94.00 to 68th Street
108	Outlet Channel-Indian Bend Wash Gaging Station Plans, Sections and Details, Sta. 88+51.06
109	Outlet Channel-Indian Bend Wash Gaging Station Archetectural Details, Sta. 88+51.06

3.2 Omissions from the drawings or specifications or the misdescription of details of work which are manifestly necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve

the Contractor from performing such omitted or misdescribed details of the work but they shall be performed as if fully and correctly set forth and described in the drawings and specifications.

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

4. CONTRACTOR SUBMITTALS.

4.1 General. Reference is made to the CONTRACT CLAUSE entitled "SHOP DRAWINGS". The Contractor shall submit for approval all shop drawings, certificates of compliance and/or equipment lists called for under the various headings of these specifications. These drawings, certificates and lists shall be complete and detailed. If approved by the Contracting Officer, each copy of the drawings, certificates, or lists will be identified as having received such approval by being so stamped and dated. The Contractor shall make any corrections required by the Contracting Officer. Unless otherwise specified in the Technical Provisions, the number of copies to be submitted shall be as stated herein. The Contractor shall complete ENG Form 4025, "Transmittal of Shop Drawings, Equipment Data, Material Samples, or Manufacturer's Certificates of Compliance for Approval" and forward 6 copies of same with each set of shop drawings, certificates of compliance, or equipment lists submitted. Blank ENG Forms 4025 will be furnished by the Contracting Officer on request. Each shop drawing submitted for approval shall have, in the lower right hand corner just above the title, a white space 3 inches x 4 inches in which the Contracting Officer can indicate the action taken. Shop drawings for submittal shall be either blue line or black line prints on a white background. Blueprints are not acceptable. Each shop drawing, certificate of compliance, and/or equipment list shall be identified with the following information as applicable:

Contract Number
Project Title and Location
Subcontractor's Name
Supplier's Name
Manufacturer's Name
Contract Specification and Paragraph Number
Contract Drawing File Number

4.1.1 Contractor Certification. Each submittal of the shop drawings shall contain the following certification on the face of the ENG Form 4025 accompanying the submittal:

"I have reviewed the shop drawings in detail
and they are correct and in strict conformance
with the contract drawings and specifications
except as otherwise explicitly stated.
Authorized Prime Contractor Representative"

4.2 Shop Drawings and Materials Submittal Register. Within 15 calendar days after commencement of work under this contract, the Contractor shall submit a preliminary register showing all shop drawings, certificates of compliance,

equipment lists, samples, and other data required to be submitted under the various headings of these specifications. The register shall be submitted in duplicate. The preliminary register shall show the submittal identification number, the type of submittal, and the description for all items to be submitted under this contract and, for all items needed prior to submittal of the Project Progress Schedule, the scheduled submittal date, approval need date, and the material/equipment need date shall also be included. The register shall be expanded to include all Contractor scheduled dates and shall be resubmitted within 15 calendar days after submittal of the project progress schedule. After original approval the register shall be updated to indicate actual dates, actions completed, and any additional submittals or resubmittals required, and two copies of all updated sheets shall be submitted on or before the fifteenth of each month. The register shall provide adequate time for review and approval of the submitted material and shall be coordinated with the construction progress schedule to assure that all equipment and materials will be available for incorporation into the work in accordance with approved schedule of construction operations. Payment for materials incorporated into the work will not be allowed until required approvals have been obtained.

4.3 Shop Drawings. The Contractor shall submit to the Contracting Officer for approval 10 copies of all shop drawings as called for under the various headings of these specifications. Nine sets of all shop drawings will be retained by the Contracting Officer and one set will be returned to the Contractor.

4.4 Certificates of Compliance (1969 MAY OCE). Any certificates required for demonstrating proof of compliance of materials with specification requirements shall be executed in 6 copies. Each certificate shall be signed by an official authorized to certify in behalf of the manufacturing company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Contractor from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet the specific requirements.

4.5 Resubmittals. If a submittal is returned for correction or is not satisfactory and is disapproved by the Contracting Officer, the Contractor shall resubmit the corrected material in the same quantity, as specified for the original submittal, for approval within 14 calendar days after receipt by him of the disapproved material.

5. PHYSICAL DATA (1965 JAN).

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

5.2 The physical conditions indicated on the drawings and in the specifications are the result of site investigations by surveys and auger borings.

5.3 Weather Conditions. Meterological information including rainfall and temperature data are available for inspection in the office of the District Engineer at 300 North Los Angeles Street, Los Angeles California. Temperature statistics based on the National Weather Service, Phoenix, Arizona Sky Harbor International Airport weather station are as follows:

TEMPERATURE DATA (IN DEGREES FAHRENHEIT)

Month	Average Daily Maximum	Average Daily Minimum	Average	Maximum**	Minimum**
January	65	38	52	88	16
February	69	42	56	89	22
March	75	46	61	97	25
May	92	60	76	113	40
June	102	69	85	117	50
July	104	85	91	118	61
August	102	76	89	117	60

*Taken from Local Climatological Data - Annual Summary for Phoenix 1974.

**Taken from Local Climatological Data - Annual Summary for Phoenix 1974 and from Climatology of the United States No. 80-2 supplement for 1951-1960.

5.3.1 Streamflow Conditions. Discharge frequency and flood hydrograph information are available for inspection in the office of the District Engineer, at 300 North Los Angeles, California.

5.4 Additional information, including but not necessarily limited to, results of laboratory tests of material encountered in test holes or other explorations and field logs is available for inspection and study in the office of District Engineer, Geotechnical Branch, 300 North Los Angeles Street, Los Angeles, California, 90012.

6. SALVAGE MATERIALS AND EQUIPMENT (1965 JAN). The Contractor shall maintain adequate property control records for all materials or equipment specified to be salvaged. These records may be in accordance with the Contractor's system of property control, if approved by the property administrator. The Contractor shall be responsible for the adequate storage and protection of all salvaged materials and equipment and shall replace, at no cost to the Government, all salvaged materials and equipment which are broken or damaged during salvage operations as the result of his negligence, or while in his care.

7. LAYOUT OF WORK.

7.1 Bench Marks and Horizontal Control Points have been established at the site of the work. These are described and indicated on the drawings.

7.2 From these control points and bench marks the Contractor shall complete the layout of the work and shall be responsible for all measurements that may be required for the execution of the work to the location and limit marks prescribed in the specifications or on the contract drawings, subject to such modifications as the Contracting Officer may require to meet changed conditions or as a result of necessary modifications to the contract work.

7.3 The Contractor shall furnish, at his own expense, such stakes, spikes, steel pins, templates, platforms, equipment, tools and material, and all labor as may be required in laying out any part of the work from the control points and bench marks established by the Government. It shall be the responsibility of the Contractor to maintain and preserve all stakes and other marks established by the Contracting Officer until authorized to remove them and if such marks are

destroyed, by the Contractor or through his negligence prior to their authorized removal they may be replaced by the Contracting Officer, at his discretion, and the expense of replacement will be deducted from any amounts due or to become due the Contractor. The Contracting Officer may require that work be suspended at any time when location and limit marks established by the Contractor are not reasonably adequate to permit checking of the work.

8. DAMAGE TO WORK (1966 MAR OCE). The responsibility for damage to any part of the permanent work shall be as set forth in the Clause of the Contract entitled "Permits and Responsibilities." However, if, in the judgment of the Contracting Officer, any part of the permanent work performed by the Contractor is damaged by flood or earthquake, which damage is not due to the failure of the Contractor to take reasonable precautions or to exercise sound engineering and construction practices in the conduct of the work, the Contractor will make the repairs as ordered by the Contracting Officer and full compensation for such repairs will be made at the applicable contract unit or lump sum prices as fixed and established in the contract. If, in the opinion of the Contracting Officer, there are no contract unit or lump sum prices applicable to any part of such work an equitable adjustment pursuant to Clause 3, Changes, of the contract, will be made as full compensation for the repairs of that part of the permanent work for which there are no applicable contract unit or lump sum prices. Except as herein provided, damage to all work (including temporary construction), utilities, materials, equipment and plant shall be repaired to the satisfaction of the Contracting Officer at the Contractor's expense, regardless of the cause of such damage.

9. PERFORMANCE OF WORK BY CONTRACTOR (1965 JAN). The Contractor shall perform on the site, and with his own organization, work equivalent to at least thirty-five percent (35%) of the total amount of work to be performed under the contract. If, during the progress of the work hereunder the Contractor requests a reduction in such percentage and the Contracting Officer determines that it would be to the Government's advantage, the percentage of the work required to be performed by the Contractor may be reduced; provided, written approval of such reduction is obtained by the Contractor from the Contracting Officer.

10. PROGRESS SCHEDULE.

10.1 Reference is made to the CONTRACT CLAUSE entitled "PROGRESS CHARTS AND REQUIREMENTS FOR OVERTIME WORK."

10.2 The Progress schedule shall provide for a uniform rate of progress throughout the entire construction period. Actual progress shall be entered on the schedule weekly. The determination of whether or not the work is behind schedule will be based upon a uniform rate of production in each feature of the work. Falling more than 5 calendar days behind the approved progress schedule in any feature of the work shall constitute sufficient grounds for a determination that the Contractor has fallen behind the progress schedule. Failure of the Contracting Officer to act under this provision shall in no way relieve the Contractor of the responsibility for completion of the work on schedule.

11. TIME EXTENSION (1965 JAN). Notwithstanding any other provisions of this contract it is mutually understood that the time extensions for changes in the work depend upon the extent, if any, by which the changes cause delay in the completion of the various elements of construction. The change order granting the time extension may provide that the contract completion date will be extended only for those specific elements so delayed and that the remaining contract completion dates for all other portions of the work will not be altered and may further

provide for an equitable readjustment of liquidated damages pursuant to the new completion schedule. The Contracting Officer will coordinate changes in the progress schedule with City of Scottsdale.

12. REQUIRED INSURANCE.

12.1 The Contractor shall procure and maintain during the entire period of his performance under this contract insurance coverage. The City of Scottsdale, the City of Phoenix, and the Flood Control District shall be named as additionally insured.

13. AVAILABILITY AND USE OF UTILITY SERVICES. Construction water from fire hydrants can be arranged with the City of Phoenix. A water meter deposit of $100.98 will be required. Charges of $33.10 per month and 51¢ per 100 cubic feet will be made for water used. Contact City of Phoenix Water Engineering and Development at 125 East Washington, 3rd Floor, at 602-262-6615.

14. EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE. (1981 JUN OCE.)

14.1 Whenever actual ownership and operating costs for each piece of equipment or equipment groups of similar serial and series cannot be determined by the Contracting Officer from a Contractor's accounting records, allowable costs for construction equipment in sound workable condition owned or controlled and furnished by the Contractor or Subcontractor at any tier for work requiring adjustments in contract price shall be determined in accordance with the applicable provisions of the "Construction Equipment Ownership and Operating Expense Schedule," Region VII. For forward pricing, the Schedule in effect at the time of negotiations shall apply. For retrospective pricing, the Schedule in effect as of the time work was performed shall apply. For the purpose of determination of the hourly rates to be applied under this contract, working conditions shall be considered to be average unless otherwise determined by the Contracting Officer. Rates for equipment not in the schedule will be computed by the Government using the formulas in the schedule. Where applicable, rates in the schedule may be used for unlisted equipment of comparable horsepower and auxiliary features.

14.2 Equipment rental costs are allowable, subject to the provisions of DAR 15-205.34 and 15.402.2, substantiated by certified reproduced copies of invoices or bills. Rates for equipment rented from an organization under common control, lease-purchase or sale-leaseback arrangements will be determined in accordance with the schedule. A copy of the schedule will be provided to the successful bidder upon request.

15. IDENTIFICATION OF GOVERNMENT FURNISHED PROPERTY (APR 1984) FAR 52.245-3.

15.1 The Government will furnish to the Contractor the property identified in the Schedule to be incorporated or installed into the work or used in performing the contract. The listed property will be furnished f.o.b. railroad cars at the place specified in the contract Schedule or f.o.b. truck at the project site. The Contractor is required to accept delivery, pay any demurrage or detention charges, and unload and transport the property to the job site at its own expense. When the property is delivered, the Contractor shall verify its quantity and condition and acknowledge receipt in writing to the Contracting Officer within 24 hours of delivery any damage to or shortage of the property as received. All such property shall be installed or incorporated into the work at the expense of the Contractor, unless otherwise indicated in this contract.

15.2 Each item of property to be furnished under this clause shall be identified in the Schedule by quantity, item and description.

* * * * *

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SECTION 1A

GENERAL REQUIREMENTS

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9. Archeological Findings During Construction
10. Public Utilities, Notices, and Restrictions
11. Public Safety
12. Occupational Safety and Health Act (OSHA) Standards
13. Quality Control

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

1.1 Federal Specifications (Fed. Spec.).

FF-B-575C	Bolts, Hexagon and Square
FF-N-105B & Int. Am-4	Nails, Brads, Staples and Spikes: Wire, Cut and Wrought
FF-N-836D & Am-1	Nut: Square, Hexagon, Cap, Slotted, Castle, Knurled, Welding, and Single Ball Seat
MM-L-751H	Lumber; Softwood
TT-E-529C & Am-2	Enamel, Alkyd, Semi-Gloss
TT-P-25E & Am-2	Primer Coating, Exterior (Undercoat for Wood, Ready-Mixed, White and Tints)

1.2 U.S. Department of Commerce National Bureau of Standards, Product Standard.

PS 1-74	Plywood, Construction and Industrial

2. PROJECT FACILITIES. The Contractor shall construct and/or erect the following project facilities.

2.1 Construction Signs. The signs shall be erected as soon as possible and within 15 days after commencement of work under this contract.

2.1.1 Two project signs at locations designated by the Contracting Officer.

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

2.1.3 Six hard hat signs at locations directed.

2.2 Project Engineer's Office, including a fenced parking area and a flagpole.

2.3 Bulletin Board at the Contractor's office.

2.4 Sanitary Facilities.

3. CONSTRUCTION SIGNS.

3.1 Materials.

3.1.1 Lumber shall conform to Fed. Spec. 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).

3.1.2 Plywood shall conform to Product Standard PS 1, grade A-C, Group 1, exterior type.

3.1.3 Bolts, Nuts and Nails. Bolts shall conform to Fed. Spec. FF-B-575, nuts shall conform to Fed. Spec. FF-N-836, and nails shall conform to Fed. Spec. FF-N-105.

3.1.4 Paints and Oils. Paints shall conform to Fed. Spec. TT-P-25 for primer and TT-E-529 for finish paint and lettering.

3.2 Construction.

3.2.1 Project and hard hat signs shall be constructed as detailed on Figures 1, 1A, 2, and 3. Decals and safety signs will be furnished by the Contracting Officer.

3.2.2 Warning Signs shall be 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 2 x 4 feet, all letters shall be 4 inches in height, and the wording shall be: "WARNING: OVERHEAD TRANSMISSION LINES."

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

4. PROJECT ENGINEER'S OFFICE.

4.1 General. The Contractor shall provide a suitable office trailer for the Project Engineer. The exact site will require the Contracting Officer's approval. The trailer shall be adequately heated, well lighted, suitably ventilated, and cooled with a refrigerated type air conditioning unit complete, with all piping and electrical connections. An adequate supply of cooled drinking water shall be furnished and maintained. Open parking space for 6 vehicles and water and sanitary facilities shall be located convenient to the office and laboratory. The combined parking and building area shall be enclosed with a woven wire fence approximately 6 feet high with a 10-foot wide lockable gate accessible from a road or street. The fenced area shall be of sufficient size to permit ease in the parking of vehicles. Materials for the facilities need not be new provided they are adequate for the intended use.

4.2 Office Trailer shall be approximately 10 feet wide by 40 feet in length.

4.3 Flagpole. The Contractor shall furnish and erect a flagpole at the Project Engineer's Office. The flagpole shall be either wood or sectional steel type, a product of a reputable manufacturer who has been regularly engaged in the manufacture of flagpoles. The flagpole shall be complete with standard fittings and equipment, including pulley, cleats, ground protector, halyards, and snap hooks. The pole shall have 20 feet exposed height and be set in concrete foundation in conformance with the manufacturer's recommendations. Painting of the wooden pole shall conform to the applicable requirements for the project sign. Steel pole shall be galvanized.

5. 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.

6. 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.

7. SCRAP MATERIAL. Materials indicated to be removed and not indicated to be salvaged, stored or reinstalled are designated as scrap and shall become the property of the Contractor and be removed from the site of the 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.

8. SALVAGE MATERIALS. All materials and/or equipment removed and indicated to be either stored or reinstalled are designated as salvaged materials and/or equipment. Any salvaged materials and equipment which are excess upon completion of the work and are not indicated to be stored shall become the property of the Contractor.

9. ARCHEOLOGICAL 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 the nature of the findings. Should the discovery site require archaeological studies resulting in delays and/or additional work, the Contractor will be compensated by an equitable adjustment under the General Provisions of the contract.

10. PUBLIC UTILITIES, NOTICES, AND RESTRICTIONS.

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

10.2 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 clause: PROTECTION OF EXISTING VEGETATION, STRUCTURES, UTILITIES, AND IMPROVEMENTS of the CONTRACT CLAUSES. 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.

10.3 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.

10.4 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.

10.5 Notices.

10.5.1 Traffic Routing. The Contractor shall notify the Contracting Officer 7 days in advance of the time work will be started in areas requiring the rerouting of traffic, traffic lane striping, and removal of street signs. The foregoing shall apply to progressive modifications of traffic routings within an area in which work is in progress. Additional requirements regarding traffic are included in section: DETOURS AND TRAFFIC CONTROL FACILITIES.

10.5.2 Notification of Local Jurisdictions.

10.5.2.1 The Contractor shall notify City of Scottsdale Engineering in writing at least 30 days prior to any work within any road right-of-way. The notification shall contain a description of the work, a schedule of work, a statement of intended method of traffic routing or closure, duration of traffic interruption and a citation of the contract provisions governing the traffic routing or closure.

10.5.2.2 City Engineers, County Road Departments, Police, Highway Patrol, and Fire Departments shall be notified by the Contractor whenever a street is to be closed to traffic. If the closing is to be of long duration, a single notification to each department on the last working day before closing will be sufficient. A single notification shall then be made at the time the street is again opened to traffic. If the closing is to be of short duration or if different sections of the street are to be closed at different times, notifications shall be made on a day-to-day basis.

10.5.3 Utilities to be Relocated or Protected.

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

Flood Control District of Maricopa County
3335 West Durango Street
Phoenix, Arizona 85009
Mr. R.W Shobe
Telephone: (602) 262-1501

Salt River Project
Civil Engineering Dept.
P.O. Box A80
Phoenix, Arizona 85001
Mr. Herb Mattingly
Telephone: (602) 236-2521

City of Scottsdale
Water and Sewer
3939 Civic Center Plaza
Scottsdale, Arizona 85251
Mr. Joe Jason
Telephone: (602) 994-2557

City of Phoenix
Water Distribution Division
3045 South 22nd Avenue
Phoenix, Arizona 85009
Mr. Lyle Orr
Telephone: (602) 262-6509

Mountain Bell Telephone Co.
3033 North 32 St.
Phoenix, Arizona 85012
Mr. Al Meins
Telephone: (602) 235-3155

Arizona Public Service
Metro Engineering Services
2121 W. Cheryl Drive
Phoenix, Arizona 85021
Telephone (602) 271-7676

10.5.3.2 Staking of Utilities. In addition to notification of representatives of utility owners, the Contractor shall notify the Blue Stakes Center, phone (602) 263-1100, two working days prior to any excavation within any street right-of-way or any work in the vicinity of known underground utilities, to have underground utilities field located and staked.

10.5.4 Existing Bench Marks and R/W Markers. The Contractor shall notify the Contracting Officer, in writing, 7 days in advance of the time he proposes to remove any bench mark or right-of-way marker.

10.5.5 Optional Disposal Areas. The Contractor shall notify the Contracting Officer within 30 days after receipt of Notice to Proceed, as to which optional disposal areas he proposes to use or whether the areas will not be used for disposal. Should the Contractor elect to use any of the disposal areas, he shall indicate the approximate quantities of material he proposes to place in each area. 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 optional disposal area, and 48 hours in advance of any work which he proposes to do in the disposal areas on Saturday, Sunday or legal holidays.

10.6 Restrictions.

10.6.1 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.

10.6.2 Access to Private Property. Convenient passage through the work or along temporary access shall be provided at all times to all driveways, houses and buildings in the vicinity of the work.

10.6.3 Permits. Contractor is required to secure necessary permits at no additional cost to the Government.

10.6.4 Construction on the following facilities shall be completed within 45 days after issuance of notice to proceed: outlet works (excluding hydroseeding); exposure and backfill of the reinforced concrete box at Station 358+00; and repair of the reinforced concrete box at Station 434+10.

11. PUBLIC SAFETY.

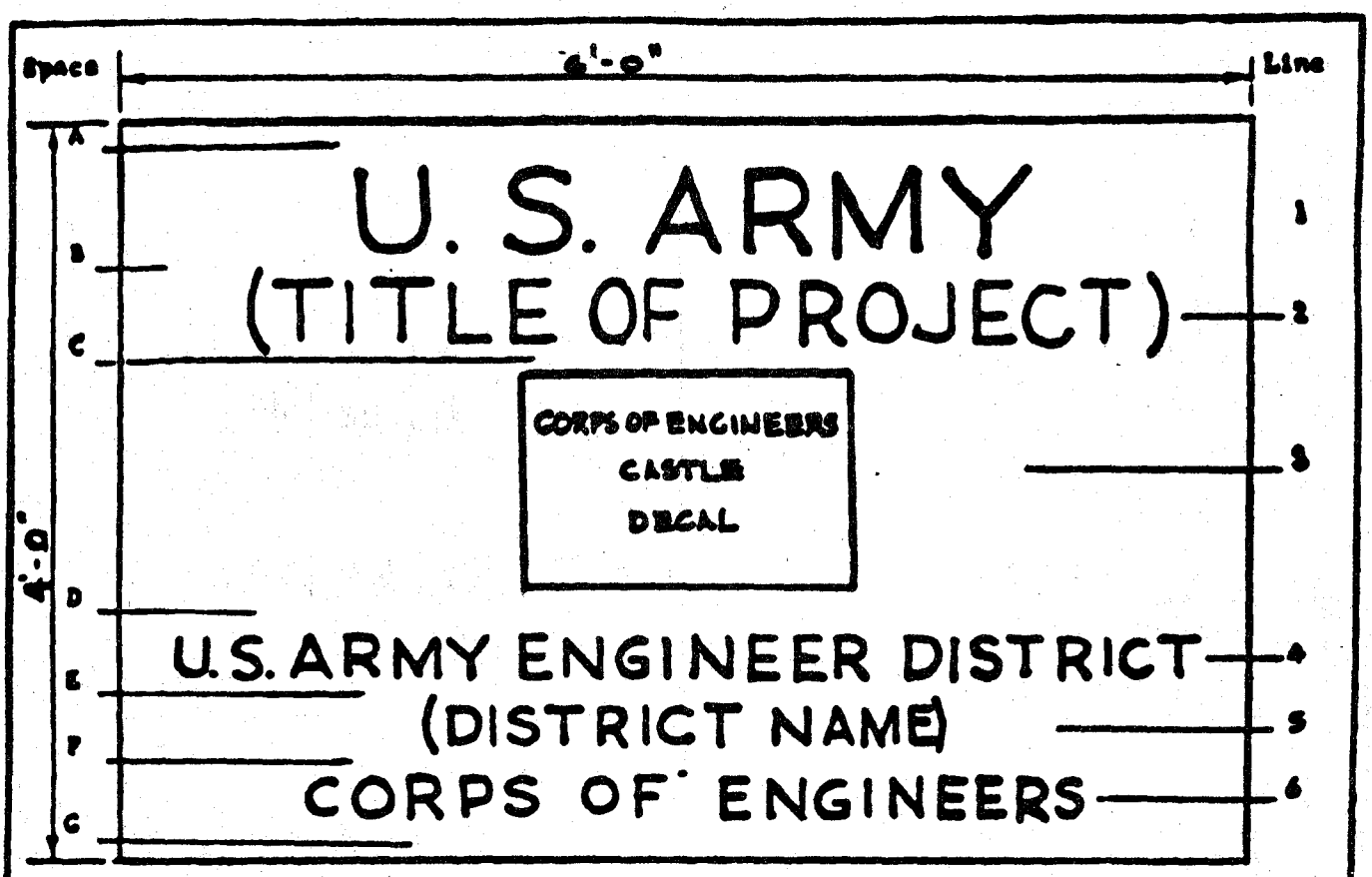
11.1 Attention is invited to the CONTRACT CLAUSE: PERMITS AND RESPONSIBILITIES. The Contractor shall provide temporary fencing, barricades, and/or guards, as required, to provide protection in the interest of public safety. Whenever the Contractor's operations create a condition hazardous to the public, 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.

11.2 Contractor will develop routes for haul trucks on public streets which will be submitted in writing through the Contracting Officer to the City of Scottsdale, City Traffic Engineering Manager, for review and approval action. The submittal shall include, but not be limited to, the proposed travel direction, turn movements, hours of use, street sweeping, watering and cleanup.

12. OCCUPATION SAFETY AND HEALTH ACT (OSHA) STANDARDS. The OCCUPATIONAL SAFETY and 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 Safety and Health Requirements Manual, EM 385-1-1 are both applicable to this contract. The most stringent requirement of the two standards will be applicable.

13. QUALITY CONTROL. The Contractor shall inspect the work of his own forces and the work of all subcontractors for compliance with the contract requirements in accordance with section: CONTRACTOR'S QUALITY CONTROL.

* * * * *



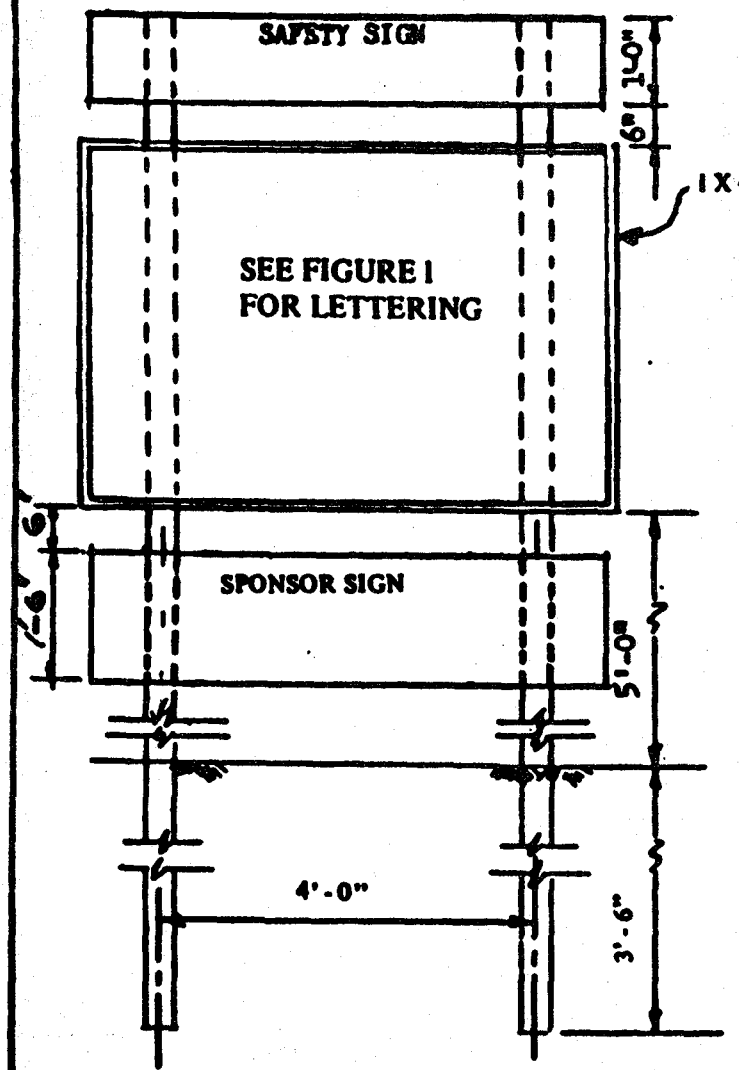
SCHEDULE

Space	Height	Line	Description	Letter Height	Stroke
A	3"				
		1	U. S. ARMY	5 1/2"	7/8"
B	2"				
		2	PROJECT NOMENCLATURE	4"	5/8"
C	2"				
		3	CORPS OF ENGINEERS CASTLE (DECAL)	14"	--
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"				

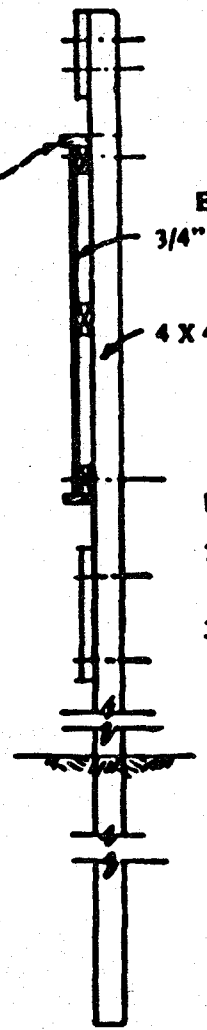
Lettering Color -- Black

PROJECT SIGN
(Army-Civil Works)

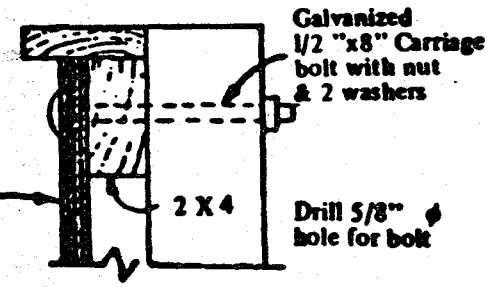
Figure 1
14 August 1972



ELEVATION



SECTION



DETAIL

General Notes

1 - Lumber to be cut & formed accurately.

2 - Secure 1 X 4 and plywood with 6d finish nails at not less than 12" O.C.

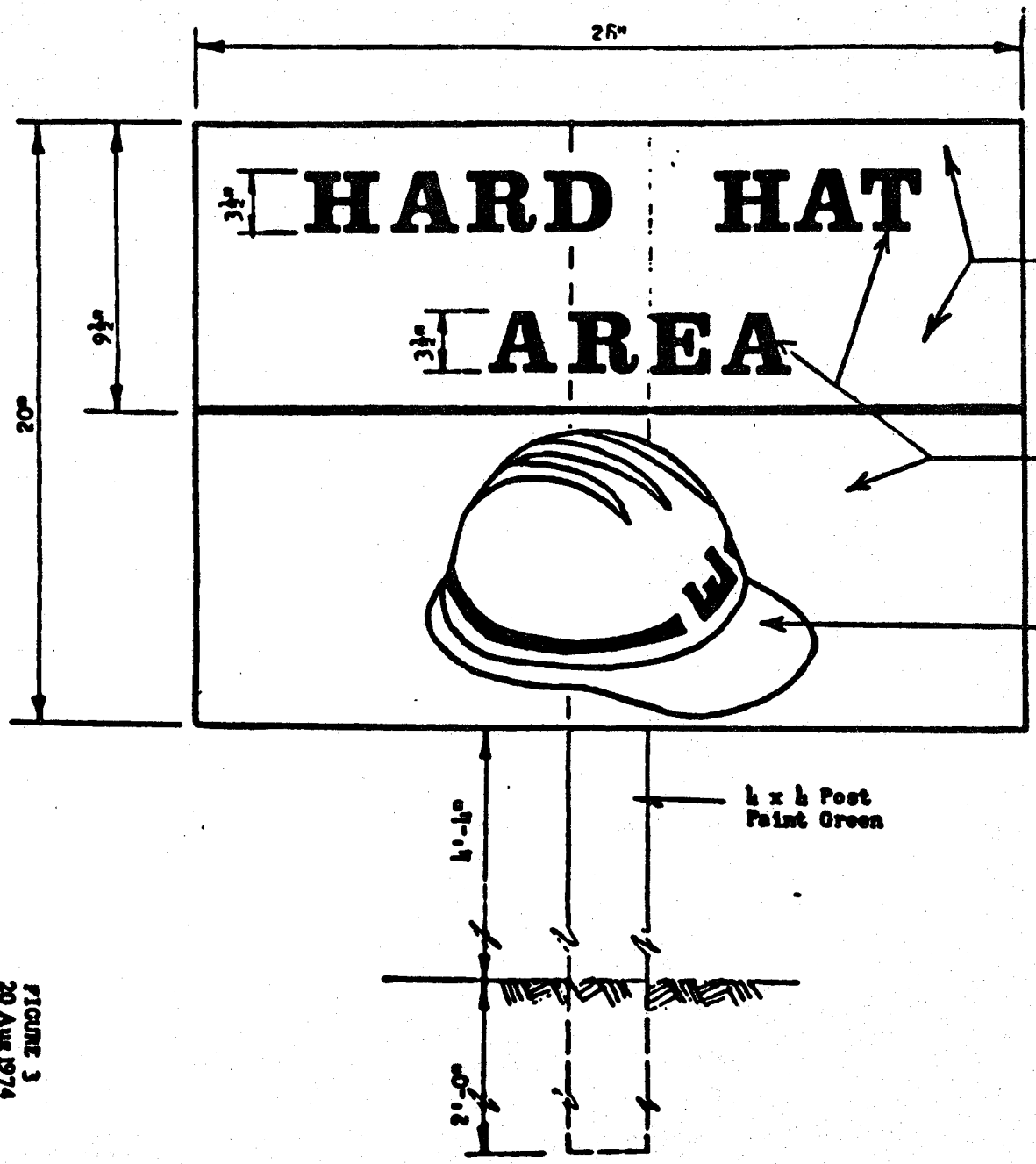
3 - All exposed nails to be set & holes filled with putty.

4 - Sign to be set in good solid ground & backfill carefully tamped into place.

5 - Where necessary, posts shall be braced to provide a solid installation.

SIGN DETAILS

Figure 2
25 February 1975



General Notes

1. Green & White Paint shall be opaque glossy as specified in ANSI Standard Z53.1
2. Bolt Sign to Post w/2½" dia. Carriage Bolts.

FIGURE 3
20 Aug 1974

SECTION 1B

PAYMENT

Index

1. Reinforced Concrete Box Repair
2. Gunite Repair
3. Restroom Repair
4. Median Repair and Sidewalks Modification
5. Grading and Surfacing Repair
6. Landscaping
7. Drilling
8. Outlet Structure
9. Asphalt Concrete Pavement
10. Fencing
11. Telemetry Box
12. Gaging Station

1. REINFORCED CONCRETE BOX REPAIR. Payment for Repair of Reinforced Concrete Box at various locations will be made at the applicable contract price, which payment shall constitute full compensation for repair of reinforced concrete box, including repair of insufficient cover over steel reinforcement; repair of construction joint offsets including the starter wall; repair of cracks; repair of honeycomb and voided concrete; removal of formwork; repair of manholes and grated inlet structures; removal of she bolts and plug the holes; repair of storm sewer connection including excavation and backfill, excavation of buried headwall and culverts, bricking of culverts, backfill to the present grades near Scottsdale and Camelback Roads; and grind and resack of inlet structure headwalls, complete.

2. GUNITE REPAIR. Payment for gunite repair will be made at the applicable contract price, which payment shall constitute full compensation for repair of gunite along the Arizona Canal backslope, complete.

3. RESTROOM REPAIR. Payment for Repair of Restroom will be made at the applicable contract price, which payment shall constitute full compensation for restroom repair, including repair of cracks in restroom slab and sidewalk; application of stuccocoat; painting, and construction of chainlink fence, complete.

4. MEDIAN REPAIR AND SIDEWALK MODIFICATION. Payment for Median Repair Sidewalk Modification will be made at the applicable contract price, which payment shall constitute full compensation for repair of median and sidewalk; modification, including removal of existing median, vertical curb and sidewalk; pavement patching; concrete construction; removal of debris; and traffic control, complete.

5. GRADING AND SURFACING REPAIR. Payment for Grading and Surfacing Repair will be made at the applicable contract price, which payment shall constitute full compensation for grading and surfacing repair, including removing material to original grade, repair damaged surfacing and compaction failures, and related final grading, complete.

6. LANDSCAPING. Payment for Landscaping will be made at the applicable contract price, which payment shall constitute full compensation for landscaping, including related excavation and fill; removing and planting of trees, shrubs and turf; native seeding; landscaping establishment; and repair of irrigation system, complete.

7. DRILLING. Payment for drilling will be made at the applicable contract price, which payment shall constitute full compensation for drilling of holes to determine concrete cover depth, complete.

8. OUTLET STRUCTURE. Payment for Outlet Structure will be made at the applicable contract price, which payment shall constitute full compensation for the outlet structure, including related excavation and backfill, handrail, protective barrier modification grouted stone, diversion and control of water, and installation of visitor center sign, repair of fire access road; and replace bender boards, complete.

9. ASPHALT CONCRETE PAVEMENT. Payment for Asphalt Concrete Pavement will be made at the applicable contract price, which payment shall constitute full compensation for asphalt concrete complete in place, including weed killer, prime coat, tack coat, subgrade preparation, aggregate base course required, removal of existing chipseal and asphalt concrete, striping, and appurtenant work, complete. Payment for repair of damaged surfacing included for payment in separate bid items will not be included for payment uner this item.

10. FENCING. Payment for Fencing will be made at the applicable contract price, which payment shall constitute full compensation for the fencing, complete. Payment will include excavation and backfill, concrete, cement, chain-link fence and appurtenant work, complete. Payment for fencing will not include fencing included in payment for Restroom Repair.

11. TELEMETRY CABINET. Payment for Telemetry Cabinet will be made at the applicable contract price, which payment shall constitute full compensation for installation of the telemetry cabinet, including excavation and backfill, complete.

12. GAGING STATION. Payment for Gaging Station will be made at the applicable contract price, which payment shall constitute full compensation for completion of the gaging station, including removing rust and preparing existing steel dowel bars for bonding with concrete block masonry; construction of concrete block masonry; steel decking; built-up roof; shelf; miscellaneous metalwork; and finishing, complete.

* * * * *

SECTION 1C

CONTRACTOR'S QUALITY CONTROL

Index

1. General
2. Coordination Meeting
3. Quality Control Plan
4. Quality Control Organization
5. Submittals
6. Control
7. Tests
8. Defective Work
9. Completion
10. Documentation

1. GENERAL. The Contractor shall establish and maintain an effective quality control system in compliance with CONTRACT CLAUSE: INSPECTION OF CONSTRUCTION. The quality control system consist of plans, procedures, and organization necessary to provide materials, equipment, workmanship, fabrication, construction and operations which comply with contract requirements. The system shall cover construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence.

2. COORDINATION MEETING. As soon as practicable after receipt of Notice to Proceed and before start of construction, the Contractor shall meet with the Contracting Officer (CO) and discuss the Contractor's Quality Control (CQC) system. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the (QC) operations; control activities, testing, administration of the system for both onsite and offsite, and the interrelationship of Contractor and Government control and surveillance. Minutes of the meeting shall be prepared, signed by both the Contractor and the CO and shall become a part of the contract file. There may also be occasions when subsequent conferences will be called to reconfirm understandings.

3. QUALITY CONTROL PLAN.

3.1 General. Prior to start of construction, the Contractor shall furnish his QC plan to the CO for acceptance. Construction will be permitted to begin only after acceptance of the QC plan, or approval of that portion of the plan applicable to the particular feature of work to be started. The QC plan the Contractor proposed to implement shall identify the personnel, procedures, instructions, records, and forms, and, as a minimum, shall include:

3.1.1 A description of the quality management organization.

3.1.2 The number, classifications, qualifications, duties, responsibilities and authorities of personnel. A copy of the letter, signed by an authorized official of the firm, which describes the responsibilities and delegates the authorities of the system manager shall be furnished.

3.1.3 Procedures for processing shop drawings, samples, certificates, and other submittals.

3.1.4 QC activities to be performed, including those of subcontractors, offsite fabricators, and suppliers.

3.1.5 Control testing procedures.

3.1.6 Documentation format for QC activities, and testing.

3.2 Notification of Changes. After approval of the QC plan, the Contractor shall notify the CO in writing of any proposed change to his QC system.

3.3 Corrective Actions. At any time it is determined that the QC system, personnel, instructions, controls, tests, or records are not providing construction which conforms to contract requirements, actions shall be taken to correct the deficient management.

4. QUALITY CONTROL ORGANIZATION.

4.1 System Manager. The Contractor shall identify an individual within his organization at the site of the work who shall be responsible for overall management and have the authority to act in all CQC matters for the Contractor.

4.2 Personnel. A staff shall be maintained under the direction of the system manager to perform all QC activities. The actual strength of the staff during any specific work period may vary to cover work phase needs, shifts, and rates of placement. The personnel of this staff shall be fully qualified by experience and technical training to perform their assigned responsibilities.

5. SUBMITTALS. Procedures for purchasing materials and equipment, subcontracting, and processing shop drawings, samples, certificates, and other submittals shall be developed. The procedures shall include the establishment of responsibilities to assure at each level adequate review and approval, timely delivery including verification procedures, and proper storage.

5.1 Procedures. Action shall be taken to ensure that only materials and equipment which comply with contract requirements are purchased and delivered to the jobsite or used in offsite fabrication, unless specific deviations are approved as specified hereinafter.

5.2 Selection and Control. The Contractor shall review the contract requirements and determine those submittals needed to assure himself of contract compliance. Within 7 days after receipt of Notice to Proceed, the Contractor shall submit to the CO for review and approval, in duplicate, a network analysis system (NAS) printout or a submittal control document (ENG Form 4288) listing and scheduling all submittal items required in the contract. When requested ENG Form 4288 will be furnished to the Contractor. The print out or control document shall include such items as shop drawings and manufacturer's literature, certificates of compliance, materials samples, and guarantees. The document shall schedule for each item the projected need dates for obtaining submittals and material procurement. When NAS is used for schedule control, the Contractor should consider its use for scheduling submittals in lieu of ENG Form 4288. A print-out limited to a list of procurement activities in i-j order shall then be furnished with each progress schedule report. If the ENG Form 4288 is used, the scheduling shall be coordinated with the approved progress schedule and information contained therein shall be revised and updated at each schedule update. Adequate time shall be allowed for those submittals specified to have Government approval. The Contractor shall review the listing at each progress schedule update and copies of updated documents shall be submitted to the Contracting Officer in the specified quantity. Payments to the Contractor will not be made for material or equipment which does not comply with the contract requirements.

5.3 Certification. The Contractor is responsible for, and shall certify that the submittals comply with the contract requirements.

5.4 Transmittal. The Contractor shall submit copies of all submittals to the Contracting Officer.

5.5 Government Approved Submittals. When submittals are required to be approved by the CO, each copy of the drawings will be identified as having received such approval by being so stamped and dated. Delays in the approval process shall not be the basis for consideration of a time extension when such delay is the result of the contractor's failure to make proper submittal or make corrections in accordance with the specifications, or the CO's comments, or is a result of a resubmittal which is required because of an unsatisfactory original submittal. Approval action by the CO will not relieve the Contractor of his responsibility for compliance with the contract but will indicate only that the general method of construction and detailing is satisfactory.

5.6 Deviations. All proposed deviations from contract requirements shall be submitted in writing for approval by the CO.

6. CONTROL. The Contractor's quality control system shall include at least the following three phases of control and management for definable features of work.

6.1 Preparatory. This control phase shall be performed before beginning work on each definable feature of work. It shall include a review of contract requirements, to assure that materials, sample panels and equipment conforms to contract requirements, and that control testing including procedures are finalized. This control shall also include examination of the work area, upon which new work is to be placed, to verify that work over which new work is to be placed conforms to contract requirements, and determination that required materials are on hand and properly stored. The CO shall be notified in writing at least 24 hours in advance of each preparatory activity.

6.2 Initial. This phase of control must be accomplished at the time of arrival of workmen on site to accomplish a definable feature work and at any time new workmen or crews arrive for assignment to the work. The Contractor's control system must permit the transfer of information on quality requirements specified in this contract to each workman before he starts, demonstration from each workman that he can provide the specified quality of work, and motivate him to continue. It is also during this phase that control testing to prove the adequacy of the Contractor's control procedures shall be initiated and verified. The CO shall be notified at least 24 hours in advance of each initial activity.

6.3 Follow-up. The follow-up phase shall be performed continuously to verify that control procedures are providing an end product which complies with contract requirements. Adjustments to control procedures may be required based upon the results of this phase and control testing.

7. TESTS.

7.1 Testing Procedure. The Contractor shall perform tests specified or required to verify that control measures are adequate to provide a product which conforms to contract requirements. The Contractor shall procure the services of an industry recognized testing laboratory or he may establish an approved testing laboratory at the project site. A list of tests which Contractor understands he is to perform shall be furnished to the Contracting Officer. The list shall give the test name, specification paragraph containing the test requirements, and the personnel and laboratory responsible for each type of test. The Contractor shall perform the following activities and record and provide the following data.

7.1.1 Verify that testing procedures comply with contract requirements.

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

7.1.3 Check test instrument calibration data against certified standards.

7.1.4 Verify that recording forms, including all of the test documentation requirements, have been prepared.

7.2 Testing.

7.2.1 Capability Check. The CO 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.

7.2.2 Capability Re-Check. Should the selected laboratory fail the capability check, the Contractor will be assessed a charge of $675.00 to reimburse the Government for each succeeding re-check of the laboratory or the checking of a subsequently-selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

7.2.3 Project Laboratory. The CO 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.

8. DEFECTIVE WORK. The Contractor shall not build upon or conceal defective work.

9. COMPLETION. At the completion of the work, the CQC representative shall conduct a joint completion review with the CO. During this review the work shall be examined, quality control shall be reviewed, and a list shall be developed of work not properly completed or not conforming to plans and specifications. This list shall be included in the quality control documentation with an estimated date for correction of each deficiency. The Contractor shall make sure that deficiencies have been corrected prior to the specified correction date. Payment will be withheld for defective or deficient features until they are satisfactorily corrected except as otherwise provided in the CONTRACT CLAUSE: INSPECTION OF CONSTRUCTION.

10. DOCUMENTATION.

10.1 The Contractor shall maintain correct records, on an appropriate approved form, of quality control operations, activities, and tests performed including the work of suppliers and subcontractors. These records shall include factual evidence that the required activities or tests have been performed, including but not limited to the following:

10.1.1 Type and number of control activities and tests involved.

10.1.2 Results of control activities or tests.

10.1.3 Nature of defects, causes for rejection, etc.

10.1.4 Proposed remedial action.

10.1.5 Corrective actions taken.

10.2 These records shall cover both conforming and defective or deficient features and shall include a statement that supplies and materials incorporated in the work comply with the contract. Legible copies of these records shall be furnished to the CO daily. The records shall cover work placed during the time period the records are furnished and shall be verified by person so designated by the Contractor.

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SECTION 1D

ENVIRONMENT PROTECTION

Index

1. Scope
2. Reference
3. General
4. Notification
5. Subcontractors
6. Implementation
7. Protection of Land Resources
8. Recording and Preserving Historical and Archaeological Finds
9. Protection of Water Resources
10. Protection of Fish and Wildlife
11. Disposal of Cleared and Grubbed Material and Other Debris
12. Dust Control
13. Maintenance of Pollution Control Facilities During Construction

1. SCOPE. This section covers the furnishing of all labor, materials and equipment and performing all work required for the protection of the environment during construction operations except for those measures set forth in other Technical Provisions of these specifications.

2. REFERENCE. "Standard Methods for the Examination of Water, Sewage, and Industrial Wastes," Thirteenth Edition, 1971, published by American Public Health Association, 1015 Eighteenth Street, N.W., Washington, D.C. 20036.

3. GENERAL. For the purpose of this specification, environment protection is defined as the retention of the environment in its natural state to the greatest possible extent during project construction and to enhance the natural appearance in its final condition. Environment protection requires consideration of air, water, and land, and involves noise, solid waste-management of radiant energy and radioactive materials, as well as other pollutants. In order to prevent, and to provide for abatement and control of, any environmental pollution arising from the construction activities in the performance of this contract, the Contractor and his subcontractors shall comply with all applicable Federal, State, and local laws and regulations concerning environmental pollution control and abatement.

4. NOTIFICATION. The Contracting Officer will notify the Contractor in writing of any noncompliance with the aforementioned Federal, State, or local laws or regulations. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. The Contractor shall, after receipt of such notice, immediately inform the Contracting Officer of proposed corrective action and take such action as may be approved. 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 any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor.

5. SUBCONTRACTORS. Compliance with the provisions of this section by subcontractors will be the responsibility of the Contractor.

6. IMPLEMENTATION. Prior to commencement of the work the Contractor will:

(1) submit in writing his proposals for implementing this section for environment protection;

(2) meet with representatives of the Contracting Officer to develop mutual understandings relative to compliance with this provision and administration of the environment protection program.

Approval of the Contractor's plan for environment protection will not relieve the Contractor of his responsibility for adequate and continuing control of pollutants.

7. PROTECTION OF LAND RESOURCES.

7.1 General. The land resources within the project boundaries and outside the limits of permanent work performed under this contract shall be preserved in their present condition or be restored to a condition after completion of construction that will appear to be natural and not detract from the appearance of the project. The Contractor shall confine his construction activities to areas defined by the plans or specifications. The following additional requirements are intended to supplement the requirements of General Provisions 46, 47, and 50.

7.2 Prevention of Landscape Defacement. Except in areas indicated on the plans or specified to be cleared, the Contractor shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without the authority of the Contracting Officer. Ropes, cables, or guys shall not be fastened to or attached to any existing nearby trees for anchorages unless specifically authorized. Where such special emergency use is permitted, it shall be performed in such a manner as to avoid damage to the trees. The Contractor shall in any event be responsible for any damage resulting from such use. Where the possibility exists that trees may be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment or operations, the Contractor shall adequately protect such trees. Stone, earth or other material that is displaced into uncleared areas shall be removed. Monuments and markers shall be protected before construction operations commence. A preconstruction survey including photographs shall be accomplished by the Contractor and a report of survey furnished when required by the Contracting Officer.

7.3 Restoration of Landscape Damage. Any trees or other landscape features scarred or damaged by the Contractor's equipment or operations shall be restored to a condition satisfactory to the Contracting Officer. Restoration of scarred and damaged trees shall be performed in an approved manner by experienced workmen. Trees damaged beyond restoration shall be removed and disposed of under requirements for clearing and grubbing. Trees that are to be removed because of damage shall be replaced at the Contractor's expense by nursery-grown trees of the same species or a species approved by the Contracting Officer. The size and quality of nursery-grown trees shall also be approved by the Contracting Officer.

7.4 Location of Storage Facilities. Contractor's storage, and other construction buildings, located on Government property, which is required in the performance of the work, shall be located upon cleared portions of the jobsite or areas to be cleared, and shall require written approval of the Contracting Officer. The preservation of the landscape shall be an imperative consideration in the selection of all sites and in the construction of buildings. Plans showing storage facilities shall be submitted for approval of the Contracting Officer. Where buildings or platforms are constructed on sidehills, the Contracting Officer may require cribbing to be used to obtain level foundations. Benching or leveling of earth may be permitted, depending on the location of the proposed facility.

7.5 Temporary Excavation and Embankments. If the Contractor proposes to construct temporary roads or embankments and excavations for plant and/or work areas, he shall submit the following for approval prior to scheduled start of such temporary work.

7.5.1 A layout of all temporary roads, excavations and embankments to be constructed within the work area.

7.5.2 A landscaping plan showing the proposed restoration of the area. The plan shall provide for the obliteration of construction scars as such and shall provide for a reasonably natural appearing final condition of the area. No unauthorized road construction, excavation or embankment construction (including borrow and disposal areas) will be permitted.

7.6 Post-Construction Cleanup or Obliteration. The Contractor shall obliterate all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures or stockpiles of excess or waste materials, as directed by the Contracting Officer. The area will be restored to near natural conditions which will permit the growth of vegetation thereon. Except in specific cases, restoration to original contours will not be required, however, all restored areas shall be smoothly and evenly dressed and sloped to drain.

8. RECORDING AND PRESERVING HISTORICAL AND ARCHAEOLOGICAL FINDS. All items having any apparent historical or archaeological interest which are discovered in the course of any construction activities shall be carefully preserved. The Contractor shall leave the archaeological find undisturbed and shall immediately report the find to the Contracting Officer so that the proper authorities may be notified.

9. PROTECTION OF WATER RESOURCES.

9.1 General. The Contractor shall not pollute streams, lakes, or reservoirs with fuels, oils, bitumens, calcium chloride, acids, insecticides, herbicides or other harmful materials. The Contractor shall investigate and comply with all applicable Federal, State, County, and Municipal laws concerning pollution of rivers and streams.

9.2 Erosion Control. Prior to any major construction the Contractor shall submit a plan for approval of the Contracting Officer showing his scheme for controlling erosion and disposing of wastes.

9.2.1 Surface drainage from cuts and fills within the construction limits, whether or not completed, and from borrow and waste disposal areas, shall, if turbidity producing materials are present, be held in suitable sedimentation ponds or shall be graded to control erosion within the acceptable limits. Temporary erosion and sediment control measures such as berms, dikes, drains, immediate seeding of cut and fill slopes, or sedimentation basins, if required to meet the above standards, shall be provided and maintained until permanent drainage and erosion control facilities are completed and operative. The area of bare soil exposed at any one time by construction operations should be held to a minimum. Stream crossings by fording with equipment shall be limited to control turbidity. Any temporary culverts or bridge structures shall be removed upon completion of the project. Fills and waste areas shall be constructed by selective placement to eliminate silts or clays on the surface that will erode and contaminate adjacent streams.

9.3 Spillages. Special measures shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, waste washings, herbicides and insecticides, and concrete drainage from entering public waters.

9.4 Washing and Curing Water. Water used in embankment material processing, aggregate processing, concrete curing, foundation and concrete lift cleanup, and other waste waters shall not be allowed to reenter the water course if a

significant increase in the turbidity of the water course will result therefrom. The Contractor shall remove from within the cofferdam all wash, curing and waste waters derived from sources either within or outside the cofferdam.

9.5 Disposal. Disposal of any materials, wastes, effluents, trash, garbage, oil, grease, chemicals, etc., in areas adjacent to streams shall not be permitted. If any waste material is dumped in unauthorized areas the Contractor shall remove the material and restore the area to the original condition before being disturbed. If necessary, contaminated ground shall be excavated, disposed of as directed by the Contracting Officer, and replaced with suitable fill material, compacted and finished with topsoil and planted as required to reestablish vegetation.

10. PROTECTION OF FISH AND WILDLIFE. The Contractor shall at all times perform all work and take such steps required to minimize interference with or disturbance to fish and wildlife. The Contractor will not be permitted to alter water flows or otherwise disturb native habitat adjacent to the project area which, in the opinion of the Contracting Officer, are critical to fish or wildlife.

11. DISPOSAL OF CLEARED AND GRUBBED MATERIAL AND OTHER DEBRIS.

11.1 General. Except as specified herein, all debris resulting from construction operations on this contract shall be disposed of in accordance with the requirements of the section: EXCAVATION.

11.2 Burning will not be permitted.

12. DUST CONTROL. The Contractor will be required to maintain all excavations, embankments, stock piles, haul roads, permanent access roads, plant sites, waste areas, borrow areas, and all other work areas within or without the project boundaries free from dust which would cause a hazard or nuisance to others. Approved temporary methods of stabilization consisting of sprinkling, chemical treatment, light bituminous treatment or similar methods will be permitted to control dust. Sprinkling, to be approved, must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the Contractor must have sufficient competent equipment on the job to accomplish this if sprinkling is used. Dust control including sweeping shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs. No separate or direct payment will be made for dust control and the cost thereof shall be considered incidental to and included in the contract prices for excavation and embankments.

13. MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION. During the life of this contract, the Contractor shall maintain all facilities constructed for pollution control under this contract as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created. During the construction period the Contractor should conduct frequent training periods on environment protection. The curricula should include methods of detecting and avoiding pollution; familiarity with pollution standards; both statutory and contractual; and installation and care of vegetative covers, plants and other facilities to prevent and correct environmental pollution.

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SECTION 2A

DIVERSION AND CONTROL OF WATER

1. REQUIREMENT.

1.1 General. All permanent construction shall be carried on in areas free from water. At intermittent periods during the time allowed for completion of construction, water in varying quantities may be flowing in the work area. Runoff from the watersheds is rapid and during periods of rain, intermittent freshets may be expected. In addition, flows up to 5,000 cfs may be diverted from Arizona Canal into Indian Bend Wash. Releases may be made as a result of storm runoff or as required because of operating conditions for the canal. The Salt River Project, operators of the canal, will make every reasonable effort to notify the Contractor when it has been determined that a release from the canal is necessary, however, releases may occur with no advance warning. The responsibility of the Contractor for protection of work against waterflows is specified in paragraph: DAMAGE TO WORK of the SPECIAL CLAUSES. At all locations where construction work is at a lower elevation than the elevation of the stream or ground water at the time of doing the work, suitable cofferdams or dikes, if necessary, shall be constructed, the construction area shall be dewatered prior to commencement of the work, and all subgrades, whether for earth fill, filter, stone, or concrete, shall be kept drained and free of water throughout the working period. Within 10 days after award of contract, the Contractor shall submit plans showing the methods he proposes to use to dewater each working area and control the water from rain, sheet flow and other surface water. The plans shall show the scheme of operations and a complete layout of drainage pipes, pumps, diversion channels, cofferdams, etc. The plans shall also take into consideration the following specific requirements. The Contractor shall provide for diversion of flows as hereinafter specified. The flows will include water originating upstream of the work, water from the Arizona Canal, water from side drains and channels adjacent to the work site and will be in addition to any and all ground water originating within the work area. Surface flows in excess of the following quantities will be regarded as floodflows.

1.1.1 Indian Bend Wash.

1.1.1.1 Runoff Quantities During Periods 1 April to 30 June and 1 October to 1 November - a streamflow of 400 cfs.

1.1.1.2 Runoff Quantities During Other Periods - a streamflow of 2,000 cfs.

1.1.2 Side Channel System. The side channel system shall remain operational during repairs. The Contractor shall not completely block side channel system at any location.

1.2 The schedule for construction operations shall be in accordance with the requirements specified in the SPECIAL CLAUSES.

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SECTION 2B

CLEARING SITE AND REMOVING OBSTRUCTIONS

Index

1. Requirements
2. Disposal of Cleared Material
3. Protection and Support of Utilities
4. Disposal Areas

1. REQUIREMENTS.

1.1 General. Except as otherwise specified, and/or indicated areas to be cleared will be limited to areas shown on the drawings or areas on which fills and/or structures are to be placed. The removal of trees, shrubs, turf, and other vegetation outside of these areas shall be held to a minimum and care shall be exercised not to damage any trees, shrubs, turf, or vegetation which can be left in place. Protection in place or restoration of landscape shall include but shall not necessarily be limited to the signs, turf, trees, shrubs and irrigation systems. The Contractor shall be responsible for locating the underground irrigation lines within the construction limits.

1.2 Existing Structures and Obstructions. The Contractor shall clear the site, include all fill and excavation areas, and remove and dispose of all existing structures and obstructions for construction, except as otherwise noted on the drawings. Except as otherwise specified, incombustible waste material, such as broken concrete, pavement, and other like materials shall be considered scrap and shall not be used in fills.

1.3 Clearing. Vegetation shall be cut off flush or slightly below the original ground surface. Clearing operations shall be conducted so as to prevent damage to trees, structures, and installations under construction, or to remain in place, and to provide for the safety of employees and others. All rubbish, waste dumps, and debris areas shall be cleared within the channel right-of-way and work areas.

1.4. Filling of Holes. Holes made by removal of obstructions and grubbing operations shall be refilled to subgrade with compacted fill material as specified in the section: FILLS AND SUBGRADE PREPARATION.

1.5 Concrete in existing construction, which will join new concrete or new construction, shall be saw cut to a depth of 2 inches and the concrete shall be removed in a manner to provide plane surfaces to which new concrete shall be bonded, unless otherwise specified.

1.6 The removal of materials for salvage, replacement or restoration shall be performed in a manner to avoid damage to such materials and to portions of the existing work to remain in place. The Contractor has the option of furnishing new fastenings and fittings in the lieu of salvaging, replacing or restoring such material. Such new materials shall be the equivalent of existing materials.

1.7 Existing Structures including sidewalks, curbs and gutters within the rights-of-way which are to remain shall be protected and supported as necessary during removal and construction operations. Any damage to existing facilities shall be repaired in accordance with applicable clauses of the CONTRACT CLAUSES.

2. DISPOSAL OF CLEARED MATERIAL. All material removed, except material specified and/or indicated to be salvaged, is designated as scrap, shall become the property of the Contractor, and shall be removed from the site. Disposal shall comply with all applicable Federal, State, and local laws.

3. PROTECTION AND SUPPORT OF UTILITIES.

3.1 General. The Contractor shall adequately support and protect from damage all existing utilities which are located within, or below, or close to the construction area and which are to remain in place.

4. DISPOSAL AREAS.

4.1 General. Disposal Area and Salt River Landfill Disposal Site may be used at the option of the Contractor for disposal of materials as specified hereinafter.

4.2 Disposal Site. Material placed in disposal site shall be excess excavated material including broken concrete. Material may be placed in uniform layers not exceeding 5 feet in depth within limits as indicated. Compaction other than that obtained by controlled movement of the construction equipment will not be required.

4.3 SALT RIVER LANDFILL DISPOSAL SITE. Salt River Landfill Disposal Site is located approximately 6 1/2 miles from the project site near the intersection of McDowell Road and Phoenix-Payson Beeline Highway next to Salt River. Material shall consist of any unsuitable material pavement, or any organic and inorganic trash. The size or shape of the material to be disposed shall be such that no special handling is required. The operator will provide the Contractor, without charge, a weigh ticket for each acceptable load. Weigh tickets shall be presented by the Contractor to the Contracting Officer at the end of each days work. The person to contact is Mr. Chuck Gabriel, Salt River Landfill Project, Route 1 - Box 216, Scottsdale, Arizona, Telephone (602) 949-7234; Mr. Wayne Hill, Scottsdale, Arizona, Telephone (602) 990-1987.

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SECTION 2C

TRAFFIC CONTROL FACILITIES

1. EQUIPMENT CROSSINGS. The Contractor shall not cross existing paved roadways with construction equipment except at approved marked crossings. Crossings shall be maintained in accordance with applicable State, County, and City regulations.

2. TRAFFIC CONTROL FACILITIES. As required by applicable State, County, and City traffic regulations, the Contractor shall furnish, install, maintain, and remove all temporary barricades, lights, warning and regulatory signs, flagmen, and other facilities necessary to control the traffic and protect pedestrians within the limits of the construction area. All signs to be used on the job during periods of darkness shall be reflectorized. Traffic control shall conform to the Part 400 of Uniform Standard Specifications for Public Works Construction, Maricopa Association of Governments, Arizona (MAG); Scottsdale Traffic control requirements; and the City of Phoenix, Phoenix Barricade Manual.

3. RESTRICTIONS - CAMELBACK ROAD. The following restrictions shall be considered in the development of a traffic control plan.

3.1 General. Two way traffic shall be maintained at all times.

3.2 No work will be allowed before 7:00 A.M. or after 7:00 P.M. unless otherwise approved by the Contracting Officer.

3.3 No utility relocation work that would obstruct the flow of traffic shall be done between the hours of 7:00 A.M. to 9:00 A.M. and 4:00 P.M. and 6:00 P.M. At other times a minimum of one lane of traffic in each direction shall be maintained.

3.4 Temporary no parking signs will be posted along both sides of Camelback Road within the active work area.

3.5 Trenches in front of driveways into restaurants and banks shall be backfilled as needed to maintain access or other arrangements made that will be satisfactory to the Owners.

3.6 No barricade or work shall be permitted on any street in the City of Scottsdale from 20-27 January 1985.

4. CHINA-INN.

4.1 The back door to China-Inn shall remain accessible to delivery trucks at all times during business hours.

4.2 Entrance to east side shall be open before entrance to south side is closed.

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SECTION 2D

EXCAVATION

Index

1. General
2. Blasting
3. Preservation of Property
4. Excavation for Structures
5. Removal of Unsatisfactory Soils
6. Disposal of Excavated Materials
7. Overcut

1. GENERAL. Excavation shall consist of the removal of every type of material encountered except materials covered by the provisions of the section: CLEARING SITE AND REMOVING OBSTRUCTION in the designated areas or from areas directed. The material to be removed may include but is not limited to earth, hardpan, silt, clay, gravel, cemented sand and gravel, rock, adobe, detached pieces of stone and concrete, rock fills, existing fills of miscellaneous debris and rubbish, and other unsuitable materials. Slope lines indicated on the drawings for temporary cuts do not necessarily represent the actual slope to which the excavation must be made to safely perform the work. Excavation for permanent cuts shall be made to the slope lines indicated. Excavation shall be performed in a manner which will not impair the subgrade. Except as otherwise specified, the finish surface of subgrades shall be smooth and shall not vary more than 1/2 inch from indicated grade.

2. BLASTING. Blasting will not be permitted.

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

4. EXCAVATION FOR STRUCTURES. Excavation within the vicinity of existing structures, utilities, 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. In general, unless otherwise shown or specified, the actual side slopes will be at the Contractor's option.

5. REMOVAL OF UNSATISFACTORY SOILS. The removal of soils which are unsatifactory for foundations of the structures, streets, and drains, may be required in certain areas. The Contractor will be required to excavate any such areas to the depth directed and backfill the areas with compacted fill conforming to the requirements of the section: FILLS AND SUBGRADE PREPARATION.

6. DISPOSAL OF EXCAVATED MATERIALS. Excavated materials suitable for required fills shall be placed in temporary stock piles or used directly in the work. All excess materials shall become the property of the Contractor and removed from the site. Excavated material not suitable for fills and unsatifactory materials shall become the property of the Contractor and shall be removed from the site. No excavated materials or waste of any kind shall be disposed of at any place beyond the limits of the work under this contract without express authority. Prior to placing material, the stockpile areas shall be cleared of trash and vegetation. Vegetation shall be cut off at the existing ground line. Clearing shall conform to the applicable requirements of the Section: CLEARING SITE AND REMOVING OBSTRUCTIONS. The stockpiles and disposal fills shall be placed in manner to preclude ponding of water and shall not block traffic or access to private property. Contractor shall furnish notice of his intentions in connection with the use of indicated disposal areas in accordance with the requirements of the paragraph: PUBLIC UTILITIES, NOTICES, and RESTRICTIONS of the GENERAL REQUIREMENTS.

7. OVERCUT. Except as otherwise specified or as may be ordered in writing, any overcut or excavation made outside the lines indicated on the drawings or directed shall be backfilled with compacted fill or concrete, and all excavating, backfilling, compacting of backfill, an concreting occasioned thereby shall be by the Contractor at no additional cost to the Government. Any overcut under bridge footings shall be backfilled with concrete.

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SECTION 2E

FILLS AND SUBGRADE PREPARATION

Index

1. Applicable Publications
2. Compaction Equipment
3. Fills
4. Subgrade Preparation

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

1.1 American Society for Testing and Materials (ASTM) Publications.

D 1557-78	Moisture-Density Relations of Soils Using a 10-Lb. Rammer and an 18-In. Drop
D 1556-64 (R 1974)	Density of Soil In-Place by the Sand-Cone Method

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

T 180-74	Moisture-Density Relations of Soils Using a 10-Lb. Rammer and an 18-In. Drop
T 191-61 (1974)	Density of Soil In-Place by the Sand-Cone Method

2. COMPACTION EQUIPMENT.

2.1 General. All equipment, tools, and machines shall be maintained in satisfactory working condition at all times.

2.2 Compaction of material shall be performed by the use of approved mechanical tampers.

3. FILLS.

3.1 General.

3.1.1 Control. Moisture-density relations shall be established by the Contractor. Field density tests shall be performed by the Contractor in sufficient number 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.

3.1.1.1 Laboratory Control. One moisture-density relation shall be made for each classification, blend or change in classification of soil materials encountered. Approval of moisture-density relations shall be obtained prior to the compacting

of any material in the work. The moisture-density relations shall be determined in a laboratory in accordance with AASHO Standard T-180, Method D, or ASTM D 1557, Method D modified as specified hereinafter.

3.1.1.2 All material over 3/4 inch in size shall be removed and replaced with an equal portion of material between 0.187 inch, No. 4 sieve, and 3/4 inch in size.

3.1.1.3 A separate batch of materials shall be used for each compaction test specimen. No materials shall be re-used.

3.1.1.4 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.

3.1.2 Field Control. Field in-place density shall be determined in accordance with AASHTO T 191 or ASTM D 1556, except that in each test, the weight of the disturbed sample representing the full depth of layer shall be not less than 10 pounds for fine grain material and 12 pounds for coarse grain material using a scale for weighing of sufficient capacity and sensitive to .01 pounds. The density tests shall be well distributed and shall average not less than one test for each 100 cubic yards of material. At least one test shall be made in each 2 feet of compacted material processed as a unit and at least one test shall be made in each area and each trench.

3.1.3 Settling of Fills or Backfills with Water will not be permitted.

3.1.4 Material shall be obtained from the required excavations and shall be free from sod, roots, brush, debris, trash or other objectionable material, and shall contain no stone whose greatest dimension is more than 3/4 of the layer thickness.

3.1.5 Placement. Heavy equipment shall not be operated over pipes and buried structures until at least 2 feet of fill material has been placed and compacted over them in conformance with the requirements of the paragraph: Compacted Fills and Backfill. Compacted fill and backfill shall be placed with suitable equipment in horizontal layers which after compaction, shall not exceed 4 inches in depth. Material containing stones shall be placed in a manner to prevent the stones from striking the concrete structures and to prevent the formation of voids.

3.1.6 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 3 percent above optimum and a minimum moisture content of not less than 3 percent below optimum.

3.1.7 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. Compaction equipment shall be so operated that structures are not damaged nor overstressed during compaction operations.

3.2 Compacted Fills and Backfill.

3.2.1 Preparation for Placing. Before placing material for compacted fill, the foundation surface shall be cleared of all existing obstructions, vegetation, and debris. Unsuitable material not meeting the requirements for fill material shall be removed where directed, and the existing surfaces scarified to a depth of 6 inches before placing the fill.

3.2.2 Compaction. Each layer of the materials shall be compacted to not less than 95 percent of maximum density except as hereinafter specified.

3.2.3 Material. In general, the best material available will be designated as fill about structures. Fill may consist of sand, gravelly sand, silty sands, sandy silts, clayey sands, and sandy clays. Organic material, silt, clay, broken concrete or pavement, boulders and other objectionable material shall not be used.

3.2.4 Placing. 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 2,500 psi when tested in accordance with section: CONCRETE. Fill shall be placed in layers not exceeding 4 inches in compacted depth and compaction shall not be less than 90 percent of maximum density until the fill has reached an elevation of at least 24 inches above the top of R.C. box and utilities.

3.3 LANDSCAPE FILL shall consist of top 6" material from the required excavation, placed in the area indicated and shall be placed with suitable equipment in layers which shall not exceed 12 inches in depth before compaction. Material shall be free from sod, roots, brush, debris, trash or other objectionable material, and shall contain no stone larger than 3 inches. Each layer of fill shall be compacted to not less than 85 percent of the maximum density.

4. SUBGRADE PREPARATION.

4.1 Subgrade Preparation for Asphalt Pavement, Curbs, Gutters, Sidewalks and Driveways. The subgrade shall be alternately watered and scarified until the material is uniformly moistened throughout for a depth of not less than 4 inches. All stones larger than 4 inches in diameter, and hard ribs of earth shall be removed. The amount of water to be applied shall be that which is required to provide optimum results in compaction under rolling. Following the above operations, the roadbed shall be shaped to a true cross section sufficiently higher than the specified grade to allow for subsequent compaction and then be thoroughly compacted to not less than 95 percent of maximum density. After the subgrade has been prepared and completed, the surface shall be firm, hard, and unyielding, with a true, even, and uniform surface conforming to the grade and cross section indicated on the drawings. All points of the finished subgrade shall be not more than 1/4 inch below or above true subgrade.

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SECTION 2F

STONE PROTECTION

Index

1. Applicable Publications
2. Materials
3. Foundation Preparation
4. Placement
5. Scales
6. Waybills and Delivery Tickets

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

C 88-73	Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
C 127-73	Specific Gravity and Absorption of Coarse Aggregate
C 136-71	Sieve or Screen Analysis of Fine and Coarse Aggregates
C 131-69	Resistance to Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine
C 535-69 (R 1975)	Resistance to Abrasion of Large Size Coarse Aggregate by Use of the Los Angeles Machine

2. MATERIALS.

2.1 Source and Material Approval. The Contractor shall make all arrangements, pay all royalties, and secure all permits for the procurement, furnishing and transporting of materials. The source from which the Contractor proposes to obtain the material shall be selected and a sample submitted a minimum of 15 days in advance of the time when the material will be required in the work. Stone from a proposed source where exploratory investigations and compliance test reports or satisfactory service records are not available, will be tested by the Government for quality compliance. The Government will test one sample at its expense. If the material fails the tests or if the Contractor desires to utilize more than one source, additional testing will be accomplished by the Government for the sum of $1300.00 for each sample tested. The costs of such tests will be deducted from payment due the Contractor. All test samples (500 pounds minimum) shall be representative of the rock source and shall be obtained by the Contractor under the supervision of the Contracting Officer and delivered at the Contractor's expense to the South Pacific Division Laboratory, U.S. Army Engineer Division, South Pacific, Sausalito, California. A list of sources from which acceptable stone protection materials have been obtained is available for informational purposes in the office of the District Engineer, Geotechnical Branch, 300 North Los Angeles Street, Los Angeles, California. Sources listed may no longer be available due to depletion or may not be acceptable because of changes in the material. The Contractor shall vary the quarrying, processing, loading and placing operations to secure the type and quality of stone protection specified. If the stone being furnished by the Contractor does not fully meet all the requirements

of these specifications, the Contractor shall furnish at no additional cost to the Government, other stone meeting the requirements of these specifications. Approval of stone from a source shall not be construed as a waiver of the right of the Government to require the Contractor to furnish stone which complies with these specifications. Materials produced from localized areas, zones or strata will be rejected when such materials do not comply with the specifications.

2.2 Quality Compliance. Test results and service records may be used to determine the acceptability of the stone protection materials. In the event compliance test reports and/or service records are not available, the material shall be subjected to the tests outlined in these specifications to determine its acceptability for use in the work. Before a proposed new source of stone will be considered for sampling and testing, one of the following criteria must be met:

a. A sufficiently developed quarry operation to demonstrate that an adequate quantity of stone is available to fulfill the contract requirements; or,

b. An exposed face plus sufficient explorations (results of which are made available to the Government) to demonstrate that an adequate quantity of stone is available to fulfill the contract requirements.

2.2.1 Bedding Material. Material shall contain no organic matter nor soft, friable particles, shall be clean, hard, and uncoated, and shall have a percentage of wear not to exceed 50 percent after 500 revolutions when tested in accordance with ASTM C 131.

2.3 Quality Compliance Tests for Stone Protection. Stone shall meet the following test requirements.

Test	Test Method	Requirement
Specific Gravity (Bulk SSD)	ASTM C 127	2.65 minimum
Absorption	ASTM C 127	2.0% maximum
Wetting & Drying	SPD Test Procedure(1)	No fracturing(3)
Sodium Sulfate	ASTM C 88(2)	10% max. loss(4)
Abrasion Loss	ASTM C 535	50% max. loss

In addition to the above tests, the stone shall be subjected to a petrographic and X-ray diffraction analysis. The stone must not contain significant amount of swelling type clay (illite or montmorillonite).

NOTE: (1): Test procedure wetting-and-drying tests. The initial step of the test is the careful examination of the entire sample and the selection of representative test specimens. The piece should be large enough to produce two cut slabs, 1 inch thick (± 1/4 inch) with a minimum surface area of 30 square inches on one side. Two chunks approximately three by four inches are also chosen. The slabs and chunks are carefully examined under a low-power microscope and all visible surface features are noted and recorded. The specimens are then oven dried at 140 degrees F., for eight hours, cooled and weighed to the nearest tenth of a gram. The test specimens are photographed to show all surface features before the test. The chunks and slabs are then subjected to fifteen cycles of wetting and drying. One slab and one chunk are soaked in fresh tap water, the other slab and chunk are soaked in salt water prepared in accordance with ASTM D 1141. Each cycle consists of soaking for sixteen hours at room temperature and then drying in an oven for eight hours at 140 degrees F. After each cycle the specimens are examined with the low-power microscope to check for opening or movement of fractures,

flaking along edges, swelling of clays, softening or rock surface, heaving of micaceous minerals, breakdown of matrix material and any other evidence of weakness developing in the rock. The cycle in which any of these action occurs is recorded. After fifteen cycles, the slabs and chunks are again carefully examined and all changes in the rocks are noted and recorded. The test specimens together with all flakes or particles which come off during the test are oven dried, weighed and photographed.

NOTE: (2): The test shall be made on 50 particles each weighing 1000 grams, +20 grams, in liew of the gradation given in C 88.

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

NOTE: (4): Sandstones which have a loss greater than the specified limit will be accepted if the Contractor demonstrates that the rock has a satisfactory service record.

2.4 Gradation Sampling and Testing for Stone Protection. Test shall be performed by an approved testing laboratory on samples selected by the Contracting Officer. The Government reserves the right to perform check tests and to use the Contractor's sampling and testing facilities to make the tests. Each sample shall consist of not less than five tons of materials and shall be selected at random from the production run. One gradation test is required at the beginning of production prior to delivery of stone to the project and a minimum of one additional test for each (10,000) tons of material placed. All sampling and gradation tests performed by the Contractor shall be under the supervision of the Contracting Officer.

2.5 Gradation.

2.5.1 General. All points on individual grading curves shall be between the boundary limits as defined by smooth curves drawn through specified grading limits plotted on a mechanical analysis diagram. The individual grading curves shall not exhibit abrupt changes in slope denoting skip grading or scalping of certain sizes. Specified grading of all material shall be met both at the source and as delivered to the project. In addition, material not meeting the required grading due to segregation or degradation during placement shall be rejected. If best results show that stone does not meet the required grading, the hauling operation will be stopped immediately and will not resume until processing procedures are adjusted and a gradation test is completed showing gradation requirements are met. All gradation tests shall be at the expense of the Contractor.

2.5.2 Filter Material. Filter material shall be well graded between the limits specified below when tested in accordance with ASTM C 136.

Sieve Size	Percent Finer
4 Inch	100
1-1/2 Inch	50-80
No. 4	30-60
No. 200	0-10

2.5.3 Type I stone shall be quarried stone or cobblestone and reasonably well graded within the limits specified below:

Pounds Weight of Pieces	Percent Smaller
1500	100
800	30-100
500	0-50
200	0-15

2.5.4 Type II Stone shall be quarried stone or cobblestone and reasonably well-graded within the limits specified below:

Pounds Weight of Pieces	Percent Smaller
160	100
70	60-100
35	15-50
20	0-15

2.6 Existing stone protection shall be salvaged where indicated. Stone shall be sorted and prepared for reuse. Stone shall be clean, free from earth, clay, refuse, and adherent coating. Stone removed and found of a quality unsuitable for reuse shall be disposed of as directed. Stone in excess of the amount required for the work shall be disposed of as directed.

3. FOUNDATION PREPARATION. Areas on which stone is to be placed shall be trimmed and dressed to conform to cross sections indicated or directed, within an allowable tolerance of plus or minus one inch from the theoretical slope lines and grades. Where such areas are below the allowable minus tolerance limit they shall be brought to grade by filling with earth similar to the adjacent material and well compacted, or by filling with approved material, and no additional payment will be made for any material thus required. Immediately prior to placing the stone, the prepared base shall be inspected by the Contracting Officer and no material shall be placed thereon until that area has been approved.

4. PLACEMENT.

4.1 Type I and II Stone shall be placed in a manner to produce a reasonably well graded mass with the minimum practicable percentage of voids, and shall be constructed to the lines and grades indicated or directed. Stone shall be placed to its full course thickness in one operation and in a manner to avoid displacing the underlying material. Method of placement shall be submitted to Contracting Officer for approval prior to commencement of placement operations. Type I stone shall be placed such that stone larger than 24" is placed with maximum dimension vertical as indicated. The Contractor shall maintain the stone protection until accepted and any material displaced by any cause shall be replaced at his expense to the lines and grades shown on the drawings. Self propelled equipment shall not be used on the levee slopes and/or toe slopes. Hand placing, barring, or placing by crane will be required only to the extent necessary to secure the results specified. Placing stone by dumping into chutes or by similar methods likely to cause segregation will not permitted. A tolerance of plus 3 inch or minus 1 inch from the indicated slope lines and grades will be allowed in the finished surface, except that either extreme of such tolerance shall not be continuous over an area greater than 200 square feet.

4.2 Stone shall not be placed against concrete which has not been in place at least 14 days. Stone within 12 inches of concrete structures shall be placed by hand or other methods that will preclude damage to the concrete structure.

5. SCALES shall be standard truck scales of the beam type. The scales shall be of sufficient size and capacity to accommodate all trucks used in hauling the material. Scales shall be tested, approved, and sealed by an inspector of the State Inspection Bureau charged with scales inspection within the state in which the project is located. Scales shall be calibrated and resealed as often as necessary to insure continuous accuracy. The necessary number of standard weights for testing the scales shall be on hand at all times and, if an official inspection bureau of the state is not available, the scales will be tested by the Contracting Officer.

6. WAYBILLS AND DELIVERY TICKETS. Copies of waybills or delivery tickets shall be submitted to the Contracting Officer during the progress of the work. Before the final statement is allowed, the Contractor shall file with the Contracting Officer certified waybills and/or certified delivery tickets for all stone actually used in the construction covered by the contract.

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SECTION 2G

AGGREGATE BASE

Index

1. Applicable Publications
2. Materials
3. Sampling and Testing
4. Equipment
5. Operation of Pits or Quarries
6. Weather Limitations
7. Preparation of Underlying Surface
8. Grade Control
9. Mixing and Placing Materials
10. Layer Thickness
11. Compaction
12. Edges of Base Course
13. Smoothness Test
14. Thickness Control
15. Maintenance
16. Waybills and Delivery Tickets

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

1.1 American Society for Testing and Materials (ASTM) Publications.

C 117-80	Materials Finer than 76-um (No. 200) Sieve in Mineral Aggregates by Washing
C 127-80	Specific Gravity and Absorption of Coarse Aggregate
C 128-73	Specific Gravity and Absorption of Fine Aggregate
C 131-79	Resistance to Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine
C 136-80	Sieve or Screen Analysis of Fine and Coarse Aggregates
D 75-71 (R 1978)	Sampling Aggregates
D 422-63 (R 1972)	Particle-Size Analysis of Soils
D 423-66 (R 1972)	Liquid Limit of Soils
D 424-59 (R 1971)	Plastic Limit and Plasticity Index of Soils
D 1556-64 (R 1974)	Density of Soil In Place by the Sand-Cone Method
D 1557-78	Moisture-Unit Weight Relations of Soils, and Soil-Aggregate Mixtures Using 10-lb. (4.5-kg) Rammer and 18-in. (457-mm) Drop
E 11-70 (R 1977)	Wire-Cloth Sieves for Testing Purposes

2. MATERIALS. Aggregates shall consist of crushed stone or slag, crushed gravel, angular sand, soil, or other sound, durable, approved materials processed and blended or naturally combined. Aggregates shall be durable and sound, free from lumps and balls of clay, organic matter, objectionable coatings, and other foreign material. It shall be the responsibility of the Contractor to obtain materials that will meet the requirements specified herein and that can be constructed to meet the grade and smoothness requirements specified herein after all compaction requirements have been completed. The material retained on a No. 4 sieve shall be known as coarse aggregate, and the material passing the No. 4 sieve shall be know as binder material.

2.1 Coarse Aggregate conforming to the requirements specified above shall have a percentage of wear not to exceed 50 percent after 500 revolutions. Slag shall be an air-cooled blast-furnace product having a dry weight of not less than 65 pounds per cubic foot. Coarse aggregate hsall consist of angular fragments reasonably uniform in density and quality. The amount of flat and elongated particles shall not exceed 30 percent. A flat particle is one having a ratio of width of thickness greater than 3, and an elongated particle is one having a ratio of length to width greater than 3.

2.1.1 Coarase aggregate retained on each sieve specified shall contain at least 50 percent by weight of crushed pieces having two or more freshly fractured faces with the area of each face being at least equal to 75 percent of the smallest midsectional area of piece. When two fractures are adjacent, the angle between the planes of the fractures must be at least 30 degrees to count as two fractured faces.

2.2 Binder Material shall consist of screenings, angular sand, soil, or other finely divided mineral matter processed or naturally combined with the coarse aggregate. Liquid-limit and plasticity-index requirements stated herein shall apply to the completed course. The portion of any component or of the complete course passing the No. 40 sieve shall be either nonplastic or shall have a liquid limit not greater than 25 and a plasticity index not greater than 5.

2.3 Gradation requirements specified herein shall apply to the completed base course, and it shall be the responsibility of the Contractor to obtain materials that will meet the gradation requirements after mixing, placing, compacting, and other operations. The aggregates shall be continuously graded within the limits specified below:

Sieve Designation	Percentage by Weight Passing Square-Mesh Sieve
1-1/8-inch	100
No. 4	18-65
No. 8	25-60
No. 30	10-40
No. 200	3-12

The values are based on aggregates of uniform specific gravity, and the percentages passing the various sieves are subject to appropriate correction by the Contracting Officer when aggregates of varying specific gravities are used.

3. SAMPLING AND TESTING shall be by and at the expense of the Contractor.

3.1 Samples shall be the size required and shall be taken by the Contractor. Copies of test results be submitted for approval prior to starting the work, and thereafter at regular intervals during production as specified hereinafter. These samples shall be obtained at the source, from test pits, borings, trucks, stockpiles, or from the designated locations. Samples for material gradation, liquid-limit determination, and plasticity-index tests shall be taken in conformance with ASTM D 75. After the material has been placed and compacted, samples for density tests shall be taken as specified in ASTM D 1556, and additional samples for gradation, liquid-limit, and plasticity-index tests shall be taken by an appropriate method. Where deemed necessary, the sampling will be supervised by the Contracting Officer. The Contractor shall arrange his work so that sampling and testing may be performed without interruption.

3.2 Tests.

3.2.1 Aggregate Gradation. Aggregate gradation shall be determined in accordance with ASTM C 117, C 127, C 128, C 136, and D 422. Sieves shall conform to ASTM C 11.

3.2.2 Liquid Limit shall be determined in accordance with ASTM D 423.

3.2.3 Plasticity Index shall be determined in accordance with ASTM D 424.

3.2.4 Wear Test shall be made in conformance with ASTM C 131.

3.2.5 Field-In Place Density shall be determined in accordance with ASTM D 1556. Moisture-density relations shall be established in the laboratory in accordance with ASTM D 1557, method D.

3.3 Testing Frequency. Results of tests to determine particle shape, presence of objectionable coatings and foreign matter, percentage of wear, fracture count, gradation, liquid-limit, plasticity-index, specific gravity, and other specification requirements for determination of the acceptability of the source shall be submitted for approval at least 7 days prior to starting of manufacture of the base course material. Production testing for material gradation, liquid limit, and plasticity index shall be performed at regular intervals with at least one test being made for each 500 cubic yards or fraction thereof, of materials procduced and results shall be submitted on a daily basis. Deviations from the materials has been placed and compacted, one field density test for each 1,000 square yards or fraction thereof of finished base course and one additional gradation, liquid-limit, and plasticity-index test for each 3,000 square yards of base course or fraction thereof shall be performed. Maximum-density moisture relations shall be established for each 4,000 square yards of base course of density data (less dry weight determinations) shall be provided on the day each test is taken. The completed test report shall be provided with the Contractor Quality Control Report on the following work day. Results of all tests made shall be submitted for approval on a daily basis and subsequent paving operations shall not commence until final approval has been obtained. Failure of any test shallbe reported verbally, by the most expeditious means and followed promptly by written report. Contractor field operations shall immediately reflect corrective measures. For every failing test, retesting after completion of corrective measures have been taken will be required.

3.4 Approval of Materials. The source of the material shall be selected 7 days in advance of the time materials will be required in the work. Tentative approval of the preliminary reports submitted by the Contractor and the source will be

based on an inspection by the Contracting Officer. Tentative approval of the materials will be based on test samples as specified herein. Final approval both the source and the materails will be based on specified tests performed on samples taken from the completed and compacted base course.

4. EQUIPMENT. All plant, equipment, and tools used in the performance of the work covered by this section will be subject to approval by the Contracting Officer before the work is started and shall be maintained in satisfactory working condition at all times. The equipment shall be adequate and have the capability of producing the required compaction, meeting grade controls, thickness controls, and smoothness requirements as set forth herein and within the specified time limits.

5. OPERATION OF PITS OR QUARRIES. All work involved in clearing, stripping, and excavating in opening or operationof pits or quarries shall be performed by the Contractor. Pits or quarries shall be opened to expose vertical faces of deposit to depths suitable for working. Materials excavated from pits shall be obtained in successive vertical cuts extending through all exposed strata. All pockets or strata. All pockets or strata of unsuitable materials overlying or occurring within the deposit shall be wasted as directed. The methods of operating pits or quarries and the processing and blending of the material may be changed or modified by the Contracting Office when necessary to obtain material conforming to the specified requirements. Quarries shall be conditioned in agreement with the local laws or authorities.

6. WEATHER LIMITATIONS. Aggregate base courses shall be constructed when the atmosperic temperature is above 35 degrees F. When the temperature falls below 35 degrees F., the Contractor shall protect all areas of the completed aggregate base course, by approved methods, against any detrimental effects of freezing. Areas of completed aggregate base course damaged by freezing, rainfall, or other weather conditions shall be corrected to meet specified requirements.

7. PREPARATION OF UNDERLYING SURFACE. Prior to constructing the aggregate base course, the previously constructed subgrade shall be cleaned of all foreign substances. The surface of subgrade shall be inspected by the Contractor for adequate compaction and surface tolerances. The subgrade shall conform to section: FILLS AND SUBGRADE PREPARATION. Ruts or soft, yielding spots that may appear in the subgrade areas having inadequate compaction, and deviations of the surface from the requirements set forth therein shall be corrected to line and grade and to all specification requirements. The finished subgrade shall not be disturbed by traffic or other operations and shall be maintained by the Contractor in a satisfactory condition until the base course is placed.

8. GRADE CONTROL. During construction the lines and grades including crown and cross slope indicated for the aggregate base course shall be maintained by means of line and grade stakes placed by the Contractor at the worksite in accordance with SPECIAL PROVISIONS of these specifications.

9. MIXING AND PLACING MATERIALS. The materials shall be mixed by the stationary-plant, traveling-plant or road-mix method and placed in such a manner as to obtain uniformity of the aggregate base course material and at a uniform optimum moisture content for compaction. The Contractor shall make such adjustments in mixing or placing procedures or in equipment as may be directed to obtain the true grades, or increase of water, and to insure a satisfactory aggregate base course meeting all the requirements of this specification.

10. LAYER THICKNESS. The compacted thickness of the aggregate base course shall be indicated. When a compacted layer of 6 inches is indicated, the material may be placed in a single layer. When a compacted layer thickness of more than 6 inches is indicated, the material shall be placed in two layers of approximately equal thickness.

11. COMPACTION. Each layer of the aggregate base course (including shoulders) shall be compacted with approved compaction equipment. Water content shall be maintained at optimum or at the percentage specified during compaction. In places not accessible to the rollers, the mixture shall be compacted with mechanical tampers. Compaction shall continue until each layer through the full depth is compacted to at least 100 percent of maximum density. The Contractor shall make such adjustments in rolling or finishing procedures as may be required to obtain true grades, to minimze segregation and degradation, to reduce or accelerate loss or gain of water, and to insure a satisfacotry aggregate base course. Unsatisfactory materials shall be reworked to produce a satisfactory material.

12. EDGES OF BASE COURSE. Where the course is placed between curbs or similar construction, approved materials shall be placed along the edges of the aggregate base course in such quantities as will compact to the thickness of the course being considered, or when the course is being constructed in two layers, to the width of the shoulder to be rolled and compacted simultaneously with the rolling and compacted of each layer of the base course, as directed.

13. SMOOTHNESS TEST. The surface of each l ayer shall not show any deviations in excess of 3/8 inch when tested with either a 10- or 12-foot straightedge applied both parallel with and at right angles to the centerline of the paved area. Deviations exceeding this amount shall be corrected by removing material and replacing with new material, or by reworking existing material and compacting, as directed.

14. THICKNESS CONTROL. The completed thickness of the base course shall be within 1/2 inch, plus or minus, of the thickness indicated. Thickness test shall be made and recorded by the Contractor. The thickness of the base shall be measured at intervals in such manner that there will be a thickness measurement for at least each 500 square yards of base course. The thickness measurement shall be made by test holes at least 3 inches in diameter through the base course. Where the measured thickness of the base course is more than 1/2 inch deficient in thickness, the Contractor, at no additional expense to the Government, shall correct shch areas by scarifying, adding mixture of proper gradation, reblading, and recompacting, as directed. Where the measured thickness of the base course is more than 1/2 inch thicker than that indicated, it shall be considered as conforming with the specified thickness requirements plust 1/2 inch. The average job thickness shall be the average of the job measurements determined as specified above, but shall be within 1/4 inch of the thickness indicated.

15. MAINTENANCE. The Contractor shall maintain the aggregate base course in a satisfactory condition until the completed work is accepted.

16. WAYBILLS AND DELIVERY TICKETS. Copies of waybills or delivery tickets shall be attached to the Daily Contractor Quality Report for the day of delivery. Before, the final statement is allowed, the Contractor shall file with the Contracting Officer waybills and/or certified delivery tickets for all aggregates actually used in the construction covered by the contract.

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SECTION 2H

PRIME COAT AND WEED KILLER

Index

1. Applicable Publications
2. Bituminous Material
3. Sampling and Testing
4. Quantity to be Applied
5. Weather Limitations
6. Equipment
7. Preparation of Surface
8. Weed Killer
9. Application of Bituminous Material
10. Waybills and Delivery Tickets

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

1.1 American Society for Testing and Materials (ASTM) Publications.

D 140-70 (R 1976)	Sampling Bituminous Materials
D 2027-76	Cutback Asphalt (Medium-Curing Type)

1.2 American Association of State Highway and Transportation Officials (AASHTO) Standard.

T 102-74	Spot Test of Asphaltic Materials

2. BITUMINOUS MATERIAL. The bituminous material prime coat shall be liquid asphalt, conforming to ASTM D 2027, designation MC-70 with the additional requirement that the residue from distillation to 680 degrees F., shall show a negative spot test when submitted to AASHTO T 102, using the standard naphtha specified therein.

3. SAMPLING AND TESTING.

3.1 Sampling. Samples of bituminous material, unless otherwise specified, shall be in accordance with ASTM D 140.

3.2 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. Certificate of compliance, with specified requirements shall be submitted to the Contracting Officer.

3.3 Certified Laboratory Test Reports. Before delivery of bituminous materials, certified copies, in triplicate, of the tests specified herein and in referenced publications shall be submitted to and approved by the Contracting Officer. The testing shall have been performed by an independent laboratory approved by the Contracting Officer.

4. QUANTITY TO BE APPLIED. Bituminous material for the prime coat shall be applied in quantities of not less than 0.10 gallon nor more than 0.4 gallon per square yard of the surface to be primed. Application of prime coat shall be divided, if necessary, into 2 applications to avoid flowing off the surface. The

exact quantities which may be varied to meet field conditions shall be determined by the Contractor and approved by the Contracting Officer upon completion of a successful test strip.

5. WEATHER LIMITATIONS. The prime coat shall be applied only when the prepared surface is dry or contains moisture not exceeding quantity to permit uniform distribution and desired penetrations; and the temperature has not been below 35 degrees F., for 12 hours immediately prior to application. Prime coat shall not be applied when the atmospheric temperature in the shade is below 50 degrees F.

6. EQUIPMENT.

6.1 General. All equipment, tools, machines, used in the performance of the work required by this section shall be subject to approval and shall be maintained in satisfactory working condition.

6.2 Bituminous Distributor shall have pneumatic tires of such width and number than the load produced on the base surface shall not exceed 650 pounds per inch of tire width. The distributor shall be designed and equipped to distribute the bituminous material uniformly at even heat on variable widths of surface at readily determined and controlled rates from 0.05 to 2.0 gallons per square yard with a pressure range of 25 to 75 pounds per square inch and with an allowable variation not to exceed 5 percent from any specified rate. Distributor equipment shall include a separate power unit for the bitumen pump, full circulation spray bars, tachometer, pressure gage, volume measuring devices, adequate heaters for heating the materials to the proper application temperature, a thermometer to show the temperature of the tank contents, and a hose attachment suitable for applying bituminous material to spots unavoidably missed by the distributor. The distributor shall be equipped to circulate and agitate the bituminous material during the heating process.

6.3 Heating Equipment for Storage Tanks. Equipment for heating bituminous material shall consist of steam coils and equipment for producing steam, so designed that steam cannot get into the material. An armored thermometer with a range from 40 to 200 degrees F., shall be fixed to the tank so that the temperature of the bituminous material may be read at all times.

6.4 Brooms and Blowers shall be of the power type and shall be suitable for cleaning prepared surfaces.

7. PREPARATION OF SURFACE. Immediately before applying the weed killer and prime coat, all loose material, dirt, clay or other objectionable substance shall be removed from the surface by means of a power broom or blower supplemented with hand brooms. After the cleaning operation and prior to the application of the prime coat, an inspection of the area to be coated shall be made by the Contractor to determine its fitness to receive the bituminous material. The Contracting Officer shall be notified 24 hours in advance of application of the bituminous material. To assure a uniform spread of the bituminous material, the areas prepared for treatment, if excessively dry, shall be lightly sprinkled with water immediately before the application as directed.

8. WEED KILLER. A chemical weed killer shall be applied to subgrade surfaces of areas to be paved prior to application of the prime coat. The weed killer may be either a fire retardant non-corrosive, water soluble mixture of sodium chlorates and sodium borates, a commercial herbicide with active ingredients of not less than 25 percent prometon: 2, 4-bis (isopropylamine-6 methoxy-5-triazone), or dry

free flowing borax. The sodium chlorate-sodium borate mixture shall be applied in a water solution at a rate that will yield a minimum of one pound of sodium chlorate per 100 square feet of treated surface. The equipment used for application of the solution shall mechanically agitate and circulate the solution at all times application is in process. Borax shall be applied dry on a previously dampened subgrade at a rate to yield the equivalent of 3 pounds of boron trioxide (B_2O_3) per 100 square feet of treated surface. After application of the borax, the area shall be uniformly sprinkled with water. The quantity of water applied in the solutions or after application of dry borax shall be at least 4 gallons per 100 square feet of treated surface. The commercial herbicide shall be applied in a water solution at a rate of one gallon per 1,500 square feet.

9. APPLICATION OF BITUMINOUS MATERIAL. Immediately following the preparation of the surface, the bituminous material shall be applied by means of a bituminous distributor. The bituminous material shall be applied at a pressure and in the amounts as directed. The bituminous material shall be so applied that uniform distribution is obtained at all points of the surface to be treated. Unless the distributor is equipped to obtain satisfactory results at the junction of the previous and subsequent applications, building paper shall be spread on the surface of applied material for a sufficient distance back from the ends of each application so that flow from the sprays may be started and stopped on the paper, and all sprayers operate at full force on the surface to be treated. Immediately after the application, building paper shall be removed and destroyed. Spots unavoidably missed by the distributor shall be properly treated with bituminous material. Following the application of bituminous material, the surface shall be allowed to dry without being disturbed for a period of not less than 48 hours, or longer as necessary to attain penetration into the foundation course and evaporation of the volatiles from prime material. The Contractor shall furnish and spread enough approved sand to blot up effectively and cure any excess bituminous material. The Contractor shall maintain the primed surface until the succeeding layer of pavement is placed by protecting the surface against damage and by repairing and repriming deficient areas at no additional cost the Government. No smoking, fire, or flames other than heaters that are a part of the equipment shall be permitted within heating, distributing, or transferring operations of bituminous material.

9.1 Application Temperature shall be as directed and shall provide an application viscosity between 40 and 120 centistokes, kinematic, or 20 and 60 seconds, Saybolt-Furol. Application temperatures shall be within the following range, except that appropriate changes should be made when the range of viscosity is raised or lowered.

MC-70	120-180 degrees F.

The temperature-viscosity relationship shall be furnished to the Contracting Officer.

10. WAYBILLS AND DELIVERY TICKETS. Copies of waybills or delivery tickets shall be submitted during the progress of the work. Before the final statement is allowed, the Contractor shall file with the Contracting Officer certified waybills and/or certified delivery tickets for all bituminous material actually used in the construction of pavement covered by this section of the specification. The Contractor shall not remove bituminous material from the tank car or storage tank until the initial outage and temperature measurements have been taken by the Contracting Officer; nor shall the Contractor release the car or storage tank until the final outage has been taken by the Contracting Officer.

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SECTION 2I

TACK COAT

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1. Applicable Publication
2. Bituminous Material
3. Sampling and Testing
4. Quantities To Be Applied
5. Equipment
6. Weather Limitations
7. Preparation of Surface
8. Application of Bituminous Material
9. Waybills and Delivery Tickets

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

1.1 American Society for Testing and Materials (ASTM) Standards:

D 140-70 (R-1976)	Sampling Bituminous Materials
D 977-80	Emulsified Asphalt

1.2 American Association of State Highway and Transportation Officials (AASHTO) Standards:

T 102-74	Spot Test of Asphaltic Materials

2. BITUMINOUS MATERIAL used for the tack coat shall be asphalt emulsion and shall conform to the following requirements.

2.1 Asphalt Emulsion shall conform to ASTM D 977, Type RS-1, with the additional requirement that the base asphalt used to manufacture the emulsion shall show a negative spot when tested in accordance with AASHTO T 102, using the standard naphtha specified therein. The Contractor shall furnish a certified statement from the emulsion manufacturer giving an analysis of the base asphalt used in the manufacturer of the emulsion and attesting to conformity to the applicable requirements above.

3. SAMPLING AND TESTING.

3.1 Sampling. Samples of bituminous material, unless otherwise specified, shall be in accordance with ASTM D 140.

3.2 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. Certificates of compliance shall be furnished.

4. QUANTITIES TO BE APPLIED. Bituminous material for the tack coat shall be applied in quantities of not less than 0.05 gallon nor more than 0.15 gallon per square yard. The exact quantities within the range specified may be varied to suit field conditions, shall be determined by the Contractor and approved.

5. EQUIPMENT.

5.1 General. All equipment, tools, and machines used in performance of work required by this section shall be subject to approval and shall be maintained in satisfactory working condition.

5.2 Bituminous Distributor shall have pneumatic tires of such width and number that the load produced on the base surface shall not exceed 650 pounds per inch of tire width. The distributor shall be designed and equipped to distribute bituminous material uniformly at even heat on variable widths of surface at readily determined and controlled rates ranging from 0.05 to 2.0 gallons per square yard, with a pressure range of 25 to 75 pounds per square inch, and with an allowable variation from specified rate not exceeding 5 percent. Distributor equipment shall include a separate power unit for the bitumen pump, full-circulation spray bars, tachometer, pressure gages, volume measuring devices, adequate heaters for heating materials to proper application temperature, thermometer for reading the temperature of tank contents, and a hose attachment suitable for applying bituminous material manually to cover areas inaccessible to the distributor. The distributor shall be equipped for circulation and agitation of the bituminous material during the heating process.

5.3 Heating Equipment. The equipment for heating bituminous material shall consist of steam coils and equipment for producing steam, designed so steam will not be introduced into the material. An armored theremometer with a range from 40 degrees F. to 170 degrees F. shall be fixed to the tank so temperature of the bituminous material may be read at all times.

5.4 Power Brooms and Power Blowers shall be suitable for cleaning the surfaces to which the tack coat is applied.

6. WEATHER LIMITATIONS. Tack coat shall be applied only when the surface to be treated is dry and the temperature shall not have been lower than 35 degrees F. for 12 hours immediately prior to application. It shall not be applied when the atmospheric temperature in the shade is lower than 50 degrees F.

7. PREPARATION OF SURFACE. Immediately before applying the tack coat, if surface is sufficiently bonded, all loose material, dirt, clay, or other objectionable material, shall be removed from the surface to be treated with a power broom or blower supplemented with hand brooms. After the cleaning operation, and prior to application of the tack coat, an inspection of the area to be treated will be made by the Contracting Officer to determine fitness of the area to receive the bituminous coating. That portion of surface prepared for immediate treatment shall be dry and in a satisfactory condition.

8. APPLICATION OF BITUMINOUS MATERIAL. Immediately following preparation of surface, the bituminous material shall be applied by a bituminous distributor at a temperature determined by the Contracting Officer, within the range of 75 to 130 degrees F. Under no circumstances shall emulsion be heated to a temperature greater than 140 degrees F. or exposed to a temperature of less than 40 degrees F. The bituminous material shall be applied so uniform distribution is obtained over all points of the surface to be treated. Unless the distributor is equipped to obtain satisfactory results at the junction of previous and subsequent applications, building paper shall be spread on the surface for a sufficient distance back from the ends of each application so that flow through the sprays may be started and stopped on the paper, and all sprays operate at full force on the surface to be treated. Immediately after application, the building paper shall

be removed and destroyed. Lightly coated areas and spots missed by the distributor shall be properly treated with bituminous material. Following application of bituminous material, the surface shall be allowed to dry to a proper condition of tackiness to receive surfacing. The period of time shall be as determined by the Contracting Officer. The Contractor shall furnish and spread a sufficient quantity of clean, dry sand on all areas that show an excess of bituminous material, to effectively blot up and cure the excess when directed by the Contracting Officer. The treated surface shall be maintained by the Contactor until the succeeding layer of pavements has been placed. During this interval the Contractor shall protect the treated surface against damage and shall repair all damaged spots at no additional cost to the Government.

9. WAYBILLS AND DELIVERY TICKETS. Copies of waybills or delivery tickets shall be submitted during the progress of the work. Before the final statement is allowed, the Contractor shall file with the Contracting Officer certified waybills and/or certified delivery tickets for all bituminous material used in the construction of the pavement covered by this section of the specification. The Contractor shall not remove bituminous material from tank car or storage tank until initial outage and temperature measurements have been taken, nor shall the Contractor release the car or storage tank until the final outage has been taken.

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SECTION 2J

ASPHALT CONCRETE

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10. Transportation of Bituminous Material
11. Placing
12. Compaction of Mixture
13. Joints
14. Protection of Pavement
15. Surface Requirements
16. Sampling
17. Pavement Replacement

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

1.1 American Association of State Highway Transportation Officials (AASHTO) Standard.

M 226-78	Viscosity Graded Asphalt Cement

1.2 American Society for Testing and Materials (ASTM) Publications.

C 117-80	Materials Finer Than No. 200 (75 um) Sieve in Mineral Aggregates by Washing
C 127-80	Specific Gravity and Absorption of Coarse Aggregate
C 128-79	Specific Gravity and Absorption of Fine Aggregate
C 136-80	Sieve or Screen Analaysis of Fine and Coarse Aggregates
D 242-70 (R 1980)	Mineral Filler for Bituminous Paving Mixtures
D 1559-16	Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus

1.3 Military Standard (Mil. Std.).

MIL-STD-620A & Notice 1	Test Methods for Bituminous Paving Materials

2. DESCRIPTION. Asphalt concrete indicated as "A.C." shall consist of fine and coarse aggregates and mineral filler, if required, uniformly mixed with hot bituminous material, and placed and compacted on a prepared base course as indicated.

3. AGGREGATES shall consist of crushed stone, crushed slag, crushed or uncrushed gravel, screenings, sand, and mineral filler. Aggregates shall have a satisfactory service record in bituminous pavement construction. The source selected shall be approved by the Contracting Officer. Material passing the No. 200 sieve shall be known as mineral filler. Mineral filler shall conform to ASTM D 242. The combined aggregates and mineral filler shall meet the requirements of subsequent paragraphs entitled AGGREGATE GRADATION and COMPOSITION OF MIXTURE.

4. BITUMINOUS MATERIAL to be mixed with the mineral aggregates shall be asphalt cement conforming to AASHTO M226, viscosity grade (AR-4000) Table 3.

5. AGGREGATE GRADATION. The aggregate for the asphalt concrete surface course and overlay shall consist of type b gradation, and the aggregate for the asphalt concrete base course shall consist of type a gradation as follows or as approved by the Contracting Officer. The aggregate gradation shall be as determined by ASTM C 117 and C 136.

Sieve Openings	Percentage by Weight, Passing	
	a	b
1 inch	100	100
3/4 inch	80-100	97-100
1/2 inch	65-85	85-100
3/8 inch	55-75	70-90
No. 4	40-60	50-75
No. 8	25-45	35-65
No. 30	10-30	20-40
No. 200	2-8	2-8

6. COMPOSITION OF MIXTURE.

6.1 Job-Mix Formula shall be submitted by the Contractor by the Contracting Officer in coordination with the City of Scottsdale, and no bituminous mixture shall be manufactured until it has been approved. The formula will indicate the percentage of each sieve fraction of aggregate, percentage of asphalt, and temperature of the mixture as discharged from the mixer. The percentage of asphalt in the job-mix formula will be between 5.0 percent and 6.0 percent for gradation type "a" and between 5.5 percent and 6.5 percent for gradation type "b". Samples of the aggregates and asphalt shall be submitted for approval with the job-mix formula.

6.2 Test Properties of Bituminous Mixtures. The apparent specific gravity, as determined by ASTM C 127 and C 128, shall be used in computing the voids total mix and voids filled with bitumen, and the mixture shall meet the following requirements as determined by ASTM D 1559.

Test Property	75-Blow Compaction
Stability, minimum, pounds	100
Flow, maximum, 1/100-inch	20
Voids total mix, percent	3-5
Voids filled with bitumen, percent	75-85

6.3 Stripping of Aggregates. If the index of retained stability of the job-mix formula is less than 75 tested in accordance with Method 104 of MIL-STD-620, the aggregates shall be rejected or treated by one of the following procedures:

(1) Addition of heat-stable additives to bitumen.

(2) Addition of hydrated lime, or other cementitious material containing free lime, as a portion of the mineral filler.

7. MIXING PLANT shall be a weigh-batch or continous-mixing type approved by the Contracting Officer and operated so as to produce a mixture within the job-mix formula.

8. OTHER EQUIPMENT.

8.1 Bituminous-Material Spreaders shall be self-propelled, capable of producing a finished surface conforming to the smoothness requirements specified hereinafter. The use of a spreader that leaves indentations or other objectionable irregularities in the freshly-laid mix will not be permitted.

8.2 Blowers and Brooms shall be of the power type suitable for cleaning the surface to be paved.

8.3 Saws shall be of the power type, capable of rapidly cutting pavement and trimming joints and edges of pavement.

8.4 Small Tools available on the work shall consist of the following: rakes, lutes, shovels, tampers, smoothing irons, pavement cutters, portable heater for heating small tools, wood sandals and stilt sandals of standard type, and other small tools as may be required.

8.5 Steel-Wheel Rollers shall be self-propelled, 3-wheel (tricycle) and/or tandem type, weighing not less than 20,000 pounds each. The rollers shall have adjustable wheel scrapers, water tanks, and sprinkling apparatus to keep the wheels sufficiently wet to prevent the bituminous mixture from sticking to the wheels. Rollers shall be capable of reversing without backlash and shall be free from worn parts. Roller wheels shall not have flat or pitted areas or projections that will leave marks in the pavement.

9. TREATMENT OF UNDERLYING SURFACE. Prior to laying a bituminous course, the underlying surface shall be cleaned of loose and foreign matter by sweeping with power sweepers, power brooms, and hand brooms, as directed. The surface to be paved shall receive a prime coat or tack coat as applicable conforming to the requirements of the section.

10. TRANSPORTATION OF BITUMINOUS MIXTURE. The bituminous mixture shall be transported from the mixing plant to the site in trucks having tight, clean, smooth bodies with a minimum coating of concentrated solution of hydrated lime and water to prevent adhesion of the mixture. Each load of mixture shall be covered with canvas or other suitable material to protect the mixture from the weather and to prevent loss of heat. Mixtures having temperatures greater than 350 degrees, mixtures having temperatures less than 235 degrees, or mixtures which form or show indications of moisture will be rejected. Hauling over freshly laid material will not be permitted.

11. PLACING. Contact surfaces of previously constructed pavement, curbs, manholes, and other structures shall be sprayed with a thin coat of asphalt. The mechanical spreader shall be adjusted and its speed regulated so that the surface of the course being placed will be smooth and continuous without tears and pulling. The course will be of such depth that after compaction, the cross section, grade, and contour will be as indicated. In areas where the use of machine spreading is impractical, the mixture shall be spread by hand. Unless

otherwise directed, placing shall begin on the high side of areas with a one-way slope or along the centerline of areas with a crowned section and shall be in the direction of the main traffic flow. Placing of the mixture shall be as continuous as possible, and the speed of placing shall be adjusted, as directed, to permit proper rolling.

12. COMPACTION OF MIXTURE shall be accomplished by steel-wheel and pneumatic tired rollers. Rolling shall begin as soon after placing as the mixture will support the roller without undue displacement. Rolling of the course shall be continued until all roller marks are eliminated and at least 95 percent of the density of a laboratory specimen of the same mixture has been obtained. The speed of the rollers at all times shall be slow enough to avoid displacement of the hot mixture. The wheels of the roller shall be moistened to prevent adhesion of the mixture. In areas not accessible to the roller, the mixture shall be compacted with hot hand tampers.

13. JOINTS. The joints between old and new pavements or between lanes of new work shall be constructed so as to insure uniform bond, texture, density, and smoothness as in other sections of the course. Edges of existing pavement shall be cut to straight, vertical surfaces. All contact surfaces of existing pavement shall be painted with a thin, uniform coat of tack coat.

14. PROTECTION OF PAVEMENT. After final rolling, no vehicular traffic shall be permitted on the pavement for at least 6 hours after rolling.

15. SURFACE REQUIREMENTS. The finished surface shall not vary more than 1/4 inch from a 10-foot straightedge. The straightedge shall be furnished by the Contractor. Defective areas shall be corrected by the Contractor at no additional cost to the Goverment.

16. SAMPLING. Sampling for the determination of thickness and density of the completed pavements will be performed by the Contractor. All tests necessary to determine conformance with the specified requirements will be performed by the Contractor. The Contractor shall replace the pavement where samples are removed at his expense. No payment will be made for areas of pavment deficient in composition, density, or thickness until they are removed and replaced by the Contractor as directed by the Contracting Officer.

17. PAVEMENT REPLACEMENT. A two course installation at a total 4 inch thickness of the A.C. surface shall be placed on 20 inches of A.B.C. at all locations that require pavement replacement on top of trenches. Where the trench crosses a road, 4 inches of pavement shall be placed between the edges of the old pavement. Where the trench is parallel to the road but to one side of the centerline, 3 inches of pavement shall be placed between the edges of the old pavement with the top surfaces even, and a one-inch thickness of pavement shall overlay the old and new pavement between the road centerline and the curb. Where the trench is parallel to the road and extends each side of the road centerline, the above procedure shall be followed except that the one-inch overlay shall extend from curb to curb. Any structures within the area to be paved which were at road grade shall be adjusted to be flush with the new grade line.

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SECTION 2K

FENCING

Index

1. Applicable Publications
2. Materials
3. Installation

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

1.1 Federal Specification (Fed. Spec.).

RR-F-191H/GEN	Fencing, Wire and Post Metal (and Gates, Chain-Link Fence Fabric, and Accessories)

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

B 32-76	Solder Metal
C 94-80	Ready-Mixed Concrete

2. MATERIALS shall conform to Fed. Spec. RR-F-191H/GEN and other requirements specified below.

2.1 Chain-Link Fabric. Fed. Spec. RR-F-191, part 1, type I, 2 oz. coating and shall be 9 gage wire woven in a 2-inch mesh, with knuckled selvage top and bottom. Fabric shall be 4 foot height, unless indicated otherwise.

2.2 Concrete. ASTM C 94, using 3/4-inch maximum size aggregate, and having minimum compressive strength of 3,000 p.s.i. at 28 days. Grout shall consist of one part Portland cement to 3 parts clean, well-graded sand and the minimum amount of water to produce a workable mix.

2.3 Post, Rails and Accessories for Chain-Link Fences. Fed. Spec. RR-F-191, parts 3 and 4, Zinc coated except as modified herein.

2.3.1 Tension Wire. Minimum Tensile strength of 80,000 pounds per square inch, zinc-coated.

2.3.2 Tie Wire. Aluminum alloy of 0.144-inch diameter for attaching fabric to toprail and to intermediate posts. Hog rings of 0.110-inch diameter aluminum wire shall be used for attaching fabric to top and bottom wires. Preformed clips of 6-gaged zinc-coated steel wire may be used for attaching fabric to intermediate posts.

2.3.3 Post Braces and Truss Rods. For each gate, corner, pull, or end post. Truss rods shall be provided with turnbuckles or other equivalent provisions for adjustment.

2.3.4 Post, Rails, and Braces. Except as otherwise specified, posts, rails, and braces shall be either round or H-Section, however, the same type shall be used throughout the project.

3. INSTALLATION OF FENCE.

3.1 General. The fence shall be installed to the alinement indicated. Fence installation shall be in accordance with the fence manufacturer's written installation instructions except as modified herein. Boundary, and other fencing details shall conform to the attached sketch No. 1a.

3.2 Post Setting. Posts shall be set plumb and in alinement. Posts shall be set in concrete bases of the dimensions indicated except where posts are set in performed holes in the wall. Concrete shall be thorougly compacted, free of voids and finished in a dome. Braced pull posts shall be installed at fence ends, intersections, each change in direction of 10 degrees or more horizontally, and at each grade change of 5 degrees or more. In addition, straight runs between braced pull posts shall not exceed 500 feet unless otherwise indicated or specified. Posts set in concrete walls shall be set with a minimum of one inch of grout around each post. Grout shall be thoroughly worked into the holes so as to be free of voids, and finished in a dome. Grout shall be cured a minimum of 72 hours before any further work is done on the posts.

3.3 Post Tops shall be installed as recommended by the manufacturer and be securely fastened to posts. Post tops shall be of the design as required to accommodate the toprail where required. Studs driven by low-velocity explosive-actuated tool may be used with steel, wrought iron, ductile iron, or malleable iron. Studs driven by any explosive-actuated tool will not be used with gray iron or other material that will be fractured.

3.4 Toprail shall be installed before installing chain-link fabric. Toprail shall be installed on both side of gate opening and at bridge approaches, where the slope of the top of the wall is greater than 2 horizontal to one vertical.

3.5 Top and Bottom Tension Wires shall be installed before installing chain-link fabric and shall be pulled taut.

3.6 Fabric shall be pulled taut and secured to the toprail or topwire and to the bottom wire close to both sides of each post and at intervals of not more that 24 inches on centers. Fabrics shall be attached to the sides of the post away from the channel or enclosed opening. Fabric shall be secured to braced pull posts using stretcher bars and ties or clips or by integrally weaving to integral fastening loops of ends, corner, pull, and gate posts for the full length of each post. Fabric shall be attached to line posts at not greater than 15 inches on center using ties or clips. Splices in fabric shall be made with suitable splicing wire. Edges of fabric made by field cuts shall be knuckled or barbed as directed.

3.7 Repair. In the event that any portion of galvanized items 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 comforming to the requirements of ASTM B 32.

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SECTION 2L

TURF

Index

1. Applicable Publications
2. Submittals
3. Delivery, Storage, and Handling
4. Environmental Protection
5. Materials
6. Installation
7. Establishment Period
8. Final Acceptance

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

1.1 Federal Specifications (Fed. Spec.).

O-F-241D	Fertilizers, Mixed, Commercial

1.2 U.S. Department of Agriculture Federal Seed Act of August 9, 1939.

53 Stat. 1275	Rules and Regulations

2. SUBMITTALS.

2.1 Certificates of Conformance or Compliance. Before delivery, notarized certificates attesting that the following materials meet the requirements specified, shall be submitted for approval.

a. Seed

b. Fertilizer

c. Herbicides

2.2 Manufacturer's Literature. Manufacturer's literature on the following materials shall be submitted.

a. Hydro-Mulch

b. Herbicide

3. DELIVERY, STORAGE, AND HANDLING.

3.1 Delivery.

3.1.1 The Contractor shall notify the Contracting Officer of the delivery schedule in advance so material may be inspected upon arrival at the jobsite. Unacceptable material shall be removed from the jobsite immediately.

3.1.2 During delivery, seed shall be protected from drying out and contamination.

3.1.3 Fertilizer shall be delivered to the site in the original, unopened containers bearing the manufacturer's guaranteed chemical analysis, name, trade name, trademark, and conformance to state and Federal laws. In lieu of containers,

fertilizer may be furnished in bulk and a certificate indicating the above information shall accompany each delivery.

3.2 Storage.

3.2.1 Seed and fertilizer shall be kept in dry storage away from contaminants.

3.2.2 Storage of materials shall be in areas designated or as approved.

3.2.3 Herbicides shall not be stored with any other materials.

4. ENVIRONMENTAL PROTECTION. All work and Contractor operations shall comply with the requirements of section: ENVIRONMENTAL PROTECTION.

5. MATERIALS.

5.1 Seed. Seed shall be state-certified seed of the latest season's crop and shall be delivered in original sealed packages bearing the producer's guaranteed analysis for percentages of mixtures, purity, germination, weed-seed content, and inert material. Seed shall be labeled in conformance with U.S. Department of Agriculture rules and regulations under the Federal Seed Act and applicable state seed laws. Seed that has become wet, moldy, or otherwise damaged will not be acceptable. Onsite seed mixing shall be done only in the presence of the Contracting Officer. Seed mixtures shall be proportioned by weight as follows:

TURF.

NAME	PURE LIVE-SEED IN POUND PER ACRE
Cynodon dactylon Hulled Bermuda grass	90 LBS

Maximum Weed Seed shall not exceed 1% by weight.

5.2 pH Adjusters shall be not less than 99 percent elemental sulfur.

5.3 Fertilizers. Fertilizers shall be commercial grade, free flowing, uniform in composition and shall conform to appicable State and Federal regulations. Granular fertilizers shall conform to Fed. Spec. O-F-241, Type I, Level B, and shall bear the manufacturer's guaranteed statement of anlaysis. Granular inorganic fertilizer shall contain a minimum percentage by weight of 16 nitrogen, 8 available phosphoric acid, and 8 potash. Granular slow release fertilizer shall contain a minimum percentage by weight of 5 nitrogen (of which 80 percent shall be organic), 3 available phosphoric acid, and 1 potash.

5.4 Mulch.

5.5 Wood cellulose fiber for use with hydraulic application of grass seed and fertilizer shall consist of specially prepared wood cellulose fiber, processed to contain no growth or germination-inhibiting factors and dyed an appropriate color to facilitate visual metering of the application of materials. On an air-dry weight basis, the wood cellulose fiber shall contain a maximum of 12 percent moisture, plus or minus 3 percent at the time of manufacture. The pH range shall be from 3.5 to 5.0. The wood cellulose fiber shall be manufactured so that:

a. After addition and agitation in slurry tanks with grass, seeds, water, and other approved additives, the fibers in the material will become uniformly suspended to form a homogeneous slurry.

b. When hydraulically sprayed on the ground, the material will form a blotterlike cover impregnated uniformly with grass seed.

c. The cover will allow the absorption of moisture and allow rainfall or applied water to percolate to the underlaying soil.

5.6 Water. Water shall contain no elements toxic to plant life and shall be obtained from sources on project site at no cost to the Contractor. The irrigation system installed as part of this contract may be used.

5.7 Erosion Control Material shall be a totally organic substance supplied in dry, powdered form, at least 70 percent of which is 92 percent pure muciloid, derived from ground Plantago ovata-insularis husk. Erosion control material shall be water-soluble, non-toxic, hydrophyllic and shall not inhibit germination.

6. INSTALLATION.

6.1 Tillage. After the areas required to be seeded have been brought to the grades as specified, they shall be thoroughly tilled to a depth of at least 6 inches by scarifying, disking, harrowing, or other approved methods. All debris and stones larger than one inch remaining on the surface after tillage shall be removed.

6.2 Application of pH Adjusters.

6.2.1 Soil Sulfur shall be applied at the rate of 15 lbs. of soil sulfur per 1000 sq. ft.

6.3 Planting Seasons and Conditions. Seed shall be sown between the dates of 1 April and 1 August. Planting shall not be done when the ground is in an unsatisfactory condition for planting. If special conditions exist that may warrant a variance in the above planting dates or conditions, a written request shall be submitted to the Contracting Officer stating the special conditions and proposed variance.

6.4 Seeding.

6.4.1 When hydroseeding, the seed, fertilizer, and approved mulch material shall be mixed in the required amount of water to produce a homogeneous slurry and then uniformly applied under pressure at the following rates (dry weight), per acre:

90 pounds seed
200 pounds 16-8-8 inorganic fertilizer
1,000 pounds 5-3-1 slow release fertilizer (organic)
2,000 pounds wood cellulose fiber mulch
100 pounds erosion control material

6.4.2 Erosion Control Material shall be applied in accordance with material manufacturer's instructions.

6.5 Protection of Seeded Areas. Immediately after seeding, the area shall be protected against traffic or other use by erecting barricades, as required, and placing approved signs at appropriate intervals until final acceptance.

6.6 Restoration and Clean-Up. Excess and waste material shall be removed daily. When turfing in an area has been completed, the area shall be cleaned of all debris and excess material. Where existing turf areas have been damaged during construction operations, the Contractor shall restore the areas to their original condition at his expense. At least one paved pedestrian access route and one paved vehicular access route to each building shall be kept clean at all times. Other paving shall be cleaned when work in adjacent areas is completed.

7. ESTABLISHMENT PERIOD.

7.1 General.

7.1.1 The turf establishment period shall be 90 days.

7.1.2 The Contractor shall be responsible for the establishment and proper care of a stand of turf over the entire seeded area.

7.2 Maintenance During the Establishment Period.

7.2.1 The Contractor shall provide the following maintenance: mowing, removal of excess clippings, eradicating weeds, water, fertilizing, overseeding and any other operation necessary to promote the growth of grass.

7.2.2 The seeded turf area shall be mowed to a height of 2 inch whenever the average height of the grass becomes 3 inches.

8. FINAL ACCEPTANCE.

8.1 General. Final inspection and acceptance will be at the end of the turf establishment period. Acceptance will be based upon a stand of turf covering at least 95 percent of the seeded area. Prior to final acceptance, the Contractor shall apply 6 pounds per 1,000 square feet of an inorganic fertilizer. Formula for this application shall be 16N-8P-8K.

8.2 Replacement. Rejected areas shall be replanted within acceptable planting dates as directed by the Contracting Officer.

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SECTION 2M

TREES, SHRUBS, AND GROUND COVER

Index

1. Applicable Publications
2. Source Inspections
3. Submittals
4. Delivery, Storage, and Handling
5. Materials
6. Site Preparation
7. Installation
8. Plant Establishment Period
9. Final Acceptance

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

1.1 Federal Specifications (Fed. Spec.).

O-F-241D	Fertilizers, Mixed, Commercial

1.2 American National Standards Institute (ANSI) Publication.

Z60.1-1973	Nursery Stock

1.3 American Joint Committee on Horticultural Nomenclature (AJCHN) Publication.

Second Edition-1942	Standarized Plant Names

2. SOURCE INSPECTIONS.

2.1 Plant Materials. Plant materials will be inspected by the Contracting Officer at the growing site and tagged or otherwise approved for delivery.

3. SUBMITTALS.

3.1 Samples. The following samples shall be submitted for approval before work is started.

3.1.1 Topsoil. Representative samples shall be taken from several locations on the area under consideration.

3.1.2 Soil Amendments. Ten pounds of each type to be used in the project.

3.2 Certified Laboratory Test Reports. Testing shall be performed by an approved independent laboratory within 10 days of submittal of reports. (Test reports on a previously tested material shall be accompanied by certificates from the manufacturer certifying that the material is equal in all respects to that proposed for this project.) Certified copies of the reports of tests listed below shall be submitted.

3.2.1 Offsite topsoil--for pH, salts, potash, and phosphorus.

3.2.2 Organic Amendments--for classification of total nitrogen moisture ash and organic matter sand content pH.

4. DELIVERY, STORAGE, AND HANDLING.

4.1 Delivery.

4.1.1 Plant material shall be inspected upon arrival at the jobsite and unacceptable plant material shall be removed from the jobsite.

4.1.2 Plants shall be protected during delivery to prevent damage to the root balls or desiccation of leaves. Trees shall be protected during transportation by tying in the branches and covering all exposed branches.

4.1.3 The use of equipment such as "tree spades" shall be permitted provided that the plant balls are sized in accordance with ANSI Z60.1 and tops are protected from damage.

4.1.4 Soil conditioners and amendments shall be delivered to the site in the original, unopened containers bearing the manufacturer's guaranteed chemical analysis and name. In lieu of containers, soil conditioners and amendments may be furnished in bulk and a certificate from the manufacturer indicating the above information shall accompany each delivery.

4.2 Storage.

4.2.1 Plant Storage. Plants not installed on the day of arrival at the site shall be stored and protected. Outside storage locations shall be continually shaded and protected from the wind. Plants stored on the project shall be protected from drying out at all times. Plants, including those in containers, shall be kept in a moist condition until planted by watering with a fine mist spray.

4.2.2 Storage of Other Materials. Soil conditions and amendments shall be kept in dry storage away from contaminants. Soil sterilant shall not be stored with any other landscape materials. Pesticide material shall be kept in dry storage and shall not contaminate adjacent material, and shall be handled and stored following manufacturer's directions. Storage of materials shall be in areas designated or as approved by the Contracting Officer.

4.3 Handling. Care shall be taken to avoid drying or damaging plants being moved from the nursery or storage area to the planting site. Plants shall not be handled by the trunk or stems. Plants shall be protected from freezing or drying out by a covering of burlap, tarpaulin, or mulching material during transportation to the planting site. Damaged plants will be rejected and shall be removed from the site.

5. MATERIALS.

5.1 Plants.

5.1.1 Plants shall be nursery grown conforming to ANSI Z60.1 and shall be of the varieties specified in the plant list bearing botanical names listed in the publication for Standardized Plant Names.

5.1.2 Planting stock shall be well-branched and well-formed, sound, vigorous, healthy, and free from disease, sun-scald, windburn, abrasion, and harmful insects or insect eggs and shall have healthy, normal and unbroken root systems. Deciduous trees and shrubs shall be symmetrically developed, of uniform habit of

growth, with straight boles or stems and free from objectionable disfigurements. Evergreen trees and shrubs shall have well developed symmetrical tops with typical spread of branches for each particular species or variety. Plants shall have been grown under climatic conditions similar to those in the locality of the project. Plants budding into leaf or having soft growth shall be sprayed with an antidesiccant at the nursery.

5.1.3 The minimum acceptable sizes of all plants, measured before pruning and with branches in normal position, shall conform to the measurements indicated. Plants larger in size than specified may be used as approved. If larger plants are used, the ball of earth or spread of roots shall be increased in accordance with ANSI Z60.1.

5.1.6 Container grown plants shall have sufficient root growth to hold the earth intact when removed from containers but shall not be root bound.

5.2 Topsoil.

5.2.1 Topsoil shall be the existing surface soil stripped and stockpiled on the site.

5.2.2 Additional topsoil, if required, beyond that available from stripping operations, shall be a natural, friable soil representative of productive soils at the site. It shall be obtained from well-drained areas and shall be free of any admixture of subsoil, foreign matter, objects larger than one inch in any dimension, toxic substances, and any material or substances that may be harmful to plant growth. The pH range shall be 6.5 to 8.0. Topsoil that does not meet this pH range shall be amended by the addition of pH adjusters, at a rate recommended by the County Extension Service agent, based on soil tests.

5.3 Fir Bark shall have 7.5 pounds of nitrogen added uniformly to each cubic yard and shall be free of chips, stones, sticks, soil, and toxic substances.

5.4 Planting Soil Mixture. The planting soil mixture shall be composed of 2 parts topsoil and one part Fir Back.

5.5 Fertilizer. Fertilizer shall be commercial grade and uniform in composition.

5.5.1 Granular fertilizer shall conform to Fed. Spec. O-F-241, Type I, Level B, and shall bear the manufacturer's guaranteed statement of analysis. Granular fertilizer shall contain a minimum percentage by weight of: 16 nitrogen, of which 50 percent shall be organic, 20 available phosphoric acid, and 0 potash.

5.6 Staking Material.

5.6.1 Stakes for tree support shall be lodge pole pine, free from knots, rot, cross grain, or other defects that would impair the strength. Standard stakes shall be hardwood, treated with pentachlorophenol, and a minimum of 2-1/2 inches in diameter by 8 feet long or as noted on drawings, and pointed at one end.

5.6.2 Hose chafing guards shall be new 2-ply reinforced rubber or plastic hose and shall be all the same color on the project. Length shall be one and one-half times the circumference of the plant at its base.

5.7 Water. Water shall not contain elements toxic to plant life.

5.8 Tree Wound Dressing. Tree wound dressing shall be a black asphalt-base antiseptic paint.

6. SITE PREPARATION.

6.1 Clearing and Grading. Clearing shall consist of the satisfactory removal and disposal of weeds, grass, brush, snags, and rubbish occuring within the area shown. Clearing shall be accomplished by hand within 5 feet of existing vegetation to be left standing. Grading shall conform to the lines and grades shown.

6.2 Layout. Plant material locations and bed outlines shall be staked on the project site before any plant pits are dug. Plant material locations may be adjusted by the Contracting Officer to meet field conditions.

6.3 Protection of Existing Vegetation. If lawns have been established prior to construction operations, the surrounding turf shall be covered before excavations are made in a manner that will protect turf areas. Existing trees, shrubbery, and beds that are to be preserved shall be barricaded in a manner that will effectively protect them during planting operations.

6.4 Turf Removal. Where planting beds occur in existing turf areas, the turf shall be removed to a depth that will ensure the removal of the entire root system.

6.5 Underground Obstructions to Planting. If underground utilities, construction, or solid rock ledges are encountered, other locations for planting may be selected by the Contracting Officer.

6.6 Plant Pits. Plant pits shall be dug to produce vertical sides and flat, the uncompacted bottoms. When pits are dug with an auger and the sides of the pits become glazed, the glazed surface shall be scarified. The size of plant pits shall be as shown.

7. INSTALLATION.

7.1 Planting Seasons and Conditions. Planting shall be done when the ground is not frozen, or in an otherwise unsuitable condition for planting. Plants shall be planted as directed by Contracting Officer.

7.2 Setting Plants. Container-grown plants shall be handled and moved only by the container. Plants shall be set plumb and moved only by the container. Plants shall be set plumb and held in position until sufficient soil has been firmly placed around ball. Plants shall be set in relation to surrounding grade so that they are even with the depth at which they were grown in the nursery. Fertilizer in packet or tablet form shall be placed prior to backfilling and in accordance with the manufacturer's recommendations.

7.2.1 Container-grown stock shall be removed from containers without damaging plant or root system.

7.3 Fertilization.

7.3.1 After establishment of finished grade around plants, all pit shall be topdressed with fertilizer at the rate of 10 pounds per 100 square feet of area or by tablet form fertilizer applied as per manufacturer's recommedations. Fertilizer adhering to plants shall be flushed off.

7.4 Watering. All watering shall be done in a manner which will provide uniform coverage but which will not cause erosion or damage to the finished surface. Sufficient water shall be applied to penetrate the planting bed to a depth of 4 inches.

7.5 Pruning.

7.5.1 New plant material shall be pruned in the following manner: Dead and broken branches shall be removed. Deciduous trees and shrubs shall be pruned to reduce total amount of anticipated foilage by one-fourth to one-third. Typical growth habit of individual plants shall be retained with as much height and spread as is practicable. Cuts shall be made with sharp instruments, and shall be flush with trunk or adjacent branch to ensure elimination of stubs. "Headback" cuts at right angles to line of growth shall not be permitted. Trees shall not be poled or the leader removed, nor shall the leader be pruned or "topped off." Trimmings shall be removed from the site. Cuts 1/2 inch in diameter and larger shall be painted with the specified tree wound dressing.

7.5.2 Existing trees to be treated are as indicated by tags on the site. Dead wood 1/2 inch or more in diameter, branches interfering with or hindering the healthy growth of the trees, and diseased branches shall be removed with a cleancut made flush with parent trunk. Cutting back or removal of branches shall be done as necessary to give the trees proper shape and balance. In removing large limbs, the initial cut shall be made on the underside at a safe distance from the trunk or lateral, to prevent ripping of bark. Large branches or limbs that cannot be removed in one piece, without endangering traffic or damaging property, shall be removed in sections and lowered by ropes. Workmen shall not be permitted to climb trees with climbing spurs. Stubs or improper cuts resulting from former pruning or limbs that have been broken shall be cut off flush and painted in order to promote proper healing. Girdling roots shall be removed. Cuts or wounds measuring 1/2 or more inches in diameter and exposed wood and scars resulting from previous work or damage shall be cleaned and painted with specified tree wound dressing. Decayed wood shall be removed to expose healthy tissue. Cavities shall be shaped to provide drainage; exposed cambium layers around cavities shall be promptly sealed with shellac; and the entire cavity shall be painted with specified tree wound dressing.

7.6 Waste Removal and Turf Repair. Excess and waste material shall be removed from the site. Existing turf areas that have been damaged or scarred during construction operations shall be restored to their original condition.

7.7 Maintenance During Installation. Maintenance operations shall begin immediately after each plant is planted and shall continue as required until final acceptance. Plants shall be kept in a healthy, growing condition by watering, pruning, spraying, weeding, and any other necessary operations of maintenance. Plant saucers and beds shall be kept free of weeds, grass, and other undesired vegetation. Plants shall be inspected at least once per week during the installation period and needed maintenance performed.

8. PLANT ESTABLISHEMENT.

8.1 Beginning Date. Plant establishment shall begin on the date all plants are in place as specified.

8.2 Establishment.

8.2.1 The native trees establishment period shall be 90 days.

8.2.2 Plants shall be watered as necessary to maintain an adequate supply of moisture within the root zone. An adequate supply of moisture is estimated to be the equivalent of 2 inches of absorbed water per week that is delivered at weekly intervals in the form of natural rain or is augmented as required by periodic waterings. Water shall not be applied with a force sufficient to displace mulch and shall not be applied so quickly that it cannot be absorbed by the mulch and plants. Dead plants shall be removed and replaced.

8.2.3 Plants shall be pruned as required.

8.2.4 Stakes and eroded plant saucers shall be replaced as required.

8.2.5 In plant beds, grass and weeds shall not be allowed to reach a height of 3 inches before completely removed, including the root growth. When plants are in groups other than cultivated beds, the Contractor shall not permit grass or other vegetation between them to become more than 5 inches in height.

8.2.6 Other work, such as spraying insecticides and fungicides to control pests, shall be done to ensure plant survival in a healthy, growing condition.

9. FINAL ACCEPTANCE.

9.1 Preliminary Inspection. A preliminary inspection will be held 6 months from the date of the beginning of the plant establishment period to determine plant acceptability and the number of replacements. Plants not in healthy growing condition will be noted and as soon as seasonal conditions permit shall be removed from the site and replaced with plants of the same species and size as originally specified. Alternate or substituted varieties of plants shall be used only if approved.

9.2 Final Inspection. A final inspection of all plants will be held after the replacement planting has been completed. No additional plant establishment period will be required for replacement plants.

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SECTION 2N

IRRIGATION SYSTEM

Index

1. Applicable Publications
2. General
3. Materials
4. Installation
5. Tests
6. Cleanup
7. Variation in Arrangement of Sprinklers
8. Guarantee

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

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

D 1785-74	Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
D 2241-74	Poly (Vinyl Chloride) (PVC) Plastic Pipe (DDR-PR)
D 2464-74	Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
D 2466-74	Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
D 2564-73a	Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings

1.2 American Water Works Association (AWWA) Standard.

C 800-66	Threads for Underground Service Line Fittings

2. GENERAL. This section covers irrigation piping including connection to source of water supply, complete. Excavation, trenching, and backfill are specified in sections: EXCAVATION and FILLS AND SUBGRADE PREPARATION.

2.1 Aboveground and Riser piping shall be galvanized steel.

2.2 Below Ground Piping. Pipe smaller than 4-inch shall be plastic. Pipe for sleeving shall be plastic. The minimum cover for laterals and branches shall be 12 inches. The minimum cover for pressure lines shall be 2.5 feet except under roadways, parking and paved areas the minimum cover shall be 3 feet.

2.3 Sprinkler heads and control valves shall not be located within 5 feet of building or structure foundations.

3. MATERIALS shall conform to the respective specifications and other requirements specified below.

3.1 Pipe. Plastic pipe shall conform to ASTM D 1785, schedule 40 for pipe with solvent welded joints and schedule 80 for pipe with threaded joints, or to ASTM D 2241, Type 1, grade 1, 315 psi for pressure lines and 200 psi for other lines for pipe with solvent welded joints. Pipe and fittings shall bear the seal of approval (nsf mark) of the National Sanitation Foundation's standard for plastic pipe and fittings for potable water service.

3.2 Joints. Plastic pipe joints shall be solvent welded or threaded. Solvent for welded joints shall conform to ASTM D 2564. Use of pipe dope or solvents on threaded joints will not be permitted.

3.3 Fittings and Specials For Plastic Pipe. Fittings shall conform to ASTM D 2464 or D 2466.

3.4 Bubblers. Bubbler Type Irrigation Heads shall be fully adjustable from full flow to shut off. Heads shall be of all brass construction tapped for 1/2-inch I.P.S. female thread. Bubbler heads shall distribute the water in multiple, short throw streams spaced 60 degrees apart. Heads shall be equipped with vandal-proof locking screws.

4. INSTALLATION.

4.1 General. Unless otherwise specified, installation of bubblers shall conform to the standard details attached to this section.

4.2 Handling. Pipe and accessories shall be handled so as to insure delivery to the trench in sound, undamaged condition. The interior of pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method. Before installation, the pipe shall be inspected for defects. Material found to be defective before or after laying shall be replaced with sound material at no additional cost to the Government.

4.3 Cutting of pipe shall be done in a neat and workmanlike manner without damage to the pipe. Unless otherwise recommended by the manufacturer and authorized by the Contracting Officer, cutting shall be done with an approved type mechanical cutter. Plastic pipe shall be cut square and all burrs, particles and curls shall be removed.

4.4 Plastic Pipe shall be installed in accordance with the procedures recommended in ASTM D 2774 and as herein specified.

4.5 Jointing.

4.5.1 Insulating Joints shall be installed in accordance with recommendations of the manufacturer.

4.5.2 Connections between different types of pipe and accessories shall be made with transition fittings approved by the Contracting Officer.

5. TESTS.

5.1 After completion of the piping system and prior to backfilling and the installation of the sprinkler heads, the entire system shall be tested for leaks and thoroughly flushed under pressure to remove any dirt, scale or other material. Cracked or defective pipe, fittings, or accessories disclosed in the pressure

tests shall be replaced by the Contractor with sound material at no additonal cost to the Government, and the test shall be replaced by the Contractor with sound material at no additional cost to the Government, and the test shall be repeated until results are satisfactory to the Contracting Officer.

5.1.1 No line shall be covered until inspection and approval has been given by the Contracting Officer.

5.1.2 Testing of plastic pipe shall not be done until all joints have had at least 24 hours to set and cure. During cold weather, 48 hours elasped time shall be allowed for setting prior to testing. No water under pressure shall come in contact with any joint during the specified curing period. In hot weather, water shall not be permitted to stand in pipes until after backfilling is completed. Water used in testing shall be drained from pipes after completion of testing.

5.2 Coverage Test. When the irrigation system is completed the entire system shall be adjusted and operated to demonstarate the water coverage is complete and adequate and that the system conforms to the requirements of the plans and specifications. All deficiencies and inadequacies resulting from defective or inadequate materials (excludes salvaged sprinkler heads, remote control value, and quick couplers) and/or workmanship shall be corrected at no additional cost to the Government. In the event any salvage sprinkler head, remote control valve, or quick coupler is found to be defective, or does not conform to manufactures requirements shall be replaced in accordance with these specifications, and an equitable adjustment in contract price will be made.

6. CLEANUP. Upon completion of the installation of the irrigation system and appurtenances, all debris and surplus materials resulting from the work shall be removed.

7. VARIATION IN ARRANGEMENT OF SPRINKLERS from the existing irrigation system will be permitted. If such variation is made, the Contractor shall submit a shop drawing for approval in accordance with the Special Provisions. If any conflicts occur necessitating departures from the contract drawings, details of departures, hydraulic calculation and reasons shall be submitted as soon as practicable for written approval of the Contracting Officer. Hydraulic calculations shall include application rate per hour, maximum triangular spacing of heads for design flow rate and pressure, overlap including wind loss allowance and friction loss through pipe fittings, valves and accessories.

8. GUARANTEE. Bubblers to be furnished under this specification shall be guaranteed for a period of one year from the date of acceptance thereof, either for beneficial use or final acceptance, whichever is earlier, against defective materials, design, and workmanship.

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SECTION 2P

RESTROOM REPAIR

Index

1. Applicable Publications
2. Stucco
3. Paint
4. Crack Repair

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

1.1 Federal Specifications (Fed. Spec.).

TT-P-19c	Paint, Acrylic Emulsion: Exterior
TT-P-55b	Paint, Polyvinyl Acetate Emulsion: Exterior
TT-P-1181a & Am. 1	Paint, Styrene-acrylate Solvent Type, Tints and Deep Tones (For Exterior Masonry)

1.2 American Society for Testing and Materials (ASTM) Publications.

C 109-80	Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50 mm. Cube Specimens)
C 150-82	Portland Cement
C 206-79	Finishing Hydrated Lime
C 897-78	Aggregate for Job-Mixed Portland Cement-Based Plasters
C 926-81	Application of Portland Cement-Based Plaster

2. STUCCO.

2.1 Samples. A panel of stucco 12 inches square showing finished texture and thickness shall be submitted for approval prior to proceeding with the work.

2.2 Materials.

2.2.1 Portland cement shall conform to ASTM C 150, gray Portland cement, Type II.

2.2.2 Lime shall conform to ASTM C 206, Type S.

2.2.3 Sand aggregate for job-mixed base coat and finish coats shall conform to ASTM C 897.

2.2.4 Water shall be clean, fresh, potable, and free of elements that would be injurious to stucco.

2.3 Surface Preparation. Surfaces on which the stucco will be applied shall be prepared in conformance with the applicable requirements of ASTM C 926.

2.4 Proportions and Mixing. Proportioning and mixing of base coat and finish coat shall conform to the applicable requirements of ASTM C 926 or the manufacturer's recommendations.

2.5 Application. Stucco shall be applied in two coats to a thickness of not less than 3/8-inch. Stucco application shall conform to the applicable requirements of ASTM C 926 and shall match the stucco on completed portions of the existing structure.

2.5.1 Surfaces of the base coat shall be dampened not more than one hour before the finish coat is to be applied to a uniform wetness with no free-standing water on the surface. The finish coat shall conform to the approved sample. The finish coat shall be fog-cured for a minimum of 48 hours. Care shall be taken to prevent staining.

3. PAINT.

3.1 Material. Paint shall conform to Fed. Spec. TT-P-19; TT-P-55, Type II; or TT-P-1181.

3.2 Color. Color shall be selected to match paint on completed portions of the existing structure.

3.3 Preparation. Remove foreign matter, efflorescence, and loose particles, and roughen glazed surfaces.

3.4 Application. The paint shall be applied in two coats by hand or mechanical methods approved by the Contracting Officer.

4. CRACK REPAIR. Repair of cracks in sidewalk shall conform to section: CRACK SEALING AND REPAIR.

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SECTION 2Q

CONCRETE PIPE

Index

1. Applicable Publications
2. Delivery, Storage, and Handling of Materials
3. General
4. Tests for Pipe
5. Pipe
6. Drainage Structures
7. Mortar
8. Joints
9. Excavation and Trenching
10. Placing Pipe
11. Backfilling

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

1.1 Federal Specifications (Fed. Spec.).

RR-F-621b	Frames, Covers, Gratings, Steps, Sump and Catch Basins, Manhole
SS-L-351B	Lime, Hydrated, For Structural Purposes
SS-S-210A & Am-1 (GSA-FSS)	Sealing Compound, Preformed Plastic, for Expansion Joints and Pipe Joints

1.2 Federal Standard (Fed. Std.).

No. 601 & Change Notices 1 through 6	Rubber: Sampling and Testing

1.3 American Association of State Highway and Transportation Officials (AASHTO) Publications.

M 170-74	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
M 198-75I	Joints for Circular Concrete Sewer and Culvert Pipe Using Rubber Gaskets
M 199-74	Precast Reinforced Concrete Manhole Sections

1.4 American Society for Testing and Materials (ASTM) Publications.

C 76-80	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
C 361-78	Reinforced Concrete Low Head Pressure Pipe
C 443-79	Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets

C 476-80	Grout for Reinforced and Non reinforced Masonry
C 478-80	Precast Reinforced Concrete Manhole Sections
D 1056-78	Flexible Cellular Materials -- Sponge or Expanded Rubber

2. DELIVERY, STORAGE, AND HANDLING OF MATERIALS.

2.1 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.

2.2 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. Gasket materials and plastic materials that are not to be installed immediately shall not be stored in the direct sunlight.

3. GENERAL. Concrete shall conform to the section: 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 pipes and structures shall conform to the applicable requirements of the sections: EXCAVATION and FILLS AND SUBGRADE PREPARATION. Welding shall conform to the requirements of the section: MISCELLANEOUS METALWORK AND MATERIALS. Removal of existing side drains is specified in the section: CLEARING SITE AND REMOVING OBSTRUCTIONS. Specified and/or indicated pipe diameter, thickness, D-loading, weight, or gage are the minimum acceptable. One size larger diameter or heavier pipe may be furnished at the option of the Contractor. Before connecting side drains to the new channel, the Contractor shall have completed all of the channel located downstream of the connection.

3.1 Extension of Drain Lines. Drain lines shall be extended with the same kind of pipe and shall have joints to match the existing joints. All joints shall be watertight. Bends, elbows, and other fittings shall be standard fittings for the various types of pipe. Except as otherwise specified, all pipe and fittings shall be new. Salvaged pipe and fittings from drain removals may be used in temporary installations necessary to the work and in permanent installations, where specified.

3.2 Manufacturers Recommendations. Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be furnished to the Contracting Officer prior to installation. Installation of the item will not be allowed until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.

4. TESTS FOR PIPE. Certified copies of test reports demonstrating conformance to applicable pipe specifications shall be delivered to the Contracting Officer before pipe is installed. Strength tests for concrete, clay, an asbestos-cement pipe as required in applicable specifications shall be the three-edge bearing tests.

5. PIPE. Pipe shall be either reinforced concrete pipe, prestress concrete cylinder pipe or cast in place non-reinforced concrete pipe. Except that pipe larger than 96 inches, inside diameter shall be reinforced concrete pipe. Reinforced concrete pipe shall conform to the requirements of ASTM C 76 or C 361, AASHTO M 170, or AWWA C 301 the nearest D-Load equal to or above D-Load indicated. Pipe suitable for reuse may be used. All joint mortar and other foreign matter shall be removed.

6. DRAINAGE STRUCTURES.

6.1 Frame and Cover or Gratings. Fabrication shall be from one or more of the material options presented in Fed. Spec. RR-F-621, except the malleable cast iron option shall conform to ASTM A 220, Grade 40010; all frame and cover shall be suitable for use in traffic areas (traffic strength), including the watertight frame and cover. Weight, shape, size, and waterway openings for grates and curb inlets shall be as indicated on the plans. Frames and covers for curb inlets and for areas not subject to vehicular traffic or storage may be malleable iron if so indicated. Malleable-iron frames and covers shall conform to ASTM A 220 and shall be of the weight, shape, and size indicated. Manhole steps shall conform to section: MISCELLANEOUS METALWORK AND MATERIALS.

7. MORTAR. Mortar and grout for pipe joints and connections to drainage structures shall conform to ASTM C 476, Mortar Type PL. The mortar shall be used within 30 minutes after the ingredients are mixed with water.

8. JOINTS.

8.1 For Reinforced Concrete Pipe. Upon completion of joining pipe sections, the inside of the joint shall be wiped clean and finished smooth. In pipe too small for a man to work inside, wiping may be done by dragging a suitable swab or long handled brush through the pipe as the work progresses. The mortar bead on the outside shall be protected from drying out until satifactorily cured.

8.1.1 Cement-Mortar Bell-and-Spigot Joint. The first pipe shall be bedded to the established gradeline, with the bell end placed upstream. The interior surface of the bell shall be carefully cleaned with a wet brush and the lower portion of the bell filled with mortar to such depth as to bring inner surfaces of abutting pipes flush and even. The spigot end of each subsequent pipe shall be cleaned with a wet brush and uniformly matched into the bell so that sections are closely fitted. After each section is laid, remainder of the joint shall be filled with mortar, and a bead shall be formed around the outside of the joint with sufficient additional mortar. If mortar is not sufficiently stiff to prevent appreciable slump before setting, the outside of the joint shall be wrapped or bandaged with cheesecloth to hold mortar in place.

8.1.2 Cement-Mortar Oakum Joint for Bell-and-Spigot Pipe. A closely twisted gasket shall be made of joint packing, conforming to Fed. Spec. HH-P-117, of the diameter required to support the spigot end of the pipe at the proper grade and to make the joint concentric. Joint packing shall be in one piece of sufficient length to pass around the pipe and lap at top. This gasket shall be thoroughly saturated with neat cement grout. The bell of the pipe shall be thoroughly cleaned with a wet brush, and the gasket shall be laid in the bell for the lower third of the circumference and covered with mortar. The spigot of the pipe shall be thoroughly cleaned with a wet brush, inserted in the bell, and carefully driven home. A small amount of mortar shall be inserted in the annular space for the upper two-thirds of the circumference. The gasket then shall be lapped at the top

of the pipe and driven home in the annular space with a calking tool. The remainder of the angle of approximately 45 degrees with outside of the bell. If mortar is not sufficiently stiff to prevent appreciable slump before setting, the outside of the joint shall be wrapped with cheesecloth. Placing of this type joint shall be kept at least five joints behind laying operations.

8.1.3 Cement-Mortar Diaper Joint for Bell-and-Spigot Pipe. The pipe shall be centered so that the annular space is uniform. The annular space shall be calked with joint packing conforming to Fed. Spec. HH-P-117. Before calking, the inside of bell and outside of spigot shall be clean.

8.1.3.1 Diaper bands shall consist of heavy cloth fabric to hold grout in place at joints and shall be cut into such lengths that they will extend one-eighth of the circumference of pipe above the spring line on one side of the pipe and up to the spring line of the other side of the pipe. Longitudinal edges of fabric bands shall be rolled and stitched around two pieces of wire. Width of fabric bands shall be such that after fabric has been securely stitched around both edges on wires, the wires will be uniformly spaced not less than 8 inches apart. Wires shall be cut into lengths to pass around pipe with sufficient extra length for the ends to be twisted at top of pipe to hold band securely in place: bands shall be accurately centered around lower portion of joint.

8.1.3.2 Grout shall be poured between band and pipe from only the high side of band, until grout rises to the top of band at the spring line of pipe, or as nearly so as possible, on the opposite side of pipe, to insure a thorough sealing of joint around the portion of pipe covered by band. Silt, slush, water, or polluted mortar grout forced up on the lower side shall be carefully forced out by the pouring and removed.

8.1.3.3 The remaining unfilled upper portion of the joint shall then be filled with mortar and a bead formed around outside of this upper portion of joint with sufficient amount of additional mortar. The diaper shall be left in place. Placing of this type joint shall be kept at least five joints behind actual laying of pipe. No backfilling around joints shall be done until joints have been fully inspected and approved.

8.1.4 Cement-Mortar Tongue-and-Groove Joint. The first pipe shall be bedded carefully to the established gradeline with the groove upstream. A shallow excavation shall be made underneath the pipe at the joint and filled with mortar to provide a bed for the pipe. The grooved end of the first pipe shall be carefully cleaned with a wet brush, and a layer of soft mortar applied to the lower half of the groove. The tongue of the second pipe shall be cleaned carefully with a wet brush; while in horizontal position, a layer of soft mortar shall be applied to the upper half of the tongue. The tongue end of the second pipe then shall be inserted in the grooved end of the first pipe until mortar is squeezed out on interior and exterior surfaces. Sufficient mortar shall be used to fill the joint completely and to form a bead on the outside.

8.1.5 Cement-Mortar Diaper Joint for Tongue-and-Groove Pipe. The joint shall be of the type described in paragraph: Cement-Mortar-Tongue-and-Groove Joint above, except that the shallow excavation directly beneath the joint shall not be filled with mortar until after a gauze or cheesecloth band dipped in cement mortar has been wrapped around the outside of the joint. The cement-mortar bead at the joint shall be at least 1/2-inch thick, and the width of the diaper band shall be at least 8 inches. The diaper shall be left in place. Placing of this type joint

shall be kept at least five joints behind the actual laying of the pipe. No backfilling around the joints shall be done until joints have been fully inspected and approved.

8.2 Joints Prestressed Concrete Pipe.

8.2.1 Materials and Test Requirements. Joints Prestressed Concrete Pipe shall be made with rubber-type gaskets. The design of joints and the physical requirements for rubber-type gaskets shall conform to ASTM C 443 or AASHTO M 198. Gaskets shall have not more than one factory-fabricated splice, except that two factory-fabricated splices of the rubber gasket type the permitted if nominal diameter of pipe being gasketed exceeds 54 inches. Material conforming to Fed. Spec. SS-S-210 is acceptable as an alternate to ASTM C 443 provided the necessary installation instructions are furnished.

8.2.2 Installation. Gaskets and joining materials shall be as recommended by the particular manufacturer in regard to use of lubricants, cements, adhesives, and other special installation requirements. Surfaces to receive lubricants, cements, or adhesives shall be clean and dry. Gaskets and jointing materials shall be affixed to the pipe not more than 24 hours prior to the installation of the pipe, and shall be protected from the sun, blowing dust, and other deleterious agents at all times. Gaskets and jointing materials shall be inspected before installing the pipe; any loose or improperly affixed gaskets and jointing materials shall be removed and replaced. The pipe shall be aligned with the previously installed pipe, and the joint pulled together. If, while making the joint, the gasket or jointing material becomes loose and can be seen through the exterior joint recess when joint is pulled up to within one inch of closure, the pipe shall be removed and the joint remade.

9. EXCAVATION AND TRENCHING. Excavation of trenches and backfilling shall be in accordance with the applicable portions of section: FILLS AND SUBGRADE PREPARATION and the following requirements.

9.1 Trenching. Shoring where indicated or required shall be placed within the trench width as specified. Care shall be taken not to over excavate. Where trench widths are exceeded, redesign with a resultant increase in cost of stronger pipe or special installation procedures shall be necessary. Cost of this redesign and increased cost of pipe or installation shall be borne by the Contractor without additional cost to the Government.

9.2 Removal Of Rock. Rock in either ledge or boulder formation shall be replaced with selected materials to provide a compacted earth cushion having a thickness between unremoved rock and the pipe of at least 8 inches or 1/2-inch for each foot of fill over the top of the pipe, whichever is greater, but not more than three-fourths the nominal diameter of the pipe. Where bell-and-spigot pipe is used, the cushion shall be maintained under the bell as well as under the straight portion of the pipe.

9.3 Removal of Unstable Material. Where wet or otherwise unstable soil incapable of properly supporting the pipe, as determined by the Contracting Officer, is encountered in bottom of trench, such material shall be removed to depth required and replaced to the proper grade with selected material, compacted as provided in paragraph: BACKFILLING. When removal of unstable material is due to the fault or neglect of the Contractor in his performance of shoring and sheeting, water removal, or other specifed requirements, resulting material shall be excavated and replaced.

10. PLACING PIPE. Each pipe shall be carefully examined before being laid, and defective or damaged pipe shall not be used. Pipelines shall be laid to the grades and alinement indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Under no circumstances shall pipe be laid in water, and no pipe shall be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary. All pipe in place shall be inspected before backfilling, and those damaged during placement shall be removed and replaced at no additional cost to the Government.

10.1 Concrete Pipe. Laying shall proceed upgrade with spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow. Circular concrete pipe with elliptical reinforcing shall be placed so that reference lines designating top of pipes will be not more than 5 degrees from the vertical plane through the longitudinal axis of the pipe. In all backfilling operations care shall be taken to prevent damage to or misalignment of the pipe.

11. BACKFILLING.

11.1 Backfilling Pipe in Trenches. After the bedding has been prepared and the pipe installed, sandy fill material shall be placed along both sides of pipe in a single lift to the springing line (maximum horizontal dimension of a pipe). The backfill shall be brought up evenly on both sides of pipe for the full length of pipe. Water shall be applied to the sandy fill by jetting in a manner, quantity, and at a rate sufficient to throughly saturate the entire lift. Vibrating compacting equipment shall be used to obtain not less than 90 percent of maximum density. Care shall be taken to insure thorough compaction of the fill under the haunches of the pipe. Above the springing line, the trench shall be filled with fill conforming to the section: FILLS AND SUBGRADE PREPARATION. The sand fill material, at a moisture content that will facilitate compaction, shall be placed along both sides of pipe in layers not exceeding 4 inches in compacted depth. The backfill shall be brought up evenly on both sides of pipe for the full length of pipe. Each layer shall be thoroughly compacted with mechanical tampers or vibrators to not less than 90 percent of maximum density. This method of filling and compacting shall continue until the fill has reached an elevation of at least 24 inches above the top of the pipe or to the bottom of the Aggregate Base Course. The remainder of the trench shall be backfilled and compacted by spreading and rolling or compacted by mechanical tampers or vibrators in layers not exceeding 6 inches. Where it is necessary in the opinion of the Contracting Officer, any sheeting and/or portions of bracing used shall be left in place, and the contract will be adjusted accordingly. Untreated sheeting shall not be left in place beneath structures or pavements.

11.2 Movement of Construction Machinery. In compacting by rolling or operation heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert or storm drain at any stage of the construction shall be at the contractor's risk. Any pipe damaged thereby shall be repaired or replaced at the expense of the Contractor.

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SECTION 3A

CONCRETE

Index

1. Applicable Publications
2. General
3. Storage
4. Materials
5. Concrete Quality
6. Formwork
7. Reinforcement
8. Installation of Anchorage items
9. Joints
10. Placing
11. Consolidation of Concrete
12. Slabs on Grade
13. Finishes of Concrete Curbs and Gutters
14. Concrete Slab Finishes
15. Curing

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

1.1 American Concrete Institute (ACI) Standards.

318-77 (1980 Suppl)	Building Code Requirements for Reinforced Concrete
SP-66	ACI Detailing Manual - 1980

1.2 American Society for Testing and Materials (ASTM) Publication.

C 94-81	Ready-Mixed Concrete

2. GENERAL. The work shall be in conformance with ACI 318, part entitled "Construction Requirements", except as specified herein. Concrete shall conform to ASTM C 94.

3. STORAGE. Materials shall be stored so as not to deteriorate or become contaminated.

4. MATERIALS.

4.1 Anchorage Items. Anchorage items for anchoring work of other trades to concrete shall be of standard manufacture and of types to engage with anchors provided and installed under other sections.

4.2 Concrete Materials. Concrete materials shall conform to ASTM C 94, cement type optional. Only one brand of any one type of cement shall be used for exposed concrete surfaces of any individual structure.

4.3 Curing Materials. Curing materials shall be impervious sheet or membrane-forming curing compound. Impervious sheet shall be white opaque polyethylene 4 mil thick, waterproof kraft paper, or polyethylene-coated burlap. Membrane-forming curing compound shall be of commercial formulation, sprayable, nontoxic, and will form a film highly resistant to moisture loss from concrete while curing and will dry within 4 hours. Compound shall be clear with fugitive dye, resin-base or chlorinated- rubber-base-type.

4.4 Dowels. Dowels shall be plain carbon steel bars, minimum yield point of 40,000 psi for use in slabs on grade.

4.5 Expansion Joint Filler Strips, Premolded. Expansion joint strips shall be nonextruding, resilient bituminous or nonbituminous type commercially used in concrete paving or construction, 3/8-inch thick.

4.6 Form Coating. Form coating shall be nonstaining form oil or form release agent that will not deleteriously affect concrete surfaces nor impair subsequent applications.

4.7 Form Materials. Form materials shall be plywood or hardboard especially made for concrete form use or other materials that will produce the specified finishes without adversely affecting the concrete surfaces.

4.8 Form Ties. Form ties shall be metal, factory-fabricated removable or snap-off, that will leave holes not less than 1/4 inch nor more than 1 inch in diameter and not more than 1 inch deep. That portion of the tie remaining permanently in the concrete shall not project beyond the surface of the concrete and shall be recessed at least 1 inch from any concrete surface that will be exposed, painted, dampproofed, or will receive direct applications of plaster.

4.9 Joint Sealant. Joint sealant shall be hot- or cold-applied, made specifically for sealing joints in concrete against moisture infiltration.

4.10 Reinforcement. Reinforcement bars shall be deformed, Grade 40 billet or axle steel, or Grade 50 rail steel. Mesh shall be welded steel wire fabric with wires at right angles to each other.

4.11 Vapor Barrier. Vapor barrier shall be polyethylene, 6-mil thick.

5. CONCRETE QUALITY. Proportioning of concrete mixes to meet the requirements specified below shall be the Contractor's responsibility.

5.1 Compressive Strength. Compressive strength in 28 days shall be 4000 psi. The compressive strengths shall be reached in 7 days when high-early-strength cement is used.

5.2 Entrained-Air Content. Entrained-air content of concrete shall be maintained at 5 to 7 percent by volume of concrete.

5.3 Slump. Slump shall be 2 to 3 inches.

6. FORMWORK. Formwork shall provide for concrete conforming accurately to the indicated shapes, lines, dimensions, and with surfaces free of offset, waviness, or bulges. Where surfaces are to be exposed or painted, panels shall be manufacturer's stock size material, using smaller panels cut to required dimensions only where required by openings and joints. Panel joints in exposed or painted work shall occur at control joints, including alinement with masonry control joints and construction joints. Exposed corners shall be chamfered, beveled, or rounded by moldings placed in the forms. Surfaces shall be thoroughly cleaned and coated before each use. Forms shall be removed at a time and in a manner that will not injure the concrete.

7. REINFORCEMENT. Reinforcement detailing and placement shall conform to ACI SP-66 and ACI 318. Reinforcement shall be interrupted 2 inches clear on each side of joints in slabs on grade and perimeter joints. Wire-mesh reinforcement shall be continuous between joints in slabs on grade. Laps shall be at least one full mesh plus 2 inches; staggered to avoid continuous lap in either direction; and securely wired or clipped with the standard clips. Mesh shall be supported on precast concrete units in a manner that will support the mesh at the minimum height indicated. Dowels and tie bars in slabs on grade shall be installed at right angles to joints; accurately alined parallel to the finished surface; and rigidly held in place and supported during concrete placement. One end of dowels shall be oiled or greased.

8. INSTALLATION OF ANCHORAGE ITEMS. Anchorage items shall be of number, size, and location to insure sufficient anchorage for purpose intended.

9. JOINTS. Expansion joint filler shall be installed at the proper level below the finished floor with a wood strip temporarily secured to the top thereof to form a groove not less than 3/4-inch deep. The wood strip shall be removed after the concrete has set and the groove filled with joint sealant so as to be slightly concave after drying.

10. PLACING. Concrete footings and exterior slabs shall be placed upon clean undisturbed surfaces free from frost, ice, and water. Dry or pervious surfaces receiving concrete shall be covered with impervious sheet materials. Concrete may be placed directly on impervious surfaces that are thoroughly moistened but not muddy. Concrete shall be placed in layers not over 12 inches deep. Concrete shall be protected from freezing. Concrete to receive other construction shall be screeded to the proper level.

11. CONSOLIDATION OF CONCRETE. Consolidation of concrete shall be with internal concrete vibrators supplemented by handspading, rodding, and tamping. Vibrating equipment shall be adequate to thoroughly consolidate the concrete.

12. SLABS ON GRADE. Surfaces receiving concrete for slabs within the building shall be covered with a vapor barrier lapped a minimum of 4 inches at edges and ends. Concrete shall be compacted, screeded to grade, and prepared for the specified finish. Slabs shall be placed in panels in alternate checkerboard pattern or in alternate lanes divided into panels. Each panel shall be approximately square terminated by slab joints so as to be not over 600-square feet in area and with sides not over 25-feet long. Contraction joints shall be true to line, 1/8-inch wide, and of depth equal to approximately 1/4 of the slab thickness. Joints shall be sawed or formed by inserting fiberboard strips of the required dimensions after placing concrete. Joints in permanently exposed slabs shall be filled with joint sealant.

13. FINISHES OF CONCRETE CURBS AND GUTTERS. Fins and loose material shall be removed. Unsound concrete, voids over 1/2 inch in diameter, and tie-rod and bolt holes shall be cut back to solid concrete, reamed, brush-coated with cement grout, and filled solid with a stiff portland-cement-sand mortar mix. Patchwork shall finish flush with adjoining concrete surfaces and where exposed, shall match adjoining surfaces in texture and color. Patchwork shall be cured for 72 hours. White portland cement shall be used as needed to attain color match. Surfaces to be painted or exposed to view shall be thoroughly wetted and then brush-coated with portland-cement-sand grout of thick consistency and of mixture so that final color will approximately match the concrete. White portland cement shall be used

as needed to attain color match. Grout shall be cork- or wood-floated to fill voids, excess scraped off with a trowel, and visible grout film removed by rubbing with burlap. Grout shall be kept damp until set.

14. CONCRETE SLAB FINISHES. Slab shall be finished to a true plane with no deviation exceeding 1/8 inch when tested with a 10-foot straightedge. Surfaces shall be pitched to drains. Surfaces shall be screeded and floated to the required finish level with no coarse aggregate visible before finishing. Monolithic finish shall be given to slabs unless otherwise specified. After the surface moisture has disappeared, floated-surfaces shall be steel-troweled to a smooth, even, dense finish free from blemish including trowel marks.

15. CURING shall start as soon as free water has disappeared from concrete surfaces after placing and finishing. Curing materials shall be applied and maintained so as to protect the concrete from moisture loss for 7 days. Curing shall be accomplished by impervious sheet or membrane-forming curing compound. Concrete surfaces shall be thoroughly wetted before covering with impervious-sheet materials. Membrane-forming curing compound shall be applied with mechanical spraying equipment at a coverage of not more than 300 square feet per gallon. Surfaces damaged during curing shall be resprayed. The compound shall not be used on surfaces to receive floor hardener or receiving applications depending on adhesion or bonding, except that resin-base or chlorinated-rubber-base compounds may be used on floors receiving resilient flooring; surfaces to be painted; and surfaces to receive bituminous roofing or waterproofing .

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SECTION 3B

CRACK SEALING AND REPAIR

Index

1. Applicable Publications
2. Requirements
3. Materials
4. Epoxy-Resin Mixtures
5. Repair of Cracks
6. Safety Precautions

1. APPLICABLE PUBLICATIONS. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto.

1.1 Federal Specifications.

MMM-B-350b	Binder, Adhesive, Epoxy Resin, Flexible
MMM-A-001993	Adhesive, Epoxy, Flexible, Filled (For Binding, Sealing, and Grouting)

2. REQUIREMENTS.

2.1 Repair Cracks and Joints in existing concrete structures as indicated on the drawings by methods as specified herein.

2.2 Tests Required for Epoxy Injection.

2.2.1 The Contractor shall take one core for each 100 feet of crack repair, and additional cores at other locations as directed by the Contracting Officer.

2.2.2 The cores shall be 2 inches in diameter and a minimum of 12 inches in depth. If any reinforcing steel is contacted during the core drilling the Contractor shall cease drilling and relocate the core drill to clear the reinforcing steel. All resulting core holes shall be filled with an epoxy-resin mixture.

2.2.3 When a core demonstrates that the epoxy has penetrated less than 90 percent of the crack volume within the core, the work shall be deemed as not meeting the requirements of these specifications and all cracks of such location shall be refilled to achieve at least 90 percent penetration.

2.3.4 All patching and additional injection work required as a result of core testing shall be accomplished at no additional expense to the Government and shall be completed in a manner satisfactory to the Contracting Officer.

2.3.5 Qualification Requirements. This method of epoxy injection work shall be performed by authorized applicators of a process which has been successfully used on at least three similar structural repairs of 1,000 lineal feet or longer and which have not failed in a minimum of 3 years.

3. MATERIALS.

3.1 The Epoxy-Resin Binder and Grout shall be furnished as a two-component system conforming to Federal Specifications MMM-B-350 and MMM-A-001993, respectively. Manufacturers' certificates of compliance will be accepted in lieu of testing by the Contractor.

4. EPOXY-RESIN MIXTURES.

4.1 Temperature, Moisture, and Protection for Repairs. Concrete repairs using epoxy-resin grout and epoxy-resin binder, as described herein, shall be accomplished when the atmospheric and concrete temperatures are above 50 degrees F. and less than 100 degrees F. and remain in this range for at least 24 hours after the repairs are made. When repairs are required to be made at temperatures other than in the above range, artificial environment shall be provided as directed for placing and curing. Epoxy-resin grout, concrete, or mortar shall not be placed when free water is present on the contact surface of the area to be repaired. Repairs shall be protected from water for at least 12 hours after placement and from all types of traffic for 24 hours.

4.2 Field Mixing and Batch Size. The maximum individual batch size for field repairs shall be in the range of 200 to 300 pounds. Mechanical drum-type mixers or hand mixing in metal pans shall be used for preparing epoxy-resin concrete and mortar mixtures. The epoxy-resin and the polysulfide-curing-agent components shall be thoroughly mixed as specified, before transferring the binder to the pan or drum-type mixer. In the preparation of the epoxy-resin concrete, the fine aggregate shall be added to the binder until a rich mortar consistency is reached. The coarse aggregate shall then be added until the capacity of the mortar is attained while retaining placeability and finishing properties.

5. REPAIR OF CRACKS.

5.1 General.

5.1.1 Adequate surface seal shall be applied to the crack or joint to prevent escape of the epoxy.

5.1.2 Entry points shall be established at a distance along the seal not less than the thickness of the cracked member.

5.1.3 The epoxy-resin mixture shall be forced into the crack at the first port with sufficient pressure to advance the epoxy to the adjacent port. The original port shall be sealed and entry shifted to the port at which the epoxy appears. This manner of port-to-port injection shall be continued until each joint has been injected for its entire length.

5.2 Preparation.

5.2.1 Before proceeding, the space in the vicinity of a crack location receiving epoxy shall have been swept and left in a generally clean condition.

5.2.2 All joints receiving epoxy under this section shall be cleaned free from dirt, laitance and other loose matter.

5.3 Presealing between ports may be done using a material meeting the requirements of these specifications.

5.4 Pumps Used for Injection shall be a positive displacement type with interlock to provide positive ratio control in proper proportions. The pumps used shall be electrically or air powered, portable and shall provide an in-line mixing and metering system for the two-component epoxy. The pressure hoses and injection nozzle shall be of such design as to allow proper mixing of the two components of the epoxy. The presence of a stand-by injection unit is required. Dwell time in mixing head shall not exceed ten seconds.

5.5 Installation.

5.5.1 The epoxy shall be injected under pressure, using a small nozzle held tightly against the port. Continue operation until epoxy material advances to and begins to exude from the next port. Repeat from port-to-port until the entire joint has been treated in one continuous operation.

5.5.2 Seal all ports including adjacent locations where epoxy seepage occurs, as necessary to prevent drips or run out.

5.5.3 Any condition other than normal shall be reported to the Contracting Officer.

5.6 Solvents may NOT be used to thin the epoxy system introduced into the cracks or joints.

5.7 The surface of the crack herein treated shall be finished flush with the adjacent concrete surfaces and shall show no indentations or evidence of port fitting.

5.8 All work under this specification shall be performed and conducted in a neat, orderly manner. All work shall be performed in the presence of the Contracting Officer.

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SECTION 3C

GROUTING STONE PROTECTION

Index

1. Applicable Publications
2. Materials
3. Mixing
4. Placing
5. Curing and Protection

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

1.1 Federal Specifications (Fed. Spec.):

SS-C-1960/GEN	Cement and Pozzolan, General Requirements for
SS-C-1960/3B	Cement, Portland

1.2 U.S. Department of the Army, Corps of Engineers, Handbook for Concrete and Cement:

CRD-C 300-77	Membrane-Forming Compounds for Curing Concrete

2. MATERIALS.

2.1 Aggregate shall conform to the requirements specified for fine aggregate stone of the section: CONCRETE.

2.2 Portland Cement shall conform to the requirements of Fed. Spec. SS-C-1960/3B, Type II. The alkali content of the cement shall not exceed 0.6 percent.

2.3 Water shall be fresh, clean, and potable.

3. MIXING. Grout shall be composed of cement, sand, and water mixed in the proportions as directed. The estimated cement content requirement per cubic yard of grout is 7-1/2 sacks. The water content of the mix shall not exceed 8-1/2 gallons per sack of cement. In calculating total water content of the mix, the amount of moisture carried on the surfaces of aggregate particles shall be included. Slump of grout mix shall be between 9 and 10 inches for the first course and between 7 and 8 inches for the second course or where one course is placed. The grout shall be mixed in a concrete mixer in the manner specified for concrete, except that time of mixing shall be as long as is required to produce a satisfactory mixture, and the grout shall be used in the work within a period of 30 minutes after mixing. Retempering of grout will not be permitted. The consistency of the grout shall be such as to permit gravity flow into the interstices of the stones with the help of spading, rodding, and brooming. Grout batches in the same course shall be uniform in mix, size, and consistency.

4. PLACING. Placing Type II grouted stone.

4.1. Prior to grouting, the stone shall be hand-placed in an aesthetically pleasing layout so as not to detract from the project or surroundings. Prior to grouting, the stone shall be flushed with water to wash down the fines and to

prevent absorption of water from grout. The stone shall be kept wet just ahead of the actual placing of grout. Except where indicated otherwise, the grout shall be placed in 2 courses to a total depth equal to a maximum of 2/3 and not less than 1/2 of the depth of the stone protection. All grout shall be placed in the bottom lower two-thirds of the stone protection layer. Each course shall be placed full width or in successive lateral strips approximately 10 feet in width, as applicable, extending from toe of slope to top. The grout shall be brought to the place of final deposit by approved means and discharged directly on the stones using a splash plate of metal or wood to prevent displacement of stone directly under the discharge. The flow of grout shall be directed with brooms or other approved baffles and to assure that all crevices are filled. Sufficient barring shall be done to loosen tight pockets of stone and otherwise aid the penetration of grout. The first course shall fully penetrate the stone blanket. The second course shall be placed as soon as the first course has sufficiently stiffened so that it will not flow when additional grout is added. All brooming shall be uphill. After the second course of grout has been placed, the grout shall be allowed to stiffen and after the second course has stiffened the entire surface shall be rebroomed to eliminate runs in the top course and to fill voids caused by sloughing of the layers of grout. The grouted surface shall then be allowed to set for not less than one hour; then air-water cleaning shall be performed. Air pressure at the nozzle shall be not less than a constant 1000 psi. The nozzle shall be held as nearly perpendicular as possible to the surface of the stone at such distance and narrow range as to clean the exposed stone without damaging the surrounding grout surface. After completion of any strip or panel, no workmen or other load shall be permitted on the grouted surface for a period of 24 hours. The grouted surface shall be protected from injurious action of the sun; shall be protected from rain, flowing water, and mechanical injury; and shall be moist cured or membrane cured at the Contractor's option. Moist curing shall consist of covering the grout with a uniform thickness of 2 inches of sand which shall be kept continuously saturated for a period of 14 days.

4.2 Placing Type I grouted stone. Placing Type I grouted stone shall be the same as placing Type II grouted stone except that the depth of grout shall be as indicated.

4.3 Surface Cleanup. All grouted stone shall be cleaned after completion of grouting so that the top 2 inches of stone will be exposed over 75 percent of the surface.

5. CURING AND PROTECTION.

5.1 Curing. Membrane curing compound shall be a non-pigmented curing compound conforming to Corps of Engineers Serial No. CRD-C 300 except that the compound shall contain a fugitive dye. The grouted surface shall be shaded from the direct rays of the sun for the first 7 days.

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

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SECTION 3D

PNEUMATICALLY PLACED CONCRETE

Index

1. Applicable Publications
2. Description
3. Materials
4. Proportioning and Mixing
5. Foundation Preparation
6. Placing
7. Finishing
8. Contractor Quality Control

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

1.1 American Society for Testing and Materials (ASTM) Publications.

C 33-80	Concrete Aggregate
C 150-80	Portland Cement

1.2 American Concrete Institute (ACI) Standard.

ACI 304-73 (R 1978)	Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete

2. DESCRIPTION. Pneumatically placed concrete (gunite) shall be produced by either the dry mixed process in which most of the mixing water is added to the dry materials immediately prior to its expulsion from the nozzle, or the wet mix process in which all of the materials (including water) are premixed before entering the delivery hose.

2.1 Curing shall conform to the requirements specified in the section: CONCRETE.

3. MATERIALS.

3.1 Portland Cement shall conform to the requirements of ASTM Standard C 150, Type I or Type II, low alkali. Cement shall meet requirements for false set.

3.2 Fine Aggregate shall conform to the requirements of ASTM C33. Fine aggregate shall contain not less than 3 percent nor more than 6 percent moisture by weight. The proportions of fine aggregate and cement shall be corrected to allow for bulking due to sand moisture content.

3.3 Water for mixing and curing shall conform to the requirements of section: CONCRETE.

4. PROPORTIONING AND MIXING.

4.1 Dry Mix Process. The dry mixture shall consist of one part Portland Cement to not more than 4-1/2 parts of fine aggregate. Measurement may be either by volume or weight. The materials shall be mixed dry in an approved power batch mixer equipped with accurate measuring and timing devices and capable of

thoroughly mixing the fine aggregate and sand in sufficient quantity to maintain placing continuity. The mixing time shall be as recommended by the manufacturer of the mixer except that the mixing time shall be not less than one minute in drum-type mixers. Mixers shall be capable of discharging all mixed material without any carry over between batches. Materials that have been mixed for more than 45 minutes have not been incorporated into the work shall not be used.

4.2 Wet Mix Process. The premixed concrete shall contain not less than 610 pounds of Portland Cement per cubic yard of fine aggregate and water. A maximum of 30 percent pea gravel may be substituted for an equal amount of fine aggregate. The maximum size of pea gravel shall be such that 100 percent passes the 1/2 inch screen and at least 90 percent passes the 3/8 inch screen. Measurement may be either by volume or weight. The mixing equipment shall be capable of thoroughly mixing the materials in sufficient quantity to maintain continuous placing. The required mixing time shall depend on the mix being used and the efficiency of the mixer. Mixing shall conform to ACI 304. Non-agitating hauling equipment may be used subject to the approval of the Contracting Officer.

4.3 Strength. Pneumatically placed concrete shall have a minimum compressive strength of not less than 3,000 pounds per square inch at 28 days.

5. FOUNDATION PREPARATION. Areas to receive pneumatically placed concrete shall be thoroughly compacted and trimmed to line and grade with sufficient moisture to provide a firm foundation and prevent absorption of water from the concrete. No free water shall be present on the surface. Ground or gaging wires shall be used where necessary to establish thicknesses, surface planes and finish lines.

6. PLACING.

6.1 Workmen. Only experienced foremen, gunmen, nozzlemen, and rodmen shall be employed and satisfactory written evidence of such experience shall be furnished the Contracting Officer or his representative upon demand.

6.2 Equipment. The Contractor shall provide delivery equipment of approved design which will apply the material by means of pneumatic pressure. Air shall be supplied in sufficient volume and under such pressure as may be necessary for the best operating conditions. Air pressure at the nozzle shall be steady and without pulsation. A constant pressure of not less than 45 pounds per square inch shall be maintained in the placing machine where the hose length is 100 feet or less and the pressure shall be increased at least 5 pounds for each additional 50 feet of hose or fraction thereof. Water used for hydration at the nozzle shall be maintained at a uniform pressure not less than 15 pounds per square inch greater than the air pressure at the machine.

6.3 Applying. The nozzle shall be held as nearly perpendicular as possible to the surface to which the mortar is applied, at such distance and narrow range of movement as will have a spreading effect over a small area. The velocity of discharge from the nozzle, the distance of the nozzle from the face, and the amount of water used shall be regulated by the nozzleman in such a way as will produce a dense coating resulting in a minimum rebound of materials and no sloughing. Rebound material shall not be used again but shall be removed from the work. The maximum thickness of each layer will be limited to the thickness which can be placed without the material sagging. Time between application of layers shall be only sufficient to insure against sloughing. In case a portion of the previous layer has set to such hardness or has become coated in a manner preventing adequate bonding, the surface of that layer shall be cleaned by air and

waterjets before starting the next layer. Construction joints shall be avoided. Where necessary, at the end of the day's work or similar stopping periods, the concrete shall be tapered to a thin edge. Before applying the adjacent section, this tapered portion shall be thoroughly cleaned and wetted.

6.4 Clean-Up. At the completion of each day's work, or as otherwise directed, all accumulations of pneumatically placed concrete on adjacent surfaces shall be removed.

7. FINISHING.

7.1 Reinforced Concrete Box. After the concrete has been placed to the required thickness the surface shall be hand trowelled such that there will not be a variation of more than 1/2 inch when measured with a 10-foot straightedge.

7.2 Arizona Canal Backslope. The concrete (gunite) shall be placed to the required thickness and shall not have any low spots or depressions permitting ponding of water of a depth of greater than one inch. Surfaces shall be left in a natural finish as produced in application of the concrete.

8. CONTRACTOR QUALITY CONTROL.

8.1 General. The Contractor shall perform the following inspections and tests, and based upon the results of these inspections and tests, he shall take such action and submit reports as hereinafter specified.

8.2 Inspection Details and Frequency of Testing.

8.2.1 Preparation for Placing. Foundation, forms and embedded items shall be inspected in sufficient time prior to each concrete placement by the Contractor in order to certify to the Contracting Officer it is ready to receive concrete. The results of each inspection shall be reported in writing.

8.2.2 Placing. The placing foreman shall supervise all placing operations and shall be responsible for measuring and recording ambient temperature, weather conditions, time of placement, yardage placed, and method of placement.

8.2.3 Compressive Strength. The Contractor shall provide for test purposes 2 test panels from each 8-hour shift. Each panel shall be not less than 12 inches square and 3 inches in thickness. Cubes, 3 x 3 x 3 inches in size shall be sawed from the panels for testing. One half of the cubes shall be tested at 7 days and one half at 28 days. Panels shall be cured, stored and tested by and at the expense of the Contractor. Cube strengths may be reported as determined or converted to cylinder strengths by multiplying by the factor 0.85. Test results shall be reported in writing.

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SECTION 3E

CONCRETE CORING

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

1.1 American Society for Testing and Materials (ASTM) Publication.

C 174-82	Measuring Length of Drilled Concrete Core

2. REQUIREMENTS. Concrete cores to determine coverage of reinforcing steel and to determine the depth of concrete will be obtained from existing slabs and walls at locations determined by the Contracting Officer. Approximately 80 percent of the cores will be taken in the reinforced concrete box culvert walls.

3. DIAMETER OF CORES. Cores will have a minimum diameter of 4 inches.

4. REPORT. Cores will be labeled and measured. A complete report as specified in ASTM C 174 will be supplied to the Contracting Officer.

5. REPAIR OF HOLES. Holes resulting from coring will be patched with fresh concrete.

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SECTION 3F

REPAIR TO CONCRETE STRUCTURES

Index

1. Applicable Publications
2. Repair of Improperly Covered Reinforcing Steel
3. Repair of Voids at Construction Joint of Walls and Honeycombing
4. Repair of Improperly Finished Manholes and Drop Inlet Structures
5. Repair of Form Tie Holes and Removal and Repair of Formwork
6. Repair of 70th Street Box Culvert

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

1.1 American Society for Testing and Materials (ASTM) Publications.

C 881-78	Epoxy-Resin-Base Bonding Systems for Concrete

2. REPAIR OF IMPROPERLY COVERED REINFORCING STEEL.

2.1 General. The requirements of this section are to be used in making necessary repairs to defective and incomplete construction. These areas are identified in the interior of the reinforced concrete box with red paint. The walls with insufficient cover over the reinforcing steel are marked with the dimensions of the existing concrete cover over the steel. Areas identified with the red paint which have less than 1-3/4" marked will be repaired by the following method.

2.2 Any wall requiring cover for reinforcing steel protection will be repaired laterally to the extent indicated on the wall with paint.

2.3 All steel in designated areas will have a minimum cover of 1-3/4" after concrete overlay. The minimum concrete overlay thickness shall be one inch.

2.4 Prior to application of the concrete, surfaces to receive concrete will be chipped or sandblasted to produce a rough surface suitable for bonding of concrete. At the edges of the patched areas, the patch will be toed down into the existing concrete as shown on the drawings. Steel exposed during surface preparation will be protected in place and cleaned prior to placement of concrete. Preparation of all surfaces to which concrete is to be bonded will be approved by the Contracting Officer's representative prior to placement of concrete.

2.5 Concrete to be applied to the walls shall be applied by pneumatically placed methods as described in the section: PNEUMATICALLY PLACED CONCRETE.

3. REPAIR OF VOIDS AT CONSTRUCTION JOINT OF WALLS AND HONEYCOMBING.

3.1 Those areas of honeycombed concrete painted black in the reinforced concrete box shall be removed to a minimum of one inch beyond the affected depth. All surfaces will be sandblasted or chipped to reveal fresh surfaces suitable for bonding concrete. No feathering at edges will be allowed. Steel exposed during surface preparation will be protected in place and cleaned prior to placement of concrete.

3.2 An epoxy bonding material conforming to ASTM C-881, Type II, Grade 3 shall be applied to all surfaces to which concrete is to be bonded. Time of application and rate of application shall be in strict accordance with manufacturer's recommendation. Materials and methods for application will be submitted to the Contracting Officer for approval, at least 15 days before application is to begin.

3.3 Fresh Portland cement concrete conforming to the requirements of section: CONCRETE will be used to fill all voids.

3.4 Those areas of honeycombed concrete painted orange in the reinforced concrete box may be patched by dry packing only. No additional surface preparation will be required.

4. REPAIR OF IMPROPERLY FINISHED MANHOLES AND DROP INLET STRUCTURES.

4.1 Two general conditions requiring repair exist: (1) voids at joints; and (2) improperly installed or uninstalled steps.

4.1.1 All voids in manhole joints will be drypacked or patched with a neat cement so that a smooth surface is made between adjacent segments of pipe and between pipe and the conduit.

4.1.2 Steps improperly positioned shall be removed and placed in proper position. Rungs may be cut back to 2 inches beyond the exposed surface. All holes resulting from repair steps will be filled with drypack. Steps not installed or missing will be installed in conformance with the drawings and meeting the following requirements.

4.1.2.1 Load Test. All manhole steps will be subjected to a load test. The test shall consist of free hanging 500 pound weight suitably attached to the step to be tested. If the step becomes loose or deflects more than one inch the step will be removed and will be reinstalled in accordance with project specifications.

5. REPAIR OF FORM TIE HOLES AND REMOVAL AND REPAIR OF FORMWORK.

5.1 At numerous locations throughout the conduit she bolts from formwork remain in place; numerous form tie holes were not filled; and metal fins, plywood, and other materials used to patch defective formwork have been left in place.

5.1.1 All she bolts will be removed or cut back to a minimum of 2 inches beyond the exposed surface. The hole will then be patched with an approved dry pack mixture.

5.1.2 All form tie holes will be filled with an approved dry pack mixture.

5.1.3 All formwork such as tins, plywood, or other materials will be removed. All voids created by formwork removal will be patched to meet the surface tolerances required for that particular structural element. All material removed shall become the property of the Contractor and shall be removed from the site.

6. REPAIR OF 70TH STREET BOX CULVERT. Numerous long cracks in the invert of the 70th Street Box Culvert have been observed. Cracks in the invert will be repaired in accordance with the section: CRACK SEALING AND REPAIR.

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SECTION 4A

REINFORCED MASONRY

Index

1. Applicable Publications
2. Qualifications of Testing Agency
3. Definitions
4. Submittals
5. Delivery, Storage, and Handling
6. Environmental Conditions
7. Materials
8. Mortar Mixes
9. Grouts
10. Preparation of Concrete Surfaces
11. Installation

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

1.1 Federal Specifications (Fed. Specs.).

SS-C-621b & Int. Am-2 (GSA-FSS)	Concrete Masonry Units, Hollow (and Solid, Prefaced and Unglazed)

1.2 U.S. Army Corps of Engineers Publications.

CRD-C 619-80	Grout Fluidifier

1.3 American Concrete Institute (ACI) Standard.

315-74 (Rev. 1978)	Manual of Standard Practice for Detailing Reinforced Concrete Structures

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

A 82-76	Cold Drawn Steel Wire for Concrete Reinforcement
A 116-73 (R 1978)	Zinc-Coated Galvanized Iron or Steel Farm-Field and Railroad Right-of-way Wire Fencing
A 153-80	Zinc Coating Hot Dip on Iron and Steel Hardware
A 615-80	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
C 5-59 (R 1974)	Quicklime for Structural Purposes
C 33-79	Concrete Aggregates
C 39-72 (R 1979)	Compressive Strength of Cylindrical Concrete Specimens
C 90-75	Hollow Load-Bearing Concrete Masonry Units

C 94-80	Ready-Mixed Concrete
C 140-75 (R 1980)	Sampling and Testing Concrete Masonry Units
C 144-76	Aggregate for Masonry Mortar
C 150-80	Portland Cement
C 207-79	Hydrated Lime for Masonry Purposes
C 270-80a	Mortar for Unit Masonry
C 404-76	Aggregates for Masonry Grout
C 426-70 (R 1976)	Drying Shrinkage of Concrete Block

2. QUALIFICATIONS OF TESTING AGENCY. The Contractor shall retain at his expense a testing laboratory to perform the laboratory testing and sampling specified herein. The laboratory shall have all facilities required to perform the specified sampling and testing. Personnel employed in the testing shall have had previous experience in sampling and testing the materials involved. Information regarding testing laboratories and qualifications of testing personnel shall be submitted to the Contracting Officer for approval.

3. DEFINITIONS.

3.1 Exposed masonry surfaces are defined as all other masonry surfaces including those to be painted.

3.2 Grout Lift and Grout Pour. A grout lift is defined as the layer of grout placed in a single continuous operation. A grout pour is defined as the entire height of grout fill placed in one day and is composed of a number of successively placed grout lifts.

4. SUBMITTALS.

4.1 Samples. The following samples shall be submitted for approval before work is started.

(1) Anchors and Ties - Two of each type proposed for use.

(2) Concrete Masonry Units - Shapes, sizes, and kinds in sufficient numbers to show full range of color and texture.

(3) Aggregates - One sample shall be taken at the source from each stockpile for each type aggregate specified herein.

4.2 Certificates of Conformance or Compliance: Before delivery of the following materials, notarized certificates, in triplicate, attesting that materials meet the requirements specified shall be submitted for approval.

(1) Concrete Masonry Units

(2) Joint Reinforcement

(3) Reinforcing Bars

4.3 Shop Drawings. The following shop drawings shall be submitted for approval prior to delivery of the materials to the job site.

(1) Reinforcing Bars. Shop drawings for reinforcing bars shall include plans, elevations, and details showing treatment of reinforcing at turns and offsets; intersections of similar and dissimilar materials; tops, bottoms, and ends of walls; control and expansion joints; and wall openings. Shop drawings shall also show details of positioning devices used to hold the vertical reinforcing bars in the proper position within the cells.

5. DELIVERY, STORAGE, AND HANDLING. Handle, store, and protect masonry units in a manner to avoid chipping, breakage, or contact with the soil or contaminating materials and exposure to the elements. Deliver concrete masonry units to the jobsite in air dry condition as defined hereinafter. Keep anchors, ties, and joint reinforcement free of rust. Steel reinforcing bars shall be free of loose scale and rust. Deliver cement and lime in unbroken bags, barrels, or other approved containers, plainly marked and labeled with the manufacturers' names and brands. Store cementitious materials in dry, weathertight sheds or enclosures or under watertight tarpaulins. Store and handle cement in a manner which will prevent the inclusion of foreign materials and damage by water or dampness.

6. ENVIRONMENTAL CONDITIONS.

6.1 Hot Weather Installation. Masonry erected when the ambient air temperature is more than 99 degrees F. in the shade and the relative humidity is less than 50 percent shall be protected from direct exposure to wind and sun for 48 hours after installation.

6.2 Cold Weather Installation. No frozen work shall be built upon. Before erecting masonry during temperatures below 40 degrees F., submit for approval a written statement giving the methods proposed to heat the masonry materials and to protect the masonry from freezing. Keep masonry unis completely covered and free from frost, ice, and snow at all times and maintain them at a minimum temperature of 32 degrees F. when laid. Maintain temperature of mortar and grout between 40 degrees F. and 120 degrees F. by heating mixing water and/or sand. Temperature of mixing water or of water and sand introduced to cement shall not exced 160 degrees F.

7. MATERIALS.

7.1 General. The source of materials which will affect the appearance of the finished work shall not be changed after the work has started. Wire gages specified herein are American Steel Wire Gages. Materials shall conform to the respective specifications and other requirements specified below.

7.2 Admixtures. The high-lift grout admixture shall conform to CRD-C-619 and in addition shall produce an expansive action in the plastic grout sufficient to offset initial water loss shrinkage and promote bonding of the grout to all interior faces of the masonry units. Other admixtures may be used in mortar or grout provided that the admixture does not adversely effect bond or compressive strength of mortar or grout designed without the use of the admixture. Anti-freeze compounds shall not be used. The admixtures shall not contain calcium chloride salts or any other chemical that will adversely affect metals or the coatings of metals embedded in the mortar or grout.

7.3 Aggregate for Grout.

7.3.1 Fine Aggregate. ASTM C 404 or C 144

7.3.2 Pea Gravel. Clean or washed gravel conforming to ASTM C 404, except that 100 percent shall pass the 3/8-inch screen and not more than 5 percent shall pass the No. 8 sieve.

7.3.3 Coarse Aggregate. ASTM C 400, size NO. 8 or ASTM C 33, 3/4-inch maximum size as indicated in Grading Table for coarse aggregates.

7.3.4 Lightweight Aggregate. ASTM C 331 except gradation shall conform to ASTM C 33 or C 404 as indicated in Grading Table.

7.4 Anchors, Ties, and Centering Devices.

7.4.1 Wire Devices. Factory fabricated from steel wire conforming to ASTM A 82. Wire devices in exterior walls shall be formed with wire that has been zinc coated in accordance with ASTM A 153, Class B-2.

7.4.1.2 Centering clips shall be formed from not lighter than 9 gage wire. Clips shall be of a design that will prevent displacement of the reinforcing bars during the course of construction.

7.4.1.3 Wire anchors for use with embedded slots or wire inserts shall be formed from not lighter than 9 gage wire looped and closed.

7.4.2 Dovetail Anchors. Dovetail anchors for use with embedded slots shall be not lighter than 16 gage steel not less than one-inch wide. Anchors shall be crimped, corrugated, or bent at the end to provide anchorage. Dovetail anchors shall be hot-dip zinc-coated in accordance with ASTM A 153, Class B-2.

7.5 Portland Cement. ASTM C 150, Type I, II, or III, including the requirements for low alkali content.

7.6 Concrete Masonry Units.

7.6.1. The linear drying shrinkage of concrete masonry units shall not exceed 0.045 percent when tested in accordance with ASTM C 426.

7.6.2 Kinds and Shapes. In addition to the requirements specified above, concrete masonry units of the various kinds shall conform to the specifications referenced below. Units shall include closer, jamb, header, lintel, and bond beam units and special shapes and sizes to complete the work as indicated. In exposed interior masonry surfaces, units having a bullnose shall be used for vertical external corners except at door, window, and louver jambs. Radius of bullnose shall be one inch. All units used in exposed masonry surfaces in any one building shall have a uniform fine to medium texture and a uniform color.

7.6.2.1 Hollow Concrete Masonry Units. ASTM C 90, Type I, grade N-I having an oven-dry weight of 125 to 105 pounds per cubic foot.

7.7 Horizontal Joint Reinforcement. Fabricated from steel wire using welded connections. Tack welding will not be permitted. The reinforcement shall conform to the following requirements.

7.7.1 Steel Wire. ASTM A 82. Wire sizes for the various types of joint reinforcment shown on the drawings shall not be less than those listed below:

Type	Minimum Wire Size Longitudinal Wire	Crosswires
Standard Duty	9 gage	9 gage
Special Duty	8 gage	12 gage
Heavy Duty	3/16-inch	9 gage
Extra Heavy Duty	3/16-inch	3/16-inch
Thin Joint	11 gage	11 gage

7.7.2 Lengths. Joint reinforcement for straight runs shall be furnished in flat sections not less than 10 feet long. Factory-formed pieces shall be provided at corners and intersections of walls and partitions.

7.7.3 Design. Design of joint reinforcement shall be as specified below for the various types of wall construction. The outermost longitudinal wires shall be spaced 2 inches plus or minus 1/8-inch less than the nominal thickness of the wall in which it is placed.

7.7.3.1 Single Wythe Hollow or Filled Cell Unit Construction. Ladder or truss design having two or more smooth or deformed longitudinal wires. Joint reinforcement shall be of one design throughout all single wythe walls. The distance between contacts of crosswires with each longitudinal wire shall not exceed 6 inches for smooth longitudinal wires and 16 inches for deformed longitudinal wires.

7.8 Lime Paste.

7.8.1 Hydrated Lime. ASTM C 207, Type S.

7.8.2 Pulverized Quicklime. ASTM C 5, except 100 percent shall pass the No. 20 sieve and 90 percent shall pass the No. 50 sieve.

7.9 Mortar Coloring. Chemically inert, finely ground limeproof pigment.

7.10 Reinforcing Bars. ASTM A 615, grade 40.

7.11 Water. Water used in mortar and grout shall be taken from a supply distributed for domestic purposes and at the time of mixing shall be clean and free of acids, alkalies, or other organic materials.

8. MORTAR MIXES.

8.1 Proportions. Mortar shall be type PL or PM in accordance with ASTM C 476. Materials shall be Portland cement, hydrated lime or lime paste, aggregate, mortar coloring and water as specified herein. The mortar shall have a flow, after suction, of 70 percent or more when tested for water retention in accordance with ASTM C 91, except mortar shall be mixed to an initial flow of 125 to 135 percent.

8.2 Color. Mortar coloring, not to exceed 3 percent of the weight of cement for carbon black and 15 percent of the weight of cement for all other pigments, shall be added to the mortar used for exposed masonry surfaces to produce a uniform color matching Desert Beige. The color pigment should be ground into the cement at the cement mill or shall be furnished in accurately pre-measured and packaged units that can be added without measuring to a measured amount of cement.

9. GROUTS.

9.1 Proportions. Grouts shall be mixed in laboratory established proportions to attain a compressive strength at 28 days of not less than 900 pounds per square inch when tested in accordance with ASTM C 91 for fine aggregate and ASTM C 39 for grout containing coarse aggregate. Grout shall be classified as fine, low lift, and high lift types as specified below and shall be used subject to the limitations of Table III.

9.1.1 Fine Grout. Fine grout shall consist of Portland cement, lime paste or hydrated lime, and fine aggregate mixed with sufficient water to obtain a pouring consistency without segration of the constituents. Slump shall be approximately 5 inches.

9.1.2 Low-Lift Grout. Low-lift grout shall consist of Portland cement, lime paste or hydrated lime, fine aggregate and coarse aggregate mixed with sufficient water to obtain a pouring consistency without segregation of the constituents. Slump shall be approximately 5 inches. Maximum size of coarse aggregate for grout shall be in accordance with Table I.

9.1.3 High-Lift Grout. High-lift grout shall consist of Portland cement, grout admixture, fine aggregate, and pea gravel or lightweight coarse aggregate mixed with sufficient water to obtain a consistency suitable for pumping without segregation of the constituents. Slump shall be between 9 and 11 inches. The maximum size of coarse aggregate shall be in accordance with Table I.

9.2 Mixing. Batching and mixing of high-lift grout, including equipment used therein, shall conform to the applicable requirements of ASTM C 94.

10. PREPARATION OF CONCRETE SURFACES. Clean laitance, dust, dirt, oil, organic matter or other foreign materials from concrete surface upon which reinforced masonry is to be placed. Use sand blasting, if necessary, to remove laitance from pores and to expose the aggregate.

11. INSTALLATION.

11.1 Laying Masonry Units. Space back-up courses to level with facing courses where metal ties occur. Adjust each unit to its final position while mortar is still soft and plastic. Remove and relay in fresh mortar, any unit that is disturbed after mortar has stiffened. Keep chases, raked-out joints, and spaces to be grouted free from mortar and other debris. Units used in exposed masonry surfaces shall be free from chipped edges or other imperfections detracting from the appearance of the finished work.

11.1.1 Tolerances. Lay masonry plumb, true to line, with courses level. Bond pattern shall be kept plumb throughout. Lay masonry within the following tolerances.

11.1.1.1 Variation from the plumb in the lines and surfaces of columns, walls and arises.

(1) In adjacent masonry units - 1/8-inch.

11.1.1.2 Variation in cross sectional dimensions of columns and in thickness of walls.

(1) Minus - 1/4-inch.

(2) Plus - 1/2-inch.

11.2 Raked Joints. In exposed exterior masonry surfaces, rake control joints constructed with mortar, dummay joints in bond beams and joints between door frames and abutting masonry walls to a depth of 3/4-inch ready for calking. In exposed interior masonry surfaces rake control joints constructed with mortar to a depth of 1/2-inch and 1/4-inch in all other areas. On the interior side of exterior door frames rake joints between door frames and abutting masonry walls to a depth of 3/8-inch.

11.2.1 Forms and Shores. Where required, construct forms to the shapes, lines, and dimensions of the members indicated. Construct forms sufficiently rigid to prevent deflections which may result in cracking or other damage to supported masonry and sufficiently tight to prevent leakage of mortar and grout. Do not remove supporting forms or shores until the supported masonry has acquired sufficienct strength to support safely its weight and any construction loads to which it may be subjected. In no case shall supporting forms or shores be removed in less than 10 days. At least 16 hours shall have elapsed after grouting masonry columns or walls before applying uniform loads and an additional 48 hours shall have elapsed before applying concentrated loads.

11.3 Reinforced Hollow Unit Masonry. Reinforced hollow unit masonry shall consist of hollow concrete masonry units reinforced vertically and horizontally with steel bars located within cells or kerfs in the units and with cells containing reinforcing bars filled solidly with grout. Lay hollow masonry units so as to preserve the vertical continuity of cells filled with grout. The minimum clear horizontal dimensions of vertical cores shall be 2 inches by 3 inches. Units shall be masonry bonded at corners. Intersections shall be anchored by reinforcing bars or stirrups as indicated.

11.3.1 Cleanouts. Provide cleanout holes at the bottom of every pour in cores containing vertical reinforcement when the height of the grout pour exceeds 48 inches. Where all cells are to be grouted, construct cleanout courses with open-bottom bond beam units inverted to permit cleaning of all cells by flushing. Establish a new series of cleanouts if grouting operations are stopped for more than 4 hours. Cleanouts shall be not less than 3- by 4-inch openings cut from one face shell. Manufacturers' standard cut-out units may be used at the Contractor's option. Do not plug cleanout holes until masonry work, reinforcement, and final cleaning of the grout spaces have been completed.

11.3.2 Bond Pattern. Except where stacked bond is indicated, lay hollow masonry units in running bond.

11.3.3 Mortar Joints. Fill bed joints with mortar for the full thickness of the face shell. Where only cells containing reinforcement are to be grouted, spread cross webs around such cells with mortar to prevent leakage of grout. Where all cells are to be grouted, spread cross webs with mortar at grout barriers only. Butter head joints for the full thickness of the face shell and shove the units into place. Avoid fins of mortar that protrude into cells to be grouted.

11.3.4 Joint Reinforcement. Place joint reinforcement so that longitudinal wires are fully embeded in the face shell mortar bed for their entire length. Provide a minimum mortar cover over longitudinal wires of 5-8-inch on the weather side of walls and 1/2-inch at all other locations. Lap reinforcement at least 6 inches for deformed longitudinal wires and at least 12 inches for smooth longitudinal wires. Install factory-fabricated sections at corners and wall intersections.

11.3.5 Bond Beams and Bond Beam Lintels. Bond beams and bond beam lintels shall consist of bond beam units, reinforced as indicated but with not less than two No. 4 bars where not indicated and filled with grout. Use open bottom type bond beam units over cells to be filled.

11.4 Placing Reinforcing Steel. Prior to placing grout, clean all reinforcement of loose, flaky rust, scale, grease, mortar, grout, or other coating which might destroy or reduce its bond with the grout. Unless otherwise indicated, the details of reinforcement shall conform to ACI 315. Do not bend or straighten reinforcing in a manner injurious to the steel. Do not use bars with kinks or bends not shown on the drawings. Placement of reinforcement shall be inspected and approved prior to placing grout. Vertical bars shall be spliced only where indicated.

11.4.1 Positioning Bars. Position vertical bars accurately at the centerline of the wall as indicated. Maintain a minimum clearance between the bars and masonry units of 1/2-inch and between parallel bars of one diameter of the reinforcement. Hold vertical reinforcing in place using metal supports, centering clips, spacers, ties, or caging-devices located near the ends of each bar. Wire column and pilaster ties in position around the vertical steel; laying ties in mortar joints will not be permitted.

11.4.2 Splices. Locate splices only where shown on the drawings. Stagger splices in adjacent bars. Lap bars a minimum of 40 diamters of the reinforcement or 2 feet whichever is greater. Welded or mechanical connections shall develop at least 125 percent of the strength of the reinforcement.

11.5 Placing Grout. Place grout using a hand bucket, concrete hopper, or grout pump. Place grout so as to completely fill the grout spaces without segregation of the aggregates. Where grouting is discontinued for more than one hour, stop the grout 1-1/2 inches below the top of a course to form a key at pour joints. The height of grout pours and type of grout used shall be limited by the dimensions of grout spaces as indicated in Table I.

11.5.1 Grouting Equipment.

11.5.1.1 Grout Pumps. Pumping through aluminum tubes will not be permitted. Operate pumps to produce a continuous stream of grout without air pockets. Upon completion of each day's pumping, eject grout from pipeline without contamination or segregation of the grout. Remove waste materials and debris from the equipment. Dispose of waste materials, debris, and all flushing water outside the masonry.

11.5.1.2 Vibrators. Internal vibrators shall maintain a speed of not less than 5,000 impulses per minute when submerged in the grout. Apply vibrators at uniformly spaced points not further apart than the visible effectiveness of the machine. Limit duration of vibration to time necessary to produce satisfactory consolidation without causing segregation.

11.5.2 Low-Lift Method. Place grout as masonry is erected at a rate that will not cause displacement of the masonry due to hydrostatic pressure of the grout. If the mortar has been allowed to set prior to grouting, remove all fins protruding more than 1/2-inch into the grout space. Place grout in final position within 2-1/2 hours after mixing when air temperature is 80 degrees F. or higher and 3-1/2 hours after mixing when the air temperature is less than 80 degrees F. Rod or puddle grout during placement using a one inch by 2 inch wood stick or a mechanical vibrator to insure complete filling of the grout space. Do not insert the vibrators into lower pours that are in a semi-solidified state.

11.5.3 High-Lift Method. Lay masonry to the top of a pour before placing grout. Do not pour grout in two-wythe solid unit masonry until mortar joints have set for at least 3 days during hot weather and 5 days during cold damp weather. Do not pour grout in hollow unit masonry until mortar joints have set for at least 24 hours. Clean mortar droppings from the bottom of the grout space and from reinforcing steel. Remove mortar fins protruding more than 1/2-inch into the grout space by dislodging the projections with a rod or stick as the work progresses or by washing the grout space at least twice a day during erection using a high pressure stream of water. Place grout in final position within 1-1/2 hours after mixing when air temperature is 80 degrees F. or higher and 2-1/2 hours after mixing when the air temperature is less than 80 degrees F. Place grout in lifts not to exceed 4 feet in height, with a waiting period between lifts, dependent on weather and absorption rate of the masonry, in order to place the succeeding lift after the preceding lift becomes plastic but prior to initial set. The first lift shall be consolidated using mechanical vibrators. After the required waiting period, place the second lift and consolidate with the vibrator extending 12 to 18 inches into the previous lift. Do not insert vibrators into lower pours that are in a semi-solidified state. Repear the waiting, pouring, and consolidating process until the top of the grout pour is reached. Reconsolidate the top pour after the required waiting period. The high-lift grouting of any section of wall between lateral flow barriers shall be completed to the top of a pour in one working day unless a new series of cleanout holes is established and the resulting horizontal construction joint cleaned.

11.5.4 Blowouts. Brace walls against wind and other forces during construction. Allow sufficient time between lifts to preclude displacement of solid masonry units or cracking of face shells of hollow masonry units. If blowouts, misalignment, or cracking of face-shells should occur during construction, tear down and re-build the wall at no additional cost to the Government.

11.6 Pointing and Cleaning. After mortar joints have attained their initial set but prior to hardening, completely remove mortar and grout daubs or splashings from epxosed masonry surfaces. Before completion of the work, rake out all defects in joints in exposed masonry surfaces, fill with mortar and tool to match existing joints. Immediately after grout work is completed remove scum and stains which have percolated through the masonry using a high pressure stream of water. Do not use metal tools or metal brushes for cleaning.

11.6.1 Concrete Masonry Units. Dry brush exposed concrete masonry unit surfaces at the end of work each day and after any required pointing. Use stiff-fiber bristled brushes only.

11.7 Field Tests.

11.7.1 Mortar and Grout. Mortar and grout shall be laboratory-proportioned and tested by a qualified testing laboratory. Certified copies of laboratory established proportions shall be submitted with the required test reports and test data.

11.7.2 Prism Tests. Make at least one prism test sample for each 5,000 square feet of wall but not less than three such samples for any building. Each sample shall consist of three prisms.

11.7.2.1 Prisms shall be not less than 12 inches high and shall have a height-to-thickness minimum dimension ratio of not less than 1.5 nor more than 5. Hollow masonry unit prisms shall be not less than one masonry unit in length and solid masonry unit prisms or solid filled prisms shall be not less than 4 inches in length. The thickness and type of construction of the specimen shall be

representative of the masonry element under consideration. Cores in hollow masonry shall not be filled, except for solid filled construction. The strength f' shall be taken as the compressive strength of the specimen multiplied by the following correction factor:

Ratio of h/d	1.5	2.0	3.0	4.0	5.0
Correction Factor	0.86	1.00	1.20	1.30	1.37

WHERE:

h = height of specimen in inches.
d = minimum dimension of specimen in inches.

Intermediate values may be interpolated.

11.7.2.2 Prisms shall be tested in accordance with ASTM E 447. Seven-day tests may be used provided the relationship between the 7 and 28-day strength of the masonry is established by test of the materials used. In the absence of tests, the 28-day compressive strength may be assumed as a 7-day compressive strength divided by 0.90.

11.7.2.3 Compressive strength shall be computed by dividing the ultimate load by the net area of the masonry used in construction of the prisms for hollow unit masonry and by the gross area of the masonry with the appropriate correction factor applied.

11.7.2.4 Compressive strength should be not less than 350 pounds per square inch.

TABLE 1

POUR HEIGHT AND TYPE OF GROUT FOR VARIOUS GROUT SPACE DIMENSIONS

Grout Space Dimensions		Grout		Maximum
Minimum Horizontal Dimensions of Core (inches)	Minimum Width of Collar Joint (inches)	Type (See paragraph entitled Grout")	Course Aggregate	Height of Grout Pour (inches)
2 x 3	3/4	Fine or mortar	None	
	2	Fine or low lift	ASTM C 404, Size 8	8
2 x 4			Fine or mortar	None 16
2-1/2 x 4		Fine or low lift	ASTM C 404, Size 8	48
3 x 4	3	High lift	3/8-inch pea gravel	72*
3-1/2 x 4	3-1/2	High lift	3/8-inch pea gravel	180
5 x 6 inch 180*			High lift	ASTM C 33, 3/4-
	5	Brick floated in grout	Max. 3/8-inch pea gravel	8

*Where only cell of hollow masonry units containing reinforcement are grouted, the maximum height of the pour shall not exceed the distance between bond beams.

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SECTION 5A

MISCELLANEOUS METALWORK AND MATERIALS

Index

1. Applicable Publications
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5. Zinc Coating (Galvanizing)
6. Castings
7. Painting Metalwork
8. Welding
9. Bolted Connections
10. Ladders
11. Automatic Drainage Gates (Flap gates)
12. Gratings, Trash Racks, Barriers and Covers Plates
13. Handrails
14. Bridge

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

1.1 Fed. Specifications (Fed. Spec.).

FF-B-575C	Bolts, Hexagon and Square
FF-N-836D & Am-1	Nut: Square, Hexagon, Cap, Slotted, Castle, Knurled, Welding and Single Ball Seat
FF-S-325 & Int. Am-3 (GSA-FSS)	Shield, Expansion; Nail, Expansion; and Nail, Drive Screw (Devices, Anchoring, Masonry)
QQ-B-750 & Am-2	Bronze, Phosphor; Bar, Plate, Rod Sheet Strip, Flat Wire, and Structural and Special Shaped Sections
QQ-F-461C & Am-1	Floor Plate Steel Rolled
QQ-S-763D Notice 1	Steel Bars, Wire, Shapes, and Forgings, Corrosion-Resisting
TT-P-86G	Paint, Red-Lead-Base, Ready Mixed
TT-P-38D & Am-1	Paint, Aluminum, Ready-Mixed
TT-P-615d & Am 3	Primer Coating: Basic Lead Silico Cromate, Ready Mixed
TT-P-645a	Primer, Paint, Zinc-Chromate, Alkyd Type
WW-P-401E	Pipe and Pipe Fittings, Cast-Iron, Soil

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

A 36-77a	Structural Steel

A 53-80	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
A 123-78	Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars and Strip
A 126-73	Gray Iron Castings for Valves, Flanges and Pipe Fittings
A 307-80	Carbon Steel externally Threaded Standard Fasteners
A 320-80b	Alloy-Steel Bolting Materials for Low-Temperature Service
A 500-81a	Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
A 563-80	Carbon and Alloy Steel Nuts
A 501-80	Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
A 618-81	Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing
A 722-75	Uncoated High-Strength Steel Bar for Prestressing Concrete
B 32-76	Solder Metal

1.3 American Welding Society (AWS) Standard.

B3.0-80	Welding Terms and Definitions
D1.1-80	Structural Welding Code-Steel

1.4 American National Standards Institute, Inc. (ANSI) Standards.

B 1.1-1974	Unified Inch Screw Threads
B 18.22.1 - 1965 (Rev. 1975)	Plain Washers

1.5 Military Specification (Mil. Spec.).

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

1.6 West Coast Lumber Inspection Bureau (WLCB) Publication.

No. 16	Standard Grading and Dressing Rules for Douglas Fir, Western Hamlock, Western Red Cedar, White Fir, Sitka Spruce Lumber Sep 1, 1970; Rev. Jan 1, 1979

1.7 American Wood Preservers Bureau (AWPB).

LP 22-80	Standard for Softwood Lumber Timber and Plywood Pressure Treated with Water-Borne Preservatives for Ground Contact Use

2. MATERIALS.

2.1 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.

2.2 Structural Steel shall conform to ASTM A 36.

2.3 Corrosion-Resisting Steel Bolts and Anchor Bolts shall conform to Fed. Spec. QQ-S-763, Class 304, Condition A, or the applicable requirements of ASTM A 320, Grade B8.

2.4 Bronze shall conform to Fed. Spec. QQ-B-750, hard temper of either composition.

2.5 Bolts shall conform to Fed. Spec. FF-B-575.

2.6 Nuts shall conform to Fed. Spec. FF-N-836.

2.7 Cast Iron for Drainage Gates shall conform to ASTM A 126, Class B.

2.8 Cast Iron Pipe and Fittings shall conform to the applicable requirements of Fed. Spec. WW-P-401.

2.9 Coal Tar Base Paint shall conform to Mil. Spec. MIL-C-18480. A special primer shall be used only if as recommended by the manufacturer of the coating.

2.10 Expansion Anchors shall conform to the applicable requirements of Fed. Spec. FF-S-325. Anchors shall be multiple unit with inside thread.

2.11 Tie rods shall be fabricated from steel conforming to ASTM A 722. Threads shall be course series conforming to ANSI B 1-1. Tie rods shall be hot-dip galvanized after fabrication.

2.12 Structural Tubing. ASTM A 500, Grade B; A 501; or A 618.

2.13 Paint. Fed. Spec. TT-P-86, Type II or II; TT-P-615, Type I, II, or V; or TT-P-645.

2.14 Carbon Steel Bolts. ASTM A 307, Grade A.

2.15 Carbon Steel Nuts, ASTM A 563, Grade A, Square, Hex, Heavy Hex, Hex Thick Style.

2.16 Plain Washers. ANSI B 18.22.1, Type B.

3. WORKMANSHIP. 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. 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. Complete shop drawings for fabrication of all miscellaneous metalwork shall be submitted for approval, in accordance with the requirements for shop drawings of SPECIAL PROVISIONS.

4. 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 contact 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.

5. ZINC COATING (GALVANIZING). Zinc coatings shall be applied in a manner and of a thickness and quality conforming to ASTM A 123. 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.

6. CASTINGS. Each casting shall have the mark number and heat number cast or stamped upon it. Dimensions of casting shown on the approved shop drawings will be the finish dimensions. Before leaving the foundry, all castings shall be thoroughly cleaned and subjected to hammer inspection after which they shall be treated.

7. PAINTING METALWORK.

7.1 Cleaning. All oil and grease shall be removed. When required, welds shall be neutralized by the use of ammonia or other suitable agent. All surfaces to be painted shall be cleaned in the shop to remove all rust, scale, dirt, and other foreign matter. "Tight" mill scale, that cannot be lifted by applying a sharp knife to any edge, will be permitted. The cleaning shall be accomplished by scraping, wire brushing, and wiping or other approved methods. The cleaning and painting operations shall be carried on in such a manner that the time between cleaning and the application of the paint will not exceed 24 hours.

7.2 Painting.

7.2.1 Subdrain Manhole Frame and Cover and Gate Box Body shall be dipped twice in a preparation of asphalt , or coal tar, and oil which is at a temperature not less than 290 degrees nor greater than 310 degrees F., in a manner to form a firm and tenacious coating not less than 1/32 inch thick.

7.2.2 Drainage Gates shall be given 3 coats of cold applied coat tar base paint. The paint shall be applied heavily by brush, at a coverage rate of approximately 100 square feet per gallon to give a total film thickness of 3 coats of 1/32 of an inch. Each additional coat shall be brushed perpendicular to strokes of preceding coat. Drying time between coats shall be as recommended by manufacture of coatings.

8. WELDING shall conform to the provisions of AWS D1.1. Welders who have not been certified within 2 years of the date of commencement of work under this contract shall be required to pass successfully the qualification tests as prescribed by AWS B3.0.

9. BOLTED CONNECTIONS. Boltes 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 .02 inch larger than the diameter of the bolt.

10. LADDERS. Ladders shall be steel individual rung ladders conforming to ANSI A 14.3. Rungs shall be galvanized, solid-section rods imbedded into concrete where indicated.

11. AUTOMATIC DRAINAGE GATES. Automatic drainage gates shall be of the size indicated and constructed for a minimum 10 foot seating head. Frames and covers shall be cast iron or cast steel. Seating surfaces shall be bronze or ductile iron. Links may be cast iron or cast steel, or high strength malleable iron. Bushings shall be bronze. Fasteners shall be galvanized steel, bronze, or corrosion-resistant steel. Gates shall have fully adjustable linkage. Each gate shall be rigidly secured in place with seating faces inclined from the vertical by approximately 3 degrees. Installation of gates shall be as recommended by the gate manufacturer. Fasteners of the size recommended by the gate manufacturer shall be utilized in assembly of gate and to secure the gates to the headwall. The gates shall be so constructed as to prevent locking in any partiallfy open position.

12. GRATINGS, TRASH RACKS, BARRIERS AND COVER PLATES. Gratings, trash racks, barriers at the outlet and cover plates, shall be of the type and size specified or shown on the drawings and shall be fabricated to accurately fit the supporting member. Openings shall be provided as shown on the drawings or as required. Steel gratings, trash racks, barriers and cover plates shall be galvanized after fabrication.

12.1 Gratings, trash racks and barriers shall be fabricated of steel conforming to ASTM A 36.

12.2 Cover Plates. Cover plates shall conform to Fed. Spec. QQ-F-461, Class 1, Pattern No. 7, 10, 11, or 17. Cover plate shall be provided with holes as shown on the drawings or as required. Sharp edges and burrs shall be removed from plates.

13. HANDRAILS.

13.1 Steel sleeves, posts and railings shall be standard-weight steel pipe conforming to ASTM A 53. Sizes and fabrication shall be as indicated on the sketch at the end of this section. Joining of posts and rails shall be welded and ground smooth. Posts shall be plumbed and alined.

14. BRIDGE.

14.1 Bridge shall be a product of a manufacturer regularly engaged in the production of this type of structure, and as approved by the Contracting Officer. Shop drawings and descriptive data shall be submitted for approval in accordance with the SPECIAL PROVISIONS. Shop drawing shall indicate materials, details of construction, methods of fastenings, and erection details.

14.2 Wood Members. All wood members shall be the sizes indicated. Sill plate shall be redwood. Decking, beams, posts, rails and diagonals shall be Lodgepole Pine or Doublas Fir. Ends of posts and diagonals shall be carefully sized to fit into bored holes as indicated.

14.3 Accessories. All bolts, nuts, washers, and miscellaneous metal items shall be corrosion resistant, suitable for intended use. Glue shall be suitable for exterior use.

14.4 Preservative Treatment. All wood members shall be preservative-treated by pressure methods and marked in accordance with AWPB Standards. Wood shall be air-dried or kiln-dried to the moisture content specified and shall be treated in accordance with AWPB LP-22. Treated wood which is cut shall be brush-coated with the preservative used in the original treatment.

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SECTION 7A

BUILT-UP ROOFING

Index

1. Applicable Publications
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5. Application of Roofing
6. Flashings
7. Roof Cutout Samples
8. Surfacing

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

1.1 Federal Specifications (Fed. Spec.).

SS-C-153C	Cement, Bituminous, Plastic
SC-R-630D & Int. Am. 2	Roofing Felt (Roll, Asphalt-Prepared, Mineral-Surfaces)

1.2 American Society for Testing and Materials (ASTM) Publications.

C 208-72 (R 1982)	Insulating Board (Cellulosic Fiber), Structural and Decorative
D 41-78	Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing
D 312-78	Asphalt Used in Roofing
D 1751-73 (R 1978)	Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
D 2178-82a	Asphalt Glass Felt Used in Roofing and Waterproofing

2. GENERAL. Asphalt or coal-tar bitumen built-up roofing shall be applied to the roof surfaces indicated.

2.1 Storage of Materials. Felts and roll roofing shall not be exposed to any moisture before, during, or after delivery to the site. Felts and roll roofing shall be stored in an enclosed building or in a trailer, and stacked on end. Felt rolls shall be maintained at a temperature above 50 degrees F. for 24 hours immediately before laying. Aggregate shall be maintained surface dry as defined by ASTM D 1863.

2.2 Coordination Requirements. Roofing operations shall be coordinated with sheet metalwork so that flashings are installed to permit continuous roof surfacing operations the same day felts are installed. Roofing operations shall also be coordinated with roof insulation work so that all insulation applied each day is waterproofed the same day with the complete roofing system.

2.3 Samples. Samples of each bitumen used on the project shall be furnished to the Contracting Officer in approved quantities and containers.

2.4 Preparation Requirements. The entire roof-deck construction of any bay or section of the building shall be completed before roofing work is begun thereon.

2.5 Application Requirements. Surfaces shall be inspected and approved immediately prior to application of roofing and flashings. The roofing or flashing shall be applied to a smooth and firm surface free from ice, frost, moisture, dirt, projections, and foreign materials. Application of roofing shall not be performed under damp or wet conditions, excessive wind conditions, or when the ambient temperature is less than 40 degrees F.

2.5.1 Asphalt shall be used with asphalt-saturated felts, and coal-tar bitumen shall be used with coal-tar bitumen felts. Bituminous-plastic-type flashings installed in accordance with these specifications shall be used throughout unless otherwise specified or indicated. Metal flashings are specified in section: SHEET METALWORK, GENERAL.

3. MATERIALS shall conform to the following requirements:

3.1 Asphalt Primer. ASTM D 41.

3.2 Bitumen.

3.2.1 Asphalt. ASTM D 312, Type II, III, or IV.

3.2.2 Coal-Tar Bitumen. ASTM D 450, Type I or III.

3.3 Felt. Felt shall be glass fiber felt of the bituminous coated or saturated type and shall conform to the following requirements.

3.3.1 Asphalt-Impregnated Roofing Felt. ASTM D 2178, Type III or IV.

3.3.2 Asphalt-Impregnated Combination Base Sheet. ASTM D 2178, Type V.

3.4 Bituminous Cement. Fed. Spec. SS-C-153, Type I.

3.5 Surfacing Materials. Crushed stone, gravel, or crushed slag shall conform to ASTM D 1863. Subject to approval, other materials may be used when blended to the grading requirements of ASTM D 1863.

3.6 Mineral-Surfaced Roll Roofing (Cap Sheet). Fed. Spec. SS-R-630, Class 3.

3.7 Premolded Filler Strip. ASTM D 1751, minimum 3/8-inch thick.

4. ROOFING SYSTEMS. Three plies of glass fiber asphalt coated felt and a mineral coated cap, or gravel, on smooth surface shall be mopped in solid with hot asphalt, see manufacturer's recommendations for application. Felts shall be laid shingle-fashion at right angles to the direction of the slope and tapped and fastened in accordance with the manufacturer's recommendations. The flashing shall be installed according to manufacturer's recommendations.

5. APPLICATION OF ROOFING.

5.1 General Requirements. The entire roofing system including aggregate surfacing, shall be finished in one operation up to the line of termination at end of day's work. Application of roofing shall immediately follow application of insulation as a continuous operation. Phased construction will not be permitted. To insure a waterproof membrane, care shall be taken to preclude bare spots between plies. To prevent slippage, care shall be taken to preclude use of an excessive amount of bitumen. Refer to Manufacturer's Recommendations for proper amount of asphalt.

5.2 Detail Requirements.

5.2.1 Prior to application of roofing, joints in rigid insulation shall be covered with a 4-inch strip of roofing felt or glass fabric, embedded in and coated with bituminous cement. Asphalt primer for concrete surfaces to receive asphalt products shall be applied at a rate of not less than 1 gallon per square. Bitumen shall uniformly cover all roof areas.

5.2.2 Mechanical application devices shall be mounted on pneumatic-tired wheels, and shall be designed and maintained to operate without damaging the insulation or the roofing membrane.

5.2.3 Bitumen stops, formed of edge envelopes shall be installed at eaves and rakes. Envelopes shall be formed of two 18-inch wide layers of roofing felt. Only glass fiber felts shall be used. Nine inches of the width shall be attached to the roof surface with 9 inches extending beyond the edge. The first layer shall be applied in a 4-inch wide layer of plastic roofing cement and nailed 1/2-inch from the roof edge at 6-inch spacing. The second layer shall be applied to the first in a 9-inch wide mopping of bitumen. The free edges shall be protected from damage throughout the roofing period.

5.2.4 Asphalt shall not be heated above 475 degrees F. Coal-tar bitumen shall not be heated above 400 degrees F. Heating kettles shall be provided with a thermometer and kettlemen shall be in attendance at all times during the heating to insure that the maximum temperature specified is not exceeded. Temperature of bitumen at the time it is applied shall be in accordance with the roofing felt manufacturers recommendations. Application temperatures shall be measured at the mop bucket - and/or mechanical applicator. Each layer of felt shall be laid in not less than 20 pounds of asphalt per square or more than 30 pounds of asphalt per square.

5.2.5 Layers of roofing shall be laid free of wrinkles, creases or fishmouths, at right angles to the slope of the deck, immediately behind the applicator. The surface of the felts shall be broomed-in full width to obtain complete adhesion between plies and to eliminate air pockets. The method of mopping a half-sheet width and turning the sheet back to mop under the other half will not be used. Workmen shall not walk on mopped surfaces when the bitumen is sticky. Each layer of roofing felt shall be carried up abutting vertical surfaces at least 4 inches, or to the top of the cant strip. After the last ply of roofing felt is applied, the edge envelope shall be formed by folding back and mopping each layer. The gravel stop, specified in section: SHEET METALWORK, GENERAL, shall be embedded in bituminous cement and nailed on top of the envelope.

5.2.6 Apply felts shingle fashion, lapping each layer 24-2/3 inches with starting widths of 12 inches, 24 inches, and 36 inches. End laps shall not be less than 6 inches and shall be staggered a minimum of 12 inches. Apply 25 pounds of hot asphalt for each 100 square feet of roof surface on each layer of felt. Distribute asphalt evenly, covering each layer 100 percent as laid and in no place shall felt touch felt.

5.2.7 Cut cup sheet into lengths not to exceed 18 feet and allow to flatten before applying. Solid mop surface of felts with asphalt at the rate of 25 pounds per 100 square feet and while hot, embed the roofing sheets. Lap roofing 2-inches on sides and 4-inches on ends; end laps nailed 6-inches on center, and staggered not less than 3-feet 0-inches apart.

5.2.8 At end of day's work or whenever precipitation is imminent, the terminated edge of built-up roofing shall be sealed with two full width strips of felt set in plastic bituminous cement. Extend half-width of strips up and over the finished roofing and extend the other half-width out and onto the bare roof deck surface. Water cutoffs shall be removed before continuing installation of roof system.

6. FLASHINGS. Flashings shall be provided where required to make the work watertight. Bituminous flashings described below shall be used, except where metal flashings are indicated or specified in section: SHEET METALWORK, GENERAL.

6.1 Strip Flashings. Gravel stops shall be stripped with two layers of roofing felt set in bituminous cement. After installation of flanges or flashings over the top ply of roofing, the strip flashings, consisting of two layers of roofing felt, 9 and 12 inches wide, shall be successively cemented to the top of the roof flange using bituminous cement, to form a waterproof joint between roofing and flashings.

7. ROOF CUTOUT SAMPLES. Samples shall be taken as directed by the Contracting Officer when there is reason to believe that deficiencies exist in the roofing membrane. When samples indicate deficiencies in the roofing membrane, corrective action shall be taken as directed.

8. SURFACING: After roofing felts have been laid and flashings installed, the roof surface except for cants shall be flood-coated uniformly with 60 pounds of hot asphalt per square or 75 pounds of coal-tar pitch per square. While bitumen is still hot, 400 pounds per square of roofing gravel or 300 pounds per square of other approved aggregate shall be embedded therein. Aggregate shall be placed in the manner and quantity required to form a compact embedded overlay. Roof surface shall be swept and all loose aggregate removed. Flood coat and aggregate shall be applied the same day as the felts are laid. If there is a probability of rain falling on the felts before the flood coat and aggregate can be applied, a light glaze coat of bitumen, 10 to 15 pounds per square, shall be applied over the exposed felts. The glaze coat may be considered as part of the flood coat provided the surfacing operation is completed within 48 hours after application of the glaze coat. Where glaze coat is used, surface treatment shall be completed as soon as weather conditions permit.

TABLE I

LAPS FOR ROOFING FELTS AND ROLL ROOFING(1)

Layers or plies	Laps in inches for 36-inch width	Starting widths in inches for 36-inch width
1	4	36
2	19	18 and 36
3	24-2/3	12, 24, and 36
4	27-1/2	9, 18, 27 and 36

(1) End laps of roofing felts and roll roofing shall be not less than 6 inches and shall be staggered a minimum of 12 inches.

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SECTION 7B

INSULATION FOR BUILT-UP ROOFING

Index

1. Applicable Publications
2. General
3. Submittals
4. Materials
5. Application of Insulation
6. Wood Nailers

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

1.1 Federal Specifications (Fed. Specs.).

FF-N-105B & Int Am-4	Nails, Brads, Staples and Spikes Wire, Cut and Wrought
HH-I-526C	Insulation Board, Thermal (Mineral Fiber)
HH-I-529B	Insulation Board, Thermal (Mineral Aggregate)
SS-C-153C	Cement, Bituminous, Plastic

1.2 American Society for Testing and Materials (ASTM) Publications.

D 41-78	Asphalt Primer Used in Roofing, Damp-proofing and Waterproofing
D 226-81	Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
D 227-81	Coal-Tar-Saturated Organic Felt Used in Roofing and Waterproofing
D 250-81	Asphalt-Saturated Asbestos Felt Used in Roofing and Waterproofing
D 312-78	Asphalt Used in Roofing
D 450-78	Coal-Tar Bitumen Used in Roofing, Damp-proofing, and Waterproofing
D 2626-81	Asphalt-Saturated and Coated Organic Felt Base Sheet Used in Roofing
E 96-80	Water Vapor Transmission of Materials

1.3 American Society of Heating, Refrigeration and Air-Conditioning Engineers, Inc. (ASHRAE) Publication.

ASHRAE Handbook, Fundamentals (1981).

2. GENERAL. Insulation for built-up roofing shall be applied to the surfaces indicated.

2.1 Storage of Materials. Insulation and felts shall not be exposed to moisture in any form before, during, or after delivery to the site. Store insulation and felts in an enclosed building or in a trailer. Wet materials shall not be used and shall be removed from the worksite. Felt rolls shall be stacked on end. For 24 hours immediately before laying, materials shall be maintained at a temperature above 50°F. Urethane, isocyanurate and composite board insulation shall be stored away from areas where welding is being performed or where contact with open flame is possible.

2.2 Preparation Requirements. The roof-deck surface shall be free from ice, frost, and surface moisture and shall be smooth, firm, free from dirt, projections, and foreign materials. Vents and other items penetrating the roof shall be secured in position and properly prepared for flashing.

2.3 Application Requirements.

2.3.1 Surfaces shall be inspected and approved prior to application of insulation.

2.3.2 Application of materials shall not be performed under damp or wet conditions, excessive wind conditions, or when the ambient temperature is less than 40°F. Except when used as part of composite board insulation, urethane shall not be used on steel decks.

2.3.3 Asphalt shall be used with asphalt-saturated felts. Asphalt shall not be heated above 475°F. Heating kettles shall be provided with a thermometer, and kettlemen shall be in attendance at all times during heating to insure that the maximum temperature specified is not exceeded. Temperature of the bitumen at the time it is applied shall be in accordance with the insulation manufacturer's recommendations. Application temperatures shall be measured at the mop bucket and/or mechanical applicator.

2.3.4 On roof slopes greater than 1/2-inch per foot, insulation shall be mechanically attached. Method of attachment shall be in accordance with insulation manufacturer's recommendations and the requirements specified hereinafter.

2.3.5 Insulation work shall be coordinated with roofing and sheet metalwork so that all material applied each day is waterproofed the same day with the complete roofing system and sheetmetal flashings.

2.3.6 Uninsulated steel decks shall have insulation applied as an underlayment to span the steel deck flutes. Minimum thickness of the insulation shall be in accordance with the insulation manufacturer's published literature.

3. SUBMITTALS. Computations used for determining insulation thickness shall be submitted for approval. The Contractor shall submit proof that adhesives for application of insulation on steel decks and composite board insulation for use on any roof deck, meets the requirements of Underwriters' Laboratories, Inc., or Factory Mutual Research Corporation.

4. MATERIALS shall conform to the following requirements.

4.1 Adhesive.

4.1.1 Adhesive for application of insulation to steel decks shall meet the requirements of the Underwriters' Laboratories, Inc., for metal roof-deck construction or Factory Mutual Research Corporation for Class I steel deck construction.

4.1.2 Adhesive for application of film or laminate type vapor barrier, or for the application of insulation thereto, shall be manufacturer's recommended product.

4.2 Bitumen.

4.2.1 Asphalt. ASTM D 312, Type III.

4.3 Bituminous Cement. Fed. Spec. SS-C-153, Type I with asphalt-saturated felts.

4.4 Insulation shall be one of the following materials.

4.4.2 Expanded-Perlite Insulation Board. Fed. Spec. HH-I-529.

4.4.4 Mineral-Fiber Insulation Board. Fed. Spec. HH-I-526.

4.5 Nails and Fasteners.

4.5.1 Nails for Fastening Insulation to Flush Mounted Wood Nailers. Fed. Spec. FF-N-105, Type II, Style 20, of sufficient length to hold insulation securely in place.

4.5.2 Fasteners.

4.5.2.1 Fasteners designed to secure insulation to steel decks shall conform to the requirements of Underwriters' Laboratories, Inc., or Factory Mutual Research Corporation.

4.5.2.2 Bolts and nuts shall be semifinished or finished, threaded for medium fit with either hexagonal-shaped or square-shaped nuts and boltheads.

4.5.2.3 Metal disks shall be flat and not less than 30 gage thickness. Disks used with nails or fasteners for securing fiberboard insulation' shall be minimum 1-inch diameter. Disks used with nails or fasteners for securing other board insulation shall be minimum 2-1/8 inch diameter.

5. APPLICATION OF INSULATION.

5.1 Installation Requirements.

5.1.1 Insulation shall be laid in one or more layers. Units of insulation shall be laid in parallel courses parallel with the roof slope. End joints shall be staggered. Insulation shall be cut to fit neatly against adjoining surfaces. If installed in more than one layer, joints in sucessive layers shall be staggered with respect to joints of preceding layer. Insulation which can be readily lifted after installation is not considered to be adequately secured.

5.1.2 Bitumen shall not be applied further than on panel length ahead of roof insulation being installed.

5.1.3 Insulation laid directly on steel deck shall be installed using 12 to 15 pounds of asphalt per square. In lieu of asphalt, nonflammable adhesive may be applied in the quantity recommended by Underwriters' Laboratories, Inc., or Factory Mutual Research Corporation. Asphalt or adhesive shall be applied in ribbons parallel to flutes and on every top flange. The continuous joints between insulation units parallel with the roof slopes, shall not occur over the fluted opening in steel decks.

5.2 Fastening Requirements. When mechanical fasteners are used for insulation installed in two or more layers, only the first layer need be secured with fasteners. When using serrated nail-type fasteners for steel decks and through an asphalt covering, a hole will be prepunched in the covering.

5.3 Protection Requirements. The insulation shall be kept dry at all times and shall be laid just before application of the roofing felts. No more insulation shall be laid than can be covered the same day with the complete roofing system. Exposed edges of the insulation shall be protected by the cutoffs at the end of each days work or whenever precipitation is imminent. Cutoffs shall be two layers of bituminous-saturated felt set in plastic bituminous cement. Cutoffs shall be removed when work is resumed.

6. WOOD NAILERS. Wood Nailers installed on the surface of the roof deck shall be furnished and installed under this section. Nailers shall be treated with waterborne preservative.

6.1 Surface Mounted Nailers. Surface mounted wood nailers shall be provided where urethane, isocyanurate, composite board, or cellular glass insulation is installed on roof slopes greater than 1/2-inch per foot. Nailers shall be installed parallel with the roof slope. The nailers shall be a nominal 3 inches wide by the full thickness of the insulation. Nailers shall be spaced not over 4 feet face-to-face, except that where the insulation units are less than 4 feet in length the nailers shall be spaced to accommodate the insulation units without cutting.

6.2 Nailer Securement. Nailers shall be secured to steel decks as indicated. Bolt anchors shall have nuts and washers countersunk, and bolts shall be cut flush with top of nailer. Powder-actuated fasteners, sized and spaced for nailer anchorage equivalent to that specified and indicated, may be used when approved.

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SECTION 7C

CALKING AND SEALANTS

Index

1. Applicable Publications
2. Submittals
3. Environmental Requirements
4. Delivery and Storage
5. Materials
6. Sealer
7. Primer
8. Backstop Material
9. Surface Preparation
10. Application
11. Cleaning

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

1.1 Federal Specifications (Fed. Spec.).

TT-C-00598C & Am-1	Calking Compound, Oil and Resin Base Type (For Building Construction)
TT-S-00227E & Am-3	Sealing Compound: Elastomeric Type, Multi-Component (For Calking, Sealing, and Glazing in Buildings and Other Structures)
TT-S-00230C & Am-2	Sealing Compound: Elastomeric Type, Single Component (For Calking, Sealing, and Glazing in Buildings and Other Structures)
TT-S-001543A	Sealing Compound: Silicone Rubber Base (For Calking, Sealing, and Glazing in Buildings and Other Structures)

2. SUBMITTALS.

2.1 Certificates of Compliance. Certificates of compliance stating that the calking and sealants conform to the specified requirements shall be submitted in accordance with the SPECIAL PROVISIONS. Certified laboratory test reports showing that the calking and sealants have been tested within the last 12 months and meet the requirements of the applicable specification shall be submitted.

2.2 Samples. One cartridge or equivalent representative sample of each calking and sealant specified herein shall be submitted for approval. The sample containers shall include the same information on the label as specified herein for containers delivered to the job.

3. ENVIRONMENTAL REQUIREMENTS. The ambient temperature shall be within the limits of 40 to 90 degrees F. when the calking and sealants are applied.

4. DELIVERY AND STORAGE. Materials shall be delivered to the job in the manufacturer's original unopened containers. The containers shall include the following information on the label: supplier, name of material, formula or

specification number, lot number, color, date of manufacture, mixing instructions, shelf life, and curing time when applicable at the standard conditions for laboratory tests. Calking compound or components outdated as indicated by shelf life shall not be used. Materials shall be carefully handled and stored to prevent inclusion of foreign materials or exposure to temperatures exceeding 90 degrees F. Sealant tape shall be handled and stored in a manner that will not deform the tape.

5. MATERIALS. Materials shall conform to the respective specifications and other requirements specified. Each container brought to the job-site with a different sealant formulation shall be marked for the intended use. For each intended use, the color shall be one of the manufacturer's standard colors as selected by the Contracting Officer.

5.1 No. 1 Calking Compound. No. 1 calking compound shall conform to Fed. Spec. TT-C-598, Type I.

5.2 No. 2 Sealant. No. 2 sealant shall be a two-component, elastomeric-type compound conforming to Fed. Spec. TT-S-227, Type II, Class A. The compound shall be supplied in pre-measured kit form for on-th-job mixing.

5.3 No. 4 Sealant. No. 4 sealant shall be a one-component, elastomeric-type compound conforming to Fed. Spec. TT-S-230, Type II, Class A or Fed. Spec. TT-S-1543, Class A.

6. SEALER. Sealer for use with No. 1 calking compound shall be aluminum paint.

7. PRIMER. Primer for No. 2 and 4 sealant shall be as recommended by the sealant manufacturer. Primer shall have been tested for durability with the sealant to be used and on samples of the surfaces to be sealed.

8. BACKSTOP MATERIAL. Backstop material shall be resilient urethane or polyvinly-chloride foam, closed-cell polyethylene foam, closed-cell sponge of vinyl or rubber, polychloroprene tubes or beads, polyisobutylene extrusions, oilless dry jute, or rope yard. Backstop material shall be nonabsorbent, nonstaining, and compatible with the sealant used. Tube or rod stock shall be rolled into the joint cavity. Preformed support strips for ceramic and quarry tile control-joint and expansion-joint work shall be polyisobutylene or polychloroprene rubber.

9. SURFACE PREPARATION.

9.1 General. The surfaces of joints to be sealed shall be dry. Oil, grease, dirt, chalk, particles of mortar, dust, loose rust, loose mill scale, and other foreign substances shall be removed from all joint surfaces to be sealed. Oil and grease shall be removed with solvent and surfaces shall be wiped with clean cloths.

9.2 Masonry Surfaces. Where surfaces have been treated with curing ompounds, oil, or other such materials, the materials shall be removed by sandblasting or wire brushing. Laitance, efflorescence and loose mortar shall be removed from the joint cavity.

9.3 Steel Surfaces. Steel surfaces to be in contact with sealant shall be sandblasted or, if sandblasting would not be practical or would damage adjacent finish work, the metal shall be scraped and wire brushed to remove loose mill

scale. Protective coatings on steel surfaces shall be removed by sandblasting or by a solvent that leaves no residue.

10. APPLICATION.

10.1 Paper Masking Tape. Paper masking tape shall be placed on the finish surface on one or both sides of a joint cavity to protect adjacent finish surfaces from primer or compound smears. Masking tape shall be removed within 10 minutes after the joint has been filled and tooled.

10.2 Backstops. The back or bottom of joints constructed deeper than indicated shall be packed tightly with backstop material to provide a joint of the depth indicated. Where necessary to provide a backstop for calking compound, the joint shall be packed tightly with rope yarn.

10.3 Primer. Primer shall be used on concrete masonry units, wood, or other porous surfaces in accordance with instructions furnished with the sealant. Primer shall be applied to the joint surfaces to be sealed. Surfaces adjacent to joints shall not receive primer.

10.4 No. 1 Calking Compound. Compound shall be gun-applied with a nozzle of proper size to fit the width of joint indicated and shall be forced into grooves with sufficient pressure to expel air and fill the groove solidly. Calking shall be uniformly smooth and free of wrinkles and shall be left sufficiently covex to result in a flush joint when dry. One coat of sealer shall be applied over joint after compound has dried sufficiently to develop a surface skin so as not to deform the surface of the joint.

10.5 No. 2 and 4 Sealant. Compound shall be gun-applied with a nozzle of proper size to fit the width of joint indicated and shall be forced into grooves with sufficient pressure to expel air and fill the groove solidly. Sealant shall be uniformly smooth and free of wrinkles. Joints shall be tooled slightly concave after sealant is installed. When tooling white or light-color sealant, dry or water-wet tool shall be used.

11. CLEANING. The surfaces adjoining the calked and sealed joints shall be cleaned of smears and other soiling resulting from the calking and sealing application as work progresses.

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SECTION 7D

SHEET METALWORK, GENERAL

Index

1. Applicable Publication
2. General Requirements
3. Submittals
4. Delivery, Storage and Handling
5. Materials
6. Sealants
7. Protection of Aluminum
8. Soldering, Riveting Seaming and Sealing.
9. Covering on Minor Flat, Pitched or Curved Surfaces
10. Gravel Stops and Fasciae

1. APPLICABLE PUBLICATIONS. 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.

1.1 Federal Specification (Fed. Spec.)

UU-B-790a & Int. Am-1	Building Paper, Vegetable Fiber: (Kraft, Waterproofed, Water Repellent and Fire Resistant)

1.2 American Society for Testing and Materials (ASTM) Publications.

B 209-81	Aluminum and Aluminum-Alloy Sheet and Plate
B 486-74 (R 1980)	Paste Solder
D 226-81	Asphalt-Saturated Organic Felt used in Roofing and Waterproofing
D 751-79	Testing Coated Fabrics
D 1670-74	Failure End Point in Accelerated and Outdoor Weathering of Bituminous Materials
D 1784-81	Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (VinylChloride) (CPVC) Compounds
D 2247-68 (R 1980)	Coated Metal Specimens at 100% Relative Humidity
D 2822-75	Asphalt Roof Cement
E 96-80	Water Vapor Transmission of Materials
G 7-77a	Atmospheric Environmental Exposure Testing of Nonmetallic Materials

2. GENERAL REQUIREMENTS. Sheet metalwork shall be accomplished to form weathertight construction. Work shall be installed without waves, warps, buckles, fastening stresses or distortion and shall allow for expansion and contraction.

Cutting, fitting, drilling, and other operations in connection with sheet metal mechanics. Exposed edges shall be hemmed. Bottom edges of exposed vertical surfaces shall be angled to form angle drips. Flashing at the end of a run shall be formed into a three-dimensional configuration to direct water to the outside of the system. Joints shall be installed as specified in Table 3. Accessories and other items essential to complete the sheet metal installation, though not specifically indicated or specified, shall be provided. Roof flanges of sheet metal shall be set in bituminous cement over built-up roofing or shall be woven into shingle roofing before nailing. Application of bituminous strip flashing over roof flanges of various sheet metal items is covered in section: BUILT-UP ROOFING. Installation of sheet metal items used in conjunction with roofing shall be coordinated with roofing work to permit continuous roofing operations. Factory-fabricated components shall be packed in cartons marked with the manufacturer's name or trademark. Bulk materials from which items are field fabricated shall have manufacturer's name or trademark printed or embossed at frequent intervals to permit easy identification. Sheet metalwork pertaining to heating, ventilating, and air conditioning is specified in other sections.

3. SUBMITTALS.

3.1 Shop Drawings. Shop drawings shall be submitted for approval in accordance with the SPECIAL CLAUSES. Materials shall not be delivered to the site until after the approved shop drawings have been returned to the Contractor. Drawings shall show weights, gages, or thickness of sheet metal; type of material; joining expansion-joint spacing, and fabrication details; and installation procedures.

3.2 Samples. Samples of materials proposed for use shall be submitted for approval upon request.

4. DELIVERY, STORAGE, AND HANDLING. Materials shall be adequately packaged and protected during shipment and shall be inspected for damage, dampness, and wet-storage strains upon delivery to the job site. Materials shall be clearly labeled as to type and manufacturer. Sheet metal items shall be carefully handled to avoid damage. Materials shall be stored in dry, weathertight, ventilated areas until immediately before installation.

5. MATERIALS. Materials shall conform to the requirements specified below and those given in Table 1. Where Table 1 lists more than one metal for a particular item, any listed metal may be used unless otherwise specified.

5.1 Aluminum Extrusions. ASTM B 221, Alloy 6063, Temper T5.

5.2 Bituminous Cement. ASTM D 2822, Type I.

5.3 Fasteners. Materials shall conform to Table 2. Fasteners shall be the best type for the application.

5.4 Felt. ASTM D 226, Type I.

5.5 Plastic Hardsetting Sealant. As recommended by aluminum manufacturer.

5.6 Polyvinyl Chloride (PVC) Reglets. ASTM D 1784.

5.8 Solder. ASTM B 486, Alloy 50B, for use with copper.

5.9 Slip Sheet. Fed. Spec. UU-B-790, Type I, Style 1b, Grade A.

6. SEALANTS. Sealants and sealing compounds referred to hereinafter are specified in section: CALKING AND SEALANTS.

7. PROTECTION OF ALUMINUM. Aluminum shall not be used where it will be in contact with copper or where it will contact water which flows over copper surfaces. Aluminum that will be in contact with wet or pressure-treated wood, mortar, concrete, masonry, or ferrous metals shall be protected against galvanic or corrosive action by one of the following methods.

7.1 Paint. Aluminum surfaces to be protected shall be solvent cleaned and given a coat of zinc-chromate primer and one coat of aluminum paint. Aluminum paint shall conform to section: PAINTING, GENERAL.

7.2 Nonabsorptive Tape or Gasket. Nonabsorptive tape or gasket shall be placed between the adjoining surfaces and shall be cemented to the aluminum surface using a cement compatible with aluminum.

8. SOLDERING, RIVETING, SEAMING, AND SEALING. Where soldering is specified herein it shall apply to copper, copper clad stainless steel, and stainless steel items. Where riveting and sealing are specified for aluminum it shall apply to aluminum 0.040 inch or less in thickness. Riveting shall apply to either metal as specified.

8.1 Soldering. Edges of sheet metals, except lead coated material shall be pretinned before soldering is begun. Soldering shall be done slowly with well heated soldering irons so as to thoroughly heat the seams and completely sweat the solder through the full width of the seam. Edges of lead coated material to be soldered shall be scraped or wire-brushed to produce a bright surface, and seams shall have a liberal amount of flux brushed in before soldering is begun. Edges of stainless steel to be pretineed shall be treated with soldering acid flux. Soldering shall follow immediately after application of the flux. Upon completion of soldering the acid flux residue shall be thoroughly cleaned from the sheet metal with a solution of washing soda in water and rinsed with clean water. Joints in aluminum sheets 0.040 inch or less in thickness shall be mechanically and sealed with the sealant specified. Aluminum shall not be soldered.

8.2 Seams. Seams shall conform to the following requirements.

8.2.1 Flat-lock seams shall finish not less than 1-inch wide.

8.2.2 Soldered-lap seams shall finish not less than 1-inch wide.

8.2.3 Unsoldered plain-lap seams shall lap not less than 3 inches unless otherwise specified.

8.2.4 Flat seams shall be made in the direction of the flow.

9. COVERING ON MINOR FLAT, PITCHED, OR CURVED SURFACES. Unless otherwise specified or indicated, all minor flat, pitched, or curved surfaces, such as crickets, bulkheads, dormers, and small decks, shall be covered or flashed with 18- by 24-inch metal sheets and secured with cleats. One ply of felt covered with one ply of slip sheet shall be applied as underlayment on wood surfaces. Two cleats shall be placed on the long side and one cleat shall be placed on the short side. Seams in materials other than aluminum shall be locked and soldered. Seams in aluminum shall be locked and sealed with plastic hardsetting sealing material recommended by aluminum supplier.

10. GRAVEL STOPS AND FASCIA. Sheets shall be fabricated without longitudinal joints except where two-piece fasciae are used when fascia depth exceeds 7 inches. Provision for expansion shall be provided at joints. Factory fabricated internal and external corner units with mitered joints shall be provided. Roof flange and splice plate of the gravel stop and fascia shall extend out on the roof not less than 4 inches, and shall be set in bituminous cement over the roofing felt. Roof flange shall be secured with nails spaced not greater than 3 inches on centers located within 1 inch of the outer edge of the flange. The fascia section shall not be face nailed except as specified for two-piece fasciae. The upper piece of two-piece fascia is the same as specified above except that the fascia depth shall be at least 3-1/2 inches, and it shall overlap the lower fascia not less than 2 inches. The upper fascia shall be hemmed 1/2 inch at lower edge and shall be formed to fit tight against lower fascia. Either smooth or corrugated sheets may be used.

10.1 Extrusions. The extruded type of aluminum gravel stop and fascia shall be a factory fabricated, prepackaged, complete system with fastening, of the style indicated. The system shall be installed in accordance with the manufacturer's recommendation and the other requirements herein specified.

10.2 Sheets, Smooth. Gravel stops shall be installed with 1/2-inch space between section. The cover plate shall be embedded in bituminous cement, nailed through the opening between the gravel stop sections and loose locked to the drip edge. The lower edge of fascia shall be hooked 3/4 inch over an edge strip and bent outward at an angle of 30 degrees.

TABLE 1. SHEET METAL WEIGHTS, THICKNESS, AND GAGES

Item Description	Copper, ounce per square foot	Aluminum inch	Stainless steel, inch	Copper clad stainless steel, inch
Gravel stops and fasciae:				
Extrusion.....	--	.075	---	---
Sheets, corrugated...	16	.032	.015	.015
Sheets, smooth.....	--	.050	.018	.018

TABLE 2. FASTENER MATERIALS

To prevent corrosion, the indicated fastener materials shall be used with the following sheet metals.

Sheet Metal	Nails	Screws	Rivets	Nuts & Bolts
Aluminum	Aluminum	Aluminum	Aluminum	Aluminum

* * * * *

SECTION 7E

STEEL ROOF DECKING

Index

1. Applicable Publication
2. Submittals
3. Materials
4. Delivery and Storage
5. Design and Fabrication
6. Erection

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

Steel Deck Institute (SDI). Steel Roof Deck Design Manual, 1981-1982

2. SUBMITTALS.

2.1 Shop Drawings. Shop drawings shall be submitted for approval in accordance with the SPECIAL PROVISIONS. Drawings shall include type, location, and necessary details of decking units, accessories, and supporting members; design loads; required section properties; fire rated construction system details; size and location of holes to be cut and reinforcement to be provided; location and sequence of welded or fastener connections; and the manufacturer's erection instructions.

2.2 Design Computations. Design computatins for the structural properties of the decking units shall be submitted with the shop drawings.

3. MATERIALS shall conform to the SDI Steel Roof Deck Design Manual. Roof deck shall receive one prime coat of manufacturer's standard paint, or shall be zinc coated.

4. DELIVERY AND STORAGE. Materials shall be delivered to the site in a dry and undamaged condition, stored out of contact with the ground and under a weather-tight covering permitting good air circulation. Finish of decking uits shall be maintained at all times, using touch-up paint whenever necessary to prevent the formation of rust. Touch-up paint for shop-painted units shall be of the same type used for the shop painting, and touch-up paint for zinc-coated units shall be an approved high zinc dust content galvanizing repair paint.

5. DESIGN AND FABRICATION.

5.1 Decking Units. Units shall have the configuration and properties as shown on the drawings. Decking units shall be fabricated from 20 gage or thicker steel sheets. Section properties shall be determined in accordance with the SDI Steel Roof Deck Design Manual. The deck units shall extend over two supports as indicated on the drawing. The maximum allowable deflection of deck and maximum working stress shall conform to SDI Steel Roof Deck Design Manual. Decking with cross-sectional configuration differing from the units indicated may be used, provided that the properties of the proposed units are equal to, or greater than, the properties of the units indicated, and the material will fit the space provided without requiring revisions to adjacent materials or systems. There shall be no loads suspended from the decking.

5.2 Accessories. The manufacturer's standard type accessories shall be furnished as necessary to complete the roof deck installation. Metal accessories shall be of the same material as the decking and have minimum gage as follows: saddles, 18 gage; welding washer, 16 gage; cant strip, 22 gage; other metal accessories, 20 gage, unless otherwise indicated.

5.2.1 Adjusting plates or segments of deck units shall be provided in loations too narrow to accommodate full-size units. As far as practical, the plates shall be the same gage and configuration as the decking.

5.2.2 Voids above interior walls shall be closed with 22 gage sheet metal where shown on the drawings. Open deck cells at end walls, eaves, and openings through roofs shall be located with manufacturer's standard closure material.

5.2.3 Cover plates, underlapping sleeves, or pressure sensitive tape shall be provided to cover joints between adjoining nonlapping units. Pressure sensitive tape shall be at least 2 inches wide, and shall have a noncombustible adhesive.

6. ERECTION of decking and accessories shall be in accordance with the SDI Steel Roof Deck Design Manual and the approved shop drawings. Damaged decking and accessories and units with burned holes shall not be installed. The deck units shall be placed on secured supports, properly adjusted, and alined at right angles to supports before being permanently secured in place. The deck shall not be used for storage or as a working platform until the units have been secured in position. The maximum uniform distributed storage load shall not exceed the design live load.

6.1 Attachment. The deck units shall be welded or fastened with screws or powder actuated fasteners to supports as indicated on the shop drawings and in accordance with SDI Steel Roof Deck Design Manual requirements. Holes and similar defects will not be acceptable. Powder actuated fasteners shall be driven with low velocity piston tool by an operator authorized by the manufacturer of the piston tool.

6.2 Repair of Coatings. Welds shall be cleaned by chipping or wire brushing. Finish of decking and accessories shall be maintained using touch-up paint whenever necessary to prevent the formation of rust. Touch-up paint for shop-painted units shall be of the same type used for the shop painting, and touch-up paint for zinc-coated units shall be an approved high zinc dust content galvanizing repair paint.

6.3 Openings through Deck. Holes and other openings required shall be drilled or cut, adequately reinforced and framed as necessary for rigidity and sufficient load-carrying capacity.

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SECTION 8A

STEEL DOORS AND FRAMES

Index

1. Applicable Publications
2. Submittals
3. Delivery and Storage
4. General Requirements For Doors and Frames
5. Installation

1. APPLICABLE PUBLICATIONS. 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.

1.1 Door and Hardware Institute (DHI) Publication.

The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames, and Builders Hardware

1.2 National Fire Protection Association (NFPA) Publications.

No. 80-1977	Fire Doors and Windows
No. 80A-1980	Protection of Buildings from Exterior Fire Exposures
No. 101-1981	Code for Safety to Life from Fire in Buildings and Structures

1.3 Steel Door Institute (SDI) Specification.

100-78	Standard Steel Doors and Frames

2. SUBMITTALS.

2.1 Shop Drawings. Shop drawings shall be submitted for approval in accordance with the SPECIAL CLAUSES. Shop drawings shall indicate the location of each door and frame, elevation of each type of door and frame, details of construction, method of assembling sections, location and extent of hardware reinforcement, hardware locations, type and location.

3. DELIVERY AND STORAGE. To provide protection during shipment, welded unit type frames shall be strapped together in pairs with heads at opposite ends or provided with temporary steel spreaders at the bottom of each frame; and knockdown type frames shall be securely strapped in bundles. Materials shall be delivered to the site in undamaged condition, and stored out of contact with the gound and under a weathertight covering, permitting good air circulation. Whenever damage becomes evident, abraded, scarred, or rusty areas shall be cleaned and touched up with the paint used for the shop painting.

4. GENERAL REQUIREMENTS FOR DOORS AND FRAMES. Doors and frames shall be factory fabricated standard duty doors conforming to SDI 100 and the additional requirements specified herein.

4.1 Doors and Frames. Doors and frames shall be prepared to receive hardware conforming to the templates and information provided under section: HARDWARE; BUILDERS' (GENERAL PURPOSE). Rubber silencers shall be installed on door frames. Where frames are installed in masonry walls, plaster guards shall be provided on door frames at hinges and strikes. Doors shall be 18 gage and door frames shall be 16 gage.

4.2 Weatherstripping. Weatherstripping for bottom of doors shall be of the mounted door shoe type consisting of neoprene or vinyl.

5. INSTALLATION. Installation shall conform to DHI publication The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel doors in Wood Frames, and Builders Hardware. Doors shall be installed in conjunction with the application of hardware. Weatherstripping shll be installed at exterior door openings to provide a weathertight installation. Installation and operational characteristics of fire doors shall conform to NFPA Nos. 80, 80A and 101.

* * * * *

SECTION 8B

HARDWARE

Index

1. Applicable Publications
2. Templates
3. Submittals
4. Packaging, Marking, and Labeling
5. Finishes
6. Fastenings
7. Keying
8. Locking Device
9. Door Trim
10. Hinges
11. Miscellaneous
12. Application
13. Hardware Sets

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

1.1 American National Standards Institute (ANSI) Standards.

A156.1-1981	Butts and Hinges
A156.2-1976	Locks and Lock Trim
A156.4-1980	Door Controls - Closers
A156.6-1979	Architectural Door Trim
A156.7-1981	Template Hinge Dimensions

1.2 Builders Hardware Manufacturer's Association (BHMA) Standards.

1301 - 1981	Materials & Finishes

1.3 Door and Hardware Institute (DHI) Publication.

Keying - Procedures, Systems and Nomenclature (Jan 1978)

Recommended Locations for Builders' Hardware for Standard Steel Doors and Frames (1975)

2. TEMPLATES or other information shall be furnished to enable the door and frame manufacturer to provide for the specified hardware. Where two or more articles of hardware are to be mounted on the same door, proper coordination shall be effected between the manufacturers of the different articles. Templates of hinges shall conform to ANSI A156.7.

3. SUBMITTALS.

3.1 Certificates of Compliance. Certificates of compliance attesting that hardware items conform to the ANSI or BHMA standards under which the items are specified shall be submitted in accordance with the SPECIAL CLAUSES. A statement that the proposed locks and latches appear in the BHMA Directory of Certified Locks and Latches may be submitted in lieu of certificates.

3.2 Hardware Schedule. Hardware schedule shall list all of the materials to be furnished and shall be submitted for approval. The schedule shall include for each item; the quantities, manufacturer's catalog numbers, hinge sizes, detail information and location and hardware set identification, corresponding ANSI or BHMA standard type or function number to manufacturer's catalog number, and list of abbreviations and template numbers.

4 PACKAGING, MARKING, AND LABELING. Hardware shall be delivered to the project site in the manufacturer's original packages. Each article of hardware shall be individually packaged in the manufacturer's standard commercial carton or container, properly marked or labeled so as be readily identifiable with the approved hardware schedule. Each change-key shall be tagged or otherwise identified with the door for which its cylinder is intended.

5. FINISHES. Unless otherwise specified, finishes shall conform to those identified under BHMA 1301.

5.1 Hinges. Hinges shall have the following finishes.

Outswinging exterior door hinges: 654.

5.2 Door Trim. Lock and door trim shall have the following finishes.

Other door lock and trim: 626.

6. FASTENINGS of proper type, size, quantity, and finish shall be supplied with each article of hardware. Machine screws and expansion shields shall be used for attaching hardware to concrete, stone, or other masonry. Fastenings exposed to the weather in the finished work shall be of brass, bronze, or stainless steel, as applicable. Sex bolts, through bolts, or machine screws and grommet nuts, where used on reverse-bevel exterior doors equipped with half-surface or full-surface hinges, shall employ one-way screws or other approved tamperproof screws. Screws for the jamb leaf of half-mortise and full-surface hinges attached to structural steel frames shall be the one-way type or other approved tamperproof type.

7. KEYING. Six keys shall be provided.

8. LOCKING DEVICE shall be Government furnished and installed by the Contractor. See attached sketches, sheets 1 through 6.

9. DOOR TRIM shall conform to ANSI A156.6

10. HINGES. Hinges shall conform to ANSI A156.1. Hinges used on metal doors and frames shall also conform to ANSI A156.7. Except for hinge sizes specified in paragraph: HARDWARE SETS, hinge sizes shall conform to the hinge manufacturer's printed recommendations and shall be indicated on the hardware schedule.

10.1 Hinges for Reverse Bevel Doors with Locks. Hinges for reverse bevel doors with locks shall have pins that are made nonremovable by means such as a set screw in the barrel, or safety stud, when the door is in the closed position.

10.2 Contractors Option. Hinges with anti-friction bearings may be furnished in lieu of ball bearing hinges. Fire door hinges shall be in accordance with NFPA No. 80.

11. MISCELLANEOUS.

11.1 Metal Tresholds. Tresholds for exterior metal doors TYPE J 600.

12. APPLICATION. Hardware shall be located on door in accordance with DHI publication, Recommended Locations for Builders' Hardware for Standard Steel Doors and Frames. When approved, slight variations in locations or dimensions will be permitted.

13. HARDWARE SETS shall be as follows.

1 1/2 pr. Butts A-8112 NRP

1 Ea. Threshold J601

3 Ea. Silencers

1 Ea. Chain door stop L02231

* * * * *

GENERAL NOTES:

1. Backing Plate, Locking Bar, Locking Jamb, and Bar Guides shall be fabricated with Carbon Steel conforming to ASTM A29-81. Housing shall be fabricated with Structural Steel Tubing conforming to ASTM A501-81.

2. Holes shall be drilled to standard drill sizes.

3. Square holes shall be drilled and filed or punched. Option: In lieu of square holes in locking jamb, locking bar, and jamb locking bar guides, the contractor may drill and tap as indicated.

4. Cuts shall be milled or sawed.

5. Flame cutting will not be permitted.

6. All locking device items shall be straight, flat, and stress relieved.

7. Locking Bar, Jamb, and Bar Guides shall be hardened as required to meet the cutting test for 7/8-inch diameter bars specified in ASTM A627-68 (1981).

8. Welds shall conform to the Structural Welding Code, Standard D1.1-81 as published by the American Welding Society.

9. Finish. All Locking Device components shall be Cadium Coated after fabrication. Cadmium coating shall conform to ASTM A165-80, Type NS with 0.00050 minimum coating thickness.

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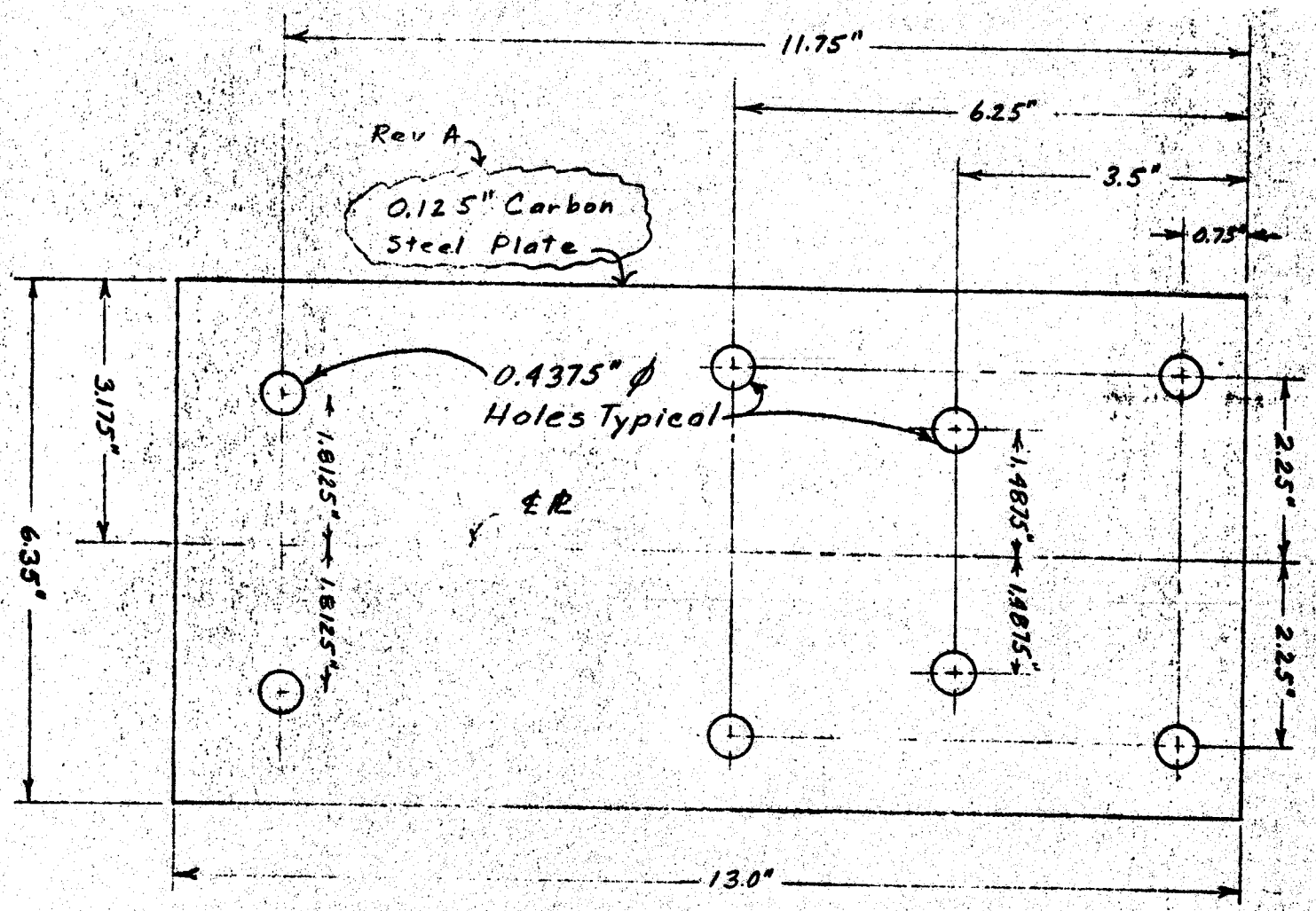
LOCKING DEVICE

Sheet 1 of 6

2/26/89



PLAN

BACKING PLATE
(2 required)

Scale: ½ inch = 1 inch

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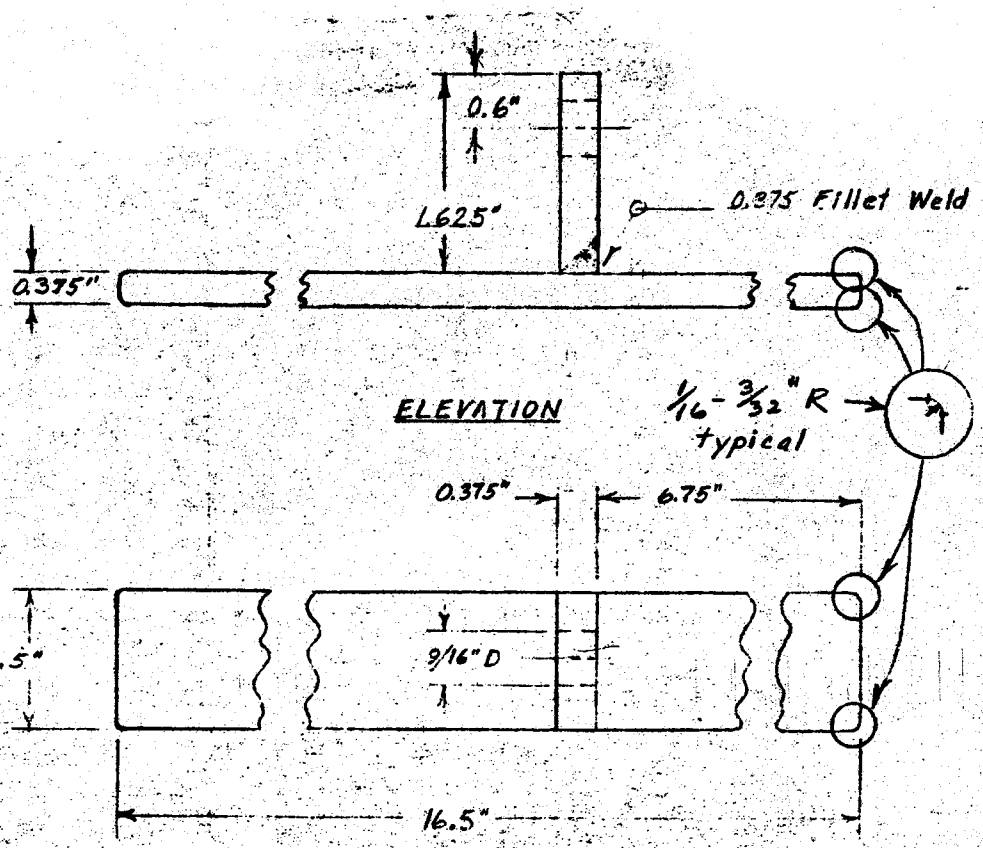
LOCKING DEVICE

Sheet 2 of 6 (Rev A)

21-1/4



PLAN

LOCKING BAR

SCALE: $\frac{1}{2}$ INCH = 1 INCH

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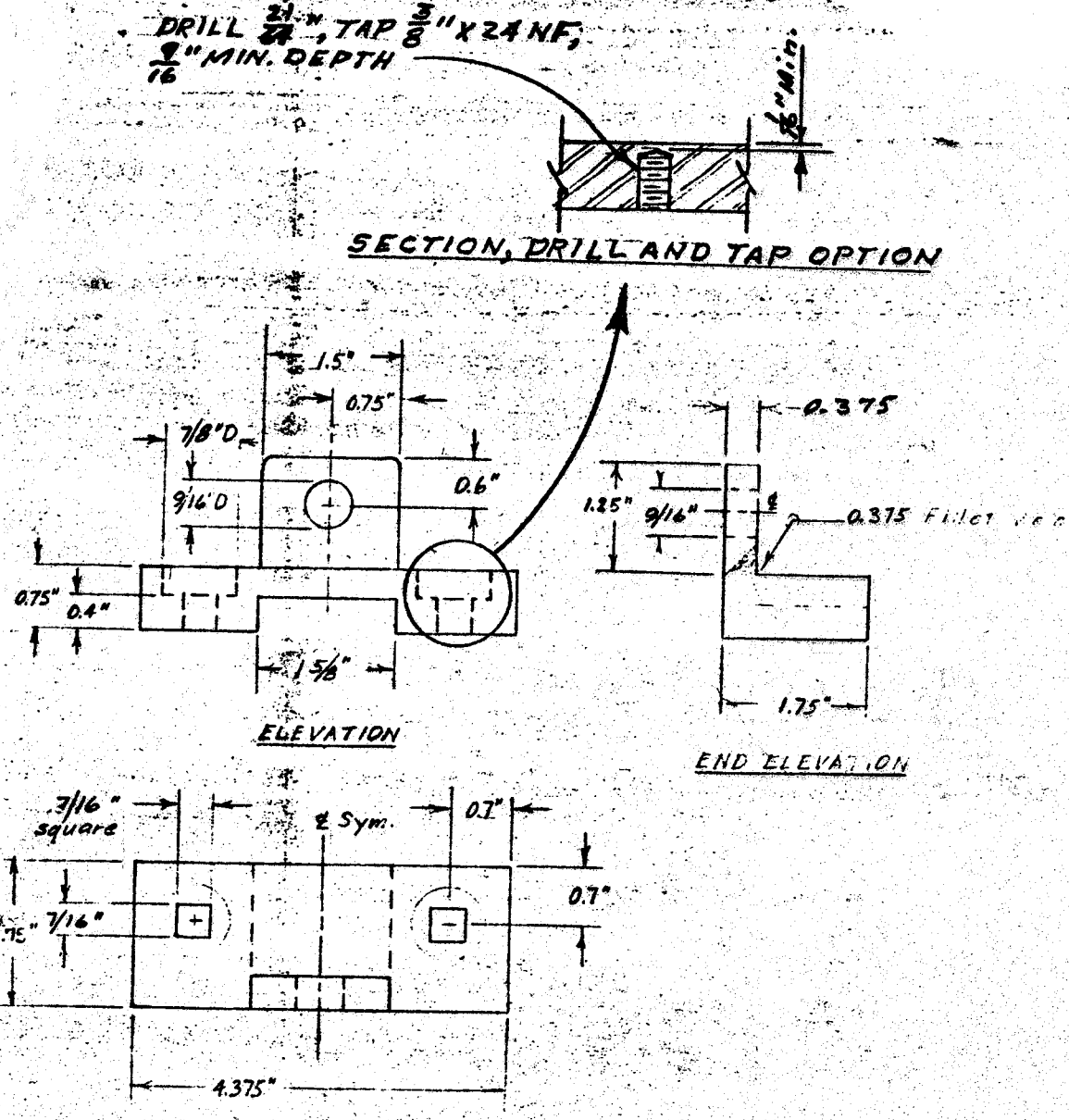
LOS ANGELES, CALIFORNIA

LOCKING DEVICE

SHEET 3 OF 6

2-122.184



SCALE: 1/2 INCH = 1 INCH

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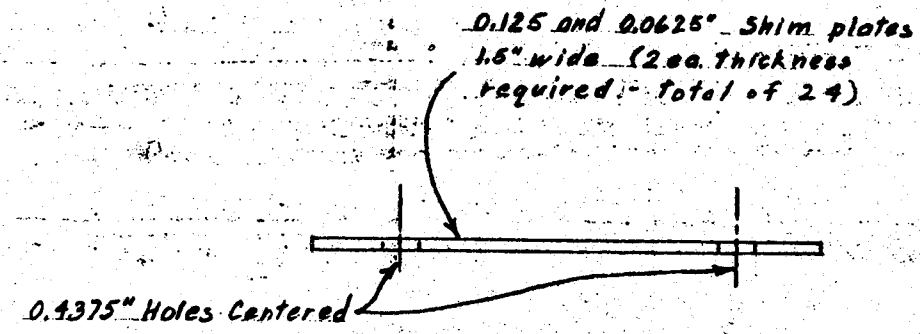
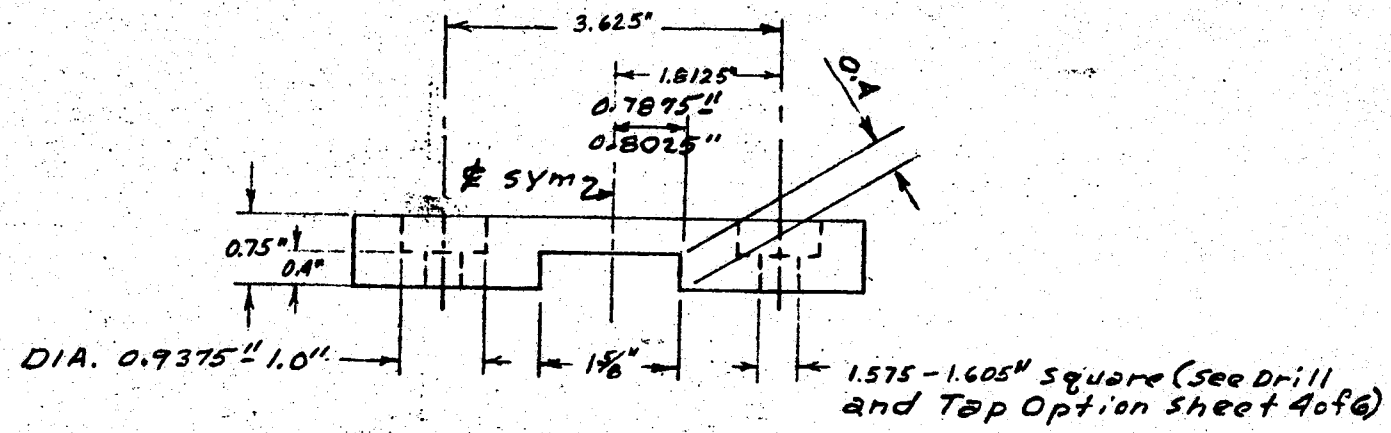
LOCKING DEVICE

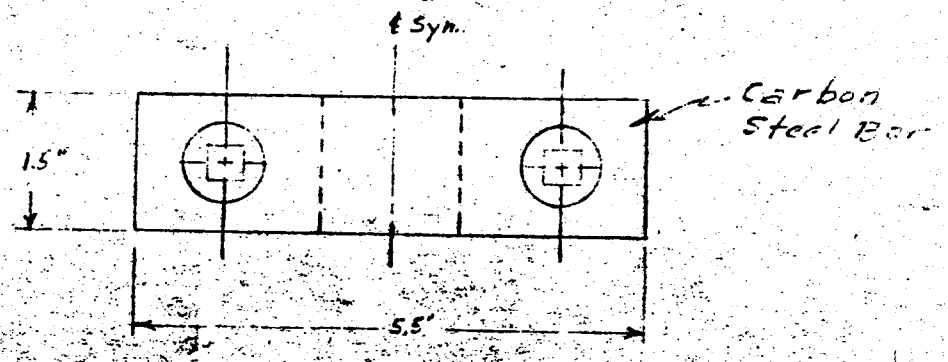
SHEET 4 OF 6 8/7/89



SHIMS



ELEVATION



PLAN

SCALE: $\frac{1}{2}$ INCH = 1 INCH

LOCKING BAR AND JAM LOCKING BAR GUIDES

(2 required)

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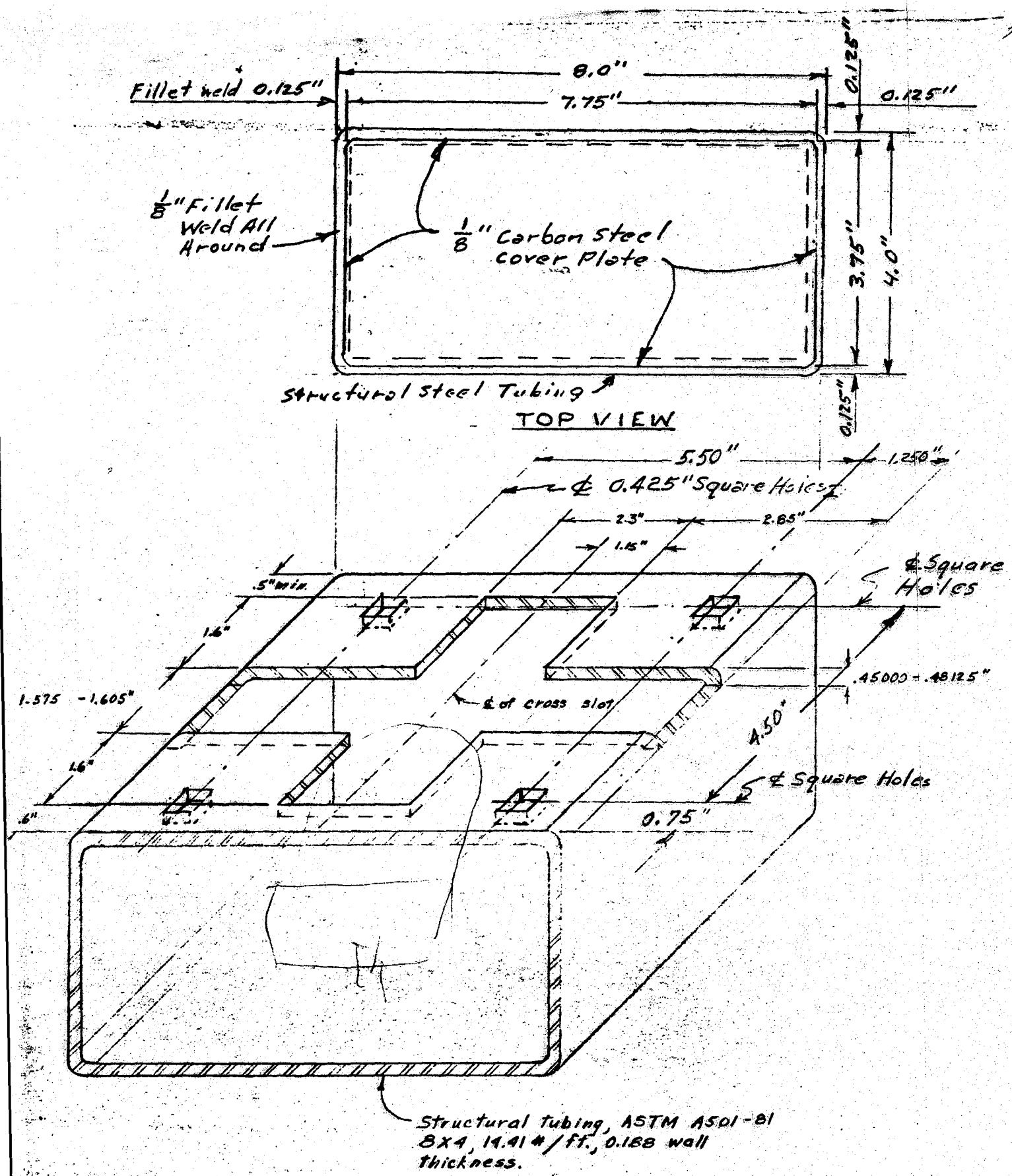
LOCKING DEVICE

SHEET 5 OF 6



HOUSING DETAIL

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SCALE: 1/2 INCH = 1 INCH

LOCKING DEVICE

SHEET 6 OF 6

SECTION 9A

PAVEMENT MARKINGS

Index

1. Applicable Publication
2. Sampling and Testing
3. Traffic Controls
4. Materials
5. Equipment
6. Surface Preparation
7. Application

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

1.1 Federal Specifications (Fed. Spec.).

TT-B-1325B	Beads (Glass Spheres); Retro-Reflective
TT-P-85E	Paint, Traffic and Airfield Marking, Solvent Base
TT-P-115E	Paint, Traffic, Highway, White, and Yellow
TT-P-1952B	Paint, Traffic and Airfield Marking, Water Emulsion Base

1.2 State of California, Department of Transportation (Caltrans), Standard Specification, July 1984.

2. SAMPLING AND TESTING. Materials proposed for use shall be stored on the project site in sealed and labeled containers, or segregated at source of supply, sufficiently in advance of needs to allow 60 days for testing. Upon notification by the Contractor that the material is at the site or source of supply, a one quart sample of each type and color of paint and a one pound sample of reflective media shall be taken by random selection from sealed containers by the Contractor in the presence of a representative of the Contracting Officer. Contents of the sampled containers shall be so thoroughly mixed as to render the sample truly representative. Samples shall be clearly identified by designated name, specification number, batch number, manufacturer's formulation number, project contract number, intended use, and quantity involved. At the discretion of the Contracting Officer, samples may be tested by the Government before approval, or material may be approved for use based on either of the following data furnished by the Contractor:

a. A test report or certification showing that the proposed paint meets all specified requirements.

b. A test report showing that a previous batch manufactured using the same formulation as that used in manufacturing the proposed batch met all specified requirements, and a report showing test results on the proposed batch for the following properties required in the material specification: weight per gallon, viscosity, fineness of grind, and drying time. If materials are approved based on reports furnished by the Contractor, samples will be retained by the Government for possible future testing should the material appear defective during or after

application. When tested by the Government and samples fail to meet specification requirements, the materials represented by the samples shall be replaced and the cost of testing will be deducted from the payments due the Contractor at the rate of $100 per sample retested.

3. TRAFFIC CONTROLS. Suitable warning signs shall be placed near the beginning of the worksite and well ahead of the worksite for alerting approaching traffic from both directions. Small markers shall be placed along newly painted lines to control traffic and prevent damage to newly painted surfaces. Painting equipment shall be marked with large warning signs indicating slow-moving painting equipment in operation.

4. MATERIALS. Paint shall be delivered and stored in sealed containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, manufacturer's name, formulation number and directions, all of which shall be plainly legible at time of use. The paint shall be homogeneous, easily stirred to smooth consistency, and shall show no hard settlement or other objectionable characteristics during a storage period of six months. Paint for roads shall conform to Fed. Spec. TT-P-115 or TT-P-85, color as selected by the Contracting Officer.

5. EQUIPMENT. All machines, tools and equipment used in the performance of the work shall be approved and maintained in satisfactory operating condition.

5.1 Paint Applicator. The equipment for applying paint to pavements shall be self-propelled or mobile-drawn pneumatic spraying machine with suitable arrangements of atomizing nozzles and controls to obtain the specified results. The machine shall have a speed during application not less than 5 mph, and shall be capable of applying the stripe widths indicated, at the paint coverage rate specified in paragraph: APPLICATION, and of even uniform thickness with clear-cut edges. Equipment used for marking roads shall be capable of placing the lines at a single pass as solid lines. The paint applicator shall have paint reservoirs or tanks of sufficient capacity and suitable gages to apply paint in accordance with requirements specified. Tanks shall be equipped with suitable air-driven mechanical agitators. The spray mechanism shall be equipped with quick-action valves conveniently located, and include necessary pressure regulators and gages in full view and reach of the operator. Paint strainers shall be installed in paint supply lines to insure freedom from residue and foreign matter that may cause malfunction of the spray guns. Pneumatic spray guns shall be provided for hand application of paint in areas where the mobile paint applicator cannot be used.

5.2 Sandblasting Equipment. Sandblasting equipment shall include an air compressor, hoses, and nozzles of proper size and capacity as required for cleaning surfaces to be painted. The compressor shall be capable of furnishing not less than 150 cfm of air at a pressure of not less than 90 psi at the nozzle for each nozzle used.

6. SURFACE PREPARATION. New pavement surfaces shall be allowed to cure for a period of not less than 10 days before application of marking materials. All surfaces to be marked shall be thoroughly cleaned before application of the paint. Dust, dirt, and other granular surface deposits shall be removed by sweeping, blowing with compressed air, rinsing with water or a combination of these methods as required. Rubber deposits, surface laitance, existing paint markings, and other coatings adhering to the pavement shall be completely removed with scrapers, wire brushes, sandblasting, approved chemicals, or mechanical

abrasion as directed. Where oil or grease are present on old pavements to be marked, affected areas shall be scrubbed with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinsed thoroughly after each application. After cleaning, oil-soaked areas shall be sealed with cut shellac to prevent bleeding through the new paint.

7. APPLICATION.

7.1 Rate of Application. Paint shall be applied evenly to the pavement area to be coated at a rate of 105 plus or minus 5 square feet per gallon.

7.2 Paint. Paint shall be applied to clean, dry surfaces, and unless otherwise approved, only when air and pavement temperatures are above 40 degrees F. and less than 95 degrees F. Paint temperature shall be maintained within these same limits. Paint shall be applied pneumatically with approved equipment at rate of coverage specified herein. The Contractor shall provide guide lines and templates as necessary to control paint application. Special precautions shall be taken in marking numbers, letters, and symbols. Edges of markings shall be sharply outlined. The maximum drying time requirements of the paint specifications will be strictly enforced, to prevent undue softening of bitumen, and pickup, displacement, or discoloration by tires of traffic. If there is a deficiency in drying of the markings, painting operations shall be discontinued until cause of the slow drying is determined and corrected.

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